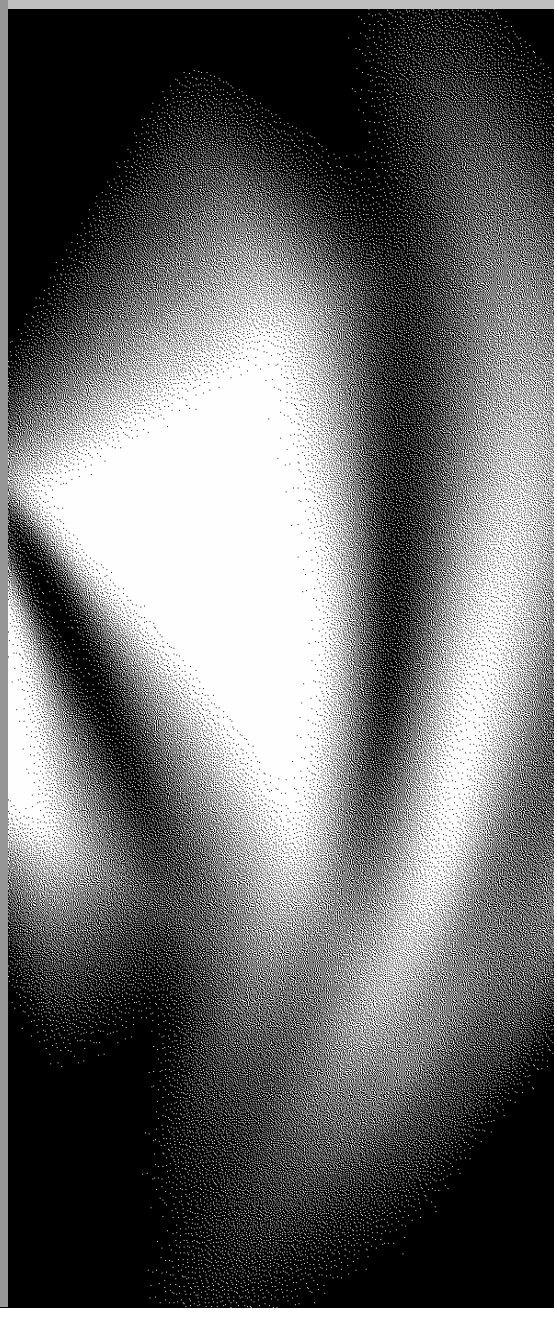
Australian Government
Productivity Commission

Economic Impacts of Migration and Population Growth

Productivity Commission Research Report

24 April 2006



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The Productivity Commission

The Productivity Commission, an independent agency, is the Australian Government's principal review and advisory body on microeconomic policy and regulation. It conducts public inquiries and research into a broad range of economic and social issues affecting the welfare of Australians.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by consideration for the wellbeing of the community as a whole.

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Foreword

Migration has played a critical role in shaping Australia's society and economy. As a policy issue, migration is seen as significant in the context of an ageing population, future labour supply and the prospects for economic growth as well as for its social and environmental impacts.

In this study, the Commission has been asked by the Australian Government to focus specifically on the economic impacts of migration. In particular, the Commission was asked to examine the ways in which the population growth and human capital aspects of migration might affect Australia's productivity and future living standards.

In conducting its research, the Commission has drawn on information from submissions, consultations with government and other relevant organisations and research groups, as well as a wide array of studies on the economic impacts of migration. The Commission is grateful to the many people who have taken the time to contribute to this study, including those who provided feedback on the position paper.

The study was overseen by Commissioner Judith Sloan, and was conducted by a research team led by John Salerian in the Melbourne office.

Gary Banks
Chairman
April 2006

Acknowledgements

The Commission would like to thank all those who assisted with this study. In particular, the Commission thanks James Giesecke and Tony Meagher of the Centre of Policy Studies at Monash University, who undertook general equilibrium modelling analysis used in this study. The Commission also thanks the independent reference panel — Paul Miller (University of Western Australia), Peter Robertson (UNSW) and Rod Tyers (ANU) — who reviewed and reported on the modelling. The Commission is also grateful for modelling work submitted by Chris Murphy of Econtech, which contributed to the thinking and analysis presented in this report. Finally the Commission is grateful to John Ryan of the Department of Immigration and Multicultural Affairs for providing detailed data on migration.

Terms of reference

THE IMPACT OF MIGRATION AND POPULATION GROWTH ON PRODUCTIVITY GROWTH IN THE AUSTRALIAN ECONOMY

PRODUCTIVITY COMMISSION ACT 1998

The Productivity Commission is requested to undertake a research study examining the impact of population growth, including migration, on Australia's productivity growth. Productivity growth is a major driver of improvements in real per capita living standards, so there is value in identifying the ways in which population growth and the human capital aspects of migration can affect productivity.

In undertaking the study the Commission is to:

1. report on the nature of international migration flows over the last decade and the extent to which Australia has participated in them, in particular, flows of skilled migrants
2. examine the impacts on skill levels in the Australian population generally, as well as within different industries and occupations, of skilled and unskilled migration
3. assess the relationship between migration, its different permanent and temporary categories, population growth, population and workforce diversity and productivity in Australia, its States and Territories and regions (where possible) and assess likely future developments, quantifying impacts where possible and drawing on the experience of other OECD countries
4. identify the mechanisms through which the impacts of migration and population growth on productivity are transmitted
5. report on any legislative or other impediments which prevent Australia realising the potential productivity gains from migration and from effective use of Australia's population and workforce diversity, and
6. consider the impact of migration and population growth on labour force participation and economic growth more broadly.

The Commission is required to provide a report within nine months of receipt of this reference. The report is to be published.

PETER COSTELLO
Received: 25 July 2005

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Abbreviations

AEI-NOOSR	National Office of Overseas Skills Recognition
ANZSIC	Australian and New Zealand Standard Industrial Classification
ASCED	Australian Standard Classification of Education
ASCO	Australian Standard Classification of Occupations
BCA	Business Council of Australia
CoPS	Centre of Policy Studies
DEWR	Department of Employment and Workplace Relations
DIMA	Department of Immigration and Multicultural Affairs (formerly DIMIA)
DIMIA	Department of Immigration, Multicultural and Indigenous Affairs
ENS	Employee Nomination Scheme
GDP	Gross Domestic Product
GNP	Gross National Product
GSM	General Skilled Migration
GSP	Gross State Product
IASS	Invest Australia Supported Skills program
JSCM	Joint Standing Committee on Migration
LOTE	Language other than English
LSIA	Longitudinal Survey of Immigrants to Australia
LSP	Labour Supply Projection
LTM	Long-Term Migration
LTV	Long-Term Visitors
MES	Main English Speaking
MFP	Multifactor Productivity
MODL	Migration Occupations in Demand List

NAT	New Arrivals Tracker
NFI	Net Foreign Income
NFL	Net Foreign Liabilities
OECD	Organisation for Economic Cooperation and Development
ORE	Occupations Requiring English
PC	Productivity Commission
RSMS	Regional Sponsored Migration Scheme
SAS	Skilled Australian Sponsored
SD	Statistical Division
SIOS	Skilled Independent Overseas Students
SIR	Skilled Independent Regional
SSRM	State-Specific Regional Migration
STNI	State, Territory Nominated Independent
TRA	Trade Recognition Australia

Glossary

Category jumping	A change in travel intentions of immigrants from short-term to permanent or long-term and vice versa.
Diaspora	In this report, used to refer to the population of Australians living overseas.
Emigration	The out-movement of people on a permanent or long-term basis.
Humanitarian Program	Government immigration program to provide protection to refugees and others in need of humanitarian assistance.
Immigration target	Annual intake ceiling on particular categories of immigration.
Long-term movement	People arriving and residents departing temporarily with an intention to stay in Australia or abroad for 12 months or more, and the departure of people and the return of residents who had stayed in Australia or abroad for 12 months or more. (Classification of people to this category is based on their self-identification on passenger arrival and departure cards.)
Migration Program	Australian Government's principal regime for regulating permanent migration to Australia each year. It comprises a Skill Stream, Family Stream and Special Eligibility Component.
Net overseas migration	Calculated as the excess of permanent and long-term arrivals over permanent and long-term departures. (See 'permanent movement' and 'long-term movement' definitions.) In the official ABS statistics, an adjustment (termed 'category jumping') is made to take account of changes in travel intentions from short-term to permanent or long-term and vice versa.
Permanent immigration	Immigration to Australia under the Australian Government's Migration and Humanitarian Programs and potentially also by way of the Trans-Tasman Travel Arrangement.

Permanent movement	Persons migrating to Australia and residents departing permanently. (Classification of people to this category is based on their self-identification on passenger arrival and departure cards.)
Permanent residency	The residency classification of an immigrant who is eligible to stay in Australia indefinitely (under the Government's Migration or Humanitarian Programs or by way of the Trans-Tasman Travel Arrangement).
Short-term movement	People arriving and residents departing temporarily with an intention to stay in Australia or abroad for less than 12 months, and the departure of people and the return of residents who had stayed in Australia or abroad for less than 12 months. (Classification of people to this category is based on their self-identification on passenger arrival and departure cards.)
Temporary entry	See 'temporary immigration'.
Temporary Entry Program	The Government's immigration program allowing people to come to Australia on a temporary basis for specific purposes which result in some benefit to Australia. All immigration to Australia is under this program except for those arriving under the Migration and Humanitarian Programs and the Trans-Tasman Travel Arrangement. The duration of stay allowed in Australia varies.
Temporary immigration	Immigration to Australia under the 'Temporary Entry Program'.
Trans-Tasman Travel Arrangement	A collection of Ministerial understandings which allow Australians and New Zealanders to visit, live and work in the other country.
Visitors	People who enter Australia under the 'Temporary Entry Program' on a visitor visa. This is mostly tourists and some short-term business entrants (generally allowed to be in Australia for a three month period).

OVERVIEW

Key points

- Migration has been an important influence on Australian society and the economy
  - affecting the size, composition and geographic location of the population and workforce.
- Recent changes to Australia's migration program include a greater emphasis on skills, increased numbers of temporary immigrants, and more diversification in the country of origin.
- The number of Australians leaving this country, permanently and long term, has risen markedly in recent years.
  - But the number has been considerably smaller than those coming to Australia.
- Economic effects of migration arise from demographic and labour market differences between migrants and the Australian-born population, and from migration-induced changes to population growth.
- However, the Commission considers it unlikely that migration will have a substantial impact on income per capita and productivity because:
  - the annual flow of migrants is small relative to the stock of workers and population
  - migrants are not very different in relevant respects from the Australian-born population and, over time, the differences become smaller.
- Some effects of migration are more amenable to measurement and estimation than others. Effects that cannot be reliably measured or estimated might still be significant.
  - Positive effects from additional skilled migrants arise from higher participation rates, slightly higher hours worked per worker and the up-skilling of the workforce.
  - Some of the economy-wide consequences lower per capita income, such as capital dilution and a decline in the terms of trade.
  - The overall economic effect of migration appears to be positive but small, consistent with previous Australian and overseas studies.
- In terms of the selection criteria of the Migration Program:
  - the greater emphasis on skills has been associated with better labour market outcomes for immigrants
  - English language proficiency stands out as a key factor determining the ease of settlement and labour market success of immigrants.

Overview

Migration has been an important influence on Australian society and the economy. Australia has about 7 million more people (including descendents) as a result of migration since the Second World War. In 2001, about 4.5 million people (23 per cent of the population) and 2.4 million workers (25 per cent of the workforce) were born overseas.

The Australian Government has asked the Commission to examine the impacts of migration and population growth on Australia's productivity and economic growth. The Commission has been requested to report on:

- the nature of international migration flows
- the impact of migration, particularly skilled migration, on the labour force, occupations, industries and regions
- the effects of migration and population growth on productivity and economic growth
- legislative and other impediments preventing Australia from realising productivity gains from migration and population growth.

The Commission has considered population growth in the context of growth arising from migration rather than as a topic of study in itself. Nonetheless, many of the issues arising from population growth generally also arise in the context of migration.

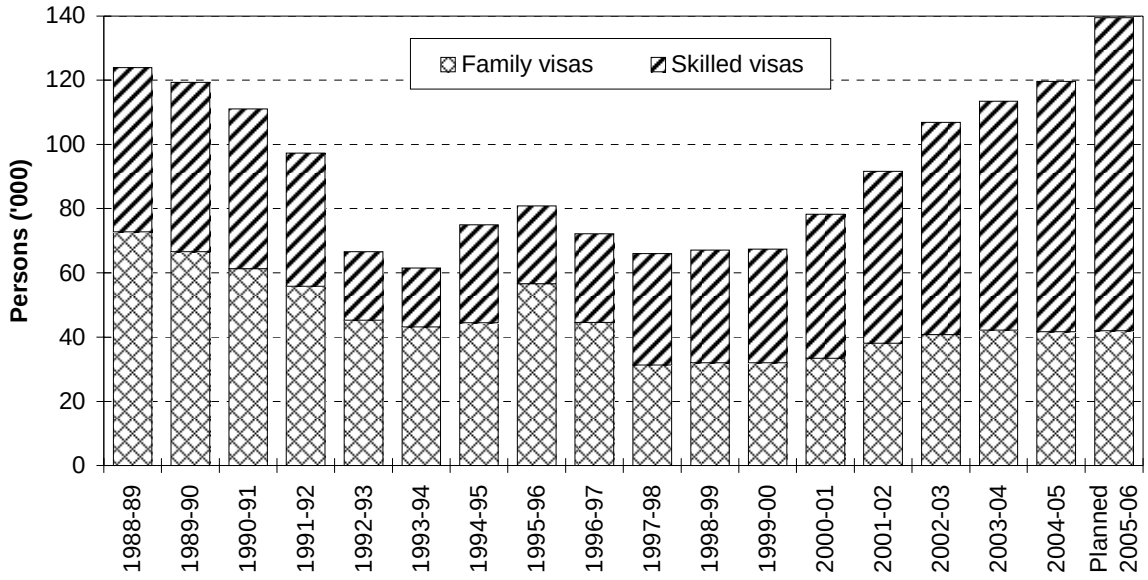
Changing nature of migration

Over the last decade, Australia has increasingly focussed on skills in its (permanent) Migration Program. The proportion of skilled immigrants in the Migration Program has increased from about 29 per cent in 1995-96 to about 70 per cent in the planned level for 2005-06 (figure 1). An increasing proportion of skilled permanent immigrants is being selected through onshore applications by overseas students and persons on temporary business visas.

There is also an increasing number of skilled workers in Australia on temporary business visas. Between 1996-97 and 2004-05, the number of persons entering

Australia annually on temporary business visas increased from about 314 000 to about 390 000.

Figure 1 **Composition of the permanent Migration Program**



Diversification of country of origin

The countries of origin of immigrants to Australia have become more diverse over time. During the 1950s and 1960s, large proportions of immigrants were from the United Kingdom, Ireland and Europe. In 2004, the United Kingdom still provided the largest number of immigrants to Australia. However, many Asian countries are now significant sources of immigrants, including China, India, Malaysia, Hong Kong, Indonesia, Japan and South Korea (figure 2).

Emigration from Australia

It appears that Australian residents are also becoming increasingly internationally mobile. Permanent and long-term departures have been increasing over the past two decades (figure 3). Emigrants tend to be highly educated and of prime working age. Most Australian-born permanent emigrants depart for the United Kingdom, New Zealand and the United States. Overseas-born permanent emigrants depart for New Zealand, the United Kingdom, Hong Kong, China, the United States and Singapore. A significant proportion of persons leaving Australia are former immigrants.

Figure 2 **Countries of origin of permanent and long-term immigrants**
Top 10 countries, 2004

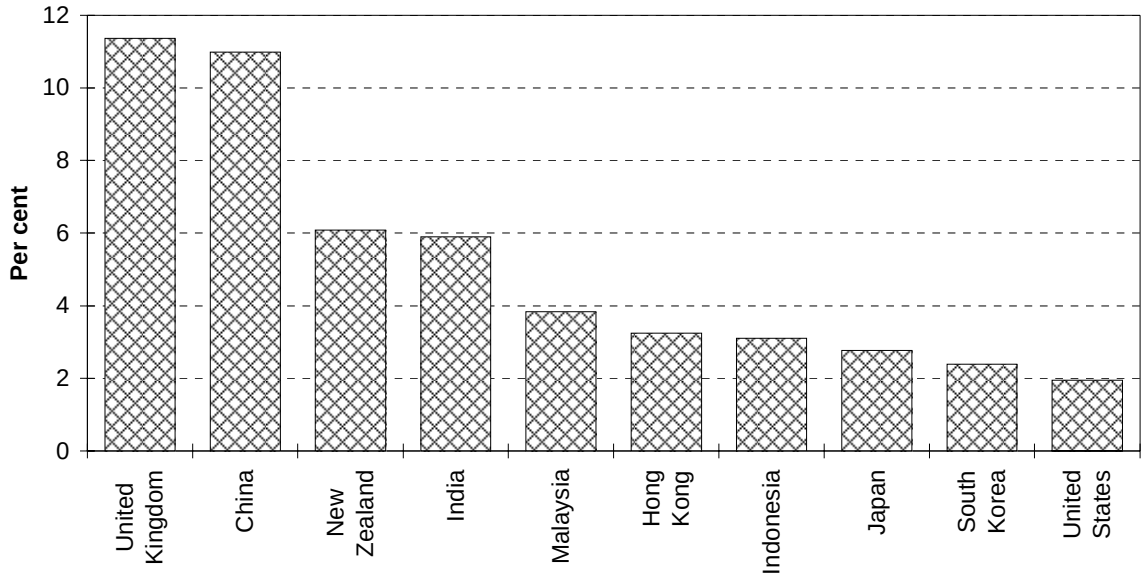
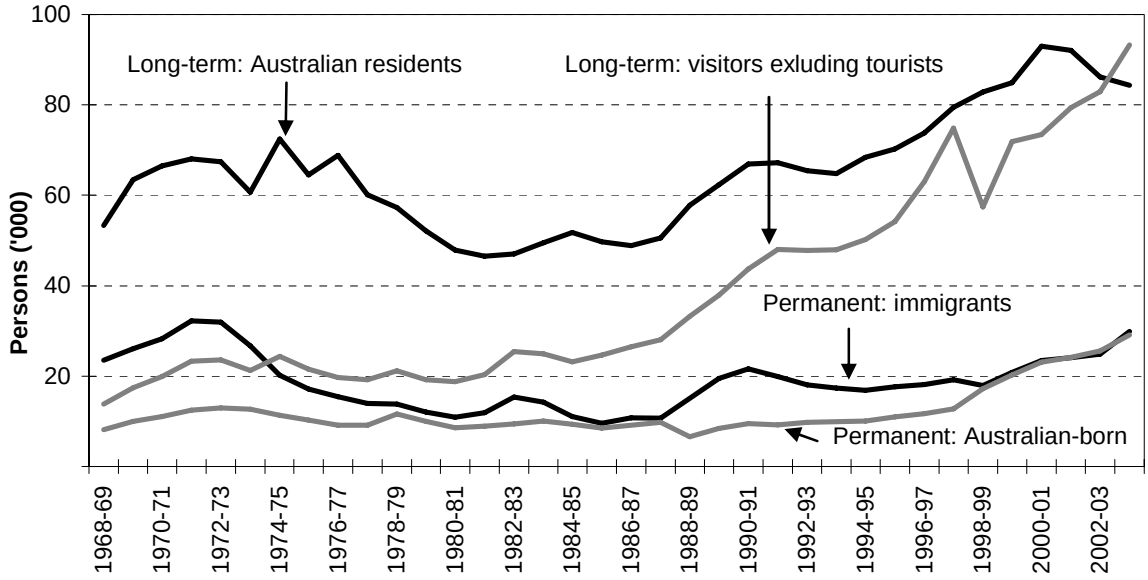


Figure 3 **Permanent and long-term departures**

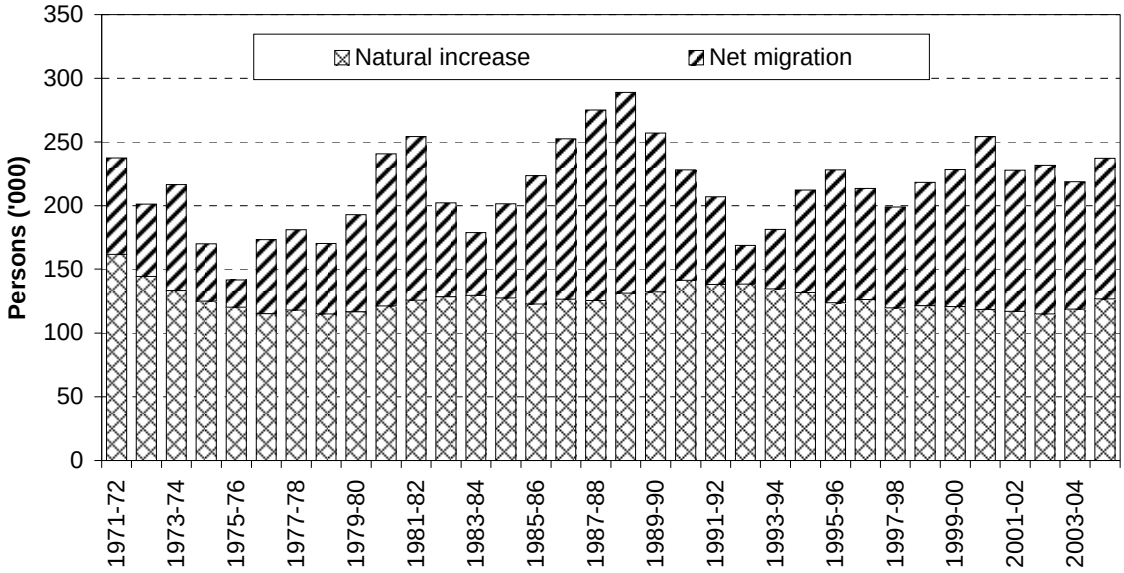


Migration, population size and ageing

Net migration has contributed to a greater population size (figure 4) and is currently contributing about half of Australia's annual rate of population growth of about

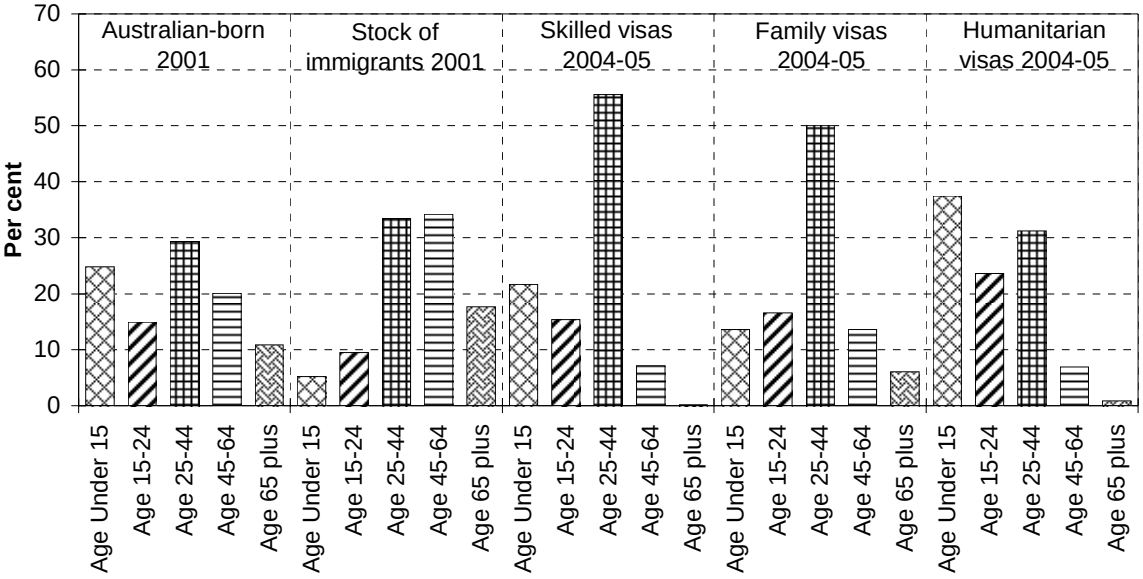
1.2 per cent. Over time, the rate of net migration has varied, with lower intakes in times of recession or slower economic growth.

Figure 4 **Migration's contribution to Australia's population growth**



The proportion of persons of prime working-age in the Migration Program (Skilled and Family visas) is high compared with the Australian-born population (figure 5).

Figure 5 **Age distribution of immigrants and Australian-born**



In 2004-05, the proportion of immigrants in the 15–44 age groups for the Skilled, Family and Humanitarian visa groups was 66, 64 and 52 per cent, respectively. This

compares with about 44 per cent for the Australian-born population and 43 per cent of the stock of all immigrants in Australia in 2001. However, over time, the cumulative effect of immigration on the age distribution decreases because immigrants themselves age.

What are the links to per capita income and productivity?

As part of this study, the Commission has been asked to identify ways in which migration and population growth impacts on productivity.

Although migration increases the absolute size of the economy, for the purpose of this study, economic growth is expressed in per capita terms (per head of population). In terms of the living standards of individuals (and families), it is income (and consumption) per capita that is most relevant. The limitations of using indicators such as Gross National Product (GNP) per capita and Gross Domestic Product (GDP) per capita as measures of welfare have long been recognised. Nevertheless, they do allow us to reveal much about the economic consequences of migration and population growth. The aspects not captured by such measures are considered in qualitative ways in this report.

The various ways through which migration and population growth might be linked to productivity and income per capita growth include:

- supply of labour, composition of labour supply, and labour market adjustment
- capital, investment, trade balance and terms of trade
- sectoral reallocation of economic activity
- government expenditure on services, transfer payments and taxation
- size economies and competition
- natural resources, land and environmental externalities
- international trade and technology transfer.

Some of these factors contribute positively, others negatively. The overall outcome depends on the sum of the contributions and is essentially an empirical matter.

A range of techniques has been employed to quantify the contributions of different factors, including statistical analyses, demographic modelling and general equilibrium modelling. However, quantifying the contributions of some of the factors was not practicable. In these cases, the Commission has presented a qualitative discussion of the ways in which these links might affect productivity and per capita income.

The impact of increasing skilled migration

To shed light on the impact of skilled migration, the Commission has simulated the impacts on the economy of a 50 per cent increase in the level of skilled migration. The effect of this increase is estimated as the difference in the economic outcomes between the base-case and increased-migration simulations. Both simulations have a number of features in common, including the migration and population projections used in the Commission's report on the economic implications of an ageing Australia.

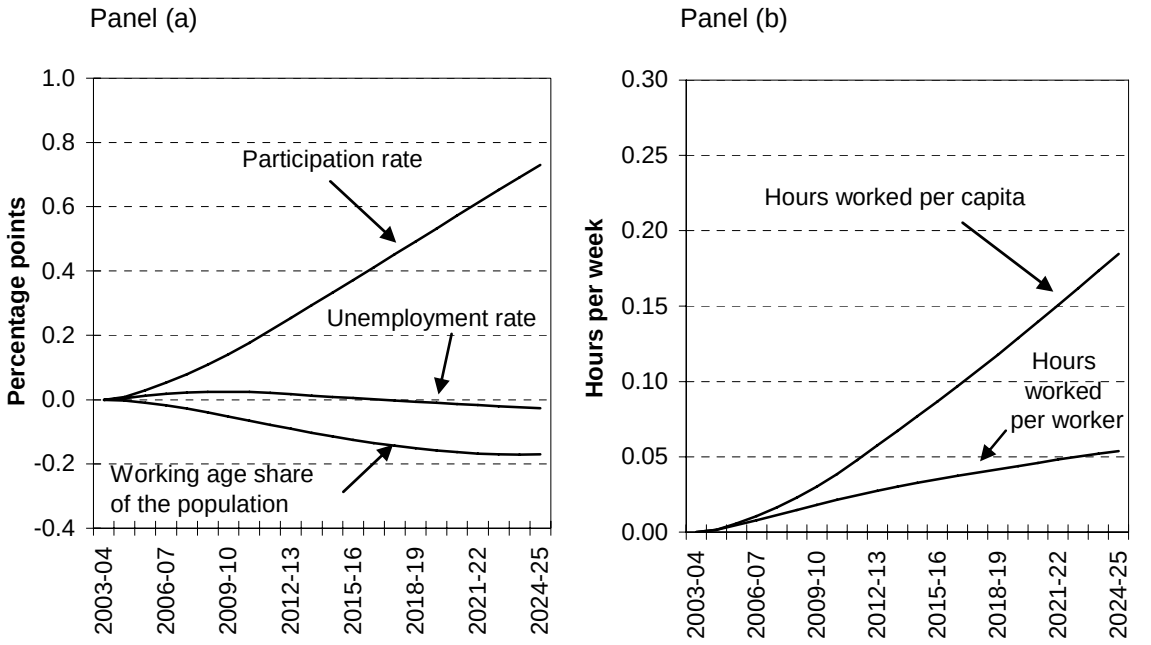
Projected effect of migration on labour supply

To estimate the effect of migration on labour supply (hours worked per capita) in the Australian economy, the Commission has developed a demographic–labour market model called the New Arrival Tracker (NAT). Using NAT, projections are made of the effect of a simulated increase in the annual level of skilled migration from 2004-05 by 50 per cent (about 39 000 persons).

The simulated increase in the level of migration is projected to have a small effect on the average annual rate of growth of the population (up by about 0.16 per cent). By 2024-25, the population is about 3.3 per cent larger than it would otherwise have been. The working age share of the population is projected to decrease over time, with the cumulative effect of migration over 21 years decreasing the share by about 0.17 percentage points (figure 6a). The participation rate increases over time, with the cumulative effect of migration and the evolving demographics of the new arrivals. By 2024-25, the participation rate is projected to be about 0.73 percentage points higher than it would otherwise have been (figure 6a).

The unemployment rate initially increases slightly, reflecting the fact that migrants tend to have higher unemployment rates when they first arrive. The unemployment rate then decreases with length of residency. Over time, the cumulative effect of decreasing unemployment rates of new arrivals early in the period starts to outweigh the higher unemployment rates of new arrivals late in the period, and overall the unemployment rate decreases. By 2024-25, the skilled migrants are contributing to a very small decrease in the unemployment rate of about 0.03 percentage points (figure 6a). There is also a small increase in the hours worked per worker (0.05 hours per week) as skilled workers tend to work longer hours (less part-time work) than less skilled workers (figure 6b).

Figure 6 **Projected deviation in labour supply from a simulated 50 per cent increase in the level of skilled migration**



The overall cumulative effect on labour supply is to increase the average hours worked per week per capita by about 0.18 hours (about 11 minutes per week) by 2024-25 (figure 6b).

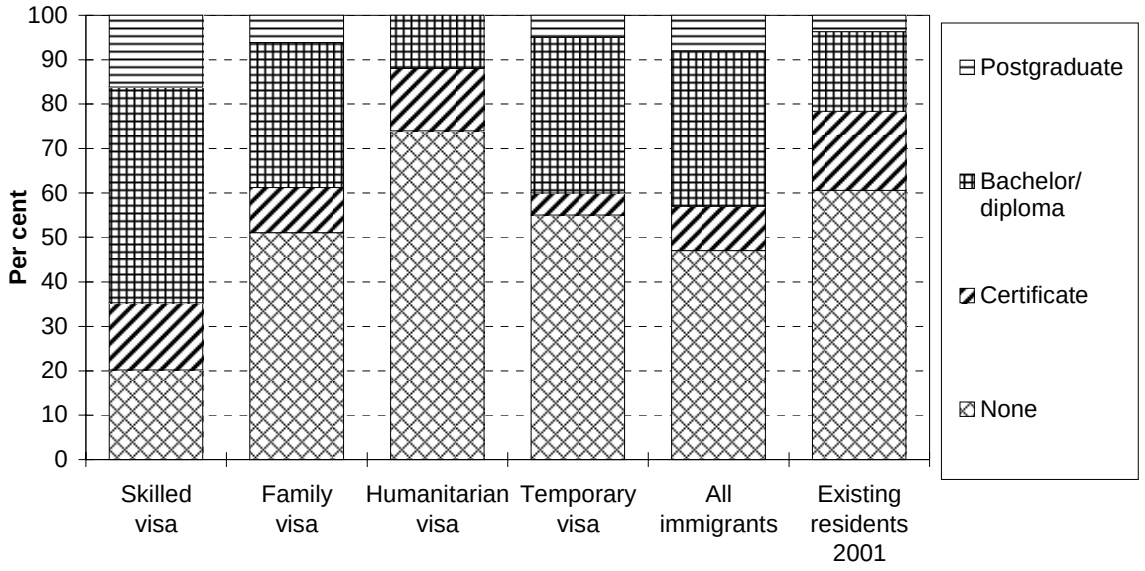
Skill composition of the workforce

The skill effect refers to the change in the average skill level of workers by changing the proportion of workers in each skill category, such as by educational attainment and occupation. Highly skilled workers are generally more productive (and thus likely to earn higher wages) than less skilled workers. Consequently, increasing the proportion of skilled workers in the workforce contributes to an increase in labour value added per capita and income per capita.

The average education level of immigrants is higher in the Skilled visa groups compared with other visa groups and the Australian population as a whole (figure 7). About 80 per cent of immigrants in the Skilled visa group have post-school qualifications compared with about 50 per cent for Family visa groups and about 27 per cent for Humanitarian visa groups. The increasing proportion of Skilled visa migrants is raising the average skill level of immigrants and the workforce.

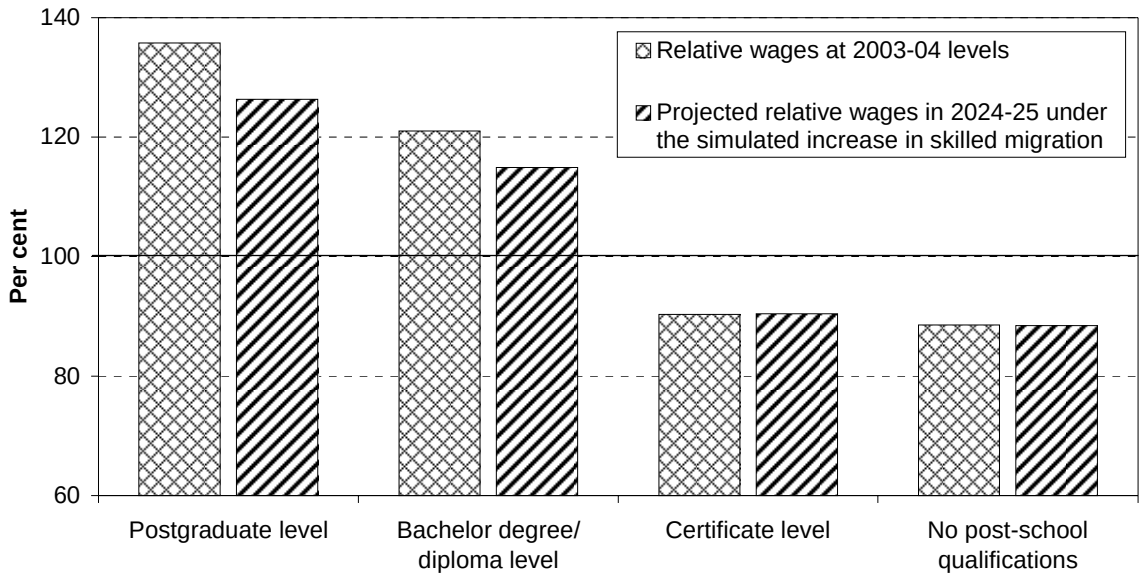
Figure 7 **Post-school education of immigrants**

Proportion of immigrants in each visa group between 2000 and 2004



The wages and salaries of skilled persons are higher than less skilled persons, as indicated in figure 8.

Figure 8 **Indexes of relative wages by skill category**



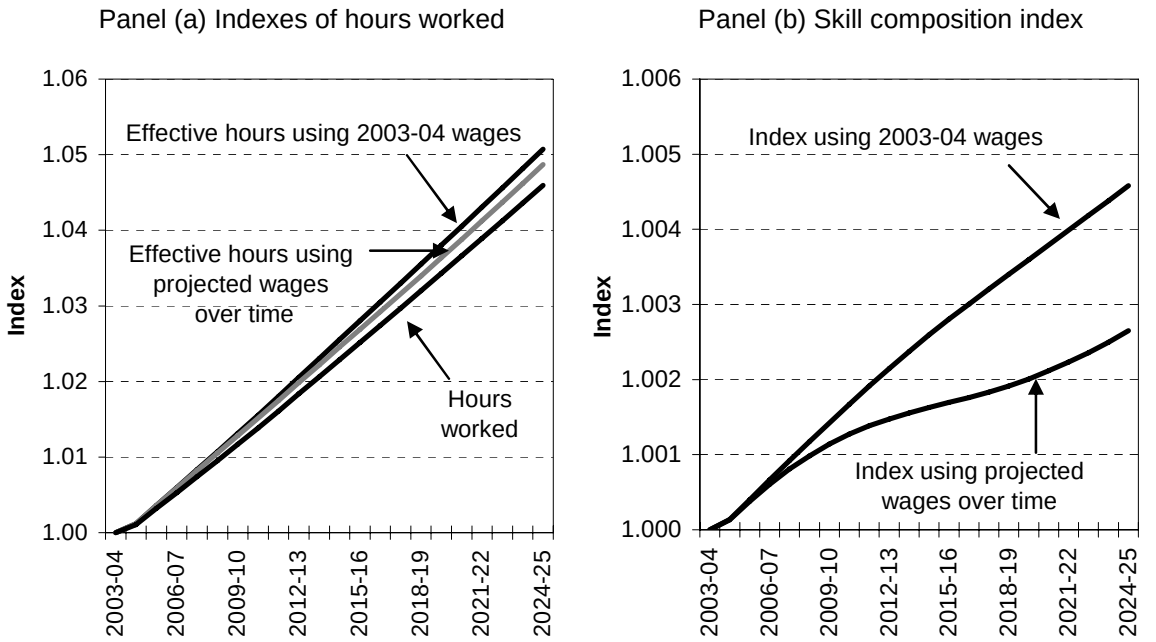
Skilled migration contributes to an increase in income per capita through the effect on the skill composition of the workforce. The contribution of skill composition to income per capita is measured by a labour composition index (figure 9b), which is defined as the ratio of the indexes of effective hours worked (hours aggregated

using wages as weights) to hours worked (simple summation of all hours worked) (figure 9a).

If the relative wages of skill categories are fixed at 2003-04 levels, then the increase in skilled migration would contribute to an increase in income per capita of about 0.46 per cent by 2024-25 (figure 9b).

However, when the relative wages are allowed to adjust in response to the different increases in labour supply by skill category, then the skill composition effect is reduced and would contribute to an increase in income per capita of 0.27 per cent by 2024-25.

Figure 9 **Contribution of skill composition to living standards**



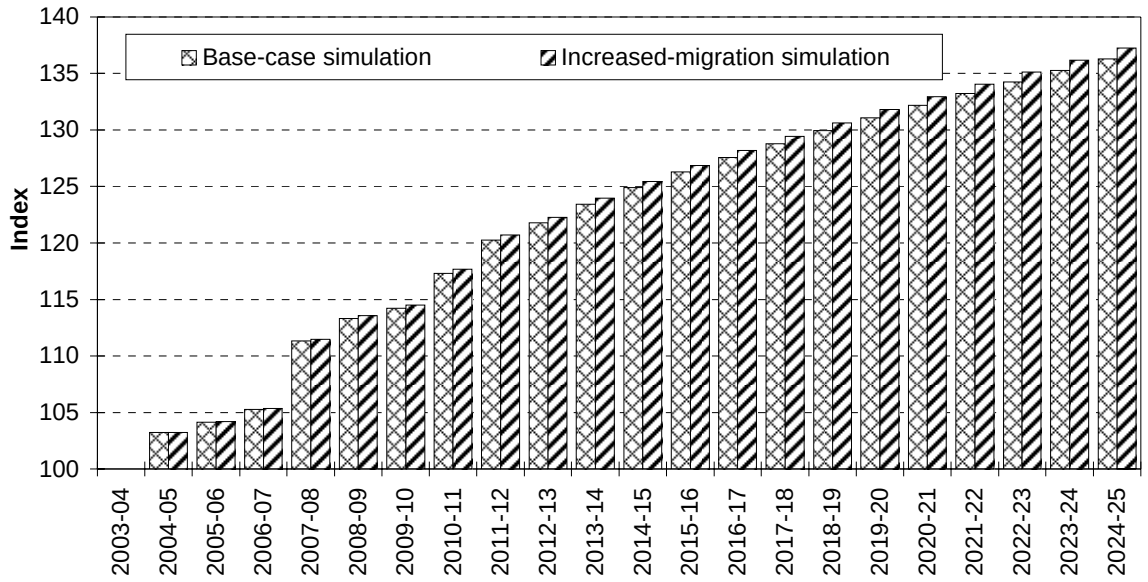
Projected overall effect of skilled migration on income per capita

To help assess the overall impact, the Commission contracted the Centre of Policy Studies (CoPS) to undertake a simulation of the economy-wide effects of the changes to labour supply and composition arising from a simulated increase in skilled migration. The model used is a simplification of the features of the economy and the adjustment process. Therefore, the results of the simulation exercise should be considered only as a guide.

The overall effect on average income per capita of the simulated increase in the level of skilled migration relative to the base case is shown in figure 10. The projected increase in average income per capita from the simulated increase in

skilled migration is small compared to the underlying projected increase from productivity growth generally.

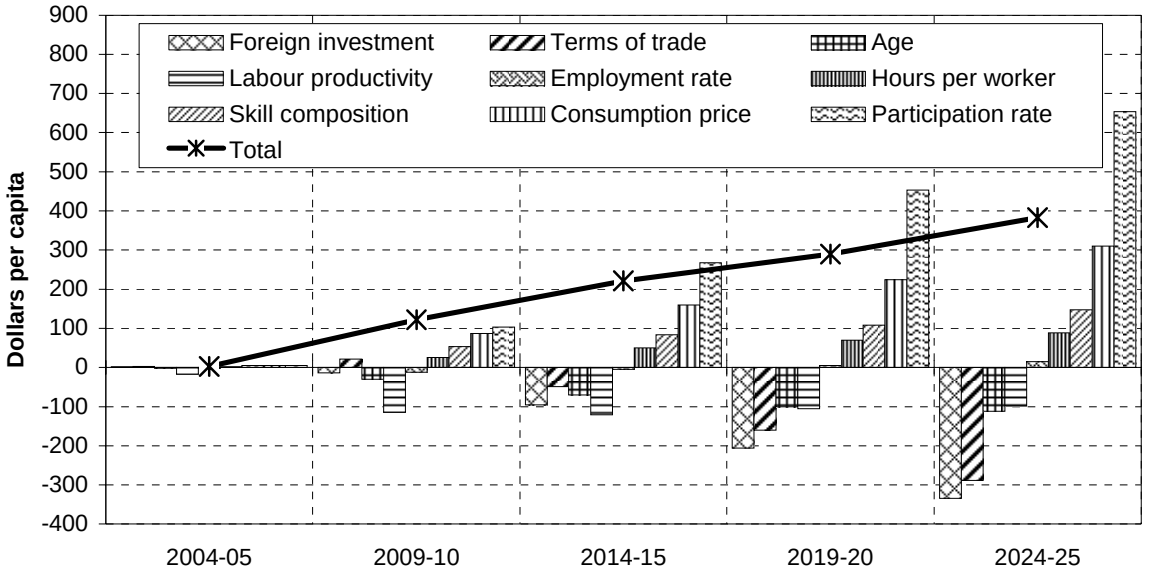
Figure 10 **Projected index of annual income (real GNP) per capita**
Constant 2003-04 dollars



The overall impact of the simulated increase in skilled migration depends on the contributions of a number of factors, some of which are positive, and others negative. The different contributions of the factors affecting income per capita in the simulated outcome relative to the base case are illustrated in figure 11. The negative contributions of the foreign ownership of capital, terms of trade, age and lower labour productivity (resulting from capital dilution and changes in sectoral composition) are offset by the positive contributions from labour supply, skill composition and lower consumption prices.

By 2024-25, annual income per capita is about $383 (or about 0.71 per cent) higher than it would otherwise have been. Modelling by Econtech for DIMA arrived at somewhat higher figures, using different methodologies.

Figure 11 **Factors contributing to annual income per capita**
Constant 2003-04 dollars



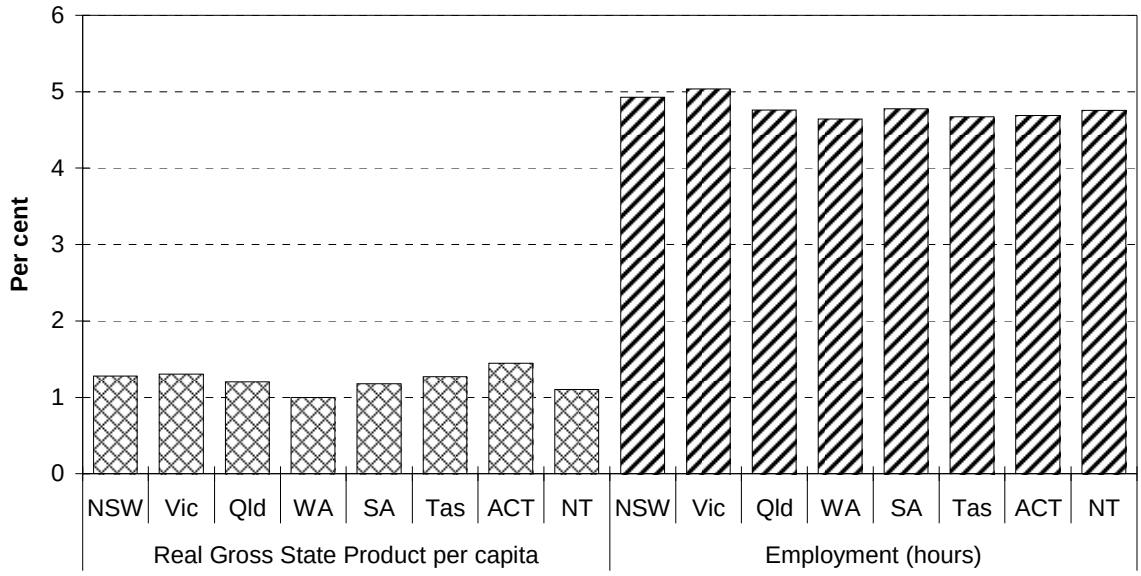
It should be noted that the increase in average income per capita is an average number across all existing residents plus new immigrants. Based on the analysis by CoPS, it appears that most of the gains are likely to accrue to the immigrants themselves. This is not a surprising result and is consistent with research in other countries, such as the United States.

Regional effects

The effects of increased skilled migration differ across the states and territories because their sectoral composition varies and skilled migration affects the sectors differently (figure 12). For example, mining and agriculture are relatively more important to the Western Australian economy than other states and territories. These two sectors are relatively capital intensive and export oriented. The increase in the construction cost of capital stock and the decline in the terms of trade particularly affect these sectors.

The effect on employment in the states and territories follows a similar pattern to Gross State Product (GSP) per capita. Employment in Victoria is projected to be about 5 per cent higher in the increased-migration simulation. For Western Australia and Tasmania, the projected increase is slightly lower at about 4.6 per cent.

Figure 12 **Projected changes to output and employment by states and territories**



Other factors to bear in mind

Like other researchers in this field, it has not been possible for the Commission to quantify all the effects that an increase in skilled migration might have on productivity and income per capita. Nonetheless, they should be borne in mind and are potentially significant.

Accelerated capital embodied technical change

The faster rate of net investment needed to support a faster growing labour force and economy could provide an opportunity to adopt new technology at a faster rate, thereby contributing to a higher rate of productivity growth and living standards.

Size economies and competition

The increase in population size *per se* could contribute to a general increase in productivity and income per capita. The potential sources of this impact are many and varied, such as the exploitation of economies of scale and 'agglomeration' or thick market effects in some cities or regions. A larger population (and domestic market) could also improve productivity by enhancing competition in domestic markets, by supporting a larger number of firms competing against each other in particular industries.

Natural resources, land and environmental externalities

Increasing the size of the economy increases the demand for natural resources (fixed and renewable) and land. If the supply of these resources is limited, then a larger population can contribute to lower productivity and income per capita.

Similarly, environmental externalities, such as congestion and pollution, might also contribute to lower productivity and living standards. The extent of such a decrease would depend partly on the policies implemented by governments and the ease and cost of substitution of technologies having lower congestion and pollution. A drag on productivity and income per capita would remain.

Government expenditure on services, transfer payments and taxation

The diversity of migrants has the potential to alter:

- the mix of government expenditure by all levels of government (for example, education and health)
- the mix and levels of the various transfer payments made by all levels of government (for example, social security)
- the level of taxation revenue collected by all levels of government.

An increase in skilled migration could increase income tax revenue from a larger workforce per head of population earning higher incomes. It could also reduce transfer payments through a reduction in the proportion of the population receiving social security. Offsetting this could be an increase in government expenditure on goods and services. If the net result is a surplus, then the government has options to spend or save, which in turn may impact on per capita income and productivity.

Trade and technology transfer

Through their links to, and knowledge of, international markets, migrants might facilitate access to more valuable markets, causing a reallocation of the nation's resources to exports having a higher value.

Migrants might also possess skills that facilitate the importation and adoption of new technologies, thereby raising productivity and income per capita. Migrants also might transfer their skills to existing residents.

Unanticipated short-term increases in labour demand

Temporary migration could provide one way to alleviate unanticipated short-term increases in labour demand. The short-term increase in labour supply might not be forthcoming from the domestic labour market. In this situation, short-term migration could generate a benefit to the economy, such as bringing forward industry expansion in response to unforeseen increases in export demand.

On balance, some of the above factors have the potential to contribute positively to growth in productivity and living standards, while others could make a negative contribution. The Commission has been unable to determine the overall net effect of these factors.

Impediments to realising productivity gains from migration

Changes to the selection criteria of Australia's migration program have been successful in targeting migrants with characteristics and attributes typically associated with better outcomes for successful migrant settlement and improved labour market outcomes. Migrants are now better educated, have better English language skills and have more pre-migration labour market experience than their predecessors. This has translated into improved labour market outcomes.

English language proficiency

English language proficiency is an important factor influencing the labour market success of immigrants. The importance of good English language skills appears to be increasing with the increasing skill level of immigrants. The increasing number of migrants originating from non-English speaking countries places a greater premium on English language skills for the overall success of the migration program.

Efficacy of skills assessment and recognition processes

Compared with other countries, the Australian regime for assessing and recognising overseas skills is generally regarded as well-developed and successful in achieving its objectives. However, a number of potential issues have been identified by interested parties which might provide a basis for 'fine tuning' of the current arrangements. Examples include removing some of the complexities of different

bodies involved in the same or similar processes and improving the information available to prospective immigrants.

Impediments arising from Australia's tax system

Some participants considered that some aspects of the Australian taxation regime create barriers to attracting and retaining skilled migrants.

There are potential economic benefits from removing unnecessary complexity for both temporary and permanent immigrants wishing to live and work in Australia.

Australian emigration

There is concern about the potential cost to the Australian economy from skilled Australians emigrating overseas, thereby taking with them valuable human capital. There would appear to be only limited scope for government policy to influence emigration flows from Australia.

Summing up

The greater emphasis on skilled immigration has contributed to improved labour market outcomes for immigrants. Consistent with previous Australian studies and research in other countries, the effect of increased skilled migration on average living standards is projected to be positive, but small. It is also likely that most of the benefits accrue to the immigrants themselves.

1 Introduction

1.1 Background to the study

Migration has played a key role in shaping Australia's society and economy. Australia has about 7 million more people attributable to migration since the Second World War. In 2001, 4.5 million people (23 per cent of the population) and 2 million workers (25 per cent of the workforce) were immigrants (chapter 2). Net migration has therefore been a significant factor contributing to a larger population, workforce and domestic economy.

The Commission has been asked by the Australian Government to examine the impacts that migration and population growth have on Australia's productivity and economic growth. Specifically:

- the nature of international migration flows
- the impact of migration, particularly skilled migration, on the labour force
- the effects of migration and population growth on productivity and economic growth
- legislative and other impediments preventing Australia from realising productivity gains from migration and population growth.

The study's terms of reference are reprinted in full at the beginning of this report.

1.2 Scope of the study

The Commission has interpreted key aspects of the terms of reference as follows.

The economic impacts of migration and population growth

Migration, with its many and varied objectives, can impact on Australian society in a number of ways. However, the Commission has focussed specifically on the economic impacts of migration and population growth on Australia's productivity and economic growth. The economic framework linking these elements is set out in chapter 3 of this report.

Defining economic growth

For the purpose of this study, economic growth is expressed in per capita terms. For individuals and families, it is the income (and consumption) *per capita* that is most relevant to their standard of living and it is therefore more informative for policy purposes. The relevant policy question is: does migration add to per capita income?

Defining productivity

Productivity is the relative rate at which outputs of goods and services are produced per unit of input (including labour, capital and raw materials). An increase in productivity means that either more output can be produced using the same level of inputs, or less inputs are necessary to produce the same level of output.

For the purpose of this study, productivity growth is expressed as labour productivity, typically measured as real GDP per hour worked. This definition accords with the Commission's approach to productivity analyses used in its other work. The link between this definition of productivity and the overall economic framework proposed for this study is presented in chapter 3.

Immigrants and emigrants

The Commission has adopted the view that all Australian residents born overseas are considered immigrants, regardless of their year of arrival and their age at the time of migrating to Australia. Emigrants are those residents who have left Australia on a permanent or long-term basis, regardless of their country of birth and age at the time of emigration.

The terms of reference require the Commission to also take into account the different permanent and temporary visa categories.

Impediments to realising potential economic gains

In undertaking part 5 of the terms of reference, the Commission has considered only the impediments that specifically affect Australia's ability to achieve potential productivity and economic growth gains from migration. The policies, legislation and programs examined are those that specifically target migration and migrants (such as skill recognition and assessment programs, and language training). There could be a range of other more general policies and programs which affect the entire Australian population (including migrants), such as labour market regulation.

Although such policies and programs might be important, they are considered to be beyond the scope of this study.

1.3 Conduct of the study

In undertaking this study, the Commission has consulted widely. Discussions were held with academics, state and federal government officials, peak body representatives and other interested parties. The research team also benefited from feedback at a roundtable workshop held in Canberra on 31 August 2005. Submissions were also sought from interested parties and 29 were received (appendix A).

Following the release of the position paper on 17 January 2006, further roundtable discussions were held in Canberra on 17 February 2006 and in Melbourne on 22 February 2006. The Commission also received 17 submissions in response to the position paper.

Details of the individuals and organisations that participated in the study through submissions, meetings and/or roundtable discussions are provided in Appendix A. The Commission thanks interested parties for their participation and in particular for their written submissions.

The Commission has approached this study from a number of perspectives. An assessment of the relevant literature was undertaken, including the large amount of previous empirical research on the economic impacts of migration and population growth.

The Commission's empirical analysis has sought to provide a better understanding of how the attributes and characteristics of the immigrant intake affect economic growth. It has also sought to examine more closely the economic mechanisms at work across different industries, occupations and migrant categories. The analysis has been informed by the latest data, where possible.

As part of its analysis, the Commission contracted the Centre of Policy Studies at Monash University to undertake general equilibrium modelling. The consultant's report on the work done for this position paper is available on the Commission's website (www.pc.gov.au/study/migrationandpopulation.html).

The Commission also appointed three independent referees to review and report on its modelling, and that of the Centre of Policy Studies. The referees were Professor Paul Miller, Dr Peter E. Robertson and Professor Rod Tyers. The referees' reports are presented in appendix I.

1.4 Structure of the report

This final report is structured as follows.

An overview of recent international and Australian migration and population trends is provided in chapter 2. This discussion is supported by appendix B (trends in international migration), appendix C (Australia's migration policies and flows) and appendix D (characteristics of Australia's migrants).

The economic framework for the study is outlined in chapter 3. In this chapter, the key mechanisms through which migration and population growth influence productivity and living standards are identified.

The effects of changes in labour supply, labour productivity, and growth in population size and the economy, are considered in chapters 4 to 6. Supporting material is presented in appendixes B to F.

The macroeconomic effects of migration and population growth are considered in chapter 7 and an overall assessment of the impact of migration on living standards is provided in chapter 8. Further detail about the Centre of Policy Studies modelling and methods are provided in appendixes G to J .

The legislative and other impediments to productivity and economic growth from migration are examined in chapter 9.

2 Trends in migration

Key points

- During the last few decades, the international flows of migrants have increased and their characteristics have changed.
  - There has been increased diversification of countries of origin, increased temporary flows of migrants and increased skilled migration.
- Generally, migration flows into and out of Australia have followed similar patterns to those overseas.
- In Australia, the focus of the Migration Program has increasingly been on skilled migration, with an increasing proportion of immigrants entering via the Skilled Stream.
  - In addition, temporary immigration has increased significantly over the past ten years.
- Movements out of Australia have been increasing in recent years, with emigrants generally being 'highly skilled' and of prime working age.
- Net overseas migration is contributing about half of Australia's population growth and is marginally raising the proportion of 'younger-aged' working people in the population, with little impact on the ageing of the entire population.
- In recent years, immigrants from China and other Asian countries have increased significantly as a proportion of total arrivals to Australia.
- Compared with the Australian-born population, immigrants have a higher propensity to settle in major cities, particularly for those immigrants who have been residing in Australia for less than 15 years.

2.1 International migration flows

To put Australian migration flows in context, the trends in migration flows worldwide and the factors driving these trends are considered.

Today's international migration flows are connected to broader processes of international economic integration that have been taking place in recent decades. These changes have increased the scale and breadth of international migration movements. Changes have included (Hugo 2004a):

- increased economic integration

- increased information flows and improved transport links
- globalisation of labour markets
- development of commercialised immigration industries
- proliferation of social networks and diasporas around the world
- changed migration policy, particularly with respect to skilled migration.

These changes have enabled migration to become a more accessible option for an increasing proportion of the world's population. They have also led to changes in the nature of migration flows, with diversification of countries of origin, increased temporary migration flows and an emphasis on skilled migration.

Trends in international migration numbers

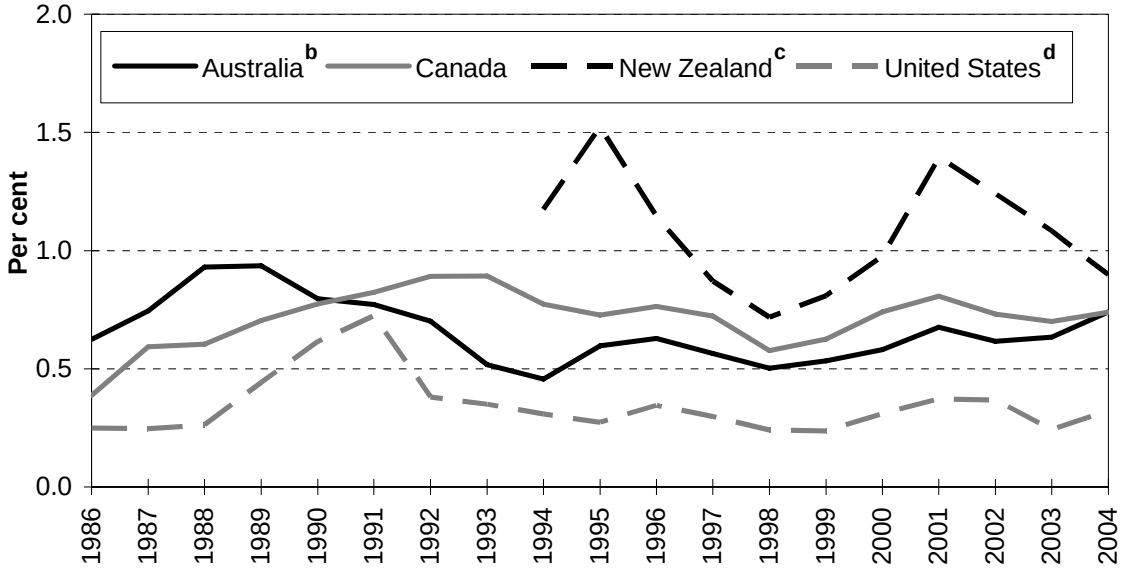
There were almost 200 million international migrants worldwide in 2005. This is more than double the number recorded in 1980 (GCIM 2005). A disproportionate number of these migrants live in developed countries. Almost one in ten persons living in the more developed countries is a migrant compared with fewer than one in 70 persons living in developing countries (UN 2002). The disproportionate number of migrants living in developed countries is likely to continue, with the total growth in migrant numbers between 1990 and 2000 occurring in developed regions (UN 2002).

Although migration flows have increased recently, they have still not reached the levels recorded in the early twentieth century. At that time, liberal migration policies and falling transport costs led to significant flows of people (Fischer 2003). Migration flows in the early twentieth century were especially large from Europe to the United States, Canada, Australia and New Zealand.

The United States, Canada, Australia and New Zealand remain among the few countries in the world admitting immigrants for permanent settlement (IOM 2005). As such, these countries are typically grouped together for analytical purposes (IOM 2005; OECD 2005b) and are often referred to as 'settlement countries'. The analysis in this section is focused on this group of countries but information is also provided on other OECD member countries for which reliable data are generally available.

Although immigration flows to settlement countries have increased since the mid-1980s, they have remained fairly steady as a proportion of their population (figure 2.1).

Figure 2.1 **Flows of permanent immigrants to settlement countries**
Percentage of total population, 1986 to 2004[a]



[a] Data include settler arrivals as well as permanent residency visas granted onshore. Comparability across countries is limited by data collection processes, as detailed in appendix B. [b] Data refer to financial years (July to June of the year shown). [c] Data not available before 1994. [d] Data refer to financial years (October to September of the year shown).

Sources: Citizenship and Immigration Canada (2005); DIMIA (2004a); OECD (2005b and earlier editions); Statistics New Zealand (2005); US Department of Homeland Security (2005).

Australia's immigration flows are often smaller (relative to the size of the total population) when compared with other settlement countries. Australia's immigration flows are also smaller when compared with some other OECD countries (appendix B). However, care should be taken in making such comparisons, as data are collected from different sources in different countries, and the definition of an immigrant also varies between countries. For example, Germany includes some short-term visitors as immigrants, who are not included in migration numbers in most other OECD countries.

Australia ranks second (to Luxembourg) among OECD countries in terms of the proportion of the population born overseas (Dumont and Lemaitre 2005). Comparing numbers of those born overseas in the population can be more useful than comparing flows of immigrants. This is because estimates of the number of foreign-born residents are more consistent across countries and total immigrant numbers give a better indication of the cumulative importance of migration to a society.

Some immigration occurs outside the bounds of formal migration programs, where people would like to migrate but are restricted in their capacity to do so legally. By

their very nature, such illegal immigration flows are difficult to measure and are not captured in the official migration flow data presented in this chapter. Illegal immigration flows are significant in the United States, for example, where it is estimated that 10 million migrants (nearly one third of the foreign-born population) are present without authorisation (GCIM 2005). Illegal immigrants are much less prevalent in isolated countries, such as Australia and New Zealand, with estimates suggesting they make up less than 5 per cent of the total immigrant population (OECD 2005b).

Immigration flows into settlement countries (and into developed countries more generally) are restricted by government policy. The level of illegal immigration and queues to migrate are indicators of the extent to which government policy is restricting immigration flows.

Migration flows into some other OECD countries are examined in appendix B. Comparisons across a wider range of countries are more difficult because of data issues. For example, growth in immigration flows as reported by the OECD (2005b) has been faster in the United Kingdom than in any of the settlement countries. However, these inflows measure all immigration of longer than a one-year period. Thus, it is difficult to make direct comparisons between the United Kingdom and the settlement countries.

Diversification of country of origin

There has been some diversification of the country of origin of migrants in recent years.

Historically, the majority of migrants to OECD countries came from a small number of source countries. These included neighbouring countries as well as countries with historical ties, for example between the United Kingdom and Australia, and Europe more broadly with the settlement countries.

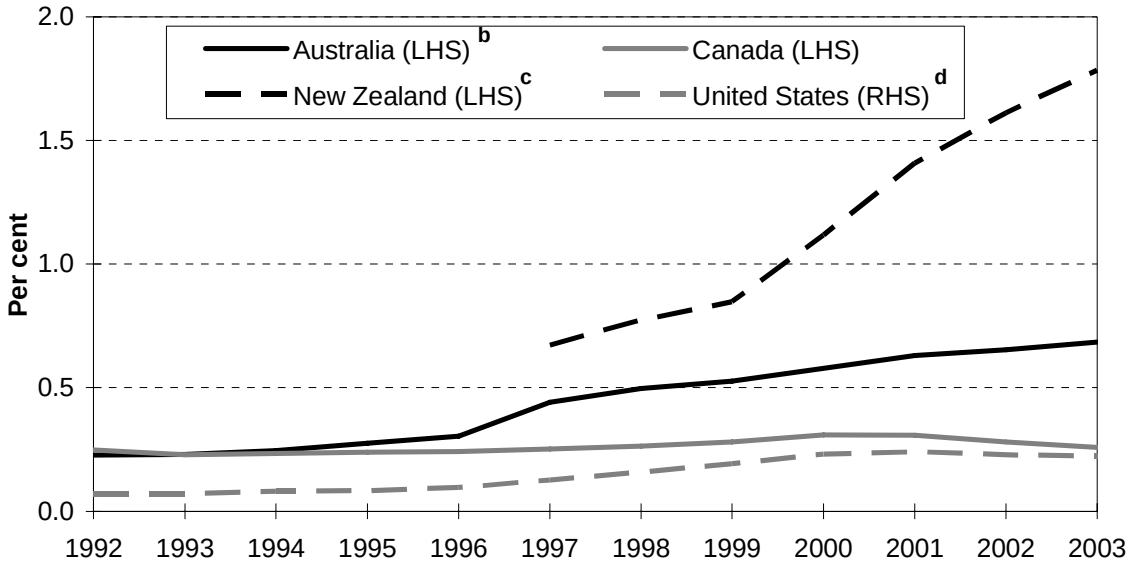
Since the early 1980s, there has been some diversification of migration movements and an increase in the range of nationalities involved. For example, the number of immigrants from India and China has been increasing. Several new source countries have also emerged, including Bangladesh, Hong Kong, Indonesia, Malaysia, Pakistan, Sri Lanka and Thailand.

For many of the new source countries, rapid income growth and higher levels of education have also been important in increasing the number of people able to finance a long-distance relocation.

Emergence of temporary migration

Although temporary migration has been occurring for decades, the scale of it to the settlement countries increased strongly during the 1990s (figure 2.2). Temporary migration to several other OECD countries also increased over the same period (appendix B).

Figure 2.2 **Entries of temporary workers into settlement countries**
Percentage of total population, 1992 to 2003[a]



[a] Comparability across countries is limited by different data collection processes, as detailed in appendix B. Data do not include foreign students. [b] Data refer to financial years (July to June of the year shown). [c] Data not available before 1997. [d] Data refer to financial years (October to September of the year shown).

Sources: OECD (2005b and earlier editions); US Department of Homeland Security (2005).

The emergence of temporary migration has also been facilitated by policy settings in destination countries. Most OECD countries have a favourable attitude to temporary immigration, although this has not always been the case. In Australia, for example, temporary immigrants were emphatically overlooked in favour of permanent immigration until the 1980s (Hugo 2004a). However, this changed in the 1990s, and today, temporary workers are valued in Australia for their contribution of 'new ideas, contacts, understanding, skills and technology' (DIMIA 2005j).

Foreign students are another type of temporary migrant and their numbers increased rapidly in OECD member countries during the 1990s. The number of foreign students hosted by OECD countries increased by 50 per cent between 1990 and 2001 (OECD 2004b). Foreign students are of particular importance to Australia. The number of foreign students in Australia increased by almost 300 per cent

between 1990 and 2001 (OECD 2004b). By 2002, only the United States, the United Kingdom and Germany had more foreign students than Australia (OECD 2005b).

Trends in skilled migration

Migration flows of skilled workers rose substantially during the 1990s. This was the case for flows both into and between OECD countries, although developing countries remained the main countries of origin.

Measuring highly-skilled migration flows is difficult due to a lack of internationally comparable data (Auriol and Sexton 2002). Part of the difficulty arises because countries measure inflows by visa type, which might not reflect the skills of immigrants. For example, a person entering under a skilled visa would be expected to have higher skills than someone entering under family reunion, but this is not always the case.

However, government policies with respect to skilled migration can be compared. Over the past decade, governments internationally have reduced barriers to the immigration of highly-skilled people. Concurrently, barriers have been increasing against the immigration of unskilled people (Hugo 2004a). These trends can be examined in more detail by focusing on the settlement countries.

In the United States, family members continue to dominate immigration flows. For permanent immigration, skilled programs are generally limited to fairly specific and narrowly defined areas of skill shortage and represent a small proportion of total immigration (IOM 2003). Temporary immigrants are an exception, with the majority of temporary work visas issued to highly-skilled workers (OECD 2005b).

In the other settlement countries, skilled immigration plays a more important role. Canada, Australia and New Zealand all have systematic points testing for selecting permanent skilled immigrants, based on characteristics including education, work experience, age and language skills. In each of these countries, an increasing emphasis on skilled immigration during the 1990s has been observed (Bedford, Ho and Lidgard 2001; Green and Green 1999; Khoo 2002). The increasing emphasis on skilled immigration in these and other developed countries has meant that competition is intense among OECD countries to attract these people (OECD 2005b). This increasing competition has been noted by government within Australia (Victorian Government, sub. 29, attachment A).

The trend towards skilled immigration in Canada, Australia and New Zealand and the continued dominance of other categories of immigration (notably family reunion) in the United States are evident from table 2.1.

Table 2.1 **Permanent immigrants entering settlement countries under skilled categories**

Per cent of all immigrants

Country	*1991*	*1999*	*2001*
	%	%	%
Australia	37	42	60
Canada	18	47	55
New Zealand	na	47	68
United States	18	22	17

na Not available.

Source: IOM (2005).

2.2 Australian perspective

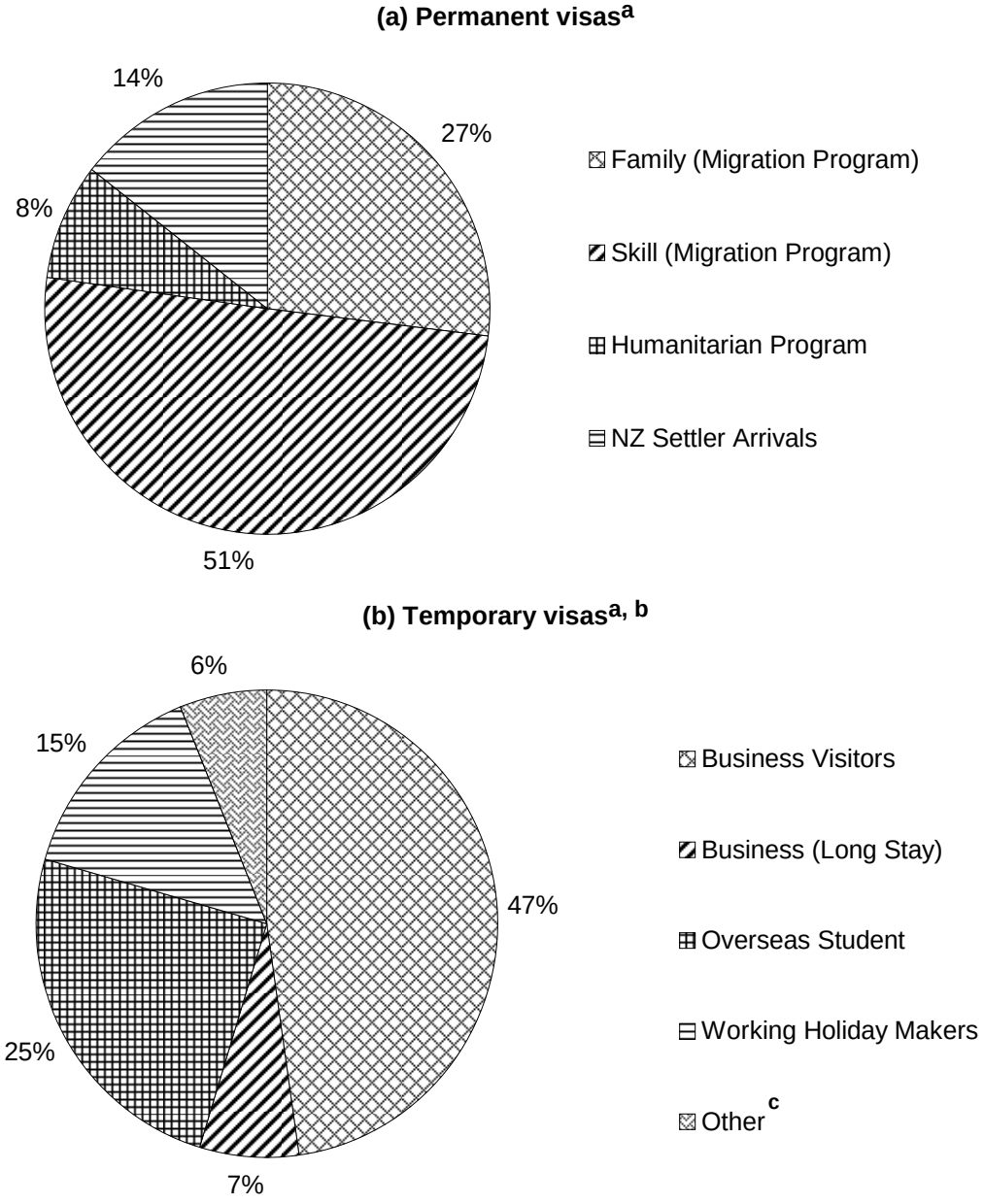
Migration has played a key role in shaping Australia's society and economy. It has contributed significantly to Australia's population, with almost one quarter of the current Australian population born outside Australia. In 2001, there were 8.3 million employed persons in Australia with about 25 per cent (2 million) born overseas (ABS 2002c).

Australia's immigration program consists of immigrants arriving under a range of permanent and temporary visa types. Figures 2.3a and 2.3b highlight the proportions of visas granted under the permanent and temporary visa categories in 2004-05. The main program under Australia's permanent immigration process is the Migration Program, accounting for around 77 per cent (about 120 000) of the permanent visas granted in 2004-05 (figure 2.3(a)). The Skill Stream accounted for around 65 per cent (about 78 000) of the visas granted under the Migration Program in 2004-05.

The temporary visa categories listed in figure 2.3(b) exclude Tourists, Sponsored Family Visitor and Medical Treatment visas granted in 2004-05. As a proportion of the 711 000 temporary visas granted in 2004-05, business visas (including Business Long Stay visas, which can be valid for up to four years) accounted for around 55 per cent (about 389 000). Overseas student visas accounted for around a quarter (about 175 000) of the temporary visas granted in the same period.

Figure 2.3 **Australian immigration visas granted**

Selected categories, 2004-05



a Visas granted do not necessarily match the number of arrivals. **b** Excludes 3 234 930 tourist visas, 10 660 sponsored family visitor visas and 3940 medical treatment visas granted in 2004-05. **c** The main visa classes included in 'Other' are Social/Cultural Events, International Relations, Medical Practitioner and Educational.

Source: DIMA unpublished data.

Following the FitzGerald Report (FitzGerald 1988), more effective and clearer selection procedures were developed for the migration process. Current migration policy has a greater emphasis on skilled migration, with the proportion of Family Stream visas granted decreasing since the late 1990s.

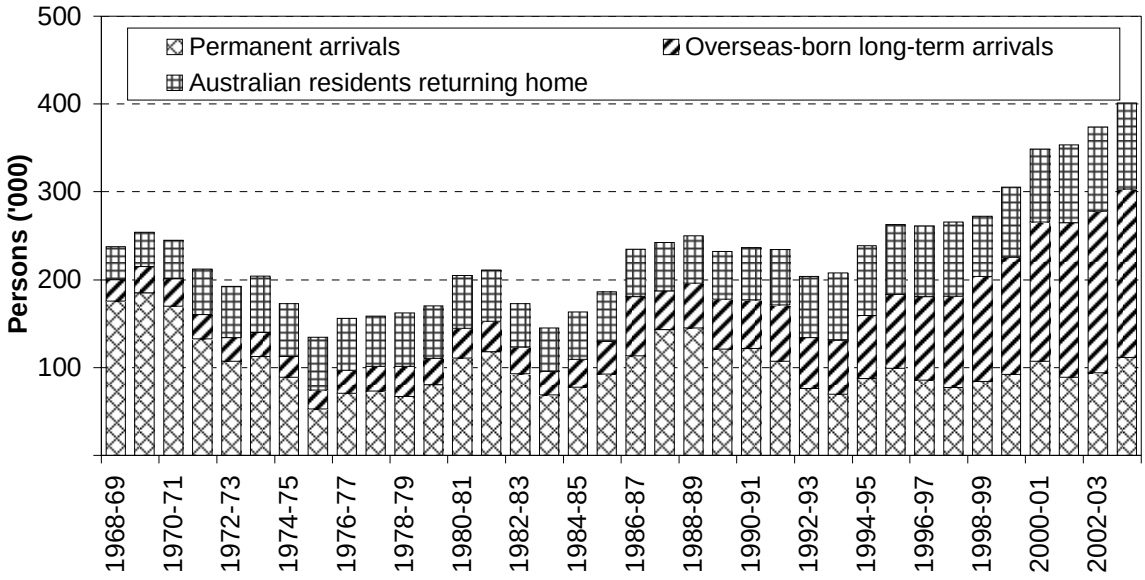
Immigration

In 2004-05, about 4.1 million visas were granted, of which 96 per cent were temporary visas (generally less than 12 months) and mostly for tourists. Excluding Tourist, Sponsored Family Visitor and Medical Treatment visas, the main visas granted under the temporary immigration program were for Business Visitors and Business Long Stay (54.7 per cent in 2004-05), Overseas Students (24.6 per cent) and Working Holiday Makers (14.7 per cent) (figure 2.3b). Around 156 000 visas (including New Zealand Settler Arrivals) were granted under the permanent immigration category in 2004-05.

Permanent immigration

Permanent immigration numbers reflect permanent and long-term temporary visas granted for immigrants entering Australia under the Migration Program, the New Zealand Settler Arrivals Stream and the Humanitarian Program. Long-term temporary arrivals have increased significantly in the past ten years. Although permanent arrivals historically constituted the larger share of permanent and long-term temporary arrivals, they are now the smaller share (figure 2.4).

Figure 2.4 **Permanent and long-term temporary arrivals**
1968-69 to 2003-04[a]



[a] Long-term temporary arrivals are sub-divided into overseas-born persons who intend to stay in Australia for more than 12 months and Australian residents returning home who have been abroad for more than 12 months.

Sources: Hugo (2004b); ABS (2004d).

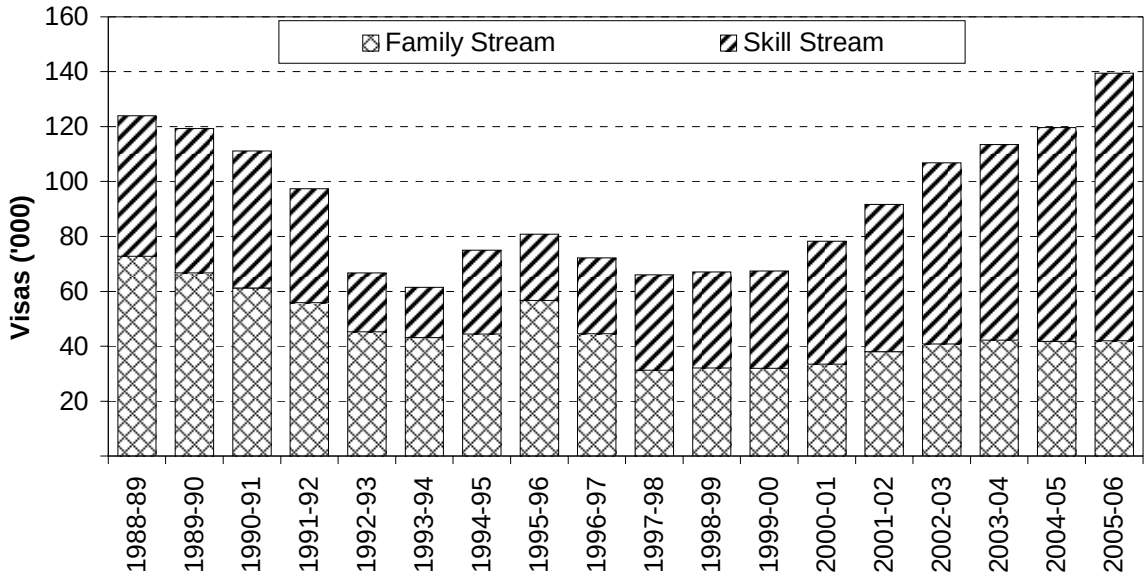
A number of policy changes are likely to have influenced the number of immigrants arriving under long-term temporary visas. These include the expansion of working rights for temporary migrants and increasing the flexibility for immigrants to change their status from temporary to permanent residency.

The Humanitarian Program usually accounts for around 10 per cent of permanent visas granted each year. Humanitarian visas are predominantly granted offshore, mainly to immigrants from Africa (71 per cent), the Middle East and South West Asia (25 per cent) (appendix C).

Migration Program

The Migration Program accounts for the majority of permanent visas granted in Australia, and consists predominantly of two streams: the Skill Stream and the Family Stream (figure 2.3(a)). Over the past ten years, the Skill Stream has accounted for an increasing proportion of the total Migration Program (figure 2.5).

Figure 2.5 **Permanent visas granted under the Migration Program**
1988-89 to 2005-06[a, b]



[a] The 2005-06 data reflect the 'upper limit' planned levels, with the planned levels for the Migration Program in 2005-06 ranging from 130 000–140 000. [b] Migration Program numbers do not include New Zealand citizens or holders of Secondary Movement Offshore Entry (Temporary), Secondary Movement Relocation (Temporary) and Temporary Protection Visas. Numbers have been rounded and totals might not be the exact sum of components.

Sources: DIMIA (2005g) and DIMIA unpublished data.

The planned proportions of visas to be granted in 2005-06 were around 70 per cent and 30 per cent for the Skill and Family Streams, respectively. This shift reflects a number of recent policy changes, including:

- shifting the points-tested 'Concessional' family category from the Family to the Skill Stream, emphasising a change from the family reunion aspect to the labour market aspect of the Migration Program
- increasing the total skilled immigrant intake
- strengthening the points test for the Skill Stream to raise the skill level of selected immigrants
- enabling the onshore application for long-term temporary visas by students who have completed their studies in Australia (appendix C).

Skill Stream

In 2004-05, the Skill Stream accounted for around 65 per cent of visas granted under the Migration Program. This stream consists of a number of categories for prospective immigrants that relate to demand in Australia for particular occupational skills, outstanding talents or business skills. Immigrants must satisfy a points test that includes skills, age, work experience and English language ability (appendix C).

A list of occupations in demand for (temporary and permanent) immigration is maintained by the Department of Employment and Workplace Relations. The Migration Occupations in Demand List (MODL) contains a list of domestic occupations and specialisations for which there is an ongoing national shortage. The MODL is reviewed twice a year to take into account existing and emerging skills shortages.

Some of the visa classes and sub-classes within the Skill Stream are capped (appendix C). In 2004-05, about 77 per cent of the visas granted under the Skill Stream were for the General Skilled Migration (GSM) category — comprising mainly the Skilled Independent visa category (69 per cent of the visas granted under the GSM).[1]

The Skilled Independent visa is one of the main visa groups accessible to overseas students. A growing proportion of these visas have been granted onshore since the 1 July 2001 policy change, which enabled successful Australian-educated overseas students with qualifications in high demand to apply for this visa type without leaving Australia. In 2004-05, around 35 per cent of the 41 180 Skilled Independent

1 The description of these visa classes and sub-classes is provided in appendix C, table C.5.

visas granted were to overseas students. The planned number of Skilled Independent visas for 2005-06 was about 49 000.

A number of State-Specific and Regional Migration (SSRM) initiatives have been introduced since 1996-97, enabling state/territory governments and regional employers to utilise skilled immigrants (on permanent or temporary visas) and fill skill shortages in particular jurisdictions. Over 37 600 visas have been granted since the introduction of SSRM initiatives (18 697 in 2004-05 — representing about 24 per cent of the total Skill Stream). Most of the visas granted have been for migrants settling in Victoria and South Australia (appendix D).

In July 2004, the Skilled Independent Regional (SIR) visa category was introduced. It enables potential GSM applicants, who fall just short of the pass mark, to stay in Australia for three years on the condition that they live and work in regional Australia. In 2004-05, 1440 SIR visas were granted, with planned numbers for 2005-06 expected to be higher.

Temporary immigration

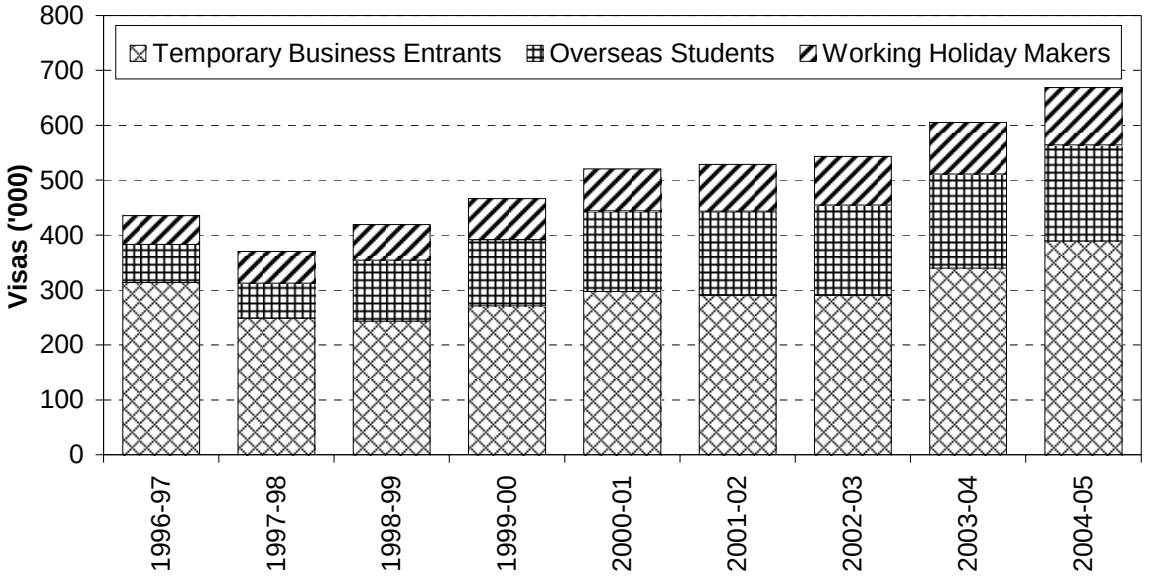
Temporary visas are granted for visitors who usually stay in Australia for less than 12 months. However, certain temporary visa categories, such as the Business Long Stay visas, allow immigrants to stay for up to four years. Further, Working Holiday Makers visas can be extended to more than 12 months and visas granted to overseas students are for the duration of their studies. The main temporary visa class granted in 2004-05 was the tourist visa, with 3 234 930 visas granted in 2004-05 (around 82 per cent of total temporary visas).

Three recent policy changes (appendix C) have influenced the nature of Australia's temporary immigration:

- An expansion of working rights under the temporary migration scheme.
- An increased regional focus in the allocation of temporary visas.
- An increased flexibility to move from temporary to permanent residency.

The main visa classes that allow temporary immigrants to work while in Australia include the Working Holiday Makers visa, Overseas Student visa, Business Visitors visa and Business Long Stay visa. The effects of the changes to the temporary immigration policy are reflected in figure 2.6. The level of temporary migration to Australia has increased considerably during the past ten years across all categories.

Figure 2.6 **Temporary visas granted**
1996-97 to 2004-05 [a, b]



[a] Overseas student visas include visas granted onshore and offshore. [b] Temporary business entrants include Business Visitors visas (short stay) and Business Long Stay visas.

Sources: DIMIA, *Population Flows: Immigration Aspects*, various editions; DIMA unpublished data; Hugo 2004a, Productivity Commission estimates.

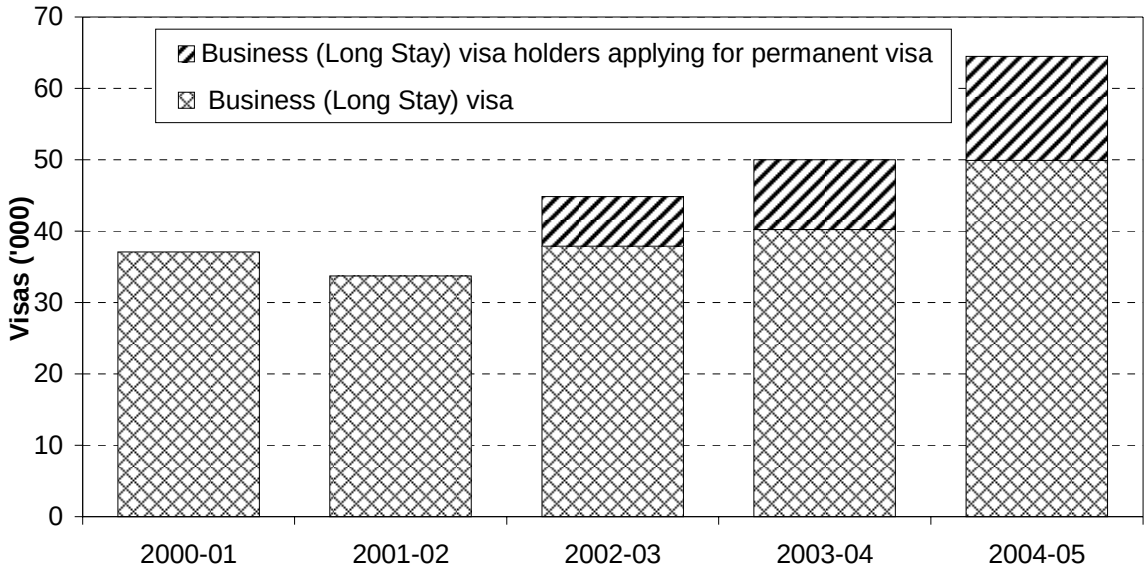
In 2004-05, there were approximately 670 000 temporary visas granted for overseas students, working holiday visitors and business entrants, representing more than 3 per cent of the Australian resident population.

In recent years, temporary visas (largely in the Skill Stream categories) have increasingly been provided to overcome short-term labour shortages in various industries and regions where Australian employers have been unable to fill vacant positions using domestic labour. In 2004-05, a total of 49 860 temporary Business Long Stay visas were granted, an increase of 24 per cent from 2003-04 (figure 2.7). Under this category, which includes various employer nominated agreements and regional schemes, the visa condition is that employees must be paid a minimum gross annual salary of $39 100 and higher for IT professions.

The main occupational groups nominated by employers under the Business Long Stay program in 2004-05 were computing professionals (11.9 per cent), managers (10.8 per cent), registered nurses (9.2 per cent), business and information professionals (3.8 per cent) and chefs (3 per cent) (DIMA 2006).

Figure 2.7 **Temporary Business Long Stay visas granted and permanent visa applications**

2000-01 to 2004-05



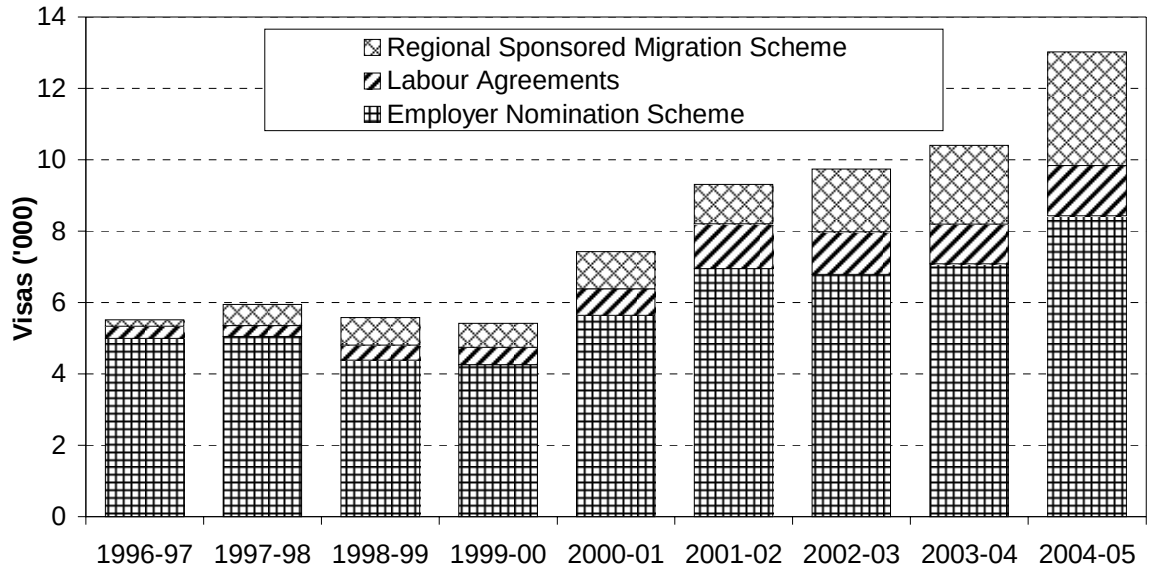
Sources: DIMIA, *Population Flows: Immigration Aspects*, various editions; DIMA unpublished data.

In 2004-05, about 14 600 temporary Business Long Stay visa holders applied for permanent residency while working in Australia, which was about 29 per cent of all Business Long Stay entrants (figure 2.7). Each year the majority of these permanent visa applicants (64 per cent in 2004-05) seek entry under the employer sponsored skill stream, in particular the Employer Nominations Scheme, which had a total of 8430 permanent visas granted in 2004-05.[2] This is followed by the Regional Sponsored Migration Scheme, which had an increase in total permanent visas granted from about 1760 to about 3190 between 2002-03 and 2004-05 (figure 2.8). In addition, temporary Business Long Stay visa holders represented 86 per cent of all onshore applicants under the permanent employer nominated skill stream in 2004-05 (DIMA 2006).

2 One of the visa conditions under the Employer Nominations Scheme requires applicants to have been working in Australia in the occupation for which they are being nominated for two years (including at least 12 months with the nominating employer).

Figure 2.8 **Total permanent visas granted under employer nominations skill stream**

1996-97 to 2004-05



Sources: DIMIA, *Population Flows: Immigration Aspects*, various editions; DIMA unpublished data.

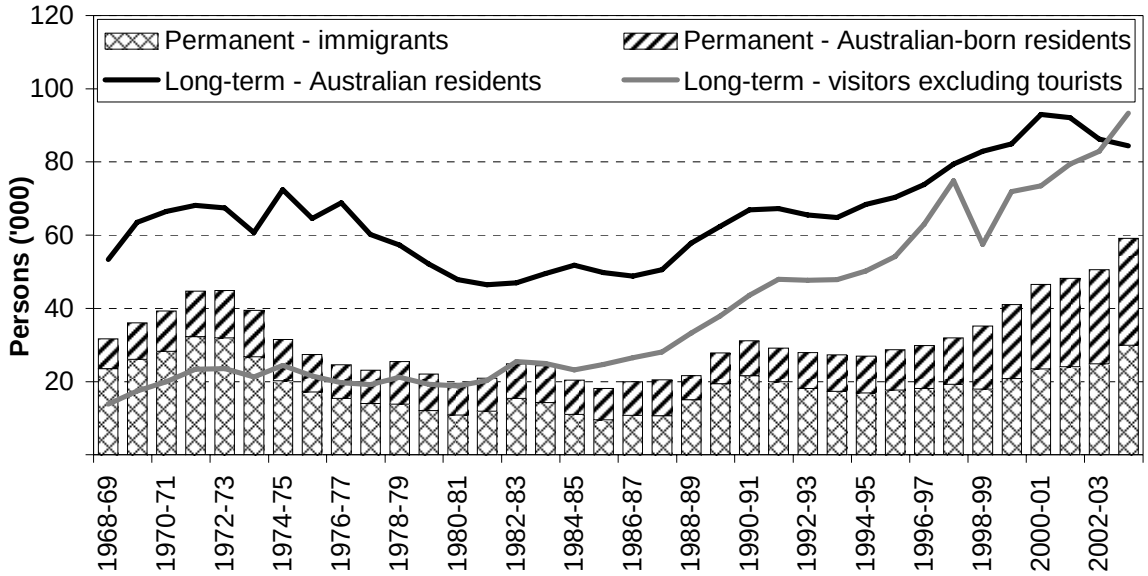
Emigration

The analysis of emigration in this section is based on those leaving permanently or on a long-term basis (12 months or more). The data on emigrants are based on self-reported information from passenger cards, which is based on the 'intentions' of persons moving out of Australia. As these intentions could change over time, some caution is needed in interpreting these data. Nevertheless, the passenger cards represent the most useful information that is available on trends in Australia's emigration.

Overall, permanent and long-term emigration has been trending up over the past two decades. Total permanent departures reached their highest level in 2003-04, with about 59 000 persons leaving Australia (figure 2.9).

People emigrate for a number of reasons. For example, overseas-born emigrants, especially those who have been in Australia for one or two years, might return to their country of birth because of feelings of homesickness. Younger immigrants might return to their country of birth because they are needed by their family. Older overseas-born immigrants sometimes leave Australia after they retire.

Figure 2.9 **Permanent and long-term departures**
1968-69 to 2003-04[a, b]



[a] By description on the card, the departures information is grouped into the following categories: 'Visitor or temporary entrant departing' (card description) = 'Overseas visitors returning overseas' (publication description); 'Australian resident departing temporarily' (card description) = 'Australian residents departing long-term' (publication description); and 'Australian resident departing permanently' (card description) = 'Permanent departures' (publication description), which is further disaggregated into Australian born and former settlers using information from other sources. 'Overseas visitors' includes persons on temporary resident, student and visitor visas. Long-term movements include Australian residents departing temporarily with the intention to stay abroad for 12 months or more. 'Australian residents' includes Australian citizens, New Zealand citizens indicating permanent residence and non-citizens on permanent residence visas. [b] The data are based on the 'intentions' of people moving out of Australia and these intentions might change over time so there is significant 'category jumping'.

Sources: Hugo (2004b); DIMIA (2005c).

However, the main reason for leaving, according to an Australian emigration survey conducted in 2002, is economic:

> … the most favoured response of both males and females for leaving Australia was *'better employment opportunities'*, although it was somewhat higher for males (59.3 per cent) than for females (34.2 per cent). (Hugo et al. 2003, p. 44)

Males and females both gave 'professional development', 'career advancement', 'higher income' and 'lifestyle' as reasons for leaving Australia. Females also indicated 'marriage/partnership' and 'partner's employment' were reasons for emigrating (Hugo et al. 2003).

There is a large number of Australian citizens residing overseas. According to the Department of Foreign Affairs and Trade, there were about 859 000 (4.3 per cent of the 2001 population) Australian citizens living overseas long-term or permanently

as at 31 December 2001. A further 265 000 Australian citizens were overseas on a shorter-term basis (Hugo et al. 2003).

In December 2001, almost half of the Australians residing overseas lived in countries of the European Union. About half of these (200 000) were residing in the United Kingdom. Greece had the second largest community of Australian citizens (135 000), most likely Greek-born Australian residents and some second-generation Australians of Greek heritage. The third largest Australian expatriate community was found in the United States (106 410), followed by New Zealand (68 000). In the Asian region, Hong Kong had the largest number of Australian citizens (46 000), with Indonesia, Japan and Singapore being the other main Asian destinations (Hugo et al. 2003).

Emigration by overseas-born

Just over half (about 30 000) of emigrants departing Australia permanently in 2003-04 were born overseas — the largest number since the early 1970s. However, the proportion of permanent departures by overseas-born as a percentage of total permanent departures has remained fairly steady since the late 1990s. Past research suggests that the higher skilled component of the immigration intake is most prone to emigration from Australia. Further, with increasing emphasis on skilled migration, an increase in former settler loss is likely (Hugo et al. 2003).

The highest proportion of the overseas-born who depart Australia permanently tend to be those born in New Zealand (about 7000 in 2003-04). The UK-born emigrants were the second largest group, with about 4600 persons departing permanently in 2003-04. Emigrants born in the South East Asian region also account for a large proportion of permanent departures, mainly those born in China and Hong Kong (appendix D).

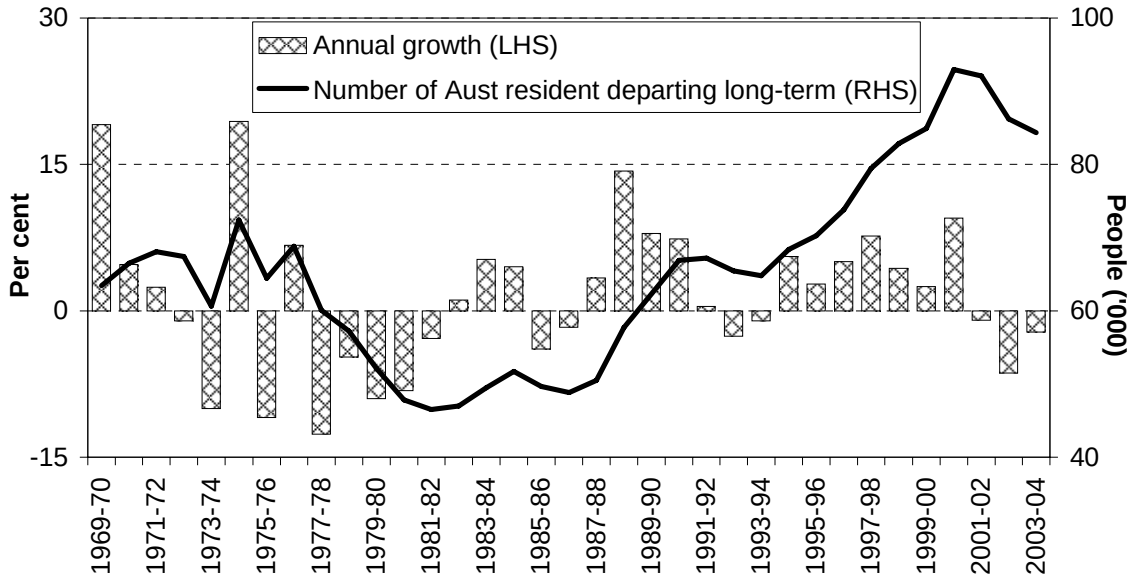
Most overseas-born emigrants (about 65 per cent in 2003-04) who leave Australia permanently tend to have lived in Australia for more than five years. However, around 10 per cent leave Australia permanently after less than a year of residence (DIMIA 2005c). According to DIMIA (2005b), a majority of overseas-born emigrants return to their country of birth. In 2003-04, the main intended countries of residence included New Zealand, the United Kingdom, Hong Kong, China, the United States and Singapore (appendix D).

Emigration by Australian-born

In 2003-04, 29 100 Australian-born persons departed permanently — the largest number recorded. Most Australian-born emigrants are moving to the United Kingdom, New Zealand and the United States. In 2003-04, about 55 per cent of Australian-born emigrants departed permanently for these three countries (appendix D).

The information collected on Australian emigrants departing on a long-term basis is in terms of Australian 'residents' rather than Australian-born. Residents include Australian citizens, New Zealand citizens with permanent residence and other permanent residents. The largest number of Australian residents (about 93 000) departing on a long-term basis was recorded in 2000-01. Since then, the number of Australians departing long-term has decreased, with about 84 300 long-term emigrants recorded in 2003-04 (figure 2.10). Combining Australian-born emigrants

Figure 2.10 **Australian residents departing Australia on a long-term basis**
Annual growth and numbers, 1969-70 to 2003-04[a, b]



[a] Long-term departures are defined as those departing temporarily with the intention to stay abroad for 12 months or more. 'Australian residents' includes Australian citizens, New Zealand citizens indicating permanent residence and non-citizens on permanent residence visas. [b] Caution is needed when examining the data. The data are based on the 'intentions' of people moving into or out of Australia and these intentions might change over time so that there is significant 'category jumping'. Further, there are visa categories for entry into Australia that overlap short- and long-term categories. For example, holders of Temporary Business Entrants visas may stay in Australia for periods of up to four years and, hence, overlap the short-term and long-term movement categories.

Sources: Hugo (2004a); DIMIA (2005c).

departing permanently and Australian residents leaving on a long-term basis, in 2003-04, there were 113 476 emigrants — around 55 per cent higher than in 1969-70 (73 454 emigrants).

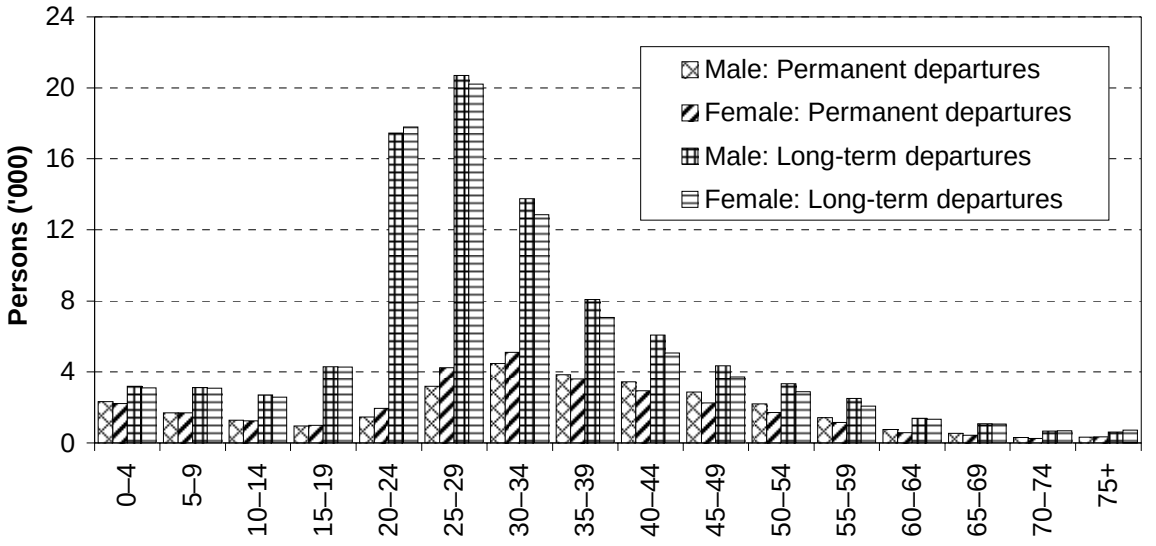
Characteristics of Australian emigrants

As with all migration processes, emigration is selective towards particular economic and demographic characteristics. There is a high proportion of young adults in the Australian emigrant population, especially among long-term departures (figure 2.11). In 2004, the most common age of emigrants departing permanently was the 30–34 year group (4480 male and 5099 female emigrants). The most common age group of emigrants departing Australia on a long-term basis was in the 25–29 year group (20 703 male to 20 212 female emigrants). According to Hugo et al (2003):

> In the long-term movements, the pattern of Australian residents leaving in their 20s and returning in their 30s is apparent. (p. 32)

Overall, there were more male than female emigrants departing permanently or on a long-term basis in 2004.

Figure 2.11 **Permanent and long-term departures by gender and age**
2004[a]



[a] Permanent departures include Australian and overseas born. Long-term departures include Australian residents, which includes Australian citizens, New Zealand citizens indicating permanent residence and non-citizens on permanent residence visas.

Source: ABS unpublished data.

Hugo et al. (2003) found that workforce participation rates in 2002 were generally higher among emigrants across all age groups except for 15–19 year olds. Further, the unemployment rate for emigrants in 2002 was around 1 per cent or less, compared with 7–8 per cent for the entire Australian workforce.

In addition, the majority of Australian emigrants are from the high skill occupation categories, 'Managers and Administrators' and 'Professionals'. DIMIA (2005b) and Hugo et al. (2003) argue that Australia gains more skilled immigrants than it loses. (More detailed analysis on the skill levels of emigrants is found in chapter 4.)

2.3 Migration and Australia's population

In this section, the contribution of migration to Australia's population size is outlined. The section then briefly summarises the country of origin, the age and settlement patterns of immigrants.

Net overseas migration and Australia's population

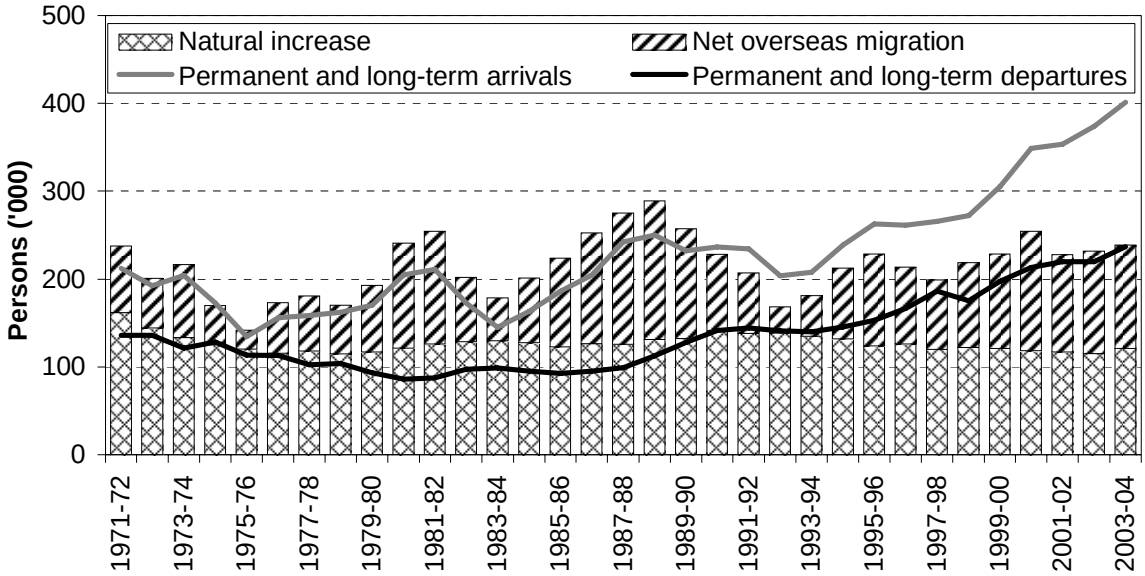
Net overseas migration is the excess of permanent and long-term immigration over permanent and long-term emigration. Australia's population grew by about 34 per cent (or 1.3 per cent per year) between 1972 and 2004, from 13.3 million to 20.2 million. Net overseas migration was a significant contributor to this growth (figure 2.12).

The net overseas migration peak of about 157 400 persons in 1988-89 contributed 55 per cent to Australia's population growth in that year. On the other hand, the trough in 1975-76 contributed only 15 per cent (about 21 200 persons) to population growth (ABS 2004b). Since 1972, about 41 per cent of Australia's population increase has been due to migration.

In terms of the contribution of net overseas migration to Australia's population size, annual migration flows have had a considerable cumulative effect. For example, 10 per cent of the population in 1947 was born overseas. By 2001, this proportion had increased to 23 per cent (figure 2.13).

There is also a second-generational effect of net migration, as the children of immigrants represent a contribution to population growth that would not otherwise have taken place. Kippen and McDonald (2000) estimate that between the Second World War and 2000, immigration added about 7 million people to the population. If post-war immigration had been zero, the Australian population would have been only 12 million instead of over 19 million in 2000.

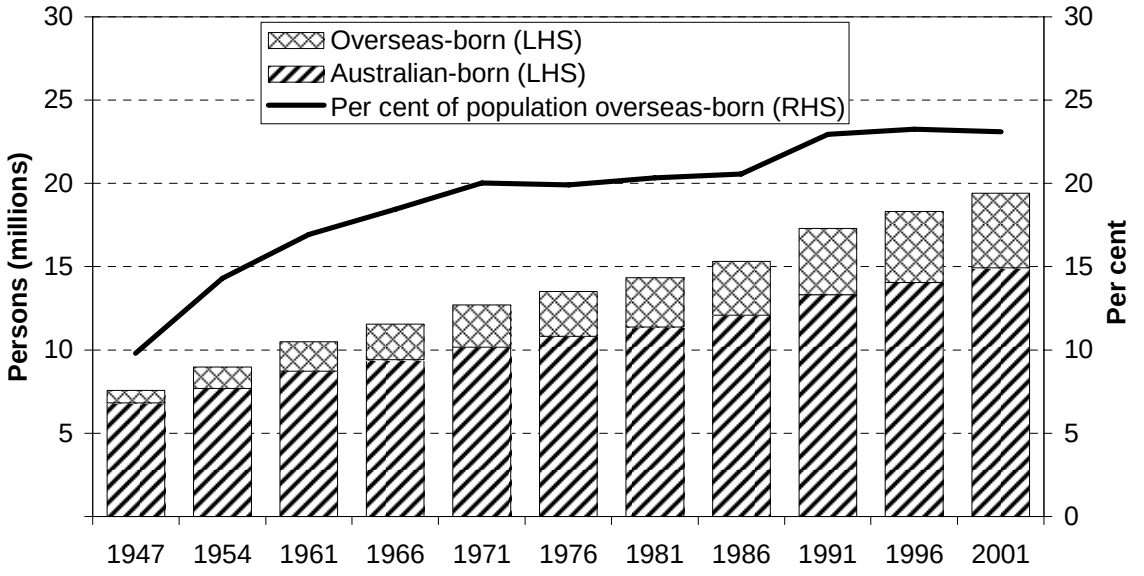
Figure 2.12 **Australia's population growth**
1971-72 to 2003-04[a, b]



[a] Natural increase is the number of births minus the number of deaths. Net overseas migration is taken from ABS calculations. It is the excess of permanent and long-term immigration over permanent and long-term emigration adjusted for category jumping and multiple movements. [b] Permanent and long-term arrivals less permanent and long-term departures do not equal net overseas migration as shown in this figure. This is because permanent and long-term arrivals, and permanent and long-term departures do not adjust for category jumping, but the net overseas migration figures do.

Sources: ABS (2004a); ABS (2004c).

Figure 2.13 **Australia's population by country of birth**
1947–2001



Sources: ABS (2004c); ABS Census years.

Country of origin, age and settlement patterns of immigrants

Country of origin

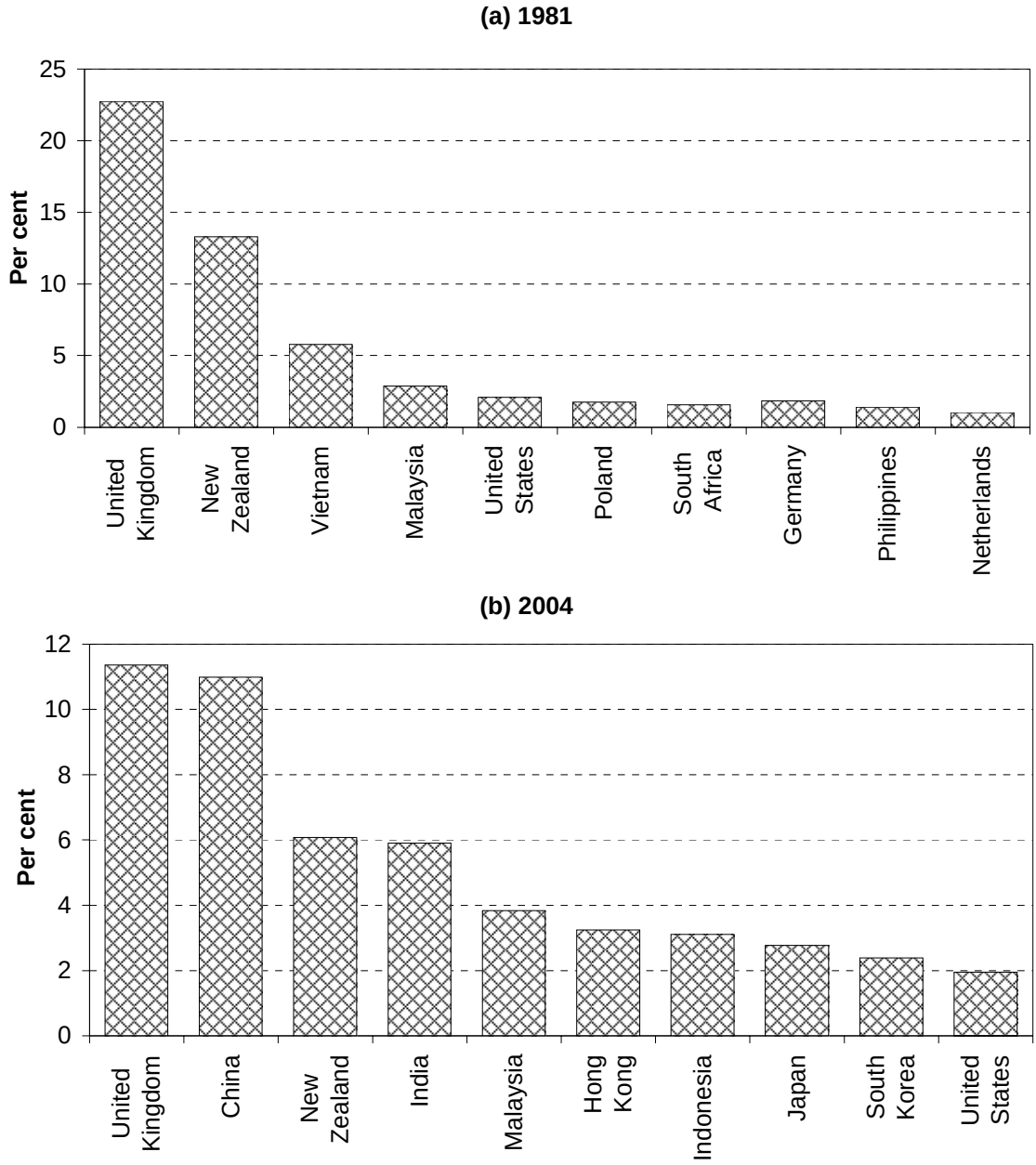
The cultural mix of immigrants to Australia has diversified, particularly over the past five decades. During the 1950s and 1960s, high proportions of immigrants from Europe reflected the role Australia played in resettling people displaced by the Second World War. The growing proportion of immigrants from the United Kingdom and Ireland was accompanied by substantial migration from Southern Europe, particularly from Greece, Italy and Yugoslavia.

Toward the end of the 20th century, there was a decrease in immigration from European countries and an increase from the Asia-Pacific region. Although historically the United Kingdom and Ireland were the largest single sources of immigrants to Australia, by the late 1970s and early 1980s, immigrants were increasingly likely to have been born in countries of the Asia-Pacific region (ABS 2002a). For example, Main English-Speaking countries (the United Kingdom, New Zealand, the United States and South Africa) accounted for around 40 per cent (84 464) of permanent and long-term arrivals to Australia in 1981. By 2004, these countries accounted for only 21 per cent (85 334) of arrivals.

Figure 2.14 displays the total number of permanent and long-term arrivals from the top ten countries in 1981 and 2004. In 1981, immigrants mainly originated from the United Kingdom (48 362), followed by New Zealand (28 277) and Vietnam (12 285). By 2004, the United Kingdom remained the main source country for immigrants (46 884), however its share of the total permanent and long-term arrivals decreased from about 23 per cent in 1981 to about 11 per cent in 2004. A similar trend was experienced by immigrants arriving from New Zealand. Their share of total permanent and long-term immigration fell from about 13 per cent in 1981 to about 6 per cent in 2004.

The increase in permanent and long-term arrivals from the Asian region is now more prevalent. In 2004, the main source countries of immigrants from Asia were China, India, Malaysia, Hong Kong, Indonesia, Japan and South Korea, which accounted for around 32 per cent (133 025) of total arrivals to Australia. The increase in immigrants from China and India, representing about 17 per cent of total permanent and long-term arrivals in 2004 (69 662), has largely occurred over the past 10 years.

Figure 2.14 **Country of origin of permanent and long-term immigrants**
Top 10 countries, 1981 and 2004



Source: ABS unpublished data.

Age

The main impact of net overseas migration on the age structure of the resident population is to contribute a larger proportion of people of early working age. The flow of immigrants is overrepresented by persons in their early teens to mid thirties. In 2003-04, around 72 per cent of net overseas migration was in the 15–34 year age group compared with 28 per cent of the Australian resident population

(ABS 2005b). An increase in the current levels of net overseas migration, however, would have little impact on ageing. As noted by McDonald and Kippen (2000):

> Levels of annual net migration above 80 000 become increasingly ineffective and inefficient in the retardation of ageing. (p.2)

Recent immigration policies have had a stronger focus on obtaining younger immigrants. The GSM, for example, focuses on obtaining immigrants aged less than 45 years, with maximum points awarded for those aged between 18 and 29. In 2004, immigrants in the 15–44 year age group accounted for 74.5 per cent (307 247 persons) of permanent and long-term arrivals — an increase of around 12 percentage points from 1981.

Settlement patterns

Immigrants have a high propensity to settle in New South Wales with 35.9 per cent of overseas-born persons in Australia residing in New South Wales in 2001. Victoria had the second highest proportion of overseas-born persons (26.3 per cent), followed by Queensland (15.0 per cent), Western Australia (12.1 per cent) and South Australia (7.2 per cent), with the ACT, Tasmania and the Northern Territory having proportions of less than 2 per cent (appendix D). According to Hugo (2004b), in recent years, Queensland has experienced an increase in the number of newly-arrived immigrants.

As a percentage of each jurisdiction's population, in 2001 the highest proportion of overseas-born persons lived in Western Australia (27 per cent). Victoria and New South Wales also had a high proportion of overseas-born persons (23.4 per cent for each jurisdiction), followed by the ACT (21.6 per cent) South Australia (20.3 per cent) and Queensland (17.2 per cent) (appendix D).

Regional settlement patterns

In 1947, almost 50 per cent of Australia's population lived outside major urban areas, decreasing to 35 per cent in 2001 (Hugo 2004b). Based on the Remoteness Area classification, in 2001, around 66 per cent of Australia's total population resided in major cities, 32 per cent lived in inner or outer regional centres and 3 per cent lived in remote or very remote areas (appendix D).

Relative to the Australian-born population, immigrants tend to have a greater propensity to settle in Australia's major cities. In 2001, around 83 per cent of overseas-born persons in Australia resided in major cities compared with around 61 per cent of the Australia-born population. The impact of immigrants in major cities is underestimated since the children born to overseas-born persons after

arrival in Australia are included in the Australian-born population. In 2001, around 24 per cent of the Australian-born population lived in inner regional areas compared with 11 per cent of overseas-born. Around 12 per cent of the Australian-born population lived in outer regional areas compared with 5 per cent of overseas-born. Around 3 per cent of the Australia-born population lived in remote and very remote areas compared with 1 per cent of overseas-born.

Settlement patterns by recency of arrival

This section briefly examines the settlement patterns of immigrants by recency of arrival at the level of the Statistical Division (SD)[3] for each state and territory.

In 2001, the majority of overseas-born persons in most states and territories resided in capital city SDs. In the case of Tasmania, just under half of the overseas-born persons (22 172) resided in Greater Hobart (figure 2.15). After the ACT (which has only two SDs), the jurisdiction with the highest proportion of overseas-born population residing within its capital city SD was Victoria, with 88.3 per cent (954 048 persons). The other jurisdictions with more than 80 per cent of the overseas-born population residing in the capital city SD were South Australia (251 953 persons in Adelaide), Western Australia (418 333 persons in Perth) and New South Wales (1 233 538 persons in Sydney) (figure 2.15).

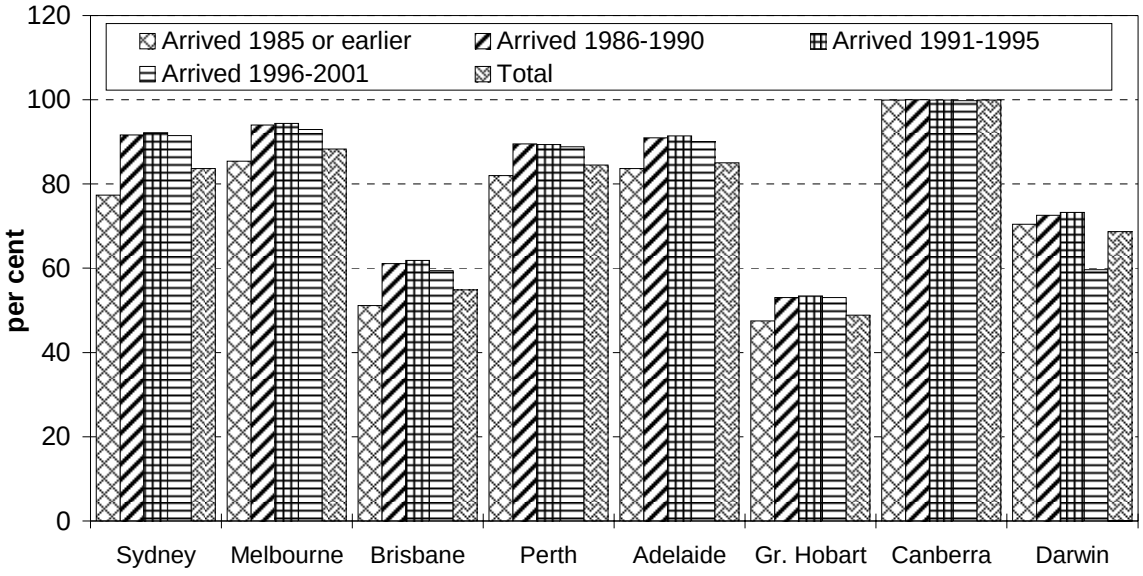
In 2001, around 55 per cent (338 128 persons) of the 616 242 overseas-born persons in Queensland resided in Brisbane. Other SDs in Queensland with relatively high overseas-born populations included Moreton (24.0 per cent), Far North (5.8 per cent), Wide Bay-Burnett (3.9 per cent) and Northern (3.3 per cent). (Appendix D contains more information on settlement patterns by each jurisdiction's SD and by immigrants from Main English-Speaking and non-Main English-Speaking countries.)

Generally, there is a higher propensity for immigrants who have been in Australia for less than 15 years to reside in the capital cities. The five capital cities, Sydney, Melbourne, Brisbane, Perth and Adelaide, accounted for about 80 per cent of Australia's overseas-born population in 2001. The proportion of overseas-born persons in these cities was higher for those arriving after 1985 than for those arriving in or before 1985 (figure 2.15). There were only small variations (around 1–2 percentage points) over time in the proportions of overseas-born residing in these capital cities between 1986 and 2001.

3 SDs are highest level of sub-divisions in each state as defined by the ABS.

Figure 2.15 **Per cent of overseas-born residing in capital cities**

Statistical Divisions by recency of arrival, 2001



Source: ABS 2001 unpublished Census data.

3 Linking migration, population and productivity

Key points

- The key drivers of the economic effects of migration are:
  - the level of migration relative to the size of the population
  - the differences between migrants and the existing resident population.
- The main sources of differences include gender, age, level of education, field of qualification, country of origin, English language proficiency, work experience, wealth and geographical region of initial settlement.
- The characteristics of migrants are influenced by:
  - the entry conditions for each visa category (Skilled, Family and Humanitarian)
  - the self-selection and motivation of migrants entering under each visa category.
- Migration and population size influence productivity and income per capita through a number of channels including:
  - changes to the supply of labour, including its size and skill composition
  - changes to macroeconomic variables, such as investment, capital stock, and the terms of trade
  - changes to the sectoral structure of the economy
  - the potential for economies of scale and increased competition in the domestic economy
  - the endowment of natural resources and potential for environmental externalities
  - the effects on the government sector, including government revenues, transfer payments and other expenditures
  - the effects on trade and the transfer of technology.
- The overall impact depends on the sum of the contributions of these influences, some of which are positive and others negative, and is essentially an empirical matter.

The Productivity Commission has been asked to examine the effects of migration and population growth on Australia's productivity and economic growth and to identify the causal links involved. These links are sketched out in this chapter. In

the following chapters and appendixes, the links are explored in more detail, both conceptually and empirically.

3.1 Economic growth and living standards

Before proceeding, it is useful to clarify some of the economic growth concepts and terminology used in this chapter.

Migration can affect society in many ways. In this study, the focus is explicitly on the effects on productivity and economic growth, as set out in the terms of reference. Thus, the important social and cultural effects of migration are not generally covered, except where they are linked to, and affect, productivity and economic growth.[1]

Improving the living standards of the community is one of the main goals of governments in administering public policy. For the purpose of this study, living standards are measured using indicators of real income per capita and real consumption per capita. The measures used are real Gross Domestic Product (GDP) per capita, real Gross National Product (GNP) per capita and real aggregate consumption per capita. GNP is equal to GDP plus Net Foreign Income and provides a measure of the income accruing to Australian residents.

The limitations of GDP and GNP as measures of welfare are well recognised (Barro 1997; Jackson et al. 1994). However, GDP per capita is widely used for policy purposes as a measure of living standards notwithstanding its limitations. It allows for the reliable identification, quantification and comparison of major factors that can affect living standards. Alternative measures of welfare and living standards are conceptually superior and are presented in box 3.1. They typically present difficult data collection and measurement problems that can reduce the ability of living standards to be meaningfully compared over time and between different population groups.

In using GDP per capita and related indicators, much can be revealed about the economic consequences of migration and population growth. Aspects of welfare not captured by GDP are considered separately and often in a qualitative way.

The economic growth metrics are expressed in per capita terms because income (or consumption) per person is most relevant to the standard of living of individuals in

1 The Department of Immigration, Multicultural and Indigenous Affairs (DIMIA 2005h) has sponsored a separate study examining the social benefits and costs of migration.

Box 3.1 **Measures of welfare and living standards**

Genuine Progress Indicator (GPI)

- GPI adjusts GDP to account for effects on living standards that arise from income distribution, the value of household and volunteer work, and costs associated with crime and pollution.

Human Development Index

- The United Nations Development Programme employs this index to measure living standards. It is based on indicators of longevity (life expectancy), knowledge (adult literacy) and standard of living (GDP adjusted for purchasing power).

Other measures of welfare include: the ABS *Measures of Australia's Progress* framework, which augments conventional economic statistics with a broad range of economic, social and environmental indicators; and the Australian Treasury wellbeing framework, which examines different indicators of consumption, distribution, risk, complexity and opportunity to measure material wellbeing. In addition, some Australian State Governments have produced their own economic and social indicators of welfare. In Victoria, for example, a series of indicators is published as part of the *Growing Victoria Together* framework.

Australia. Thus, growth measured in per capita terms is more informative for policy purposes. The absolute sizes of the economy and population are less relevant when considering living standards.[2]

For the purpose of this study, productivity growth is expressed as labour productivity, typically measured as real GDP per hour worked. This follows the conventional approach used to study economic growth at the macroeconomic level.

Whose living standards are we assessing?

The economic effects of migration and population could be assessed from the perspective of various groups in the Australian population, including the Australian-born, existing immigrants, existing residents (Australian-born plus existing immigrants), future immigrants, or all of the above.

Existing residents have an interest in the impact of current and future migration on their income and wealth. Their interests could relate to their level of income or its relativity to that of new immigrants; or about the fiscal implications of migration for tax rates and benefit rates; or about the value of various migration-sensitive assets,

2 For other matters, such as national security, the size of the economy and the population might be more relevant.

such as housing. Consequently, the political and policy debates often includes discussion of the economic effects on existing residents compared with new immigrants. Thus, many studies of the economic impacts of immigration focus on effects on the income of 'natives'[3] or attempt to quantify the 'migration surplus': the increase in the income or wealth of the host population following immigration.[4] The effect of immigration on existing residents is an appropriate policy focus. However, because the estimation of the migration surplus is difficult, only particular aspects have been attempted for this study.

Estimating the income and wealth distribution consequences of immigration for existing residents, new immigrants, or the entire resident population is more complex than estimating the effects on average income per capita. Income changes can occur through many pathways including: the systems of transfer payments, provision of government services (health and education), and all forms of taxation, as well as the market determination of the returns to capital and labour, and of changes in wealth. Estimation of income distribution effects on existing residents and new immigrants requires the 'tracking' of the outcomes for these groups.

The Commission provides some insights into the income distribution effects of migration and population growth in chapter 7.

3.2 Size and diversity are keys to the economic effects

The links between migration, population and the economy are interdependent and complex. The economic effects depend partly on the level of migration relative to the size of the population. The rate of growth of the population and the economy are directly related to the rate of migration. In turn, a faster growing economy can affect the rates of growth in productivity and income per capita.

However, migration affects much more than growth rates and the sizes of the population and economy. Migration affects a diverse set of demographic factors, which can cause adjustment throughout the economy (box 3.2).

The policy settings of the migration program and the self-selection of immigrants are important determinants of the diversity of immigrants (Chiswick 1999). The motivation for migration is likely to differ across visa categories (for example,

3 The term 'native' is widely used in the literature (particularly in the United States) to describe someone born in a country.

4 Borjas (1995), Levine, Lotti and Pearlman (2003), Clarke and Ng (1993) and Chang (2004).

Box 3.2 **Links between migration and demographic and economic factors**

Migration flows can influence demographic and economic factors in various ways, including through:

- the number of migrants (net migration to Australia), which can affect the rate of growth of the population and the economy
- the gender and age distributions of migrants, which can affect economy-wide fertility rates, labour supply, household consumption and savings, and government revenues and expenditures
- the geographical location of settlement, which can affect regional labour supply and congestion in large cities
- the occupation, level of qualification, work experience, country of origin, and fluency in English, all of which can affect the labour market
- the self-selection of migrants could mean that they have characteristics, such as motivation and determination to succeed, which are higher than those of the resident population
- the amount of capital transferred into and out of Australia, which can affect savings and investment and the balance of payments.

Skilled, Family and Humanitarian). Thus, immigrants in each category can have different characteristics compared with those of the Australian-born and existing migrant populations, or immigrants of another visa category.

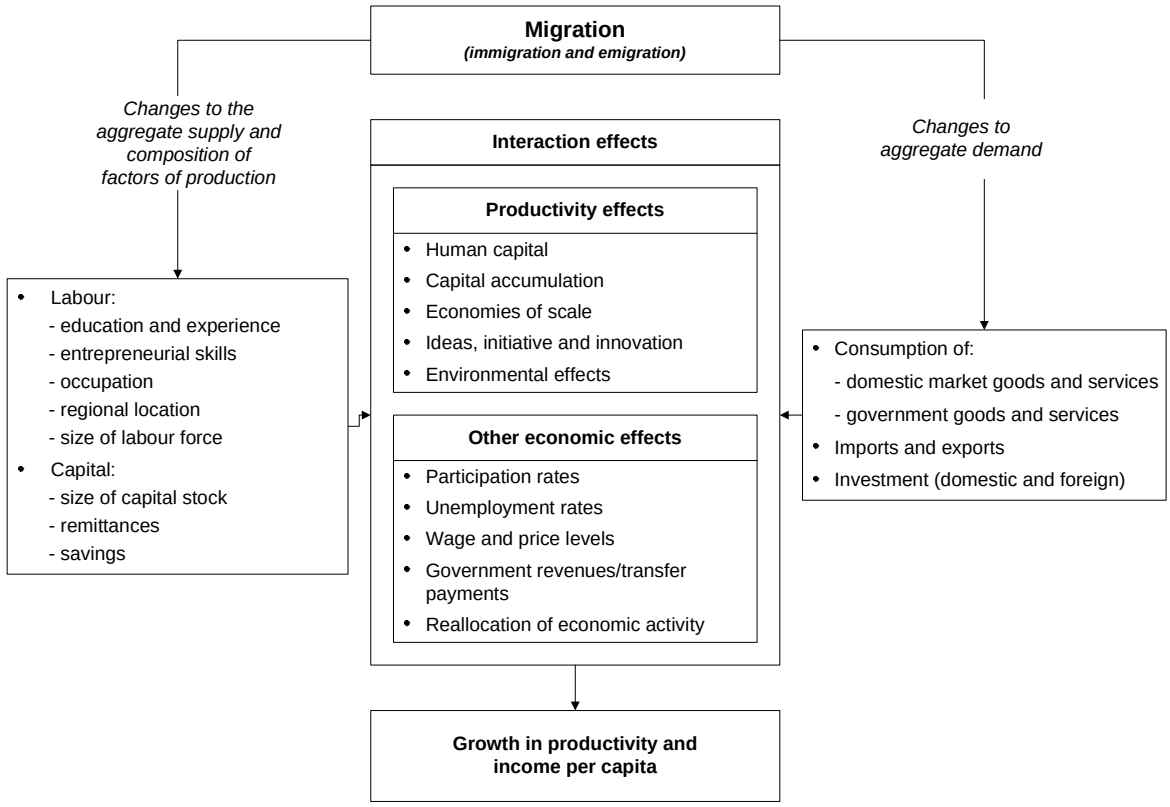
The characteristics of immigrants could also change with the length of residency in Australia. Moreover, the Australian-born children of immigrants could have different characteristics compared with the rest of the Australian-born population.

Thus, the cumulative effects of diversity arising from immigration can change the evolution of the economy.

A stylised representation of the links between migration and the economy is presented in figure 3.1. It illustrates how migration can alter many of the supply and demand relationships in the Australian economy.

Positive net migration is likely to result in a faster growing population and economy. It could also change the structure of the economy, depending on the extent to which the characteristics of migrants differ from those of existing residents. Given the policy settings of Australia's migration program, the economic effects of migration are also likely to vary by industry, occupation and geographical location.

Figure 3.1 **Stylised links between migration and the economy**



Sources: Adapted from Meikle (1985); Wooden et al. (1994); Junankar et al. (1998).

However, the changing size and structure of the economy, per se, is not the central issue for this study. The relevant question is: what are the implications for growth in income per capita and productivity? The focus of this study is explicitly about how migration is linked to income per capita and productivity. These links also provide insights into how migration affects the distribution of income between existing residents and new immigrants.

The key linkages are described briefly in the next section. These linkages are elaborated in the following chapters and appendixes.

3.3 Overview of migration's links to productivity and income per capita

There is a large body of literature about the economic effects of migration and population growth. The purposes of these studies vary widely and a range of analytical frameworks and quantitative techniques are used. Foster (1996) has a useful introduction to the approaches applied in Australia. Borjas (2003, 1999 and 1995) provides an overview of the approaches used for the United States. The

migration and economic environments in Australia and the United States are quite different. Consequently, the focus of the studies in each country differs. In the United States, the principal focus is on the labour market effects on American-born (the migration surplus).

It is a complex task to identify the ways in which migration and population growth are linked to productivity and income per capita growth. A systematic approach is to synthesise the theory and principles found in the fields of economic growth, macroeconomics and the economics of labour markets. This approach also facilitates the clustering of the linkages into thematic groups.

The thematic grouping of the links discussed below reveals a large number of complex factors. Partial analysis of each link provides insights into the effects of each factor. However, such partial analysis is generally inappropriate for drawing inferences about the overall economic effects. To assess the *overall* economic effects, the Commission has employed an overarching framework — using, where feasible, statistical analysis of some links and demographic modelling of others — within a general equilibrium model. The main links, through which migration and population growth can affect productivity and living standards, are briefly discussed below. Ultimately, however, the relevance of each link is an empirical matter.

Supply and composition of labour

Immigration increases total labour supply in the economy. However, growth theory shows that it is labour supply per head of population that is relevant to understanding growth in income per capita (Weil 2005).

The effects on labour supply per capita can be understood easily by expressing hours worked per capita as the product of the following ratios:[5]

- total hours worked divided by the number of persons in employment
- number of persons in employment divided by the number of persons in the labour force (employment rate)
- number of persons in the labour force divided by the number of working-age persons (participation rate)
- number of working-age persons divided by the total population.

Migration could alter these ratios with the net result dependent upon the labour market outcomes for both immigrants and the resident population.

5 This form of ratio analysis has been used to illustrate the effects of ageing on GDP per capita (PC 2005b).

In addition to changing the hours worked per capita, immigration can change the productivity of labour supply, measured as GDP per hour worked. Increases in the level of skilled immigration might, for example, be expected to lead to increases in the value added per hour worked (a 'skill effect'). All else equal, any skill effect resulting from increasing the level of skilled immigrants should, over time, be reflected in higher average wage rates.

Labour market outcomes can also differ depending on whether immigration is temporary or permanent. The effects of temporary immigration on the labour market depends on the time horizon examined, as this determines the extent to which temporary immigration complements, rather than substitutes for, long-term labour supply. Increases in the number of temporary immigrants in response to short-term labour shortages in one industry or region can address any short-term labour market disequilibrium (box 3.3). This might lead to short-term productivity improvements, for example, in allowing projects to go ahead which otherwise would have been delayed due to the shortage of labour supply. However, in the longer term, the reliance on temporary immigration to address short-term labour supply shortages might act as a substitute for the development of long-term labour supply by dampening signals as to those areas where labour supply needs to expand.

Overall, therefore, the labour market outcomes of immigration are determined by three principal factors:

- the number of immigrants arriving in various visa categories relative to the size of the existing population
- the extent of differences in characteristics between immigrants of various visa categories and the existing population
- the labour market adjustment to the initial changes in the supply of labour arising from immigration.

Any analysis of the labour market adjustment arising from immigration needs to accommodate a relatively high degree of labour market segmentation (for example, labour differentiated by skill and occupation). This is especially the case for Australia, where migration policy targets immigrants in specified occupations and skills. In addition, the self-selection of immigrants entering under various visa categories (Skilled, Family or Humanitarian) can also modify the labour market attributes of immigrants because the motivation for immigration can differ between visa categories.

Labour market outcomes of immigration also have income distribution effects. In this respect, a key issue is the extent to which the wages of existing residents change by occupation, skill category, industry and region.

Box 3.3 **Labour demand and skill shortages**

Skill shortages arise when demand for workers exceeds supply. This occurs as a result of an insufficient supply of appropriately qualified workers willing to work under existing market conditions, particularly at the prevailing wage. Over time the market should adjust to address such imbalances. However, a variety of causes might delay or hinder the adjustment process and the extent to which skill shortages are experienced in any particular sector, industry or occupation. These include:

Wages slow in adjusting — for example, employers take time to recognise and respond to labour shortages or workers take time to recognise better opportunities elsewhere and react to them (Shah and Burke 2005)

Labour supply slow in adjusting — for example, education and training institutions take time to recognise skill needs, or there is a fundamental mismatch of skills and training provided and those demanded in the labour market. Moreover, many skills take years to acquire (especially professional and technical skills) (Richardson 2005)

Information problems — related to the above, there might be poor or unreliable information in the labour market, thereby dampening market signals to workers, industry, employers, and education and training institutions (OECD 2003)

Technological change — rapid technological change might lead to a structural shortage of workers in possession of needed skills (PC 2000)

Institutional — for example, imperfect product market competition, contracts of employment between employers and employees, and social welfare arrangements (OECD 1994)

Demographic — for example, low female participation rates, population ageing and so forth.

The impact of immigration on skill shortages is complex. Immigration can provide a means of addressing skill shortages without the costs associated with time and training of the domestic workforce. However, immigration might also dampen the labour market price signals that encourage investment in training by domestic businesses and labour (exacerbating longer-term shortages).

In Australia, immigration initially changes the supply of labour by occupation, educational attainment, skills and region of immigrant settlement. The demand for the various types of labour is also likely to differ across industries. The labour market adjustments across industry sectors could vary depending on:

- the labour intensity of the sector
- substitution possibilities between immigrant and existing resident workers (Chiswick 1989; Grossman 1982)
- substitution possibilities between skilled and unskilled workers (Chiswick 1989; Hamermesh and Grant 1979)

- substitution possibilities between occupations
- the relative growth of sectors arising from the reallocation of sectoral activity (Appleyard and Field 1992)
- any labour market rigidities.

Increasing the supply of skilled labour causes adjustments in the labour market. To reach a new equilibrium with a higher ratio of skilled to unskilled workers in the economy, the marginal physical product (and real wage) of skilled workers would be expected to decrease, all else equal. Correspondingly, the marginal physical product (and real wage) of unskilled workers would be expected to rise.

The productivity of a larger labour supply depends, in part, on what happens to the supply of capital.

Capital accumulation

Growth theory suggests that macroeconomic conditions regarding savings and investment are important determinants of the level of labour productivity and income per worker (Barro 1997; Benge and Wells 2002; Romer 2001; Weil 2005). If the rate of net investment is unable to sustain the capital to labour ratio with a faster growing workforce caused by migration, then labour productivity and real wages could decrease, all else equal. This process is referred to as capital dilution.

Migration can alter the supply of labour in diverse ways across skill levels, occupations and industries. The resulting adjustment of the capital to labour ratio is likely to differ across industries. The extent of the adjustment depends on the initial capital to labour ratios (labour intensity), the elasticities of substitution between labour and capital, and the sectoral reallocation of economic activity.

The capital dilution effect has often been used to argue that migration leads to a decrease in real wages (Borjas 1995). To bring about equilibrium in the economy with a lower capital to labour ratio, the marginal physical product of labour and real wages decrease, all else equal. Correspondingly, the marginal physical product of capital and the rate of return on capital increase.

The decrease in the real wage does not necessarily mean that the income per capita of existing residents decreases (Borjas 1995). The higher return on capital can contribute to higher income per resident (to the extent that the capital is owned by existing residents). The net result of these two effects determines the overall outcome.

The effect of capital dilution is likely to be smaller for a small, open economy, such as Australia. A higher rate of investment can be met from foreign investment if the rate of domestic saving and investment is too low. In this environment, there would be more limited long-term effects on real wages and rates of return on capital, all else equal.

There is another way that the capital to labour ratio could be affected. With a larger economy, expansion in output could lead to an expansion in exports. This expansion in exports could lower the prices received for exports, leading to a decrease in the terms of trade. To the extent that domestic rates of return on capital are determined by international markets, the marginal physical product of capital would need to rise in order to raise the marginal *value* product of capital. In turn, this would decrease the marginal physical product of labour, real wages, the capital to labour ratio, and labour productivity.

The accumulation of capital can also be affected by the amount of capital that immigrants bring with them, and the extent to which they send remittances to their country of origin (Brown 2005; Lopez-Cordova and Olmedo 2005). In addition, the marginal value product of capital might increase as a result of changes in the construction price of capital. For example, the cost of construction could increase if wage rates in the construction industry increase in response to the increase in demand for investment.

Finally, the faster rate of net investment could provide an opportunity to adopt new technology at a faster rate, thereby contributing to higher productivity and living standards.

Economies of scale and competition

As noted in chapter 2, migration to Australia has contributed significantly to population growth. If economies of scale are present, then the increase in population size could contribute to an increase in productivity and income per capita. This source of productivity is cited often as a potential benefit of migration (BCA 2004; Corden 2003; Foster 1996; Garnaut 2002 and Withers 2003d).

An important issue is the extent to which the increase in population translates into an increase in demand for the goods or services of those sectors that exhibit economies of scale.

Corden (2003) suggests that the link between economies of scale and the size of the population is most relevant in sectors producing goods and services that are not

traded internationally (for example domestic transport, communications and public administration).

Population size (and domestic demand) could be less relevant to internationally traded goods and services sectors because economies of scale can be achieved through international trade. A caveat here, raised by both Corden (2003) and Withers (2003b), is the extent to which transport costs are impeding exports. Australia's transport costs could be high due to the 'tyranny of distance'. In this case, a larger domestic market might provide a platform to lower unit costs of supply, thus offsetting high transport costs and providing a platform for breaking into export markets. Whether this occurs depends, in part, on the extent to which economies of scale arise from a modest increase in the size of the population.

There are other ways in which a larger population could affect productivity. These effects arise from those externalities that are themselves manifested as economies of scale. The externalities arise from the higher density of population and economic activity, and are often referred to as 'agglomeration' or 'thick markets' effects.

Agglomeration of economic activity can:

- increase knowledge spillovers between firms (Morrison-Paul and Siegel 1999)
- lead to economies of localised industry arising from shared inputs in production (repair, accounting, legal) (Quigley 1998)
- exploit greater specialisation between firms and any economies of scale in local transport networks (Ciconne and Hall 1996)
- reduce transaction costs (matching work skills to job requirements) (Quigley 1998)
- increase the adoption of new technology by increasing the domestic capability to undertake research and development (Keller 2002)
- reduce risk arising from diversity of customers and non-coincident fluctuations in sales (Quigley 1998).

Finally, a larger population (and domestic market) might improve productivity by enhancing competition in domestic markets, by supporting a greater number of firms which compete against each other (BCA 2004; Corden 2003). This could reduce the misallocation of resources arising from monopolistic pricing behaviour.

Natural resources, land and environmental externalities

Increasing the size of the economy increases the demand for natural resources (fixed and renewable) and land. Growth theory suggests that if the supply of these

resources is limited, then it can result in lower labour productivity and income per capita (Romer 2001). The effect is similar to that of capital dilution described above.

Linking migration and population size to the use of natural resources and its productivity effects raises similar issues to those discussed in economies of scale. Natural resources and land can be used in the production of most goods and services. However, in the context of migration, it is their use in the production of non-traded goods and services that is most relevant. Migration and a larger population contribute to an increase in demand for non-traded goods and services. An exception arises if migration leads to a deterioration in the current account balance. To sustain the current account balance, an increase in exports might be required. In turn, this could increase the demand to use the natural resources embodied in the exports.

If the supply of natural resources cannot keep pace with growth in their demand (regardless of the source of demand), then the price for natural resources rises. Over time, the increase in price encourages substitution to alternative inputs and the development of new technologies. These developments allow the economy to decrease the intensity of the use of natural resources (Romer 2001; Weil 2005).

Substitution and the development of new technologies can reduce the drag on productivity arising from the scarcity of natural resources and land. Nevertheless, a drag remains, and its size depends on the ease of substitution between natural resources/land and other factors of production. The potentially lower productivity arising from limited natural resources and land needs to be balanced against the other productivity effects of migration and population growth.

The links between population size and environmental externalities, such as congestion (traffic congestion, congestion in national parks) and pollution, are similar to those described above for natural resources. The main difference is that the effects of these externalities are not necessarily reflected in market prices (Clarke and Ng 1993; Weil 2005). Thus, government intervention might be required to internalise these effects, such as establishing property rights, pollution taxes, subsidies, or regulations.

The avoidance of pollution and congestion can moderate the decrease in living standards and productivity. However, the abatement and enforcement costs must also be considered. The overall impact depends on both the internalisation of the externality and the ease of substitution of technologies that have lower congestion and pollution (costs of abatement).

Once again, this decrease in productivity from environmental externalities needs to be balanced against the other productivity effects of migration and population growth.

The income redistribution effects arising from the increasing relative scarcity of natural resources and land are likely to favour existing residents. They accrue as increasing resource rents to existing residents, if they own the resources (Clarke and Ng 1993). The exception would be the dilution of per capita resource rents for those resources embodied in exports, where prices are set by international markets (Garnaut 2002). The income redistribution effects arising from internalising environmental externalities depend on the level of the externality, the policies implemented to internalise them and their costs of abatement. In other words, it is difficult to determine the effects without knowledge about the specific policies implemented by government to solve the problem.

Government expenditure on services, transfer payments and taxation

The diversity of immigrants has the potential to alter:

- the mix of goods and services provided by all levels of government (for example, education and health)
- the mix and levels of the various transfer payments made by all levels of government (for example, social security)
- the level of taxation revenue collected by all levels of government.

Governments use fiscal policy to achieve a number of objectives, such as macroeconomic management of the economy, income redistribution and economic growth.

However, only the efficiency effects of changes to government expenditures and revenues are relevant to productivity and income per capita. According to growth theory, it is possible for fiscal policy (taxation and government expenditure) to have long-run implications for economic growth (Zagler and Durnecker 2004).

For example, positive externalities could exist in education, health, research and development, and infrastructure. In such circumstances, there could be a role for government to facilitate provision so that the benefits of these externalities are captured (Weil 2005; Zagler and Durnecker 2004).

On the revenue side, taxes can distort private decisions with respect to labour supply and capital accumulation. These distortions can alter the productivity of the economy (Diewert and Lawrence 1995; Freebairn 1995). On the other hand,

distortionary taxes can also be used to internalise any externalities arising from private decisions regarding the accumulation of human and physical capital, and research and development.

To illustrate how migration might affect efficiency, consider an increase in skilled migration. This could increase income tax revenue because a larger workforce per head of population is earning higher wages. It could also reduce transfer payments through a reduction in the proportion of the population receiving social security. Offsetting this would be an increase in the provision of goods and services. If the net result were a surplus, then the government might consider reducing tax rates to maintain the budget balance. This could reduce the deadweight loss of taxation and improve productivity.

Alternatively, governments might choose to increase the provision of services, increase savings or retire debt. The efficiency effects depend on the government response to the initial changes in expenditures and revenues, and the extent of any externalities and distortions.

The nature of the taxation and transfer payment systems is also pertinent to income redistribution effects. In the above example, existing residents would benefit from reduction in the tax rate.

Sectoral reallocation of economic activity

The diversity of immigrants can lead to a reallocation of economic activity between the various sectors of the economy. The change in the relative size of each sector can affect the growth rate in productivity at the aggregate level. This is because the aggregate rate of productivity growth is a weighted average of the sectoral rates of growth in productivity, with the weights equal to the relative size of each sector.

Generally, rates of productivity growth differ across sectors. The reallocation of economic activity across sectors changes the weights assigned to each sector. The aggregate rate of productivity growth could increase if the reallocation of activity were to result in higher weights for sectors with higher rates of productivity growth (Gollop 1985; Weil 2005). It is also possible for the restructuring of the economy to contribute to a lower aggregate rate of growth in productivity.

Trade and technology transfer

Immigrants, through their links to and knowledge of international markets, might facilitate access to more valuable markets, causing a reallocation of the nation's resources to exports that have a higher marginal value.

Immigrants might also possess skills that facilitate the importation and adoption of new technologies, thereby raising productivity and income per capita. It might also be possible for migrants to transfer their skills to existing residents (Stromback 1994). The skill transfer could occur by training provided by skilled migrants, cross-cultural skills and the imparting of attitudes favourable to increased efficiency.

Quantifying the links

There are many factors to consider in evaluating the effects of migration and population growth on productivity and growth in per capita income. Some contribute positively, others negatively. The overall outcome depends on the sum of the contributions. The magnitudes of the contributions are essentially an empirical matter, and are explored in the following chapters and appendixes.

In conducting this study, different methods have been employed to estimate the relationship between the relevant variables. These include statistical analysis, demographic modelling and general equilibrium modelling. Where possible the Commission has used these methods to quantify the links described above. However, quantifying some links was not practicable. For these links, the Commission has presented a qualitative discussion of the ways in which these links might affect productivity and per capita income. Consequently, there remains a number of important factors that could contribute to an increase or decrease in the estimates reported.

4 The diversity of the migrant workforce

Key points

- Immigrants work more hours per head of population than the Australian-born population, which makes a positive contribution to output per capita. This is a consequence of:
  - a high proportion of the immigrant population being old enough to work
  - employed immigrants working slightly longer hours than Australian-born workers.
- The immigrant population works more hours per head of population even though they have a lower workforce participation rate.
- Immigrants entering Australia under skilled visa categories have higher participation and lower unemployment rates than their counterparts entering under family and humanitarian visas.
- A permanent 50 per cent increase in skilled immigration would increase the supply of labour per capita in Australia by about 1.2 per cent after 21 years.
- Immigration could affect the hours worked by other Australians. However, studies have failed to find a link between immigration and unemployment among the existing population.
- Emigrants appear to work more than the average Australian resident. However, the effect of emigration on hours worked in Australia is likely to be small compared with the effect of immigration because the number of immigrants in Australia is much larger than the number of Australian-born persons residing overseas.
- Immigrants and emigrants alike have relatively high levels of formal education. They tend to be more concentrated in skilled occupations than the rest of the Australian population. Hence immigration — especially the Skilled Migration Stream — has increased average skill levels in Australia. Emigration appears to have decreased average skill levels, though the effect is much smaller than that of immigration.

Migration changes the composition of the Australian labour supply. These changes relate to the proportion of the population in work, the time spent at work, and workforce skills and roles. These factors can affect output from the Australian economy.

Growth theory indicates that it is labour supply per head of population that is relevant to understanding growth in income per capita, as discussed in chapter 3.

Migration has the potential to alter the supply and productivity of labour when the characteristics of migrants differ from those of the existing population. This is illustrated in box 4.1, where GDP per capita is decomposed into the product of hours worked per capita and labour productivity. Hours worked per capita is discussed in this chapter and the effect of migration on labour productivity is examined in chapter 5.

Labour supply per capita can be easily understood by expressing hours worked per capita as the product of the following ratios (box 4.1):

- number of working-age people divided by total population
- number of people in the labour force divided by number of working-age people (participation rate)
- number of people in employment divided by number of people in the labour force (employment rate)
- total hours worked divided by number of people in employment (average hours per worker).

These factors vary with the characteristics of immigrants entering Australia. The characteristics of immigrants in terms of post-school education, occupation and industry of employment of immigrants are reviewed in sections 4.1 and 4.2. The outcome for immigrants in terms of the four factors contributing to hours worked per capita are analysed individually (sections 4.3 to 4.6).

Immigration can have relatively large effects on the labour supply in regional areas, which are considered in section 4.7. Immigration can also affect the composition of the labour supply through second generation effects. The children of immigrants might have different characteristics to third or greater generation Australians, leading to additional long-term effects on the composition of the labour supply. These effects are considered in section 4.8. In addition, emigration might have implications for the labour supply, an issue which is discussed separately following the analysis of immigration (section 4.9).

This historical analysis gives little indication of the effect that the current migration program could have on the total Australian labour supply. To address this, the effect of changes in immigration flows on the labour supply are projected in section 4.10. The overall effect of migration on labour supply per capita is considered in section 4.11.

Box 4.1 **Decomposing GDP per capita**

Income per capita can be expressed as the product of hours worked per capita (the focus of this chapter) and labour productivity, measured as real output (GDP) per hour worked:

$$\frac{GDP}{POP} = \frac{Hours}{POP} \times \frac{GDP}{Hours}$$

where POP is the total population, GDP is real gross domestic product and Hours are total hours worked in the economy by its population.

In turn, hours worked per capita can be expressed as the product of four ratios:

$$\frac{Hours}{POP} = \frac{POP15+}{POP} \times \frac{LF}{POP15+} \times \frac{EMP}{LF} \times \frac{Hours}{EMP}$$
$$= \frac{POP15+}{POP} \times \frac{LF}{POP15+} \times (1-UR) \times \frac{Hours}{EMP}$$

where POP15+ is the population aged over 15 years, LF is the labour force (people in work or looking for work), EMP is the number of persons employed and UR is the unemployment rate. Also:

$\frac{POP15+}{POP}$ = proportion of the total population that is of working age

$\frac{LF}{POP15+}$ = participation rate

$1-UR = \frac{EMP}{LF}$ = employment rate

$\frac{Hours}{EMP}$ = hours worked per worker.

Source: PC (2005b).

4.1 The education levels of immigrants

Immigration brings in people who have varying levels of skills across a broad range of fields. Immigrants might increase or decrease average skill levels in Australia, depending on whether they have higher or lower average skill levels than the people already in Australia. By affecting the demand for, and supply of, skilled workers, immigration might also affect the skill levels of people already in Australia.

For the purposes of this section, educational attainment is used as a measure of skill. Four categories of educational attainment are used. In ascending order, they are no post-school education, certificate level, bachelor degree or diploma level, and postgraduate level.

Effects of immigration on the education levels of the workforce

Immigrants tend to be more highly educated than Australian-born people. Throughout the 1990s, a greater proportion of immigrants than Australian-born people had post-school qualifications (figure 4.1). Although the education level of the Australian-born population increased between 1986 and 2001, so did the education level of immigrants. By 2001, immigrants were more likely to have qualifications at postgraduate, bachelor degree or diploma levels. They were also more likely than Australian-born people to have completed year 12 or higher level schooling (DIMA, sub. 22).

Immigrants are more highly educated partly because the Australian immigration program has had a clear objective to attract skilled immigrants since at least the mid-1980s (DIMIA 2001). For example, of about 135 000 places provided for in the 2004-05 Migration and Humanitarian Programs, 77 800 were for skilled immigrants. The skilled visa groups of the Migration Program are specifically designed to target principal applicants who have desired skills. Immigrants in this group also include 'secondary' applicants, such as partners and children accompanying the primary applicant. The secondary applicants do not necessarily have the same skill levels as the principal applicant. However, they are still likely to have some skills, and to the extent that highly skilled people are likely to have highly skilled partners and children, the secondary applicants might in fact bring significant skills into Australia.

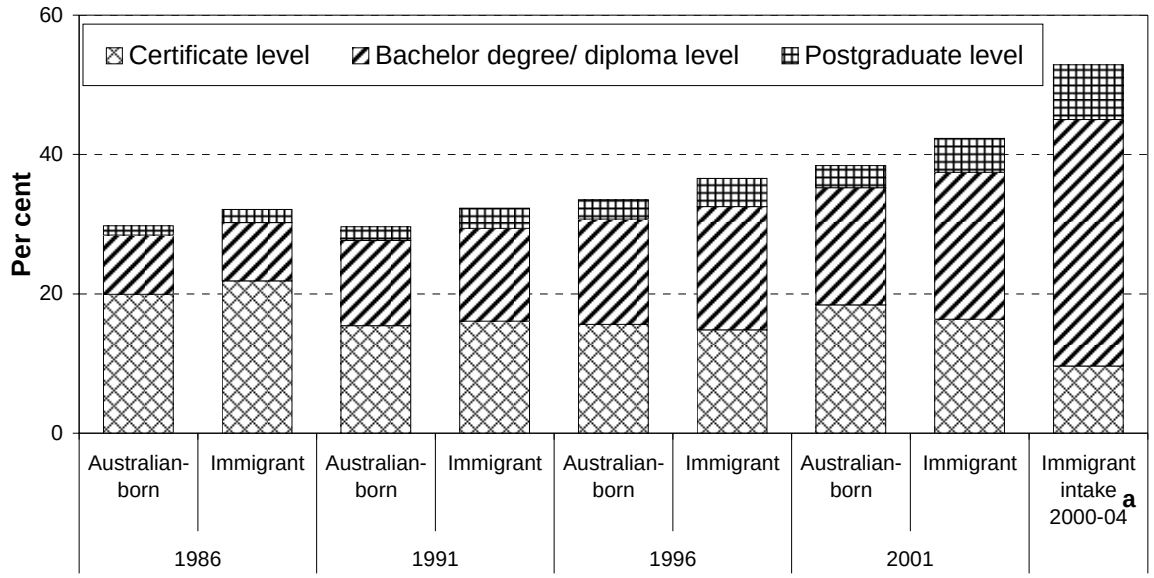
A proportion of immigrants entering under other visa groups also have skills. However, there are likely to be some qualitative differences in skills between primary and secondary applicants entering under skilled visas and also between the skilled visa group and other visa groups. For example, the qualifications of those in the non-skilled visa groups, and secondary applicants under the skilled group, are not assessed for their equivalence to standards in Australia.

Table 4.1 shows that the education level of immigrants is higher for those entering under skilled visas compared with other visa types. That said, many of those entering under other visa types are still highly educated. For example, a higher proportion of immigrants entering under the family stream between 2000 and 2004 had post-school qualifications than did the Australian-born population. On the other hand, few humanitarian immigrants had post-school qualifications.

The objective to attract skilled immigrants gained increased emphasis during the late 1990s (Khoo 2002). This has meant that recent immigrants are more skilled than those who entered in the early 1990s (Cobb-Clark 2006; Richardson et al. 2001). Over half of all immigrants between 2000 and 2004 held some form of post-school qualification (figure 4.1).

Figure 4.1 **Proportion of Australian-born persons and immigrants with post-school qualifications**

People aged over 15 years, 1986 to 2001 Censuses



a Immigrants who arrived in Australia between 2000 and 2004, were still in Australia in November 2004 and planned to stay in Australia for at least 12 months.

Source: Productivity Commission estimates based on unpublished ABS Census and Labour Force Status and Other Characteristics of Migrants Survey data.

Table 4.1 **Post-school education level of immigrants**

Proportion of immigrants aged over 15 years in each visa group between 2000 and 2004[a]

Visa type	*No post-school education*	*Certificate level*	*Bachelor degree/ diploma level*	*Postgraduate level*
	%	%	%	%
Family stream	50.8	10.4	32.4	6.4
Humanitarian	74.3	13.9[c]	11.8[c]	0.0[d]
New Zealand citizen	53.7	15.8	24.7	5.8[c]
Skilled	20.1	15.1	48.8	16.1
Long-term temporary[b]	55.0	4.8	34.9	5.4
All immigrants	46.9	9.7	35.5	7.9

a Rows might not add to 100 per cent as a result of rounding. **b** Includes only people planning to stay in Australia for at least 12 months. **c** Estimate has a relative standard error of 25 to 50 per cent. **d** Estimate has a relative standard error of over 50 per cent.

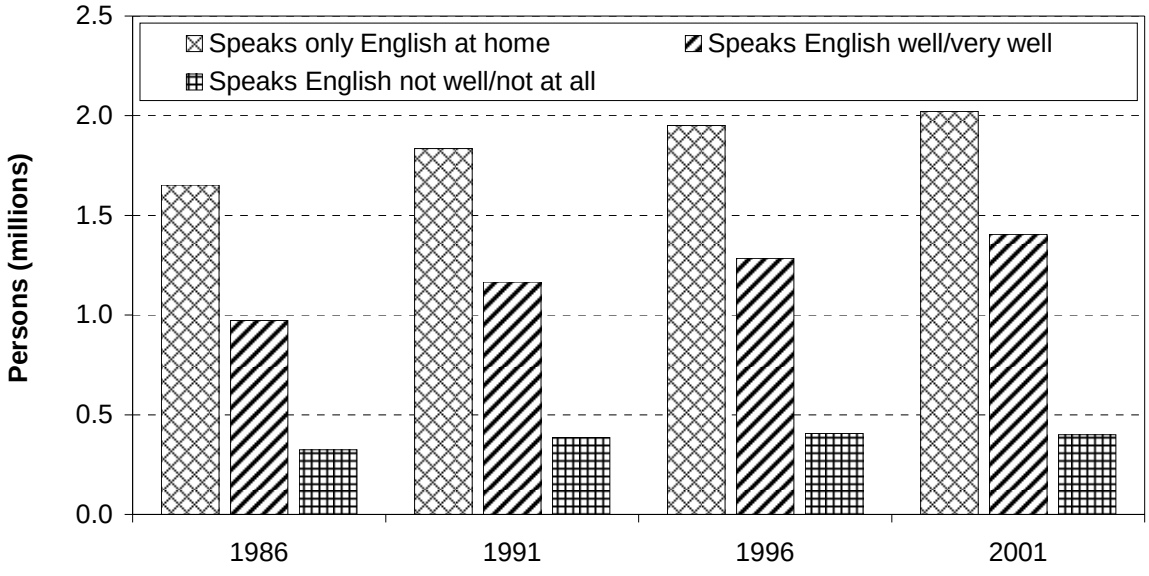
Source: Productivity Commission estimates based on unpublished ABS Labour Force Status and other Characteristics of Migrants Survey data.

In Australia, an important factor influencing immigrants' labour market outcomes is their proficiency in English. Based on data from the 2001 Census, most immigrants speak only English at home (figure 4.2). About 80 per cent of these immigrants came from countries where English is the major language. Of those immigrants who speak another language at home, most claim to speak English well or very well. Only about 10 per cent of all immigrants reported that they speak English 'not well' or 'not at all'.

Like formal education levels, the self-reported English ability of recently arrived immigrants has improved. Over 20 per cent of immigrants who arrived in the five years before each of the 1986, 1991 and 1996 Censuses claimed that they spoke English 'not well' or 'not at all'. This compares with about 16 per cent in the 2001 Census and for those arriving between 2000 and 2004 (unpublished ABS Labour Force Status and other Characteristics of Migrants Survey data).

To summarise, immigrants are more highly educated than Australian-born people. Therefore, their presence in Australia has raised the average education level of the population. Even though the education levels of Australian-born people have been rising over time, immigration has contributed to a further increase. The effect on Australian education levels depends on the migration stream — immigrants arriving under the Skilled Stream of the Migration Program have a particularly positive effect. The English ability of immigrants has improved over time, but there remains a significant group that report they do not speak English well.

Figure 4.2 **English ability of immigrants**
1986 to 2001 Censuses



Source: Productivity Commission estimates based on unpublished ABS Census data.

Effect of immigration on education of the existing resident population

It has been suggested that immigration can affect the skill levels of the existing Australian population. For example, the Australian Manufacturing Workers Union submitted that '[t]emporary skilled migration is a substitute for capability building through skills training' (sub. 20, p. 9).

Immigration by skilled people could have a negative effect on the education and training of the existing resident population through at least two mechanisms. First, by providing an alternative source of skilled workers, immigration could affect the *demand* for skilled Australian workers. Employers might choose to hire skilled immigrants rather than train local residents. Second, immigration could also change the return to skills in Australia. This would affect the incentives for individuals to undertake training, and in turn the *supply* of skilled workers in Australia.

As an offset to any such effects, some researchers (for example, Baker and Wooden 1992; Withers, sub. DR35) have suggested that skilled immigrants might be able to pass on their ideas and skills to the rest of the workforce, so that immigration might be a complement to, rather than a complete substitute for, domestic training. There is evidence of some Australian companies recruiting foreign workers specifically to improve the skills of their local workers (Northern Territory Government, sub. 25). Stromback (1994) found that most immigrants entering under the Employer Nominated Scheme and the Temporary Residence Program in Western Australia provided training to their co-workers.

Using a large, individual-level database, Baker and Wooden (1992) conclude that immigration did not displace training activities in Australia, although immigration was found to have a small negative impact on in-house training. Withers (2003b) also suggests that demand for goods and services by immigrants will contribute to an increase in demand for skilled workers and thus new training slots, offsetting the negative effects on training of other Australians. Based on these empirical studies, it appears that immigration has only a small impact on the training levels of existing workers.

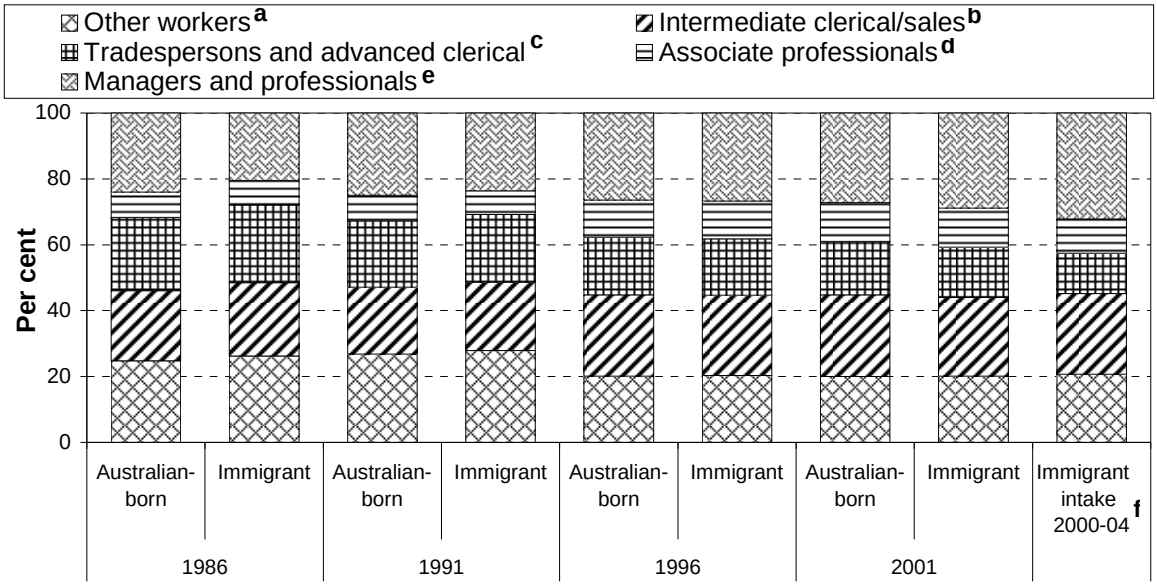
4.2 Immigration and the supply of labour by occupation and industry

Reflecting their higher educational attainment, immigrants tend to work in more skilled occupations than Australian-born workers. In 2001, a higher proportion of immigrants than Australian-born workers were managers, professionals or associate professionals. Since 1986, there has been a trend towards an increasing proportion

of immigrants working in higher skill occupations compared with Australian-born workers (figure 4.3).

Nevertheless, for a given education level, a higher proportion of immigrants work in less skilled occupations compared with the Australian-born population. Of people with diploma level or higher education, immigrants are less likely than the Australian-born population to be working as managers or professionals (table 4.2). This is especially so for recently arrived immigrants and is consistent with the findings of Green, Kler and Leeves (2005). Other evidence suggests that immigrants often work in less skilled occupations compared with their occupation before migration (Williams, Murphy and Brooks 1997). Both studies found that such differences are particularly marked for immigrants from non-English-speaking backgrounds.

Figure 4.3 **Occupation of employed persons**
1986 to 2001 Censuses



a Elementary clerical, sales and service workers, and labourers and related workers (Australian Standard Classification of Occupations (ASCO) skill level 5). **b** Intermediate clerical, intermediate production, clerical, sales, service and transport workers (ASCO skill level 4). **c** Tradespersons and related workers, advanced clerical and service workers (ASCO skill level 3). **d** Associate professionals correspond to ASCO skill level 2. **e** Managers, administrators and professionals (ASCO skill level 1). **f** Immigrants who arrived in Australia between 2000 and 2004 and were still in Australia in November 2004 and planned to stay in Australia for 12 months or more.

Source: Productivity Commission estimates based on unpublished ABS Census and Labour Force Status and other Characteristics of Migrants Survey data.

Table 4.2 **Education and occupation of immigrants and Australian-born persons**

Proportion of employed persons in each occupation class, 2004

Post-school education	*Arrival in Australia*	*Managers and professionals*	*Associate professionals*	*Tradespersons and advanced clerical*	*Intermediate clerical/ sales*	*Other workers*
		%	%	%	%	%
Postgraduate level	2000-04	66.8	10.8	3.4	9.8	9.1
	1990-99	68.2	9.7	5.5	14.3	2.5
	Before 1990	77.3	11.3	2.9	5.3	3.1
	Born in Australia	81.7	9.7	2.2	5.4	1.1
Bachelor degree/ diploma level	2000-04	41.9	7.6	8.9	25.0	16.7
	1990-99	39.9	14.6	9.6	24.1	11.8
	Before 1990	56.7	14.2	6.5	16.2	6.4
	Born in Australia	58.4	15.1	6.9	13.7	5.9
Certificate level	2000-04	14.2	12.4	33.2	24.1	15.9
	1990-99	8.1	11.3	34.6	22.4	23.7
	Before 1990	13.7	15.6	33.2	23.5	14.1
	Born in Australia	11.9	13.6	34.2	26.2	14.1
No post-school education	2000-04	3.0	7.8	10.5	31.5	47.1
	1990-99	8.1	9.6	12.9	33.0	36.5
	Before 1990	11.2	11.4	14.3	34.2	28.8
	Born in Australia	10.2	9.9	14.1	33.9	31.9

Source: Productivity Commission estimates based on unpublished ABS Survey of Education and Work data.

The distribution of immigrant workers by industry is compared with that of Australian-born workers in table 4.3. In 2001, the Manufacturing, Property and Business Services, and Retail industries were the three biggest employers of both immigrant and Australian-born workers.

Relative to Australian-born workers, immigrants were less likely to work in Agriculture, Forestry and Fishing and more likely to work in Manufacturing. In 1986, immigrants were more likely than Australian-born people to work in Construction, though this was not so by 2001. Immigrants' historical propensity to work in Manufacturing and Construction has been suggested as an explanation for why immigrants fare poorly in the labour market during recessions (Ackland and Williams 1992).

The distribution of the employment of immigrants across industries continues to change. Immigrants entering Australia between 2000 and 2004 were less likely to work in Manufacturing than their predecessors. They were more likely to work in Property and Business Services or Accommodation, Cafes and Restaurants.

Although immigrants do not differ greatly from Australian-born workers in their employment by broad occupation and industry groups, they can make up a large

part of the workforce in certain occupations. For example, immigrants made up almost 40 per cent of people in Australia with bachelor degrees or higher in the accounting field and over 30 per cent of people working as accountants in 2001 (Birrell and Rapson 2005). In industries with a large immigrant workforce, immigrants might have an impact on the job prospects of Australian-born people.

Table 4.3 **Employed immigrants and Australian-born persons by industry**
Proportion in each industry[a]

	1986		*2001*		
Industry	*Australian-born*	*Immigrants*	*Australian-born*	*Immigrants*	*Immigrant intake 2000-04*[b]
	%	%	%	%	%
Accommodation, cafes and restaurants	3.2	4.0	4.8	5.8	9.1
Agriculture, forestry and fishing	7.0	2.4	4.8	1.9	0.9[c]
Communications	2.2	2.0	1.7	2.1	1.3
Construction	6.4	8.0	6.9	6.7	6.0
Cultural and recreational services	1.9	1.5	2.7	2.0	1.6
Education	7.4	5.6	7.7	6.3	6.7
Electricity, gas and water	2.1	1.7	0.8	0.6	0.4[c]
Finance	4.9	3.7	3.8	4.2	5.0
Government	6.7	5.1	4.9	3.7	2.1
Health	8.3	8.7	9.7	10.7	12.0
Manufacturing	12.8	22.0	11.1	16.4	10.8
Mining	1.5	1.4	1.0	0.8	0.7
Personal services	3.3	2.8	3.9	3.1	2.5
Property and business services	6.4	7.0	10.8	13.1	19.0
Retail	14.4	12.9	15.7	12.3	9.6
Transport	5.6	5.2	4.4	4.5	5.4
Wholesale	5.8	6.1	5.3	5.7	7.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

[a] Totals might not add as a result of rounding. [b] Immigrants who arrived in Australia between 2000 and 2004, were still in Australia in November 2004 and planned to stay in Australia for 12 months or more. [c] Estimate has a relative standard error of 25 to 50 per cent.

Source: Productivity Commission estimates based on unpublished ABS Census and Labour Force Status and other Characteristics of Migrants Survey data.

4.3 Immigration and the working age population

Excluding intergenerational effects, immigration has increased the proportion of the population of working age, thus contributing to a higher level of labour supply per capita.

Because the children of immigrants born after entry to Australia are part of the Australian-born population, the immigrant population in Australia has historically been older than the Australian-born population. At any point in time, the immigrant population is a mix of immigrants entering Australia just recently and in earlier years. Immigrants who entered Australia many years ago will now be older than when they entered. Although around a quarter of immigrants are below working age when they enter Australia, only a small proportion of the immigrant population — around 5 per cent — was aged under 15 in 2001 (table 4.4). In contrast, about 25 per cent of the Australian-born population was younger than 15 years.

The older age of immigrants is accentuated because rates of net migration to Australia (as a proportion of the population) peaked around 1950 and remained high until the late 1960s (Withers and Pope 1993). This has meant that there is a relatively large cohort who entered Australia during this period who are now older than the recent arrivals.

Table 4.4 **Age distribution of immigrants and Australian-born populations**

Age	*Immigrant population 2001*	*Australian-born population 2001*	*Migration and humanitarian programs 2004-05*			
			Skilled	*Family*	*Humanitarian*	*All programs*
	%	%	%	%	%	%
Under 15	5.2	24.8	21.7	13.6	37.4	20.7
15 to 24	9.5	14.9	15.4	16.6	23.6	16.6
25 to 44	33.4	29.3	55.6	50.1	31.2	51.4
45 to 64	34.2	20.1	7.2	13.6	6.9	9.2
65 plus	17.7	10.9	0.2	6.1	0.9	2.1

Source: Productivity Commission estimates based on unpublished ABS Census and Department of Immigration and Multicultural Affairs movements database.

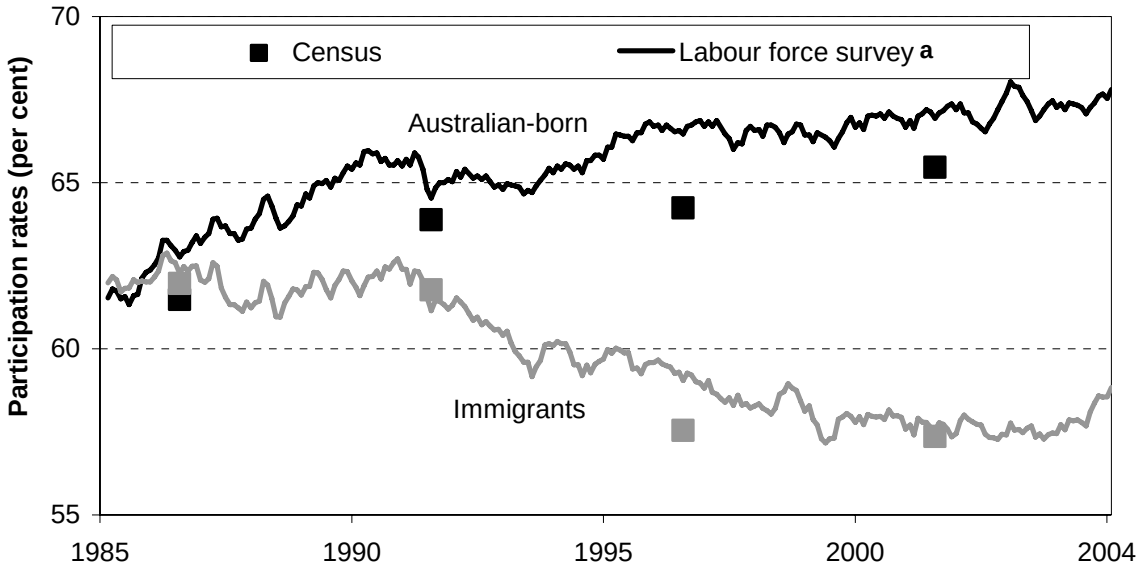
4.4 Immigration and labour force participation

Since the mid-1980s, the immigrant population has had a lower participation rate than the Australian-born population (figure 4.4). This has contributed to a decrease in the number of hours worked per head of population in Australia.

The difference between participation rates of immigrants and Australian-born people is explained using the information in table 4.5. The Commission's analysis indicates that participation rates depend on compositional factors such as education, location, gender, age and (for immigrants) English ability (appendix E). Participation rates for immigrants are likely to be higher compared with the Australian-born population because immigrants are more highly educated, more

Figure 4.4 **Participation rates of immigrant and Australian-born persons**

Persons aged over 15 years



a Three month moving average.

Sources: ABS unpublished Census data and ABS (*Labour Force, Australia*, Cat. no. 6291.0).

Table 4.5 **The difference in participation rates between immigrants and the Australian-born population**

Immigrant participation rate less Australian-born participation rate, 1986 to 2001 Censuses

	1986	*1991*	*1996*	*2001*
	%	%	%	%
Contribution of compositional factors				
Education	0.4	0.5	0.7	0.9
Location	0.3	0.4	0.5	0.6
Gender	0.7	0.3	0.2	0.1
Age	-1.0	-1.3	-2.2	-3.2
English ability	-2.5	-3.7	-5.4	-5.2
Difference explained by compositional factors	-2.2	-3.7	-6.3	-6.7
Difference not explained by compositional factors	2.5	1.1	-0.5	-1.4
Total difference	**0.3**	**-2.6**	**-6.8**	**-8.2**

a Includes only Census responses that identify age, education and English ability.

Source: Productivity Commission estimates based on unpublished Census data.

likely to live in cities and more likely to be male. They are lower because the immigrant population is older and because of the lower proficiency in English of some immigrants. The negative effects of age and English ability dominate. In 2001, the compositional factors contributed to immigrants' participation rate being almost 7 percentage points lower compared with the Australian-born population. However, there are other unidentified factors contributing to a lower participation rate for immigrants compared with Australian-born people, so that the overall difference between the immigrant and Australian-born populations was just over 8 percentage points.

Part of the reason for comparable immigrants having lower participation is that immigrants have low participation when they first arrive in Australia. This conclusion is based on a separate analysis, presented in appendix E (table E.2). The analysis showed that immigrants tend to have lower participation during their first five to fifteen years in Australia. This analysis also shows that immigrants who have been in Australia longer than 15 years have higher participation rates than Australian-born people with the same characteristics (education, location, gender, age and English ability).

Between 1986 and 2001, the participation rates of immigrants declined relative to the Australian-born population. Only around half of this decline can be explained by the compositional factors listed in table 4.5. Of these compositional factors, English ability and age are the most important. Although the English ability of immigrants improved between 1986 and 2001, the adverse effect of poor English ability on participation rates increased (appendix E, table E.2). Age became more important because the number of immigrants aged over 65 increased by almost 50 per cent, as a large cohort of immigrants (many of whom entered Australia during a period of high immigration in the 1950s and 1960s) moved into this age bracket.

An analysis of the participation rates of more recent immigrants is described in table 4.6. Immigrants entering Australia between 2000 and 2004 had lower participation rates than both Australian-born people and immigrants who arrived between 1990 and 1999. These participation rates can be expected to rise over time with length of residence in Australia.

Participation rates vary widely across visa categories (table 4.6). These differentials largely appear to reflect the underlying characteristics of individual immigrants, rather than differences in visa categories per se (Cobb-Clark 2000, 2003; Miller 1999). Immigrants entering Australia under the Skilled Stream of the Migration Program tend to be highly educated and of prime working age. This contributes to a higher participation rate compared with immigrants in other visa categories.

Table 4.6 **Participation rates of immigrants**

By year of arrival, visa group and age group, 2004

		Age				
Year of arrival	*Visa*	*15-24*	*25-44*	*45-64*	*65 & over*	*Total*
		%	%	%	%	%
2000 to 2004	Skilled	60.3[c]	85.3	77.9	0.0[d]	82.0
	New Zealand citizen	71.6[c]	87.0	81.3	0.0[d]	80.7
	Family stream	57.5	62.9	50.9	0.0[d]	57.9
	Humanitarian	53.3[d]	40.8[c]	38.9[d]	0.0[d]	39.6
	Temporary visa[a]	31.6	57.6	37.6[c]	7.7[d]	43.1
	All programs	43.9	71.8	63.1	1.9[d]	62.1
1990 to 1999[b]		66.8	75.7	70.1	3.8	68.3
Australian-born		72.0	82.8	71.5	8.5	67.3

[a] Temporary residents planning to stay in Australia for 12 months or more. [b] Total for all visa classes. [c] Based on estimates with relative standard errors greater than 50 per cent and likely to be unreliable. [d] Based on estimates with relative standard errors between 25 per cent and 50 per cent.

Source: Productivity Commission estimates based on unpublished ABS Labour Force Status and other Characteristics of Migrants Survey data.

There is also evidence that among otherwise similar immigrants, those entering under skilled visas participate more. Cobb-Clark (2006) finds that immigrants in skilled visa categories tend to have higher participation rates than those arriving under family and humanitarian visas, even after accounting for age, education, English ability and other characteristics.

The higher participation of otherwise similar immigrants under skilled visas might be because of qualitative differences in the skills between entrants under different visas. The qualifications of those in the non-skilled visa groups are not assessed for their equivalence to standards in Australia and thus they might not be as useful in the labour market as the qualifications of skilled visa holders. There might also be differences in the motivations of skilled visa holders compared with those under other visa types. Entrants under skilled visas might be more likely to have migrated for economic reasons and thus more inclined to seek work.

Immigrants might also affect the participation of other Australians. However, this effect is likely to be small. The impact of immigrants on unemployment rates of the Australian-born population has the potential to be more significant (section 4.5).

In summary, immigrants have a lower participation rate overall than does the Australian-born population. This is mostly explained by compositional differences between the immigrant and Australian-born populations in terms of their education, location, gender, age and English ability. Immigrants who have been in Australia for longer than 15 years participate more compared with Australian-born people

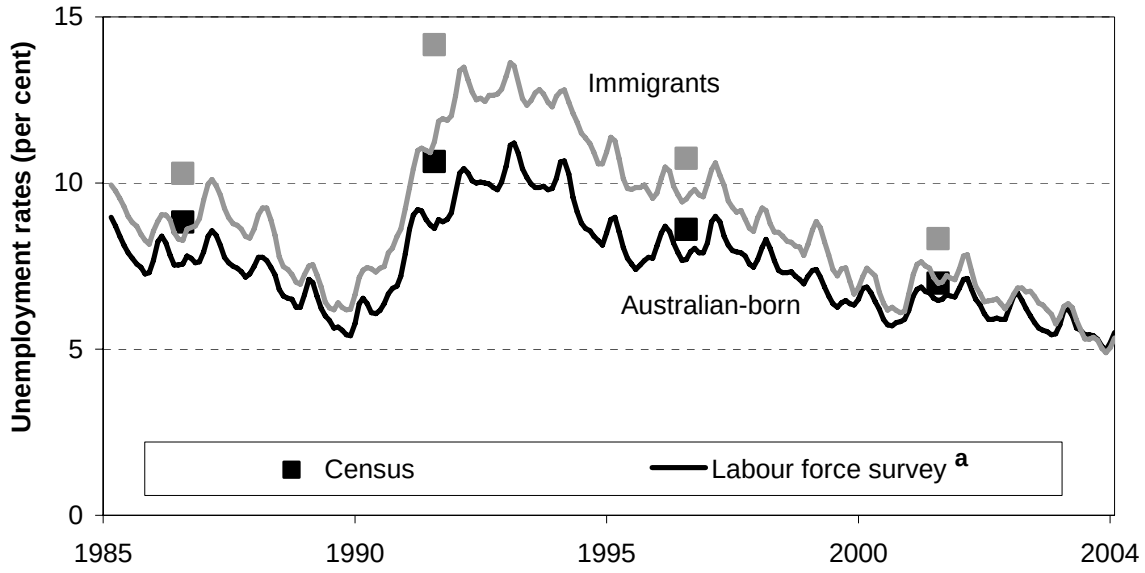
with the same characteristics. However, their participation is lower if they have recently arrived in Australia or speak English poorly. Immigrants who have entered Australia under skilled visas participate more than people under family and humanitarian visas. Most (but not all) of the difference between visa categories is attributable to differences in the composition of immigrants between visa categories.

4.5 Immigration and unemployment rates

By the early 2000s, there was little difference between the unemployment rates of immigrants and Australian-born people (figure 4.5). This was a change from the early 1990s, when the unemployment rate of immigrants was as much as 3 percentage points higher than that of the Australian-born population.

The greater difference in unemployment rates in the early 1990s has been posited by some researchers to be due to the recession and immigrants' relative concentration in recession-prone industries (Ackland and Williams 1992). Others have found that the improved employment outcomes for immigrants arriving in Australia around 2000 largely reflected improvements in their characteristics, such as education and English ability (Richardson et al. 2001). These improvements were considered to be

Figure 4.5 **Unemployment rates of immigrants and Australian-born**
Persons aged over 15 years



a Three month moving average.

Sources: ABS unpublished Census data and ABS (*Labour Force, Australia*, Cat. no. 6291.0).

partly due to changes to migration programs such as an increasing proportion of immigrants entering under skilled migrant visas and tightening of the eligibility criteria for entry.

At the time of the 2001 Census, immigrants had an unemployment rate around 1 percentage point higher than the Australian-born labour force. This difference is not explained by the compositional factors in table 4.7. The poorer English ability of some immigrants contributed to unemployment being almost 2 percentage points higher for the immigrant population compared with the Australian-born population. Factors contributing to immigrants having lower unemployment rates were their older age, their greater propensity to live in cities and their higher education levels. These factors meant that their unemployment rate was almost 2 percentage points lower. The offsetting positive and negative effects meant that there was little net difference between unemployment among immigrants and Australian-born people arising from compositional differences. The 1 percentage point difference between the unemployment rates of the immigrant and Australian-born populations was due to factors not included in table 4.7.

As in the case of participation rates, the difference in unemployment rates not explained by compositional factors arises partly because of the different experiences of immigrants who arrived in Australia recently. Separate analysis presented in appendix E indicates that, all else equal, when immigrants first come to Australia

Table 4.7 **The difference in unemployment rates between immigrants and the Australian-born population**

Immigrant unemployment rate less Australian-born unemployment rate, 1986 to 2001 Censuses

	1986	*1991*	*1996*	*2001*
	%	%	%	%
Contribution of compositional factors				
English ability	2.0	3.4	2.6	1.8
Gender	0.0	0.1	0.1	0.0
Education	-0.1	-0.3	-0.4	-0.4
Location	-0.7	-0.5	-0.5	-0.4
Age	-1.3	-1.5	-1.1	-1.0
Difference explained by compositional factors	-0.2	1.2	0.6	0.1
Difference not explained by compositional factors	1.5	2.2	1.4	1.2
Total difference	**1.3**	**3.3**	**2.0**	**1.3**

a Includes only Census responses that identify age, education and English ability.

Source: Productivity Commission estimates based on regression analysis reported in appendix E.

they are considerably more likely to be unemployed. The likelihood of being unemployed decreases with time in Australia. For example, immigrants who had been in Australia for less than five years in 2001 would be expected to have an unemployment rate 5 percentage points higher than otherwise similar immigrants who have been in Australia for more than 15 years. Immigrants who have been in Australia for longer than 15 years and are native English speakers are less likely to be unemployed than an Australian-born person with the same gender, education, region of location and age (appendix E, table E.3).

The analysis of unemployment rates and their drivers also sheds light on the changes to unemployment rates over time. The key change occurred between 1991 and 2001, over which time the unemployment rate differential between immigrants and Australian-born people fell from 3 percentage points to just over 1 percentage point. Changes in the compositional factors explain part of this narrowing. The increasing educational attainment of immigrants has been partly responsible, but more important has been a decrease in the effect of the English ability of some immigrants. This is partly because immigrants' English ability improved over this period, but also because the effect of poor English on unemployment rates decreased. This could reflect a variety of factors, including employers being more willing to take on people with relatively poor English ability as the Australian labour market tightened in the late 1990s.

Unemployment rates of immigrants have also fallen relative to those of Australian-born people with otherwise similar characteristics. This might, in part, reflect factors not controlled for, such as immigrants' concentration in previously recession-prone industries. It also reflects the fact that recently arrived immigrants had significantly lower unemployment rates in 2001 than did their counterparts when they arrived in the early 1990s. Even after controlling for the characteristics (especially education, English ability and age) of more recent immigrants, there is still a significant difference between unemployment rates among recent immigrants in 2001 and those in 1991. Immigrants who arrived in the five years to 1991 were expected to have an unemployment rate almost 10 percentage points higher than otherwise similar immigrants who had been in Australia for more than fifteen years. This gap had narrowed to 5 percentage points by 2001 (appendix E, table E.3). This might partly reflect improvements to the screening of new immigrants, but it might also be a function of changes that have limited immigrants' access to transfer payments when they first arrive in Australia (Cobb-Clark 2006).

Nevertheless, more recent data on unemployment among immigrants indicate that those arriving recently continue to have higher unemployment rates than immigrants who have been in Australia longer (table 4.8). Unemployment rates also

Table 4.8 **Unemployment rates of immigrants**

By year of arrival, visa group and age group, 2004

		Age				
Year of arrival	*Visa*	*15-24*	*25-44*	*45-64*	*65 & over*	*Total*
		%	%	%	%	%
1990 to 2004	Skilled	0.0[d]	5.2	1.8[c]	0.0[d]	4.3
	New Zealand citizen	7.0[c]	2.4[c]	6.9[c]	..	3.8
	Family stream	21.3[c]	8.4	5.4[c]	0.0[d]	8.8
	Humanitarian	25.0[d]	14.1[c]	22.2[c]	..	16.9[c]
	Temporary visa[a]	7.3[c]	5.9[c]	7.1[d]	0.0[d]	6.4[d]
	All programs	11.4	5.8	5.2	0.0[d]	6.2
2000 to 2004[b]		11.3	7.0	5.2[c]	0.0[d]	7.6
1990 to 1999[b]		11.6	4.9	5.1	0.0[d]	5.1
Australian-born		10.3	3.9	2.8	0.4	4.9

[a] Temporary residents planning to stay in Australia for 12 months or more. [b] Total for all visa classes. [c] Based on estimates with relative standard errors greater than 50 per cent and likely to be unreliable. [d] Based on estimates with relative standard errors between 25 per cent and 50 per cent. **..** Not applicable.

Source: Productivity Commission estimates based on unpublished ABS Labour Force Status and other Characteristics of Migrants Survey data.

vary across visa categories, with immigrants arriving under skilled visas having lower unemployment rates than those under family and humanitarian visas.

Differences in unemployment rates across visa types are largely explained by differences in the characteristics of the immigrants entering under the different categories (Cobb-Clark 2006). It is mostly because of their higher education and concentration in the prime working ages that immigrants under skilled visas have lower unemployment rates than family and humanitarian entrants.

However, unemployment rates of immigrants entering under skilled visas are lower than those of otherwise similar holders of family or humanitarian visas. Eighteen months after arriving in Australia, holders of skilled visas are likely to have lower unemployment rates than those of immigrants under other visas, even after adjusting for age, education and other characteristics (Cobb-Clark 2006).

Effect of immigration on unemployment rates of other Australians

The effect of immigration on unemployment rates of other Australians involves evaluating two offsetting impacts. On the one hand, immigrants might obtain jobs that would otherwise have been filled by Australians. In the absence of a fall in wages, this could increase unemployment among the existing Australian population. On the other hand, immigration also stimulates demand for goods and services in

the local economy. Seeking to meet this demand, local producers are likely to expand output and employ more people.

Studies that compare these offsetting effects generally find that immigration does not cause unemployment among the existing resident population (Shan, Morris and Sun 1999; Tian and Shan 1999; Parasnis, Fausten and Smyth 2005). Chapman and Cobb-Clark (1999) show that, in theory, immigration can either increase or decrease the job prospects of unemployed Australian residents. However, they find that with realistic assumptions, immigration improves the short-run employment prospects of unemployed residents in 'practically all' labour market circumstances. Chapman and Cobb-Clark also provide a useful summary of empirical studies in Australia, Canada and the United States, which generally find that, at an aggregate level, immigration is not associated with higher levels of unemployment.

The conclusion that immigration has not caused unemployment at an aggregate level does not imply that it cannot lead to higher unemployment for specific groups. Immigration could worsen the labour market outcomes of people who work in sectors of the economy that have high concentrations of immigrant workers (DeVoretz 2001).

4.6 Immigration and working hours

Employed immigrants worked an average of around half an hour per week longer than Australian-born workers based on analysis of data obtained from the 1986 to 2001 Censuses (figure 4.6). There was little change in this pattern between Census collections.

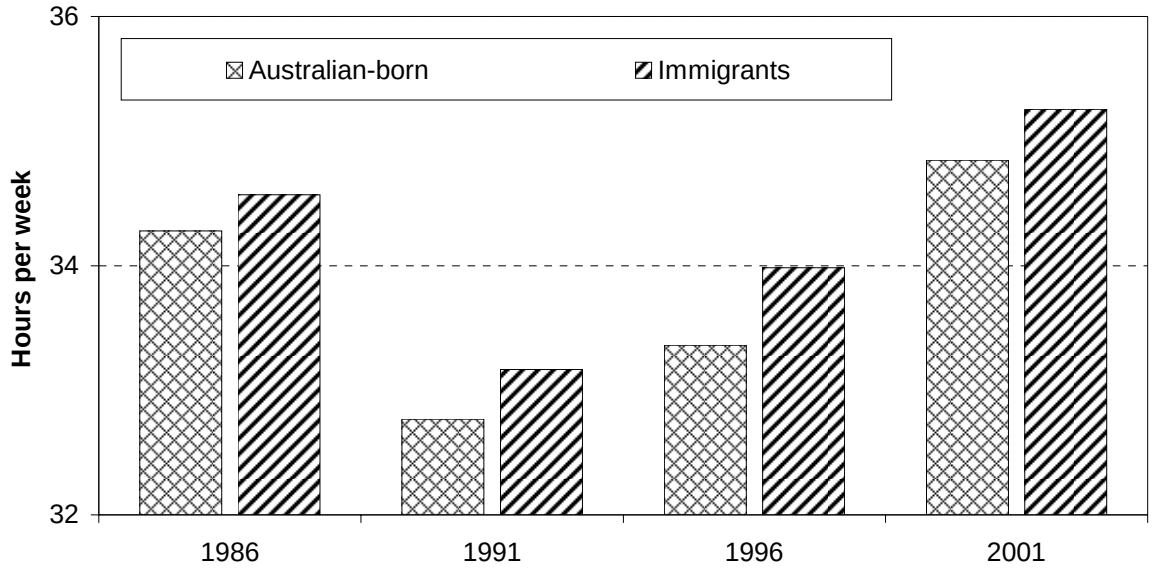
The difference in working hours between immigrant and Australian-born workers arises from differences in age and in industry and occupation of employment (table 4.9). Workers of prime working age (25 to 64 years old) work longer hours on average than younger and older workers. In 2001, immigrants worked about half an hour longer because a smaller proportion of immigrant workers were aged between 15 and 24. Immigrants worked almost a further half an hour longer because more were male and because of the occupations and industries they worked in.

English ability is another important factor influencing the working hours of immigrants. In 2001, the average working hours of immigrants were around half an hour lower because immigrants with lesser English ability tended to work fewer hours.

Thus, immigrant working hours are different because of the characteristics and work choices of immigrants, rather than because they are immigrants per se. After

adjusting for differences in their characteristic and work choices, immigrants did not work significantly different hours to otherwise similar Australian-born workers in 2001 (appendix E, table E.4).

Figure 4.6 **Hours worked by immigrant and Australian-born workers**
1986 to 2001 Censuses



Source: Productivity Commission estimates based on unpublished ABS Census data.

Table 4.9 **The difference in working hours between immigrant and Australian-born workers**
Immigrant average working hours minus Australian-born average working hours, 1986 to 2001 Censuses

	1986	*1991*	*1996*	*2001*
	%	%	%	%
Contribution of compositional factors				
Age	0.0	0.2	0.3	0.6
Gender	0.2	0.2	0.2	0.2
Occupation	-0.1	-0.1	0.0	0.1
Industry	0.0	0.0	0.1	0.0
Location	0.0	0.0	0.0	0.0
English ability	-0.1	-0.2	-0.2	-0.4
Difference explained by compositional factors	-0.1	0.2	0.5	0.5
Difference not explained by compositional factors	0.3	0.4	0.1	0.0
Total difference	**0.3**	**0.6**	**0.6**	**0.5**

a Includes only Census responses that identify age, occupation, industry and English ability.

Source: Productivity Commission estimates based on regression analysis reported in appendix E.

4.7 Immigration and regional labour supply

Immigration can have relatively large effects on regional labour markets. In regions where immigrant settlement is concentrated, the effects on local labour supply can be more significant than the effects on the entire Australian labour market. However, most immigrants settle in major cities (appendix D), where their effect on the labour market is smaller because the new immigrants arriving each year are a small proportion of the population.

Those immigrants who do settle in regional areas, where their impact can be more substantial, have better relative labour market outcomes than those settling in major cities. In 2001, the differences in participation and unemployment rates between Australian-born people and immigrants were lower in regional areas (particularly in remote areas) than in major cities (table 4.10). This generally occurs across all states and territories.

This does not mean that sending immigrants to regional areas will necessarily ensure better outcomes. Skilled designated area sponsored immigrants have been shown to have worse labour outcomes six months after arrival than immigrants under other skilled visa types (Richardson 2005a).

Table 4.10 **Participation and unemployment rates across regions**
Immigrants and Australian-born populations, 2001 Census

	Major city		*Inner regional*		*Outer regional*		*Remote*	
	Australian-born	*Immigrants*	*Australian-born*	*Immigrants*	*Australian-born*	*Immigrants*	*Australian-born*	*Immigrants*
	%	%	%	%	%	%	%	%
Participation rate	67.5	58.0	61.1	52.2	63.6	56.4	66.4	64.3
Unemployment rate	6.4	8.3	8.4	8.8	7.7	8.7	5.4	5.1

Source: Productivity Commission estimates based on unpublished ABS Census data.

4.8 Intergenerational effects

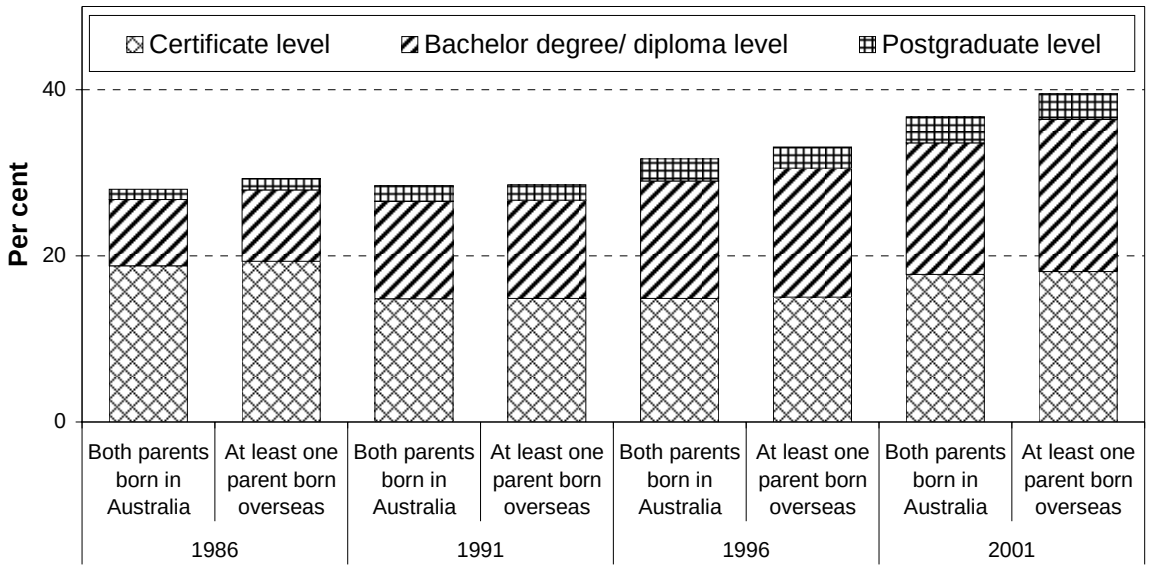
In 2001, there were 3.5 million second-generation Australians — people born in Australia who have one or both parents born overseas. Second-generation Australians might have different labour market outcomes compared with third- and higher-generation Australians. If this is the case, second-generation Australians will represent a further long-term compositional effect of migration on the supply of labour.

Fewer second-generation Australians are of working age than other Australian-born people. At the time of the 2001 Census, 71 per cent of second-generation Australians were of working age, compared with 77 per cent of people with both parents born in Australia.

Second-generation Australians are more highly educated than other Australian-born people. In particular, second-generation Australians are more likely to hold a qualification at bachelor degree or diploma level (figure 4.7). In 2001, a similar proportion of second-generation Australians was working in skilled occupations, compared with people with both parents born in Australia (table 4.11).

Figure 4.7 **Proportion of Australian-born persons with post-school qualifications**

By parents' birthplace, 1986 to 2001 Censuses



Source: Productivity Commission estimates based on unpublished ABS Census data.

To some extent, differences in the occupations and qualifications between second-generation and other Australian-born people could be explained by the differences in their age structures. Khoo et al. (2002, p. vii) avoid this issue by comparing cohorts of second- and higher- generation Australians in the 1996 Census and find that 'the second generation as a group are doing or has done better than their peers who are at least third generation in terms of educational attainment and occupational status'.

Differences in the age structure of second-generation and third- and higher-generation Australians are also important when comparing their participation

Table 4.11 **Occupation of employed Australian-born persons by parents' birthplace**

1986 to 2001 Censuses

	1986		*1991*		*1996*		*2001*	
Occupation	*Both parents born in Australia*	*At least one parent born overseas*	*Both parents born in Australia*	*At least one parent born overseas*	*Both parents born in Australia*	*At least one parent born overseas*	*Both parents born in Australia*	*At least one parent born overseas*
	%	%	%	%	%	%	%	%
Managers and administrators	10.2	7.8	11.6	9.0	10.5	8.0	10.2	8.2
Professionals	14.9	15.4	15.7	16.1	17.3	17.6	17.9	18.9
Associate professionals	7.9	7.8	8.3	8.2	11.5	11.5	11.9	12.2
Tradespersons	15.1	16.4	14.1	15.4	13.1	14.0	12.5	13.0
Other occupations	51.9	52.7	50.3	51.4	47.7	48.9	47.5	47.7

Source: Productivity Commission estimates based on unpublished ABS Census data.

and unemployment rates. For a given age group, there is little difference between the participation and unemployment rates of second-generation Australians and other Australian-born people (table 4.12). However, for the group as a whole, second-generation Australians have higher participation and unemployment rates because of their concentration in the younger age groups.

Overall, second-generation Australians are likely to work fewer hours per capita than the rest of the Australian-born population. This is because a smaller proportion of the cohort is old enough to work.

Table 4.12 **Participation and unemployment rates of Australian-born persons by parents' birthplace**

2001 Census

		Age				
		15-24	*25-44*	*45-64*	*65+*	*Total 15+*
		%	%	%	%	%
Participation rate	At least one parent born overseas	66.9	82.8	69.7	8.4	67.6
	Both parents born in Australia	68.8	81.8	69.5	8.4	65.2
Unemployment rate	At least one parent born overseas	13.1	5.9	4.4	2.1	7.5
	Both parents born in Australia	13.1	6.0	4.4	1.9	6.8

Source: Productivity Commission estimates based on unpublished ABS Census data.

4.9 Emigration and labour supply

The other side of the migration story concerns the emigration of Australian residents. Each year since the mid-1990s, over 100 000 Australian residents have emigrated on a long-term or permanent basis. This is less than inflows of foreign residents, but is by no means insignificant.

Emigrants are not a representative sample of the population they leave behind. They tend to be concentrated in the prime working years (table 4.13). They also tend to be more skilled than the Australian population as a whole (Hugo, Rudd and Harris 2003; Fullilove and Flutter 2004). These characteristics shape the effect of emigration on the Australian labour supply.

Table 4.13 **Age distribution of emigrants and Australian population**

Age	*2004-05 resident departures*	*Australian population 2004*
	%	%
Under 15	13.5	19.8
15 to 24	14.7	13.8
25 to 44	52.4	29.3
45 to 64	16.9	24.2
65 plus	2.5	13.0

Sources: Department of Immigration and Multicultural and Indigenous Affairs movements database and ABS (*Australian Demographic Statistics*, cat. no. 3101.0).

Emigrants generally work in highly skilled occupations. More than 60 per cent of emigrants who provided an occupation on their outgoing passenger card stated that they were managers, administrators or professionals (table 4.14). This compares with less than 30 per cent of the Australian population as a whole (figure 4.3).

The high skill level and age distribution of emigrants means that they are likely to work more hours per person than the population they leave behind. A higher proportion are of working age (table 4.13). Based on outgoing passenger card data, it appears that emigrants have higher participation and lower unemployment rates than the Australian population. Given their concentration in highly skilled occupations, they would also be expected to work longer hours.

The loss of highly skilled Australian residents has led to some concern of a ‘brain drain’ from Australia. The number of Australian-born people with tertiary education living in other OECD countries has recently been estimated at 120 000 (Docquier and Marfouk 2005). This estimate should be considered a lower bound: OECD countries are the destination for about two-thirds of Australian-born people leaving Australia permanently (DIMIA 2005c).

Table 4.14 **Occupation of Australian residents departing permanently or long term[a]**

Occupation	*1999-2000*		*2003-04*	
	number	%	number	%
Managers and administrators	13 244	15.7	15 389	15.7
Professionals	35 326	41.7	44 122	45.0
Associate professionals	8 207	9.7	8 977	9.2
Tradespersons	5 607	6.6	6 342	6.5
Other occupations	22 255	26.3	23 232	23.7
Total	**84 639**	**100.0**	**98 062**	**100.0**

a Includes only persons stating an occupation on their passenger card when departing Australia. Totals might not add as a result of rounding.

Source: Passenger card data in Birrell et al. (2005a).

The estimated number of Australian-born people overseas is a useful measure of the cumulative importance of emigration, as it excludes returned emigrants and immigrants to Australia who have left again. Birrell, Rapson and Smith (2005a) have pointed out that many emigrants are young people going 'to see the world' and many others are recently arrived immigrants leaving. Such movements comprise 'brain circulation' rather than brain drain. It has been suggested that returning emigrants often accumulate more skills while overseas than their peers who remain in the country (Barrett and O'Connell 2001; Co, Gang and Yun 2000).

Overall, Australia appears to achieve a significant net brain gain. Although the estimate of 120 000 tertiary-educated Australian-born people living overseas is a lower bound, it indicates that skill loss through emigration is small compared with the more than 1.5 million overseas-born people with tertiary education living in Australia (Docquier and Marfouk 2005). It is, of course, possible that those leaving are more highly skilled than those coming to Australia — we could be losing our very best and brightest. In light of this possibility, Birrell et al. (2004) assessed whether Australia was losing those at the highest level of education. They examined the movement of people who had obtained PhD qualifications between 1996 and 2001. They found that Australia had a net inflow of these highly qualified people over the period 1996 to 2001. Although comparing numbers of educated emigrants and educated immigrants is not necessarily comparing like with like, the sheer number of tertiary educated immigrants means that it is hard to argue that Australia faces a problem from brain drain.

In aggregate, emigration has a small negative effect on hours worked per person in Australia because it removes people who are likely to work more hours per person, on average, than the broader Australian population. The effect is small because the number of Australian-born people overseas is small relative to the foreign-born population in Australia — the total number of Australian-born people in other

OECD countries has been estimated at 270 000 (Dumont and Lemaitre 2005) compared with 4.5 million overseas-born people in Australia in 2001. Although Australia's expatriate community numbers around 1 million (Fullilove and Flutter 2004), around a quarter of these people are overseas temporarily and many are not Australian-born. The flows of Australian residents overseas are dominated by temporary movements and remigration of immigrants.

4.10 Projecting the effect of changes in immigration flows on labour supply

The analysis presented above gives some idea of differences between the labour supply of migrants and the Australian-born population. These differences are reflective of migration over a long period of time. However, the analysis gives only a broad indication of the effect that the current migration program, or variations in the current program, could have on the total Australian labour supply.

To understand more fully the effects of migration into the future, the Commission has developed a model called the New Arrival Tracker (NAT). This model is described in detail in appendix F. The NAT is an extension of the Labour Supply Projection model used to make demographic and labour force projections for the Commission's report on the economic implications of an ageing Australia (PC 2005b).

The NAT is used to simulate the supply of labour under two different migration scenarios. The first is a base-case simulation, which projects the supply of labour over the next 20 years based on a continuation of 2004-05 migration flows. Under the base case, migration flows under humanitarian, family and skilled visas are assumed to remain at 2004-05 levels until 2024-25. The second simulation projects the labour supply effects of a permanent 50 per cent increase in immigrants entering Australia under skilled migration visas in 2004-05 — about 39 000 extra immigrants each year. The projections allow for remigration and childbearing by these extra immigrants. The difference between the base-case and increased-migration simulations is used to estimate the effects of an increase in the level of skilled migration. These estimates are projections rather than forecasts — they project what would happen *if* the assumptions in the simulations were to hold, rather than forecasting what *will* actually happen.

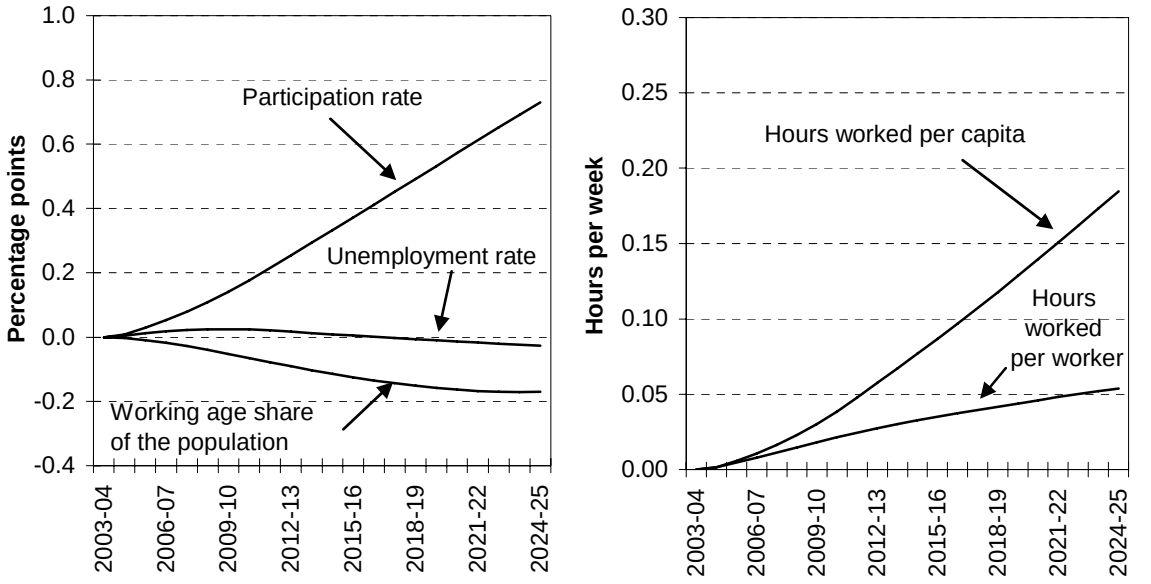
The increase in the level of skilled migration has a small effect on the rate of population growth. By 2024-25, the population is about 3.3 per cent larger than it would otherwise have been. The new immigrants are generally of prime child bearing age, thus they have more children compared with the Australian population

as a whole. This means that the working age share of the population decreases over time, with the cumulative effect of migration over 20 years decreasing the share by about 0.17 percentage points (figure 4.8).

The major labour supply effect of the increase in skilled migration is to raise participation rates. Participation rates initially increase slowly because recently arrived immigrants participate less than immigrants who have been in Australia longer and because there are few new immigrants early in the simulation period. As the additional skilled immigrants from earlier in the period spend more time in Australia, their participation rates increase. Further, the increasing cumulated numbers of new immigrants mean that their impact increases over time. These effects cause the participation rate to become larger. By 2024-25, participation rates are about 0.7 percentage points higher than they would otherwise have been.

Unemployment rates initially increase, reflecting the fact that immigrants tend to have higher unemployment rates when they first arrive. The unemployment rate then decreases with length of residency. Over time, the cumulative effect of decreasing unemployment rates of the arrivals from early in the period starts to outweigh the higher unemployment rates of those arriving late in the period, and overall unemployment rates decrease. By 2024-25, the skilled immigrants cause a small decrease in the unemployment rate.

Figure 4.8 **Differences in labour supply arising from a 50 per cent increase in the level of skilled immigration**



Source: Commission projections from the Labour Supply Projection model (scenario 2) and NAT reported in appendix F.

The cumulative effect of the increase in skilled migration is to increase hours worked per person in the economy. By 2024-25, hours worked per capita are almost 0.2 hours per week (or 1.2 per cent) higher.

4.11 Overall assessment

In 2001, the immigrant population in Australia worked more hours per capita than the Australian-born population (table 4.15), mainly because a greater proportion of immigrants were of working age. This was offset somewhat by the children of immigrants, a higher proportion of whom were not old enough to work. All else equal, the extra hours worked per capita by the immigrant population would have contributed positively to income per capita in 2001.

Employment and participation rates vary significantly across the immigrant population depending on education, age, gender, English ability and time spent in Australia. The Skilled Migration program targets highly educated people of prime working age. As a result, immigrants under skilled visas have higher employment and participation rates than immigrants arriving under family or humanitarian visas. Further, even when comparing immigrants with similar characteristics, immigrants under skilled visas are more likely to be participating and employed than are family and humanitarian immigrants.

Looking at history alone does not provide insights into the current and future effects of migration. The Commission's analysis of the effects of the current skilled migration program simulated the effect of a 50 per cent increase in the level of skilled migration. By 2024-25, the increase in skilled migration increases the proportion of the population of working age, the participation rate and the hours

Table 4.15 **Hours worked per capita per week[a]**
1986 to 2001 Censuses

	Units	*Immigrants*				*Australian-born*			
		1986	1991	1996	2001	1986	1991	1996	2001
Proportion of working age	%	90.8	93.1	94.2	94.8	71.2	73.3	73.9	75.2
Participation rate	%	62.0	61.8	57.5	57.4	61.5	63.9	64.2	65.5
Unemployment rate	%	10.3	14.2	10.7	8.3	8.8	10.6	8.6	7.0
Hours per worker	hrs/week	34.6	33.2	34.0	35.3	34.3	32.8	33.4	34.9
Hours worked per capita	hrs/week	17.4	16.4	16.5	17.6	13.7	13.7	14.5	16.0

a Hours per person calculated as the product of the proportion of working age, participation rate, employment rate and hours per worker, as outlined in box 4.1.

Source: Productivity Commission estimates.

worked by each worker. These changes effect a 1.2 per cent (0.2 hours per week) increase in hours worked per capita in Australia by 2024-25 (table 4.16).

Immigration can also affect the labour supply if immigrants cause the hours worked by other Australians to change, through changes in their unemployment rate, participation rate or weekly hours worked. This is a difficult and often controversial topic. However, there is little evidence that immigration causes unemployment among the existing Australian-born population and effects on participation and working hours can reasonably be assumed to be small in the aggregate.

Like immigrants, emigrants from Australia tend to be highly educated and concentrated in highly skilled occupations. They are also likely to work more hours per person than the Australian population as a whole. However, the effects of emigration are likely to be small, since the number of Australian-born people overseas is an order of magnitude smaller than the number of overseas-born people in Australia.

Table 4.16 **Simulation of the labour supply effects of an increase in skilled migration**

		2004-05		*2024-25*	
	Units	*Base-case simulation*	*Increased-migration simulation*	*Base-case simulation*	*Increased-migration simulation*
Population	Number	20 228 190	20 247 771	24 855 754	25 687 942
Proportion of working age	%	80.2	80.2	82.6	82.4
Participation rate	%	63.5	63.5	59.9	60.6
Unemployment rate	%	5.6	5.6	4.9	4.9
Hours per worker	Hrs/week	33.6	33.6	32.6	32.6
Hours worked per capita	Hrs/week	16.1	16.1	15.3	15.5

Source: Commission projections from the Labour Supply Projection model (scenario 2) and NAT reported in appendix F.

5 Migration and labour productivity

Key points

- On average, immigrants earn more per hour worked than Australian-born workers. This is principally because of compositional differences between immigrants and Australian-born workers such as their education, age, region of employment and industry of employment. After controlling for these factors, as well as for English proficiency, immigrants still earn slightly more, on average, than the Australian-born population.
- For immigrants, English language skills are an important factor influencing their hourly incomes. Immigrants with poor English skills earn significantly less than other workers, all else equal.
- The increased focus on skills in Australia's Migration Program has resulted in new immigrants earning higher incomes than in the past, attributable mainly to their higher levels of education. New immigrants under the Skilled Stream earn more than new immigrants under the Family and Humanitarian Streams.
- A smaller proportion of immigrants work in regional areas compared with the Australian-born population. The average hourly income of those who do, however, is higher than their Australian-born counterparts. This is largely explained by compositional differences.
- An increase in the number of skilled immigrants delivers a boost to GDP per capita because the additional immigrants have a higher level of workplace skills, on average, than the existing population. This means they are likely to be more productive. After 20 years, a 50 per cent increase in the skilled migration intake is estimated to deliver a 0.27 per cent increase to GDP per capita through this skill effect.

Labour productivity is an important determinant of economic growth and income per capita (see discussion in chapter 3 and chapter 4, box 4.1). Labour productivity is the ratio of the real value of output to labour input and depends on the efficiency with which labour and other inputs (such as capital and land) are combined to produce goods and services. In the context of economy-wide productivity and economic growth, labour productivity is typically defined as real GDP per hour worked.

Real GDP per hour worked can be expressed as the product of two ratios (box 5.1). This chapter considers the effect of immigration on the skill composition of hours worked in the economy, and the implications for real GDP per hour worked. If

immigration increases the proportion of hours worked by highly skilled (and thus highly productive) workers then, all else equal, GDP per hour worked will rise. Broader issues, including the efficiency with which labour is combined with other inputs, are considered in chapter 7.

In recent years, Australia's migration program has focused on attracting skilled individuals of working age. In part, this policy has been predicated on the proposition that the skills and experience of these workers will have a positive impact on the average skill level of the Australian workforce and, in turn, labour productivity.

In what follows, the impact of immigration on productivity is examined in two ways. First, the evidence on the productivity of immigrants currently in the labour force is analysed, assessing whether or not there are differences in their productivity relative to Australian-born workers. Income per hour worked is used as an approximate measure of productivity. Income per hour worked is indicative of a worker's marginal productivity. In comparing income, human capital theory is used to understand those characteristics, if any, that contribute to differences in the incomes of immigrant and Australian-born workers.

The question of whether increasing skilled immigration is likely to have a positive effect on the composition of hours worked is considered in the second half of this chapter. Any such 'skill effect' would contribute towards an increase in Australia's aggregate productivity, as measured by real GDP per hour worked.

Box 5.1 **Decomposing labour productivity**

In chapter 4 (box 4.1) it was shown that income per capita could be expressed as the product of hours worked per capita and labour productivity:

$$\frac{GDP}{POP} = \frac{Hours}{POP} \times \frac{GDP}{Hours}$$

Labour productivity can itself be decomposed into two ratios:

$$\frac{GDP}{Hours} = \frac{GDP}{Effhrs} \times \frac{Effhrs}{Hours}$$

where *Effhrs* are 'effective hours worked' — the total hours worked weighted by the relative productivities (wages, or unit value added) of each hour worked. Changes in the ratio of effective hours worked to hours worked capture changes in the skill composition of the total hours worked in the economy. GDP per effective hour worked measures the efficiency with which each type of labour in the economy combines with other inputs to produce output.

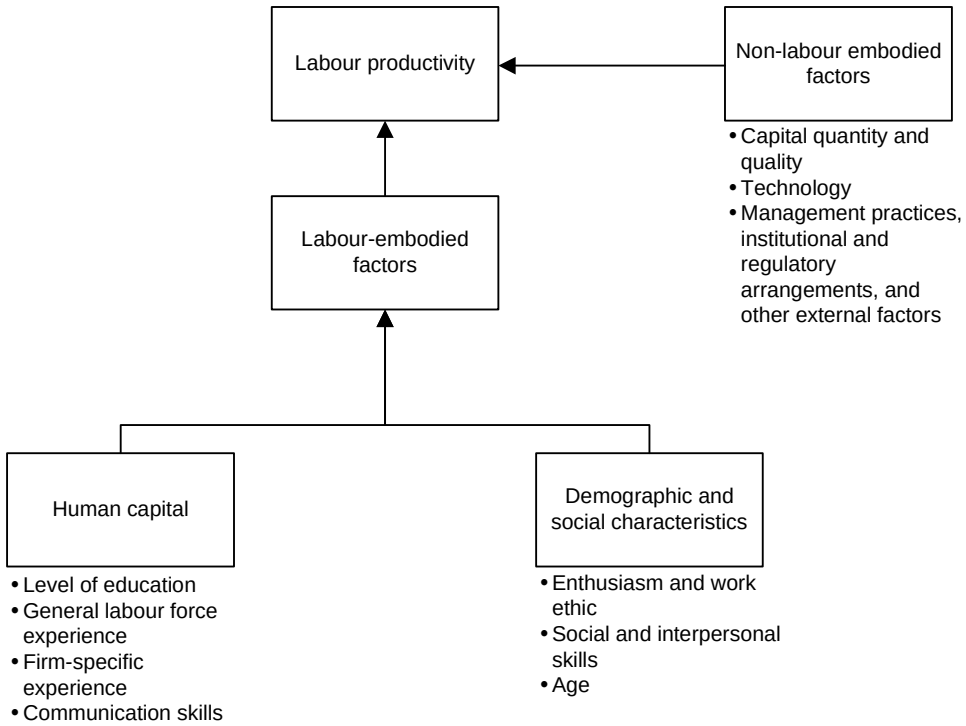
5.1 Migration, human capital and productivity

A large number of factors affect labour productivity, including the quality of the workforce (which can be measured by its stock of human capital), as well as the quality and availability of physical capital and other inputs. These factors can be characterised as those that are embodied in workers (labour embodied) and those that cannot be attributed to labour (non-labour embodied).

In terms of labour-embodied factors, human capital theory suggests that differences in workers' productivity can be explained by differences in the workers' respective productive characteristics (Becker 1962; Mincer 1974). Non-labour embodied factors that affect productivity include the level and quality of capital available per worker, and the level of prevailing technology.

When considering how immigrants affect productivity, all of these factors as well as the institutional and regulatory arrangements governing the operation of the labour market need to be taken into account. A stylised representation of how the human capital, demographic and other characteristics of immigrants, by differing from other workers, might be expected to influence productivity is presented in box 5.2.

Box 5.2 **Some stylised links between a worker's characteristics and their productivity**



Human capital

Human capital refers to the stock of productive knowledge and skills embodied in an individual as a result of education, training and experience. Chiswick and Miller (1995) set out three basic requirements of 'human capital':

- It is embodied in the person.
- It is productive in the labour market or in consumption.
- There are costs (including opportunity costs) to its acquisition.

Skills acquired through formal education (especially post-school education), labour force experience and communication skills all fulfil these requirements.

Education

In the human capital literature, education is considered fundamental to an individual's productivity (Becker 1964; Mincer 1974). In general, productivity and hourly rates of pay are expected to be positively correlated with the level of educational attainment.

This general proposition might not hold if there is a short-term excess demand for less educated workers in the economy, such that demand for the services they provide increases their wages relative to those of more educated workers. Similarly, a worker with more years of education than another, might not enjoy higher earnings if their qualifications are considered inferior, or not in demand.

Labour force experience

Human capital theory and several empirical studies suggest a positive association between a worker's age and their productivity (for example, Dustmann and Fabbri 2003; Dustmann and Van Soest 2002). The precise 'shape' of the relationship is not clear; however, most empirical studies find evidence that returns to labour force experience increase at a decreasing rate.

Recent immigrants, regardless of their prior general labour force experience, generally have less local firm-specific human capital than Australian-born workers, or immigrants who have been in Australia for some time. As such, the productivity of immigrants might be expected to improve as they gain local, relevant work experience (Chiswick 1986).

Communication skills

Communication skills are an important determinant of labour productivity and earnings (Chiswick and Miller 1985, 1995; Shields and Wheatley Price 2002).

There are a number of mechanisms through which a person's language ability will affect their labour market outcomes. These include the degree to which proficiency in English can affect a person's search for employment or allow them to convince a prospective employer of their broader abilities (Dustmann and Fabbri 2003). Language skills are also a prerequisite for positions that require communication ability (for instance, jobs in the service sector).

Other factors influencing the productivity of immigrants

Aside from their human capital, immigrants possess characteristics that might be different from those of other workers and affect their productivity.

Enthusiasm and work ethic

It is often suggested that immigrants are more enthusiastic and possess a greater 'work ethic' than other workers. A survey conducted by Turner and Norman (1985) noted that in the opinion of employers, 'migrants exhibit generally a propensity to work harder and longer and seek overtime more intensively than the Australian-born worker' (p. 96). Of course, if the 'work ethic' of immigrants leads them to work longer hours, rather than with greater intensity, this might not translate into greater productivity, as measured in income per hour worked.

There are a range of factors that could explain why immigrants might exhibit a greater enthusiasm for work. For instance, it could be that immigrants, having endured the costs and efforts involved in migration, represent a self-selected group who are, on average, 'more able and more highly motivated' than others (Borjas 1987; Chiswick 1978). This, however, assumes that the motivation for immigrants is financial. Family immigrants and refugees do not generally migrate for purely financial reasons. As such, although they might be highly motivated (in terms of their migration decision), this might not translate into a superior work ethic (Chiswick 1999).

Another factor that might lead immigrants (especially recently arrived immigrants) to work harder than non-migrants is the lack of established networks in their new country. Recently arrived immigrants might work harder in order to overcome deficiencies in networks, communication skills, country-specific skills and experience enjoyed by the established workforce (McDonald and Worswick 1999).

Temporary migrants, and other immigrants who are likely to return to their country of origin, might work harder in order to accrue savings. For example, they can achieve higher levels of consumption over time by earning higher real wages and saving while in their host country (Galor and Stark 1991). Another explanation could be the desire to send remittances to family remaining in their home country.

Age at migration

A substantial body of research suggests that age at the time of migration can have a significant impact on labour market outcomes, particularly in the initial years after arrival. Borjas (1995) finds that older immigrants can be expected to earn less than their peers, after taking into account education, labour force experience, years since migration and other traits. Schaafsma and Sweetman (2001), in a study of Canadian immigrants, also find 'a sizeable correlation with age at immigration and earnings, even after controlling for cohort effects and a range of demographics'.

5.2 What is the evidence on the labour productivity of immigrants in Australia?

There is no measure or data set that directly compares the productivity of immigrant and Australian-born workers. However, given certain assumptions, economic theory suggests that wages can be used to provide an approximation of a worker's productivity (box 5.3). According to theory, the marginal productivity of labour is an important determinant of wages and, other things being equal, a more productive worker will earn more per unit of labour supplied than a less productive one.

The median nominal hourly income for immigrants and Australian-born workers, based on the 1986, 1991, 1996 and 2001 Census collections, is presented in figure 5.1. The median income of recently arrived immigrants (who, at the time of the Census, had been in Australia for less than five years) is also shown.

Three observations can be made from figure 5.1. First, the median hourly income of immigrants is slightly higher than that of Australian-born workers. Second, over time, the median hourly income of immigrants has increased slightly faster compared with Australian-born workers. Finally, the median hourly income of recently arrived immigrants has also increased faster over time compared with Australian-born workers.

Box 5.3 **Wages as an indicator of productivity**

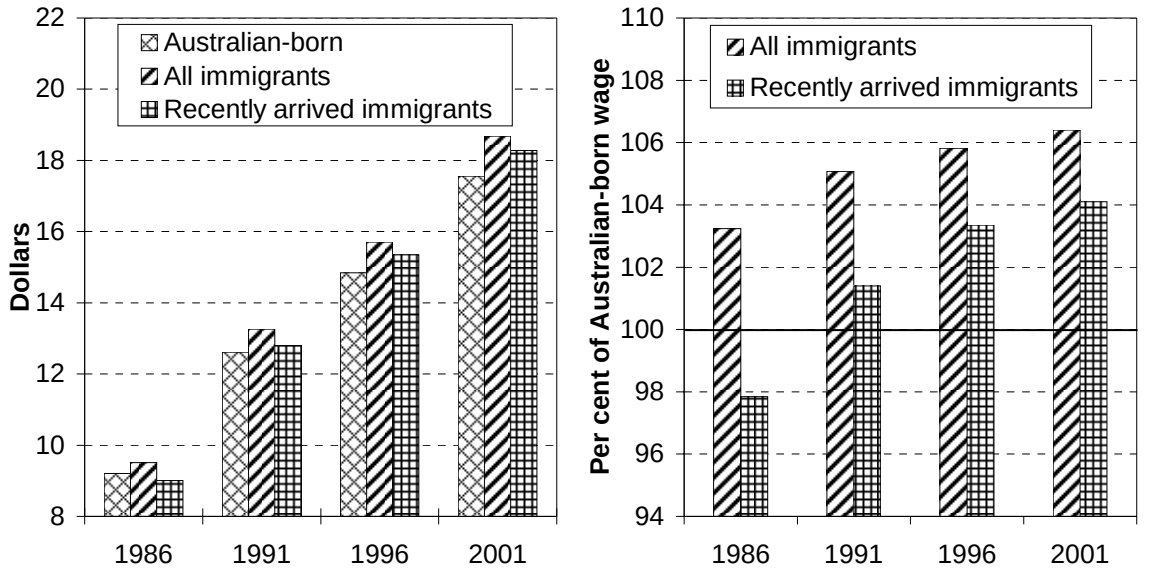
In competitive markets, the theory of labour demand suggests that firms employ labour up to the point at which the marginal revenue generated to the firm of an additional hour worked is equal to labour's marginal cost (the hourly wage rate). Among other things, the productivity of the worker determines the output (and revenue) generated by the firm from the hour of work.

By comparing the wage rates of immigrants with Australian-born workers, differences in the wage rate (differences in labour value added per hour worked) can be interpreted as the difference in the productivity of those workers.

In practice, wages might not always equal a worker's value of marginal physical product at a point in time. Market imperfections and non-wage labour costs mean that the wage might under- or over-estimate a worker's productivity. However, it is reasonable to expect that wages are generally correlated with productivity across the labour market. In this way, a comparison of wage relativities between certain groups of workers can provide a useful indication of relative productivity.

Figure 5.1 **Median income per hour worked of immigrants and Australian-born workers**

1986 to 2001 Censuses, nominal



Source: Productivity Commission estimates based on unpublished Census data.

The differences in the hourly income of immigrants and Australian-born workers could be a reflection of a number of factors, including:

- differences in their human capital (education, labour force experience and language ability)
- region of settlement (the relative proportions of immigrants and Australian-born workers living in capital cities or regions)
- differences in demographics (age and gender)
- industry of employment and occupations.

To understand fully the underlying causes of the observed differences in hourly incomes, the relative importance of each of these factors needs to be known. Furthermore, the analysis needs to reveal the nature of the differences — are they due to immigrants and Australian-born workers having a different composition of these factors, or are there other differences that cannot be explained by compositional factors alone? Put another way, it is important to know if an immigrant earns more or less than an Australian-born worker after controlling for factors such as age, gender and education.

Empirical evidence

To shed light on these issues, the Commission undertook two separate but related analyses. First, hourly incomes of Australian residents were regressed on a set of explanatory variables. The regression analysis provides insight into the importance of various factors in explaining variations in hourly income for both Australian-born and immigrant workers. In order to decompose the contributions of compositional and other differences to the observed gap in the median hourly income of immigrants and Australian-born workers, the Blinder–Oaxaca method was used (appendix E).

The variables in the equation were drawn from human capital theory and previous empirical work (Borjas 1986b; Chiswick 1978; McDonald and Worswick 1999; Stromback 1983; Tran-Nam and Nevile 1988). The explanatory variables were age (as a proxy for work experience), level of post-school education, gender, region of residence (‘capital city’ or ‘other’), industry of employment, and immigrant status (for details, see appendix E).

Factors influencing hourly incomes in Australia

Hourly income is strongly and positively correlated with post-school educational attainment and age, consistent with theory and prior empirical work (table 5.1).

Gender and location of residence also affect hourly income. For example, being female and working in regional Australia reduces hourly earnings, other things being equal. The industry in which a person is employed also explains a significant proportion of variation in hourly income.

Table 5.1 **Factors influencing income per hour worked of immigrants and Australian-born workers — regression 1[a]**

1986 to 2001 Censuses, nominal dollars

	1986	*1991*	*1996*	*2001*
Adjusted R-square[b]	0.73	0.79	0.79	0.80
Income of 15 to 24 year old, Australian-born, no qualifications, working in Retail Trade Industry and in a capital city	5.88	8.33	9.70	11.24
Age				
25 to 44	2.38	3.55	4.13	4.63
45 to 64	2.72	4.27	4.94	4.98
65 and over	3.89	7.51	8.08	8.04
Education				
Postgraduate level	5.56	9.37	8.91	8.91
Bachelor degree/diploma level	4.50	5.92	5.32	5.52
Certificate level	0.98	0.82	0.72	0.70
Other demographics				
Live in a regional area	-0.57	-1.18	-1.20	-1.68
Female	-1.37	-2.09	-2.03	-1.33
Immigrant	-0.27	-0.45	-0.51	-0.48
Industry				
Accommodation, Cafes and Restaurants	0.51	0.63	0.37	-0.05[c]
Agriculture, Forestry and Fishing	-2.11	-2.59	-2.39	-2.74
Communications Services	2.86	3.23	4.59	5.76
Construction	1.39	1.96	1.81	2.79
Culture and Recreational Services	1.81	2.18	2.54	2.78
Electricity, Gas and Water Supply	3.51	3.72	5.02	7.86
Education	4.07	1.27	1.63	3.09
Finance and Insurance	2.98	4.94	5.55	6.94
Government Administration and Defence	2.86	3.14	4.03	5.20
Health and Community Services	2.11	2.54	2.86	3.20
Manufacturing	1.30	1.68	1.76	2.50
Mining	6.00	9.23	11.64	9.70
Personal and Other Services	1.37	1.34	1.44	1.83
Property and Business Services	2.31	3.98	4.01	4.81
Transport and Storage	2.32	2.61	3.11	2.98
Wholesale Trade	1.53	2.24	2.17	2.32

[a] All coefficients are significant at the 1 per cent level unless otherwise indicated. Regression of group data weighted by employed persons. [b] The adjusted R-square using grouped data is higher than it would be if the regression were done on the ungrouped data. [c] Not significant at the 5 per cent level.

Source: Productivity Commission estimates based on unpublished Census data.

Importantly for this study, the results indicate that hourly earnings of immigrants are lower, having adjusted for age, education, region, gender and industry. To investigate this effect further, a second regression was estimated with the immigrant dummy variable replaced by a set of explanatory variables for English language ability (only speaks English, speaks it well or very well, or speaks English not well or not at all) and the period of time the immigrant has been in Australia (less than five years, five to 15 years, or 15 years and over).

Other factors influencing immigrants' incomes

The results show that English language ability is an important determinant of immigrants' income (table 5.2). Immigrants from English-speaking backgrounds (those who only speak English at home) have higher incomes, possibly even higher than equivalent Australian-born workers. However, immigrants from non-English-speaking backgrounds who nonetheless speak English well or very well, have lower hourly incomes than equivalent Australian-born workers. Speaking English poorly (or not at all) is strongly and negatively correlated with hourly income. The sign and magnitude of the estimated coefficients are consistent with previous studies.

The relatively small (and statistically less significant) effect of time in Australia on immigrant earnings is consistent with previous Australian research (Chiswick and Miller 1985; McDonald and Worswick 1999; Tran-Nam and Nevile 1988;), as well as with overseas research (Borjas 1999).

Decomposing differences in the incomes of immigrant and Australian-born workers

To help clarify the relative importance of composition and other differences, a separate regression analysis was undertaken and the results decomposed using the Blinder–Oaxaca method (appendix E). The decomposition analysis revealed that the higher median income of immigrants is mostly due to the composition of their education, experience (age), gender, region of residence and industry of employment factors. The median income of immigrants is lower because of the lesser English ability of some immigrants. After controlling for all these differences in composition, immigrants would still earn slightly more (table 5.3). In 2001, for example, after controlling for their age structure, educational attainment, gender, region of location and industry of employment, immigrants' hourly income would have been 10.4 per cent higher than Australian-born workers. When the lower English ability of some immigrants was also taken into account, their hourly income would have been only 5.4 per cent higher. However, because immigrants received higher earnings than comparable Australian-born workers then, overall, their average earnings were 7.4 per cent higher.

Table 5.2 **Factors influencing income per hour worked of immigrants and Australian-born workers — regression 2[a]**

1986 to 2001 Censuses, nominal dollars

	1986	*1991*	*1996*	*2001*
Adjusted R-square[a]	0.74	0.80	0.80	0.82
Income of 15 to 24 year old, Australian-born, no qualifications, working in Retail Trade Industry and in a capital city	5.89	8.37	9.76	11.31
Age				
25 to 44	2.40	3.58	4.16	4.64
45 to 64	2.76	4.29	4.94	4.94
65 and over	3.91	7.53	8.09	8.02
Education				
Postgraduate level	5.53	9.35	8.92	8.92
Bachelor degree/diploma level	4.47	5.89	5.32	5.53
Certificate level	0.94	0.76	0.65	0.63
Other demographics				
Live in a regional area	-0.61	-1.25	-1.30	-1.78
Female	-1.36	-2.09	-2.03	-1.33
English ability of immigrants				
Not well or not at all	-1.51	-2.50	-3.27	-3.67
Very well or well	-0.76	-1.26	-1.63	-1.47
Native speaker	0.16	0.28	0.43	0.55
Years since immigrant's arrival in Australia				
Recent (<5)	-0.19[b]	-0.49	-0.29	-0.24[c]
Medium (5 to 15)	-0.10[b]	-0.10[c]	-0.28	-0.44
Industry				
Accommodation, Cafes and Restaurants	0.55	0.70	0.45	0.04[d]
Agriculture, Forestry and Fishing	-2.09	-2.56	-2.35	-2.70
Communications Services	2.85	3.22	4.56	5.74
Construction	1.41	1.96	1.80	2.77
Culture and Recreational Services	1.76	2.1	2.44	2.68
Electricity, Gas and Water Supply	3.51	3.71	4.98	7.81
Education	4.04	1.21	1.54	3.00
Finance and Insurance	2.95	4.89	5.48	6.88
Government Administration and Defence	2.83	3.08	3.95	5.12
Health and Community Services	2.09	2.50	2.79	3.13
Manufacturing	1.36	1.77	1.88	2.59
Mining	5.98	9.18	11.57	9.61
Personal and Other Services	1.35	1.30	1.39	1.78
Property and Business Services	2.28	3.93	3.94	4.76
Transport and Storage	2.31	2.59	3.09	2.97
Wholesale Trade	1.51	2.21	2.12	2.30

a All coefficients are significant at the 1 per cent level unless otherwise indicated. Regression of group data weighted by employed persons. **b** The adjusted R-square using grouped data is higher than it would be if the regression were done on the ungrouped data. **c** Significant at the 5 per cent level. **d** Not significant at the 5 per cent level.

Source: Productivity Commission estimates based on unpublished Census data.

Table 5.3 **Percentage difference in the hourly income of immigrant and Australian-born workers**

1986 to 2001 Censuses

	1986	*1991*	*1996*	*2001*
	%	%	%	%
Contribution of compositional factors				
Age	3.5	4.3	4.3	3.3
Education	0.4	1.9	2.6	3.3
Location	1.5	2.1	1.9	2.2
Industry	0.7	1.3	1.1	1.4
Gender	0.5	0.4	0.4	0.2
English ability	-4.2	-4.8	-5.4	-5.0
Difference explained by compositional factors	2.4	5.4	4.8	5.4
Difference not explained by compositional factors	0.9	0.9	1.7	2.0
Total difference	**3.2**	**6.3**	**6.4**	**7.4**

Source: Productivity Commission estimates based on unpublished Census data.

The results show that the main differences in composition relate to immigrants (as a group) being more educated, older and being more likely to live in capital cities. Taken together, the differences in the composition of the age, education and location of residence results in an earnings premium for immigrants of between 5.4 per cent and 8.8 per cent over the review period. Immigrant workers are also more likely to work in higher paying industries and (slightly) more are male compared with Australian-born workers — both of which contribute a smaller amount to the overall composition difference and their higher earnings.

These positive effects are offset by the effect of English ability. Though the majority of immigrants speak English as their first language, a significant proportion (47 per cent) do not. Because English language ability is such an important determinant of immigrants' income, those immigrants who do not speak English as a first language (and especially those immigrants who speak English poorly) have a significant negative effect on the average wages of all immigrants.

The decomposition analysis can also be used to explain why, between 1986 and 2001, the median hourly income of immigrants increased slightly faster compared with Australian-born workers. This faster rate of growth is largely a compositional story. Three quarters of the faster growth of immigrants' wages is explained by improvements to their productive characteristics, relative to Australian-born workers.

The most significant compositional factor contributing to the faster increase in immigrants' hourly income was their increasing level of educational attainment

compared with Australian-born workers. Two factors appear to have driven this trend. First, the immigrant population became increasingly educated compared with the Australian-born population. Second, the returns to education at a bachelor degree/diploma level or at a postgraduate level increased between 1986 and 2001 (tables 5.1 and 5.2).

Recently arrived immigrants

Comparing the performance of Australia's population of immigrants to that of Australian-born workers is informative. However, of greater policy interest is the performance of recently arrived immigrants. Recently arrived immigrants (those residing for less than five years at the time of the Census) do better now, compared with Australian-born workers, than they did in the past (table 5.4). In 1986, recently arrived immigrants earned 0.5 per cent less than the average Australian-born worker. By 2001 however, recently arrived immigrants earned 7.3 per cent more.

Recently arrived immigrants' higher earnings in 2001 are mainly due to their higher level of educational attainment, location of residence and industry of work. Together, these compositional factors contribute to recently arrived immigrants earning more than 11 per cent more compared with Australian-born workers.

Two other compositional factors, age and gender, have little effect on earnings differentials between recently arrived immigrants and Australian-born workers.

Table 5.4 **Percentage difference in the hourly income of recently arrived immigrant and Australian-born workers**

1986 to 2001 Censuses

	1986	*1991*	*1996*	*2001*
	%	%	%	%
Contribution of compositional factors				
Education	3.3	7.0	8.8	7.8
Location	1.8	2.6	2.2	2.5
Industry	0.2	1.6	1.1	1.2
Gender	0.1	0.2	0.3	0.2
Age	-0.3	0.8	0.5	0.1
English ability	-5.5	-7.7	-10.1	-7.8
Difference explained by compositional factors	-0.3	4.6	2.8	4.1
Difference not explained by compositional factors	-0.1	-0.7	2.9	3.2
Total difference	**-0.5**	**3.9**	**5.7**	**7.3**

Source: Productivity Commission estimates based on unpublished Census data.

Recently arrived immigrants have a similar gender balance to the Australian-born population. In contrast, the age distributions of the two groups are quite different. There are fewer recent immigrants in the younger (15 to 24) and older (45 plus) age groups compared with Australian-born workers. Hourly earnings increase with age, so the earnings of recently arrived immigrants are higher because fewer of them are young, but lower because fewer are old. The net result is that little of the difference in earnings can be attributed to age.

The adverse effect of English language ability on earnings is larger for recently arrived immigrants. This is because the English ability of recently arrived immigrants is worse than that of the total population of immigrants, since language skills improve with time.

The evidence from this decomposition analysis suggests that the increased skills focus and other changes to Australia's Migration Program have yielded dividends.

Another way to consider the impact of the change in the composition of Australia's migration intake is to assume recently arrived immigrants in 2001 had the same composition of human capital and other factors as recently arrived immigrants in 1986. If this were the case, instead of recently arrived immigrants earning 7.3 per cent more than Australian-born workers in 2001, they would have earned 0.2 per cent less.

Immigrants in regional areas

As part of the terms of reference for this report, the Commission has been asked to examine the impact of migration on productivity with particular reference to regional areas.

In regional areas (locations other than capital cities), the hourly income of immigrants is about 11 per cent higher than that of their Australian-born counterparts (table 5.5). In terms of composition differences, the main determinants of the higher earnings of immigrants are education, age and, to a lesser extent, industry of employment. The adverse effect of English ability on immigrant earnings is not nearly as large in regional areas. It appears that, on average, immigrants in regional areas speak better English than do city-based immigrants.

Immigrants in regional areas also earn about 3 per cent more than otherwise similar Australian-born workers. However, the impact on overall wages in regional areas is tempered by the small numbers of immigrants living in regional areas (appendix D).

Table 5.5 **Percentage difference in the hourly income of immigrant and Australian-born workers living in regional Australia**

1986 to 2001 Censuses

	1986	*1991*	*1996*	*2001*
	%	%	%	%
Contribution of compositional factors				
Education	2.3	3.2	3.3	3.8
Age	2.7	3.1	3.3	2.9
Industry	4.4	3.4	2.4	1.8
Gender	0.6	0.3	0.2	0.0
English ability	-1.5	-0.9	-1.0	-0.6
Difference explained by compositional factors	8.5	9.2	8.1	7.9
Difference not explained by compositional factors	3.2	3.7	3.8	3.3
Total difference	**11.7**	**12.9**	**11.9**	**11.2**

Source: Productivity Commission estimates based on unpublished Census data.

Earnings of immigrants under different visa categories

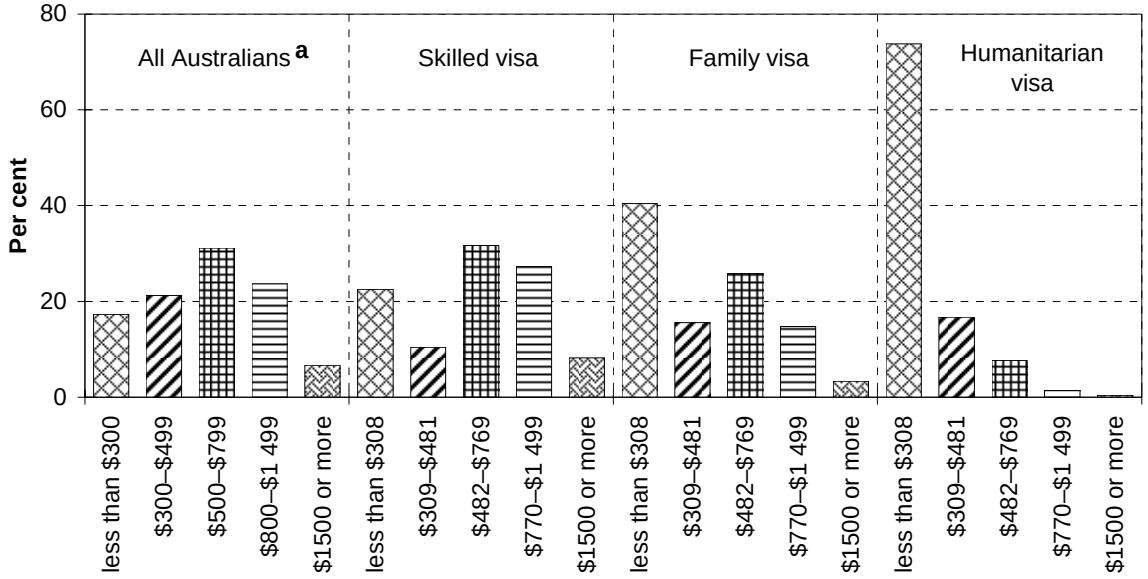
An important issue is the extent to which earnings are dependent, or determined by, the visa category for entry. That is, does entry under the Skilled Migration Stream lead to a 'skill effect'. In the preceding analysis, it was not possible to use visa category upon entry as an explanatory variable of income. However, an examination of data from other sources can shed some light on this issue. One such source is the Longitudinal Survey of Immigrants to Australia, undertaken by the then Department of Immigration and Multicultural and Indigenous Affairs. Data on wages by visa category are presented in figure 5.2.

Immigrants are tested for their workforce and language skills when applying under the Skilled Stream of the Migration Program. As such, it is not surprising that Skilled Stream immigrants receive higher wages than those entering under the Family and Humanitarian programs. Other studies have concluded that, even after controlling for education and English-speaking skills, immigrants entering with skilled visas have higher wages than do family and humanitarian immigrants 18 months after arrival in Australia (Chiswick, Lee and Miller 2005). To the extent that wage differentials between skilled and other immigrants reflect differences in enduring characteristics such as post-school qualifications, these differences would be expected to persist over time.

The incomes of recently arrived skilled immigrants also appear to exceed those of the Australian population as a whole: a higher proportion of income earners among

Figure 5.2 **Distribution of weekly income of immigrants 18 months after arrival and of all Australians**

Proportion of persons reporting an income, 2001



a Income brackets for 'all Australians' are different from those for recently arrived immigrants.

Sources: ABS unpublished Census data; DIMIA (2002).

skilled immigrants were in the top two income brackets in figure 5.2. Based on these data, recently arrived skilled immigrants had a mean weekly wage of about $715, compared with $670 for the Australian population as a whole.

Summary

There a number of important points that can be drawn from the analysis of hourly incomes. First, immigrants have higher hourly incomes than Australian-born workers. This is mainly attributable to immigrants being different from Australian-born workers in terms of their levels of education, their age, where they live and the industries in which they work. They have higher hourly incomes even though some have lesser English language ability. After adjusting for these differences, the average immigrant earns more than a comparable Australian-born worker.

We can also observe that the earnings of immigrants are improving relative to Australian-born workers over time. In particular, earnings of recently arrived immigrants have improved relative to Australian-born workers. In large part, these improvements are attributable to their increasing level of educational attainment. The improving earnings of recently arrived immigrants is of particular policy relevance and provides evidence that the increased skills focus and other recent

changes to Australia's Migration Program have yielded dividends. The higher wages earned by skilled immigrants are further evidence of the benefits from focussing on skilled migration.

To the extent that wages reflect productivity, it is possible to infer that the *average* immigrant is more productive than the *average* Australian-born worker. This is a composition or skill effect, rather than a 'true' productivity effect of like workers being more productive. Immigrants are only marginally more productive than *comparable* Australian-born workers. However, this does not hold for immigrants with poor English ability, who tend to be less productive than otherwise similar Australian-born workers.

5.3 The skill effect of immigration

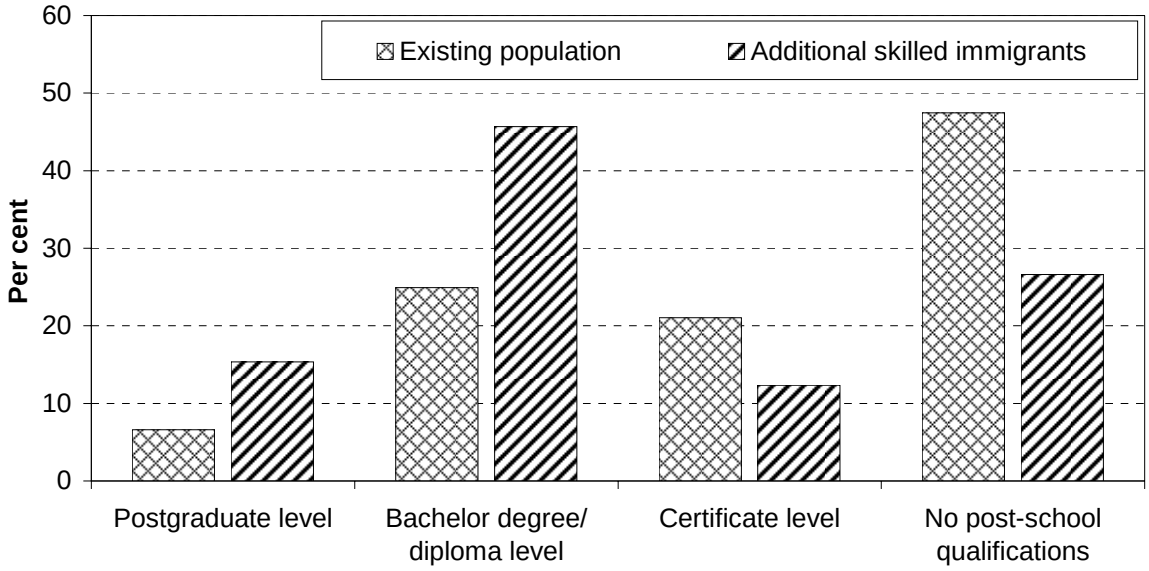
The skill effect refers to the impact of increasing the average skill level of the workforce by changing the proportion of workers in each skill category. Highly skilled workers are generally more productive (and thus likely to earn higher wages) than unskilled workers. Consequently, increasing the average skill level by increasing the proportion of skilled workers in the workforce contributes to an increase in GDP per capita.

This skill effect is not strictly a productivity effect, as it does not represent a change in the productivity of any particular skill category of worker. Instead, it is a compositional effect, reflecting an increasing share of more highly skilled workers in the workforce. However, the skill effect does contribute to an increase in aggregate labour productivity where the measure of labour input is the total sum of hours worked (that is, unadjusted for skill composition).

The skill effect can be illustrated by comparing the skill-adjusted and ordinary indexes of total hours worked. This approach is similar to that used by the Australian Bureau of Statistics to measure changes in labour composition (Reilly, Milne and Zhao 2005). The skill-adjusted index of hours worked is derived by aggregating the hours worked across skill categories using weights based on wages for each skill category, and is referred to here as the index of effective hours worked.

The skill effect is predicated on there being differences in the distribution of immigrants and the existing population by skill category, and also differences in wages across skill categories. Differences in distribution by skill category are shown in figure 5.3. Skilled immigrants have a higher proportion of hours worked for the higher skilled categories of education.

Figure 5.3 **Proportion of hours worked by qualification level**
Skilled immigrants and existing Australian population, 2004-05



Sources: Productivity Commission projections from the New Arrivals Tracker reported in appendix F; Centre of Policy Studies estimates based on ABS Survey of Education and Work.

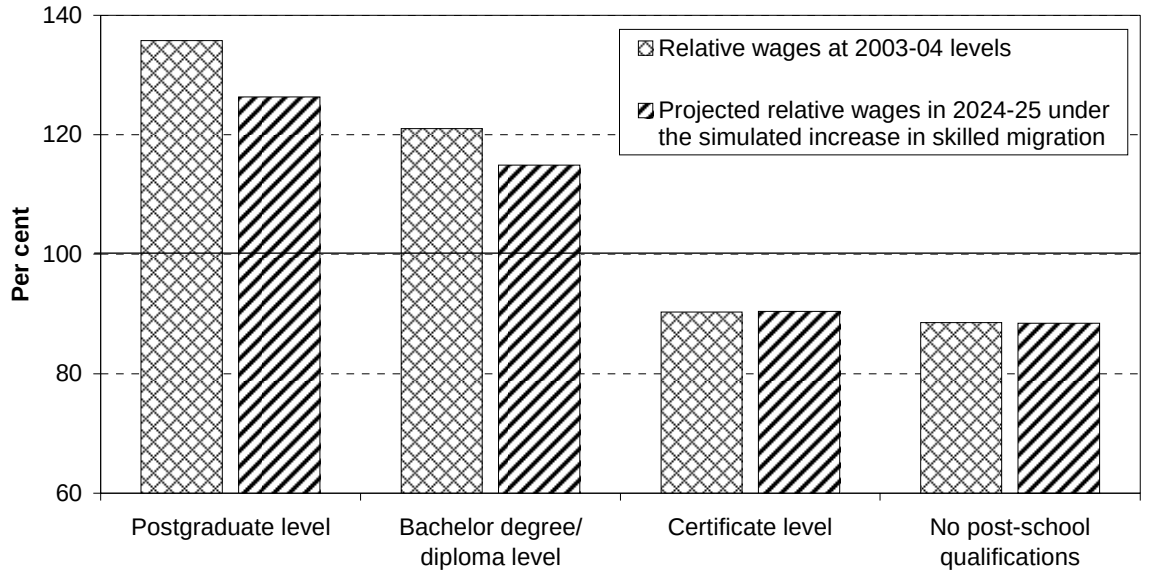
As demonstrated earlier, there are differences in wages between occupations, which reflect differences in skills. The relativity of wages by skill category is shown in figure 5.4, based on results from Centre of Policy Studies simulations using the MONASH Model.

In the Centre of Policy Studies' simulation of a 50 per cent increase in the level of skilled immigration, the relative wages by skill category adjust over time to the changes in the demand for and supply of hours worked for each skill category. In the MONASH Model, disproportionately increasing the supply of skilled labour leads to a (slight) decrease in the relative wage earned by skilled labour.

Using the data underlying figures 5.3 and 5.4, skilled immigrants have a skill level 12 per cent above that of the existing Australian population in 2003-04. This skill level is calculated by aggregating the qualification mix of hours worked for newly arrived skilled immigrants with weights based on relative wage levels. An implicit assumption is that the newly arrived immigrants' wages (by qualification) are the same as those of the existing resident population. This is supported by the analysis in table 5.4 (page 86) which shows that in 2001, given their qualifications, recently arrived immigrants earned similar wages to the rest of the Australian population.

Figure 5.4 **Hourly wages by qualification**

As a proportion of average Australian wages, 2003-04 and 2024-25



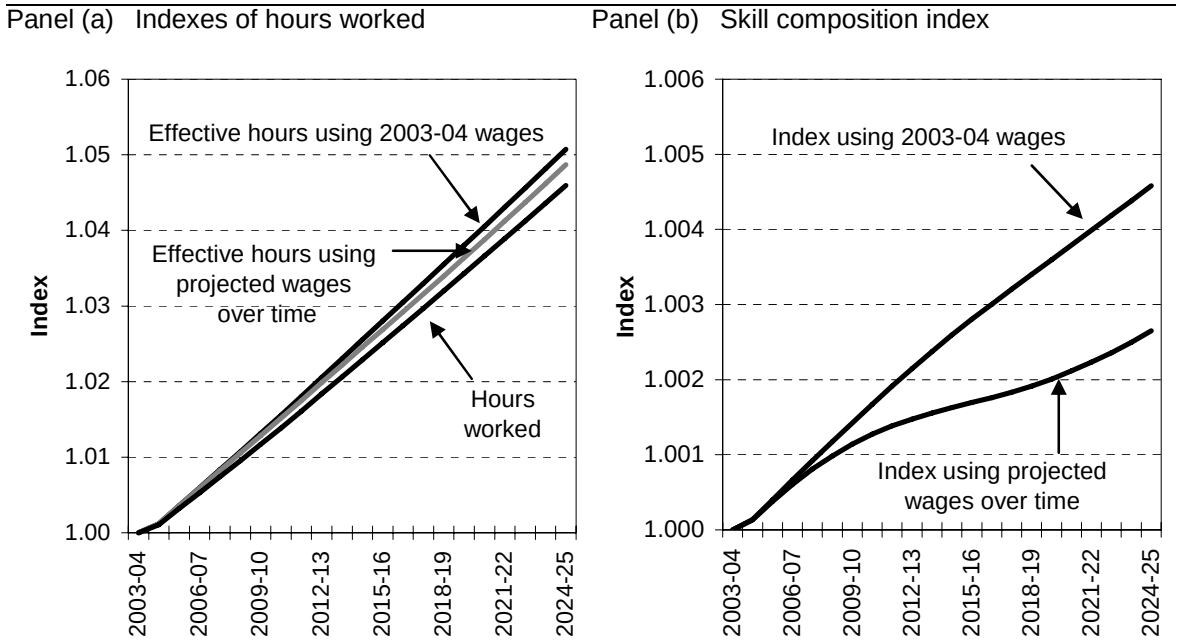
Source: Productivity Commission estimates based on Centre of Policy Studies simulations using the MONASH Model.

The increase in skilled immigration means that the index of effective hours worked increases by more than the index of hours worked (figure 5.5). The skill effect of assuming no change in relative wages can be estimated by setting wages in 2024–25 to 2003-04 levels. The skill effect, assuming constant wages over time, is larger than the skill effect where the relative wages are assumed to adjust over time.

The contribution of the skill effect to income per capita is measured by a labour composition index, which is defined as the ratio of the indexes of effective hours worked (hours aggregated using wages as weights) to hours worked (simple summation of all hours worked).

If the relative wages of skill categories are fixed at 2003-04 levels, then the increase in skilled migration would contribute to an increase in income per capita of about 0.46 per cent by 2024-25. However, when the relative wages are allowed to adjust in response to the different increases in labour supply by skill category, the skill composition effect is reduced and would contribute to an increase in income per capita of 0.27 per cent by 2024-25.

Figure 5.5 **Skill effect arising from a 50 per cent increase in the level of skilled immigration**



Source: Productivity Commission estimates based on Centre of Policy Studies simulations using the MONASH Model.

5.4 Overall assessment

Measuring the impact of migration on productivity is a challenging task. In this chapter, the Commission has attempted to assess whether there are differences in the productivity of immigrant and Australian-born workers, as well as to estimate the likely size and direction of the impact that migration has on economy-wide productivity. From the analysis presented in this chapter a number of messages emerge.

The average immigrant earns more than the average Australian-born worker. This is mostly because immigrant workers are (on average) older, more educated and more likely to live in capital cities.

Once differences in composition are taken into account, and 'like with like' are compared, in general immigrants still earn slightly more per hour worked than comparable Australian-born workers. However, relative earnings of immigrants compared with those of an equivalent Australian-born worker depend on their English speaking ability. Immigrants with poor English ability earn less than otherwise comparable Australian-born workers.

The hourly earnings of recently arrived immigrants relative to Australian-born workers have improved over time. This is due mainly to the changing composition and improving education levels of recently arrived immigrants. This reflects the emphasis of Australia's Migration Program on skilled immigration in recent years. Raising the skill composition of immigrants contributed to an increase in GDP per capita, arising from the skill effect.

The results of the Commission's increased-migration simulation suggest that additional skilled immigration will, all other things being equal, deliver a skill effect that contributes to an increase in GDP per capita. A 50 per cent increase in skilled migration delivers a 0.27 per cent increase in labour productivity, measured by GDP per hour worked, by 2024-25. This contributes a similar increase to GDP per capita.

6 Scale and environmental effects of migration

Key points

- Migration contributes to the size of the population and domestic economy.
- To the extent that economies of scale exist, migration could add to productivity and per capita income growth.
  - There are practical difficulties to estimating the effects of scale economies. As a result, the empirical evidence on the contribution of economies of scale to productivity growth is inconclusive.
- Migration contributes to increasing demands for natural resources and the environment, resulting in a drag on productivity and per capita income growth. The magnitude of these impacts is uncertain.
- Migration's impact on the environment is likely to be more significant in Australia's large cities (Sydney, Melbourne and Perth). These cities face challenges in planning and environmental management.

As noted in chapter 2, migration since the Second World War has contributed significantly to the size of Australia's population. Important issues for this study are the extent to which a larger population size or a faster rate of population growth arising from migration translates into growth in productivity and living standards.

Some participants to this study emphasised the potential benefits of economies of scale and scope, and of agglomeration, that might arise from such an increase in population size. For example, the Business Council of Australia stated that:

> … population growth, by producing larger domestic markets, can produce production economies for firms (particularly domestic producers of non-traded goods), as well as spillovers associated with knowledge externalities and thick market benefits. These benefits may be particularly beneficial to an economy such as Australia which has a relatively small population, is a long distance from major global markets, and has fragmented domestic markets. (sub. 24, p. 2)

The Western Australian Government suggested that a larger population might also improve living standards by enabling the '… local delivery of a wider range of personal, health and education services' (sub. DR37, p. 1).

Other participants, however, stressed that there are also diseconomies associated with a larger population, particularly for Australia's larger urban centres. Mr Robert Braby, for example, noted that:

> … when an urban centre reaches optimum size, economies of scale (agglomeration economies) give way to diseconomies of scale (agglomeration diseconomies), in the form of chaotic road congestion, costly road projects (for example, harbour tunnels and 'City Link' projects), capital destruction (for example, demolition of historic buildings and replacement with costly high-rise construction), water shortages, the disamenities of medium and higher density living, et cetera. (sub. DR36, p. 1)

Participants also identified potential negative effects that a larger population might have on natural resources and the environment more generally. Sustainable Population Australia (Tasmania), for example, argued that population growth in Tasmania led to:

> … widespread forest destruction caused by logging operations and the reduction in visual and environmental value in coastal areas caused by expanding residential developments. (sub. 9, p. 6)

The issues associated with economies of scale and thick markets are discussed in section 6.1, and natural resources and the environment in section 6.2.

6.1 Migration and economies of scale

Migration, through its impact on the size of the population and domestic economy, might contribute to growth in productivity and living standards to the extent that a larger population allows economies of scale to be exploited (Foster 1996; Garnaut, Ganguly and Kang 2003; Withers 2004).[1] A larger economy, for example, might allow for:

> … utilisation of economies of scale in goods and services that are not traded internationally. This includes transport and communication services, and public administration. Furthermore, it allows for more variety of products and hence greater available choice. In addition, by allowing for more producers who produce at reasonable scale levels it makes possible a more competitive environment. It also allows for more network economies. … The experience of Japan, and indeed many

[1] Scale economies exist for a firm producing a single output if, when output doubles, the total cost of production less than doubles. Economies of scope exist where one firm can supply two products at a lower cost than can two firms individually producing one product each. For example, the costs of the joint provision of cable television and telephony services may be lower than the provision of these services separately.

other countries, also suggests that a large home market can provide a platform for a take-off into quality exporting. (Corden 2003, p. 13)

Economies of scale, productivity and economic growth

Scale effects in their broadest sense include all the mechanisms that might lead to lower unit costs of production, marketing and distribution because of larger output, or pecuniary benefits from network economies. Scale effects can originate at the level of the firm or plant, the level of the industry, or the regional or national level.[2]

Economies of scale at the level of the firm and industry

At the level of the firm, economies of scale can exist in production and in distribution and marketing. Larger production runs might allow firms to achieve lower unit production costs. Potential sources of economies of scale include spreading fixed costs over more output, employing more volume-efficient equipment, and/or employing work organisation techniques that are more efficient with larger scale (for example, specialisation of labour). Larger markets could also lower the unit cost of marketing and distribution.

Economies of scale at the level of the industry arise from the benefits of agglomeration or 'thick markets'. These advantages are a widely accepted explanation for the concentration of population and industry in larger cities (Henriksen, Knarvik and Steen 2001). The benefits of agglomeration can arise from a number of sources including a larger local pool of skilled labour, sharing of local inputs, network economies and information spillovers.

Local skilled labour pooling

A large local pool of workers with the relevant skills can lower the costs to firms of expanding their workforce in two ways. First, larger ('thicker') labour markets have many vacancies and applicants, and can increase the ease with which vacancies are filled and applicants are employed. This might lower the cost to firms of hiring labour to respond to changing market conditions. Second, a larger pool of labour

[2] There is a significant body of research which explores the links between economic growth and the existence of scale and agglomeration effects. Useful surveys of the key topics and recent literature are provided in Arrow, Ng and Yang (1998), Hansen (2002), Rosenthal and Strange (2003), and SGS (2002).

might allow firms to employ staff with the appropriate skills more easily. This can reduce labour costs associated with training and skill acquisition.

Sharing of local inputs

Geographic clustering of firms allows specialist inputs to be provided to firms at a lower cost than would be otherwise possible if the firms were dispersed (Ciconne and Hall 1996; Quigley 1998). These inputs include specialist support services (legal services, research and development, design and testing, and so on), which might have high setup costs. Agglomeration allows the setup costs of these services to be spread over a large number of local customer firms. Agglomeration also allows all market participants to access the benefits of shared infrastructure while sharing the costs.

Network economies

Larger populations might also provide more opportunity for direct and indirect network economies (also referred to as 'network externalities').[3] Products that exhibit network externalities include telecommunications, transportation systems, electricity distribution, credit card networks, and computer hardware and software. Where network externalities exist, a larger population might lower costs for firms that use the network good or service as an input to production. The Commission's report on international benchmarking of Australian telecommunications services, however, found that:

> Network externalities are likely to be significant when a network has low penetration. For mature networks, the additional benefit to each existing subscriber, from one more subscriber, might be small. (PC 1999b, p. 219)

Information spillovers

The generation and sharing of new ideas and concepts can improve productivity by ensuring firms use best practice techniques and have a coherent picture of the overall market environment (Morrison-Paul and Siegel 1999). Larger concentrations

[3] Direct network externalities exist where the value of a service or good to an existing user increases when additional users subscribe to the service or purchase a good. For example, the value to a user of telecommunications increases when an additional user subscribes to the service. Indirect network effects arise when the value of a product increases as the number of, or the variety of, complementary goods or services increases. For example, complementary products for motor vehicles include spare parts and repair services. A larger penetration of a particular make or model will lead to a wider availability of spare parts and repair services, raising the value of ownership to all purchasers.

of firms and people promote information spillovers in a number of ways. For example:

> … while much knowledge is usefully codified and accessible by books, the internet and education and training, much other knowledge is tacit and transmitted by informal physical interaction between people. The synergies are great as workers move between firms, formal and informal interactions take place between people with productive knowledge and people capable of identifying and using that knowledge. Formal and informal interactions occur among investors, researchers, board members, managers, workers, consumers et cetera. (Withers 2004, p. 15)

Withers (sub. DR35) further argued that migrants can make a particular contribution to information spillovers where they have knowledge and skills that would not otherwise be available (such as international links and networks that may increase trade access, or knowledge such as production techniques).

Private versus public benefits from scale

The benefits of firm-level scale are fully captured by the firm and are thus 'private' (Hansen 2002). However, the industry-level effects are essentially externalities, or spillovers, and cannot be fully captured by any single firm (that is, they are 'public', or 'social' in nature). Hansen (2002) argued that this distinction implies that:

> … private increasing returns to scale cannot be a feature of most plant-level production because it implies that each good would be produced by a single firm using a single production plant, which is not an observed feature of the real world for most goods and services. By this reasoning, economic growth must come mostly from social, rather than private, increasing returns, with the divergence implying the presence of technical externalities, such as knowledge spillovers. (p. 14)

There could be industries characterised by firm-level economies of scale, but where market domination by individual firms is prevented by competition regulation. Aspects of competition regulation that might limit firms' scope to realise economies of scale might include oversight of mergers, access to essential infrastructure and pricing practices of public utilities. In implementing such arrangements, governments make a trade-off between the possible benefits of competition and scale.

Economies of scale in regions

A small population and inability to achieve economies of 'agglomeration' might be important for explaining some of the challenges faced by regional centres. In its submission, the Northern Territory Government (sub. 25) identified population size as particularly important for the Northern Territory economy because of economies

of scale in industry, the labour market and the provision of public infrastructure (box 6.1).

The Western Australian Minister for State Development; Energy also provided an example of how agglomeration could lower costs:

> It is thought that a city needs to have a population of around 100 000 to be a self sustaining service centre with a university, sophisticated health services, high cultural amenity and providing a range of economic opportunities … (sub. 27, pp. 3–4)

Box 6.1 **Regional impacts of scale in the Northern Territory**

The Northern Territory Government suggested that the relatively small population of the Northern Territory affects the structure of its economy and the efficiency of its labour market.

Structure of economy

Relative isolation and a small local population are important determinants of the structure of the Northern Territory economy:

> Import substitution is not possible for a number of industries as there is not the local demand to sustain significant manufacturing and service industries. [As a result the] … economy relies primarily on mining, tourism, government administration and defence, and fiscal transfers from the Commonwealth.

Labour market efficiency

Thin labour markets affect economic growth by adding to employee hiring costs and shortages of skilled workers:

> One of the major impediments to business and economic growth in regional Australia is a chronic shortage of skilled labour. This might be due to increasing returns to scale in the matching efficiency of the labour market: the larger the labour market, the greater the ability of the labour supply to meet the specific demands of employers. This is demonstrated by vacancy rates in the Northern Territory which are up to twice as high as the national rates, while unemployment is around the national average. Inter-regional labour market imbalances such as these are only partially corrected by wage adjustment and labour mobility mechanisms.

Source: Northern Territory Government (sub. 25, p. 5).

Economies of scale at the national level

Scale effects at the national level can include lower costs of providing government services and lower transport costs associated with Australia's geographical size and location.

Provision of government services

The cost of providing the minimum level of some government services includes a large fixed cost component, which is not affected by the size of the population (Foster 1996). Examples include the cost of defence and public administration. The Commonwealth Grants Commission, for example, has noted that:

> … each State operates basic administrative structures to provide machinery of government, provide policy advice across the full range of services, and to administer and implement those policies. The administrative scale factor reflects the needs of some States to spend more per capita than other States to provide the basic structure of government. The concept of basic structure of government refers, in this context, to part of the function of head offices of departments. (CGC 2001, p. 1)

The provision of government services such as health and education will also involve a fixed cost component, but are more closely linked to population size.

The tyranny of distance

Australia's geography and distance from world markets has been cited as a source of economic disadvantage. Rahman (2005), for example, has noted that:

> In contrast to the US, Australia is a long way from the centre of world economic activity, and is also a geographically large country with a relatively small population. … The dispersed nature of the population discourages labour mobility within Australia… Australia [might also forego] many of the benefits of proximity [to the centre of world economic activity] that accrue to the US. These benefits include the economies of scale, intensity of competition, and low transportation costs that are available in more densely populated markets. (p. 1)

Withers (2004) also argued that distance from international centres of intellectual activity might limit knowledge transfer.

Although developments in transport and communications have diminished the disadvantages of distance, including lower real transport costs, they have not overcome it (Corden 2003; Withers 2004). A recent paper by the Australian Government Treasury argued that nearly two-fifths of the productivity gap between Australia and the United States might be explained by Australia's remoteness (Rahman 2005).

Arguably, the challenges posed by Australia's geographic size and location might be mitigated by a larger domestic population and economy. If economies of scale exist, a larger population and domestic economy might help offset any disadvantage associated with distance by lowering the costs of domestically produced goods and services. Where these are used as intermediate inputs, lower production costs might

offset the high transport component of the cost structure of the traded goods and services sectors and provide a stimulus for export.

Diseconomies of scale

Economies of scale might not exist without limit. For example, in the literature, it is suggested that economies of scale within the firm are limited by factors such as management and internal communications problems (Foster and Baker 1991, Canbäck 2004). Similarly, diseconomies of scale can occur at the industry level if factors such as greater demand for limited inputs force up the cost of production (Meikle 1985).

Most participants in their submissions, however, focused on diseconomies of scale associated with the broader impacts of economic activity on the built and natural environments. For example, Mr Robert Braby (sub. DR36) noted that environmental diseconomies include:

> … resource depletion, erosion, salination, green algae, deforestation, loss of biodiversity and environmental damage to coastal holiday resorts. (p. 3)

These natural resource and environmental issues are considered in section 6.2.

Evidence on the impact of migration on economies of scale

Assessing the effects of migration on productivity and economic growth arising from economies of scale is problematic. The OECD (2004a), for example, argued that although economies of scale are sometimes raised as an argument for higher migration and population growth in order to achieve higher economic growth, there:

> … is doubt about the importance, and maybe the existence, of economies of scale at the economy wide level, even if they may exist at the level of individual plants. And if they do exist, an important question would be the degree of increasing returns. (p. 176)

This doubt arises from two sources. First, estimates of economies of scale are inconclusive. Second, the contribution of migration (when compared with other influences) to economies of scale is unclear.

Estimates of economies of scale are inconclusive

Verifying the existence and measuring the importance of economies of scale is a difficult exercise (Corden 2003; Foster 1996; OECD 2004a; Perkins et al. 1990). Foster and Baker (1991), for example, noted that:

> Empirically, however, it is difficult to separate the effects of possible contributing factors to productivity growth, such as skills, scale change and technology. Observed changes in unit costs of production as input levels increase through time cannot be easily split into components reflecting 'pure' scale effects, or the effects of technological change or enhanced skills, as 'embodied' in the respective increments to capital and labour. The issue is complicated further by interactions between such sources of productivity growth — any contribution of scale economies, for example, might vary according to prevailing technology. (p. 81)

Diewert (2004) explained that empirical studies to identify the sources of productivity can be inconclusive because econometric approaches:

> … cannot deal adequately with a large number of inputs and outputs and the results that the econometric approach generates are often fragile and are generally not reproducible. … Different investigators will choose different explanatory variables, make different functional form assumptions, choose different instrumental variables in a simultaneous equations model, make alternative stochastic assumptions and use alternative methods of estimation. (p. 4)

A specific illustration of these issues with regard to measurement of productivity and economies of scale was provided by Diewert (2004):

> Diewert and Fox (2004), using exact index number techniques and drawing on the work of Nakajima, Nakamura and Yoshioka (1998) and Nakajima, Nakamura and Nakamura (2002), worked out a simple econometric method for estimating the contribution of returns to scale to productivity growth. Their method involved regressing aggregate input growth on aggregate output growth. However, if output growth were regressed on input growth, the resulting estimate of returns to scale became substantially smaller on average. (p. 4)

In other words, two empirical studies could lead to quite different estimates while still individually being theoretically and technically defensible. In such circumstances, it is not clear which method yields estimates closer to the 'truth', and therefore it is difficult to support either conclusively (Diewert 2004).

However, previous research by the Commission has identified a number of industries where economies of scale might exist. These include agricultural products such as pigmeat (PC 2005a) and egg farming (PC 2005c); manufacturing products such as motor vehicle manufacturing (IC 1997); and services and infrastructure such as telecommunications (PC 2001), electricity generation (Sayers and Shields 2001), rail transport (PC 1999a) and air passenger transport (Doove et al. 2001).

In many of these studies the Commission had difficulty identifying conclusive quantitative evidence on the magnitude of economies of scale in the Australian context. The Commission's research report on electricity prices and cost factors, for example, was able to identify anecdotal evidence of network economies in

electricity distribution in Australia. In particular, output density and customer density were identified qualitatively as key drivers of distribution costs (Sayers and Shields 2001). However, no conclusive empirical evidence for Australia was available.

Although a number of international studies have found evidence of economies of scale,[4] it is difficult to extrapolate these results to the Australian economy. Sayers and Shields (2001), for example, provided empirical estimates of these factors based on studies using data for the United States.[5] Extrapolating these estimates to Australian circumstances was not recommended for a number of reasons.

> First, … the data in [the report] provide only an estimate of output densities [in Australia]. Second, the econometric estimates relate to overseas utilities that are mainly located in urban areas. Third, elasticities are point estimates that cannot be used to infer the extent of economies over a large range of output densities. Further, the utilities that form the basis of the estimates may have different cost structures to the utilities included in this study. (Sayers and Shields 2001, pp. 170–1)

Overall, the empirical evidence on the aggregate impact of scale economies is inconclusive. There might be scale economies in some industries and agglomeration effects are likely to benefit specific locations, but the extent to which these effects contribute to aggregate productivity and economic growth is unclear.

The contribution of migration to the size of the economy

Some insight into the issues regarding the impact of population size on labour productivity and living standards can be achieved by considering the relationship between population size and productivity across countries (box 6.2). This analysis has significant limitations, and is only provided to illustrate the difficulty of identifying reliable estimates of the effects of scale. This exercise highlights the point made by Diewert (2004) above, that it is possible to derive quite different estimates by making different assumptions.

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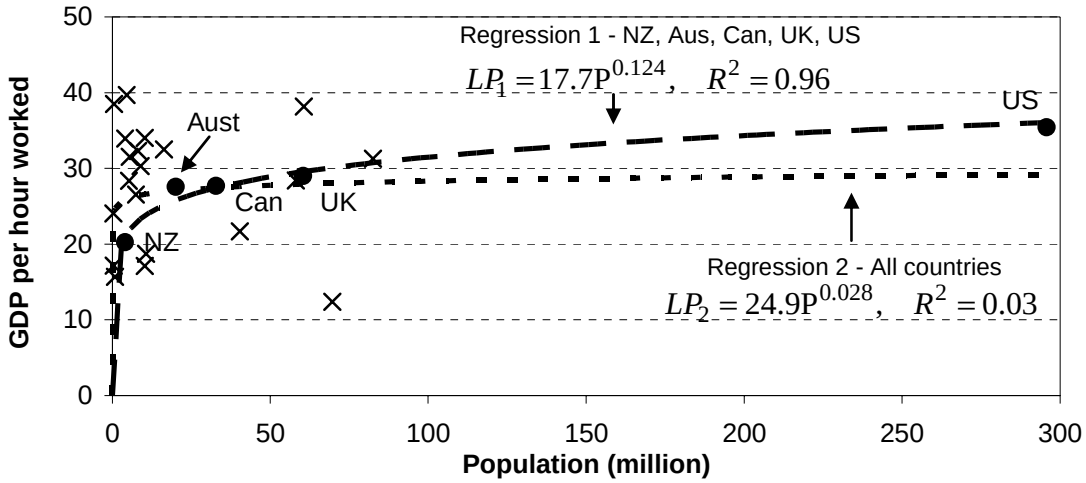
4 These studies include evidence of firm level ('private') economies of scale in capital-intensive industries such as manufacturing (Kaskarelis 1997; Hwang 2003; Morrison-Paul and Siegel 1999), and electrical power generation (Hisnanick and Kymn 1999).

5 The estimates on economies of output density were in the range of a -1.2 to -4.6 per cent change in costs for a 1 per cent change in density. The estimates on economies of customer density were in the range of a -1 to -1.6 per cent change in costs for a 1 per cent change in density (Sayers and Shields 2001, pp. 170–2).

Box 6.2 **Labour productivity and population size**

Labour productivity (GDP per hour worked) was regressed against population size for a selection of OECD countries, using data for 2004-05 from the Groningen Growth and Development Centre (GGDC 2006). The functional form adopted for the regression equation was $LP = \alpha P^{\beta}$, where LP is labour productivity and P is population size. Two regression models were estimated. The first included only Australia, Canada, New Zealand, the United Kingdom, and the United States. This model represented an 'optimistic' sample which was likely to provide the strongest support for a positive relationship between population size and labour productivity. The second model included all OECD countries for which data were available (see figure below). The estimated elasticity parameter from the all OECD country sample, however, was not statistically different from zero.



The elasticity parameters (β) for each regression were then applied to data for Australia in 2003-04. The recalibrated model was $LP = 50.4P^{\beta}$. The effect of the increase in the size of the population from the increased-migration simulation was then combined with the elasticity from the five country sample. The increase in population would add approximately $177 per year to GDP per capita by 2025. Using the elasticity that was estimated from the all OECD country sample, the addition to GDP per capita would be $39 per year.

Sources: Productivity Commission estimates based on GGDC (2006); appendix F; ABS (2006).

Overall assessment

Migration could contribute to aggregate productivity and economic growth to the extent that scale economies exist and are directly attributable to the size of migration and the domestic population. However, the evidence is not conclusive on the contribution of migration to productivity and economic growth through scale economies:

- Estimates of the contribution of economies of scale to productivity and economic growth are inconclusive.
- Estimates of the contribution of economies of scale in the past might not be applicable to the present or future.
- The contribution of economies of scale can be realised by many means and estimates typically do not isolate the contribution of migration and population.

Although it would be possible to include economies of scale in the analysis, the Commission considers this inappropriate. Any such inclusion would have a limited empirical basis due to the inconclusive nature of the existing body of research.

6.2 Migration, natural resources and environmental externalities

A larger population and domestic economy can increase the demand for natural resources and urban land, which might be in limited supply. It might also increase negative environmental spillovers such as pollution, environmental degradation and congestion.

An important question is: does the increase in demand for limited resources and the generation of environmental externalities have implications for growth in productivity and living standards? These concerns were raised in a number of submissions to this study.

A number of participants argued that there are real costs associated with a larger population, whether from migration or natural increase. Some participants, like Sustainable Population Australia (Tasmania), suggested that population growth in the past had resulted in significant impacts on the natural environment:

> The huge level of population growth over the last two centuries has resulted in a massive loss of biodiversity and a widespread degradation of the landscape. The latter is manifested in salinity of the soil and topsoil erosion. (sub. 9, p. 6)

Other participants identified the potential impacts of population growth in urban areas. Claus Environmental Engineering (sub. 12), for example, suggested that larger urban populations lead to more air pollutants, sewage and wastewater, polluted runoff, solid waste and greenhouse gases. Mr Richard Harfield (sub. DR31) argued that:

> Another consequence of population growth and expanding metropolitan boundaries is the longer travel times and higher fares or running costs many people face, to and from their places of employment and entertainment. (p. 6)

Participants varied, however, in their assessment of the extent to which these impacts affect productivity and can be managed. Some participants pointed to international environmental issues such as potential oil shortages and global warming as possible environmental constraints on Australia's economic performance in the future. For example, Sustainable Population Australia (ACT) argued that:

> [I]t requires quite a remarkable degree of confidence in the possibilities for technological breakthrough and substitution on a scale and at levels of cost that would see present levels of economic activity being sustained much longer, let alone the achievement of per capita growth for an increasing population. (sub. DR38, p. 2)

Others, such as Sustainable Population Australia, argued that:

> … a bigger population is a hindrance to productivity, not an aid. The only kind of skilled immigration that can be justified — apart from that needed to fill short-term shortages while our training institutions catch up — are the scientists and technicians who will help Australia develop new technologies that will help us move to a new society, one not based on cheap oil as it is today. (sub. 14, p. 10)

Dr Patnaikuni, on the other hand, argued that there are options for minimising environmental demands by influencing people's behaviour:

> In Australia a good percentage of water is used for gardens but this can be considerably reduced by encouraging people to plant native gardens which do not require much water … Energy problems can be reduced by encouraging people to install solar hot water systems. … People may be encouraged to use public transport instead of a single person driving a V6 car to go to work. (sub. 2, p. 3)

Natural resources, productivity and economic growth

Australia's environmental resources include air, water and land. These are inputs to production and recreation activities, and provide life-supporting systems and amenity services for the population (Beltratti 1996; Kennedy 1990).[6] Some natural resources are finite, such as reserves of minerals and fossil fuels. Supplies of these resources can be supplemented via discovery of new reserves and imports in the short term, but stocks ultimately diminish with use. Other natural resources (such as forests and fisheries) and the waste assimilation capacity of the environment (for example, the pollution absorption capacity of city airsheds and waterways) can be

6 Kennedy (1990) notes that social problems can arise when conflict between multiple uses of the environment and over-use of the environment (for example, degradation, pollution and the depletion of resource stocks) cannot be resolved under existing institutional arrangements.

exploited on an ongoing basis provided this exploitation does not exceed sustainable levels.[7]

There are a number of reasons why growth in productivity and living standards in the past has been possible in the presence of environmental constraints. For example, the output of resource sectors (such as agriculture and energy) have declined as a share of GDP in countries around the world. This might be explained by the growth in less resource-intensive goods and services as a share of economic activity. It might also be evidence that economies have, in the past, been able to respond to the increasing scarcity of natural resources by substitution and technological advances (Romer 2001).

In some cases, markets for environmental resources have provided the incentive for people and organisations to internalise the scarcity value of resources and reduce their reliance on those scarce natural resources. In other cases, even in the absence of efficient markets, the demands on environmental resources might not have reached a level that would constrain growth. Nonetheless, natural resource and environmental constraints are likely to have limited growth compared with what would have been the case had environmental resources been unlimited. Environmental policy can help reduce, but not eliminate, this drag on growth.

An increase in the size of the economy increases the demand for natural resources to the extent that natural resources are used as a factor of production. If the supply of natural resources cannot keep pace with increased demand, then the price of these resources rises to reflect current and expected future scarcity (Pearce and Turner 1990). Over time, the higher price of scarce resources relative to other inputs provides an incentive for producers and consumers to reduce their use. This can be achieved in a number of ways:

- *Technological developments*. Technological developments can expand long-term substitution possibilities, facilitate more efficient use of resources and might reduce waste and pollution (Beltratti 1996). For example, water desalination plants can, at a cost, alleviate water scarcity. Similarly, more efficient water use technologies might lower the amount of water used to grow an irrigated crop.
- *Substitution between final goods and services.* The high price of scarce resources is reflected in the price of final goods and services. Consumers are induced to switch consumption to other products which are relatively less expensive. For

7 Sustainable exploitation levels of these types of environmental assets and services are fixed in the short term but can be increased over time with investment and innovation. For example, the stock of renewable timber can be expanded through managed plantations.

example, the relatively high cost of hardwood flooring provides an incentive for consumers to switch consumption to alternative forms of flooring.

- *Substitution between factors of production*. Resource intensity can also be reduced by substitution between capital and resources. Substituting irrigation pipes for open channels in the Murrumbidgee and Coleambally irrigation areas, for example, would be expected to reduce water loss through seepage and evaporation by 190GL per year (CSIRO 2005). Similarly, investment in building insulation could lower emissions from fossil fuel power generation.
- *Substitution between resources*. Resources that provide similar benefits can also be substituted, for example, the substitution of synthetic fuels for fossil fuels. Although this might relieve the intensity of petroleum use, it might also raise the intensity of resources used to produce the synthetic fuels and the importance of managing the pollution effects associated with these processes (Lowe 1988).

Productivity and economic growth are likely to be less than would be the case if the supply of natural resources were unlimited (Weil 2005). Reducing the use of natural resources per unit of labour and capital lowers the productivity of these factors. Similarly, exploration of technological alternatives redirects investment capital, which could have been employed elsewhere. These effects might be accentuated by delays in finding suitable substitutes and technology.

Efficient pricing, substitution and the development of new technologies can reduce the drag on productivity and economic growth arising from environmental constraints, but a drag still exists. The size of this drag depends on the availability and cost of suitable substitutes, and the cost and effectiveness of technological development.

Migration and natural resources

Migration can influence the demand for natural resources in both non-urban and urban areas. For example, migration might increase demand for the output of industries that use natural resources (such as agriculture), which are mainly located in non-urban areas. In urban areas, migration might increase the demands on natural resources that physically support the population (such as water and airsheds).

Non-urban impacts

The mining and agriculture, forestry and fishing industries are the major primary users of Australia's natural resources in the non-urban environment. However, as Foran and Poldy (2002) noted, domestic population size is unlikely to be a key driver of demand in these industries because they are highly export-oriented:

> Production characteristics of the minerals and agriculture industries, and to a lesser extent forestry and fisheries, are driven not by domestic population levels, but by demand from global export markets. Those export markets are, in turn, driven by populations in the globalised marketplace, and their requirements for subsistence, lifestyle and affluence … Domestic population levels have relatively minor primary or direct effects on resource and environmental issues related to mining and agriculture but more pronounced effects on forestry and fisheries. (p. 115)

Migration increases the demand for natural resources to the extent that it increases demand for goods and services that use these resources, and to the extent that exports expand in order to pay for increased imports.

Urban impacts

The most direct impact of migration on the demand for natural resources is likely to occur in urban areas because, like other Australians, immigrants tend to live in the major urban locations. In 2001, 83 per cent of overseas-born Australians (89 per cent of recent arrivals), lived in a major city (ABS 2004a). It is therefore likely that the direct influence of migrants on the environment is most significant in the larger cities. Arguably, this is particularly the case for Sydney, where one-third of the population was born overseas (ABS 2004a).

The relative scarcities of land and potable water are often cited as examples of natural resource challenges for large urban areas (for example, Burley, Murphy and Fagan 1997; Chisholm and Kennedy 1990; Washer 2005).

Urban land

Urban land that is suitable for development is limited in the short term. In Sydney, this constraint is typically argued to be physical, while in other cities it is related to development policy and to the cost of providing infrastructure and services to outer suburbs (Burley, Murphy and Fagan 1997). However, in the longer run, there is scope to increase land availability through development, reclaiming of land and higher density developments.

Some commentators argue that, because migration is an important driver of population growth, it is a key driver of demand for land in major cities (Foran and Poldy 2002; Garnaut 2002). However, many factors other than population growth drive the demand for land and housing, such as trends in household structures and preferences (Washer 2005).

The recent Commission report on first home ownership found that permanent and short-term migration had been an important contributor to housing demand since the

mid-1990s, particularly in Sydney and Melbourne. However, the impact of migration has been offset by low natural population growth and movement of people away from the large cities (PC 2004a).

Urban water

A larger population is also likely to increase the pressure on urban water supplies. Many of Australia's large cities are facing potential water shortages in the short term. Migration will contribute to the pressure on urban water supplies. In the longer term, technological solutions exist that could alleviate water shortages, but at a cost. Sydney and Perth, for example, are exploring the option of water desalination.

Correctly pricing water might provide the incentive for users to modify their consumption (for example, by adopting water efficient garden design and/or investment in water efficient technology). Progress has been made towards consumption-based charges, with the introduction of volumetric-based tariffs for urban water in some jurisdictions (PC 2002; PC 2005c). Further progress in the integration of urban and rural markets could ensure that water is allocated to where it is most valued (PC 2005c). Even with these policies, there remains a drag on growth from water supply constraints.

Environmental externalities, productivity and economic growth

The relationship between environmental externalities, productivity and economic growth is similar to that of the natural resources presented above. The main difference is that the effects of externalities might not necessarily be fully reflected in market prices (box 6.3).

If prices do not provide an incentive for producers and consumers to adjust their behaviour to take into account the costs that their actions impose on others, then the environment might be exploited at 'socially inefficient' levels. For example, if the full costs of harvesting a fishery are not internalised, the fishery might be harvested at an unsustainable rate. This behaviour might result in the complete loss of the resource, and the need for more extreme substitution and technological responses than would otherwise have been necessary.

The size of the drag on productivity and economic growth associated with environmental externalities will depend upon the extent to which costs are internalised, and the availability of suitable substitutes and technological alternatives.

Box 6.3 **Externalities**

It is important to distinguish between environmental goods for which there are well-defined property rights (such as land, forests and mineral reserves), and those for which there are not (including pollution-free air and water) (Romer 2001).

Where well-defined property rights exist and are enforceable, the owner of the right can internalise the benefits and costs associated with exploiting the environmental good. Efficient markets allow price to signal scarcity or environmental costs, and encourage efficient use of scarce environmental goods (both currently and inter-temporally).

However, where property rights are not well-defined or enforceable, not all the costs or benefits associated with using the environmental good are internalised, and the use of the good might generate externalities. In these circumstances, the price faced by decision makers might not encourage efficient use of the environment. For example, pollution causes costs to society as a whole; similarly, overuse of fisheries affects the sustainability of the fishery for all users. If the cost of additional pollution or fishing faced by the individual does not take into account the costs to other users, the individual has an incentive to pollute or fish at a higher level than is socially optimal.

The Australian Government Treasury (2002) noted that many of the environmental challenges faced by Australia are related to externalities:

> These include land and inland water quality degradation, loss of biodiversity, air quality, climate change and pressure on coastal, marine and wetland ecosystems. These environmental problems often occur when people do not face the full costs of or receive the full benefits from their actions. (p. 66)

The preferred approach is to deal with externalities (that is, market failure) directly through pollution taxes, subsidies, sale of property rights, and so on (IC 1997). In some situations, high monitoring and enforcement costs might preclude such approaches (for example, monitoring emissions from individual motor vehicles would be costly). However, in such cases, various regulatory processes or incentive systems that have both pricing and regulatory components can be used (Clarke et al. 1990).

Migration and environmental externalities

Migration might increase the costs associated with environmental externalities through its contribution to the size of the population and economy. These costs might be reduced by policies that internalise the cost of people's decisions to use the environment. However, they are not eliminated. Chisholm and Kennedy (1990) differentiate between environmental impacts in non-urban and urban locations.

Externalities in non-urban areas

One of the key externalities that is often cited for non-urban areas is land degradation resulting from agriculture, forestry and mining activity (ABS 2002b).

However as noted above, the demand for the agriculture, forestry and mining activity that causes land degradation is not significantly affected by migration or population size. Chisholm (1999), for example, observed that:

> Australia's agricultural sector is highly export oriented. Thus, what happens on Australia's farms (and in its mines) is largely determined by overseas markets. (p. 24)

In addition, most of the problems are associated with climatic events (such as droughts and floods), and past poor farming practices (AATSE 2001; Withers 2004). Inappropriate government policies can also lead to perverse environmental outcomes:

> These outcomes may stem from: a lack of clarity in the specification of regulations; a failure to apply the regulations flexibly on a case-by-case basis in a way that focuses on environmental outcomes; a lack of recognition of the economic incentives underlying the problem at hand; and/or a lack of resources to ensure effective environmental management. (PC 2004b, p. 106)

The conclusion follows that non-urban environmental externalities are not closely linked to migration. To the extent that non-urban environmental externalities exist, they represent costs in terms of productivity and living standards which would be minimised by implementing good regulatory practices, even with the current population.

Externalities in urban areas

Externalities in urban areas can be associated with either the natural or man-made environment. Sustainable Population Australia (ACT), for example, argued that evidence of the adverse impacts of environmental externalities is implied by:

> Front page feature articles in major metropolitan dailies about growing traffic congestion and water supply issues ... (sub. DR38, p. 2)

Externalities that relate to the natural environment include, for example, the use of the environment as a 'sink' for the by-products of production and consumption activities. A study by the Australian Academy of Technological Sciences and Engineering (AATSE 2001) examined 21 environmental issues likely to arise from increased population size, and identified four for which they considered the relationship to be strong:

- Pollution of land (and groundwater basins) where the waste generated by a larger population is beyond the absorptive capacity of the environment or infrastructure.
- Pollution of coastal waters, rivers and lakes near major urban areas from increased stormwater runoff and sewage discharge.

- Pollution of urban airsheds principally from increased vehicle emissions and, to a lesser extent, energy generation.
- Depletion of urban fresh water stocks from greater demand on renewable water reserves for domestic activities such as drinking, washing and gardening.

Externalities that relate to the man-made (or 'built') environment include congestion. As noted in the recent New South Wales Government sustainable transport inquiry:

> Congestion imposes costs on other road users in the form of increased travel time and running costs, and on society through increased pollution. Typically, road users are not charged for these costs, and in the absence of a price mechanism to allocate a road to those motorists who most value it, many roads are overused (congested) at particular times. The result is inefficiencies in road use, in vehicle use, and in the use of motorists' time. (Parry 2003b, p. 183)

A larger population raises the cost of using shared facilities such as roads and public transport. Traffic congestion raises the costs of transport and freight operations, as well as prices to customers (BCA 2005).

It is widely accepted that environmental management problems should be dealt with directly, even with Australia's present population size (Australian Government Treasury 2002; Clarke et al. 1990; Corden 2003). For example, AATSE (2001) suggested that the major population-related urban environment and infrastructure challenges faced by Australia can be managed in several ways:

> - Technological innovations can contain or potentially reverse environmental impacts through improved efficiency, containment or 'ways of doing things'.
> - Behavioural shifts caused by education programs and regulatory measures can be applied to minimise the impact people have on the environment.
> - Pricing policies can be applied to change behaviours by rendering the true cost of supplying a service or impacting on the environment more transparent to consumers.
> - Planning and settlement pattern policies, which seek to lessen environmental impacts through alternative land use and transport arrangements, can be applied to deliver superior environmental outcomes. (p. iii)

Evidence on migration's impact on natural resources and the environment

Assessing the impact of migration on productivity and economic growth arising from changing demands for natural resources and the environment is difficult. First, the relationships between population, the environment, and productivity and

economic growth are complex. Second, the effect of migration on these relationships is unclear.[8]

As discussed above, natural resource and environmental limitations are likely to impose a drag on productivity and economic growth. The effect of migration on the size, rate of growth and characteristics of the population, however, is only one of a number of factors which might influence productivity and economic growth. For example, other factors that could be equally or more significant might include:

- the state and pace of technological development
- the capacity of the environment and availability of substitutes
- the degree to which resource and environmental use are influenced by markets or appropriate regulation
- the preferences and behaviour of individuals and businesses (both domestically and internationally).

There is currently no established quantitative framework which incorporates the dynamics of all the relevant factors that can be used to estimate general equilibrium effects of environment constraints.[9] It is therefore not possible to assess reliably the aggregate impact of natural resources and environmental limitations on productivity and economic growth. Similarly, it is not possible to attribute reliably the contribution of migration to these impacts. This does not imply that the impact is

8 This is particularly the case where environmental constraints are defined in a global rather than national context (for example, demands on world reserves of gas and oil, or the impact on greenhouse gases). Migrants will consume from these reserves and add to externalities like greenhouse gases wherever they live, although possibly at different rates (Foran and Poldy 2002). Assessing the impact of migration should therefore take into account net additional impact of a migrant living in Australia rather than another country.

9 One attempt to model the aggregate impact of various population and migration scenarios on the environment for Australia is presented in Foran and Poldy (2002). This study however, adopted the Australian Stocks and Flows Framework — a physical-flows method which embodied assumptions which severally limited it usefulness as a tool for economic analysis.

In particular, the method does not include the scope for prices and costs to influence consumer and business behaviour. This is particularly relevant from an economic perspective because price is the main feedback mechanism through which emerging scarcities are signalled (encouraging substitution and technological development). Similarly, prices and costs are the main mechanism through which market-based environmental policies operate.

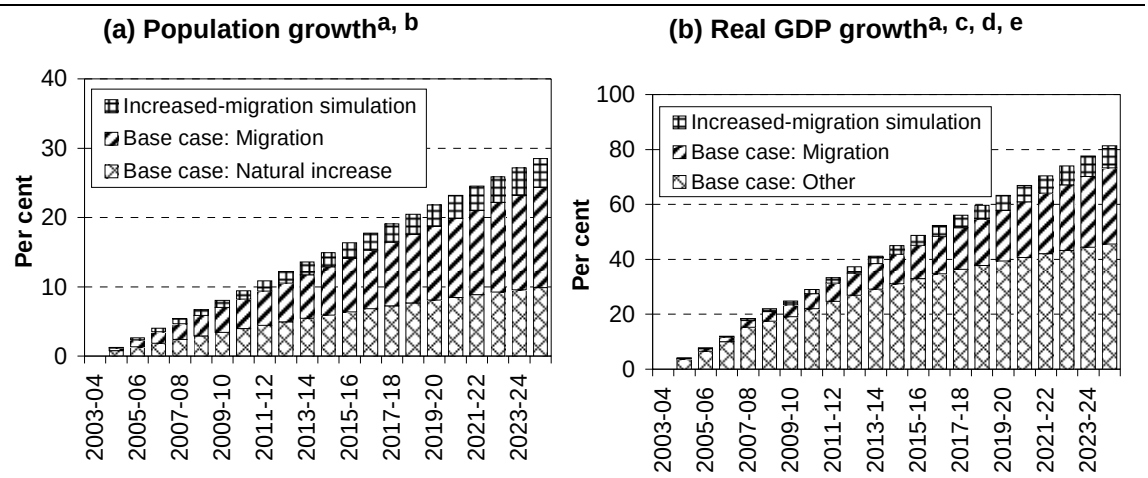
A comprehensive critique of the study by Dr Chris Murphy and Dr Mark Wooden, two economists on the study's reference group, is included in pages 266–70 of Foran and Poldy (2002).

small or does not exist, only that it cannot accurately be assessed for modelling purposes.

The contribution of migration to the size of resource-using industries

One way of assessing the likely impact of migration on the demand for natural resources is to assess the impact of migration on the size of resource-using industries. Extrapolating the results from the Commission's simulation projections suggests that, if the existing levels of migration continue until 2024-25, the population will be 14.4 per cent larger due to migration (box 6.4). This will expand real GDP and output in the resource-using industries (figure 6.1).

Figure 6.1 **Growth in population and real GDP by source**
2003-04 to 2024-25



a The increased-migration simulation assumes a 50 per cent increase in the annual skilled migration program. The base-case simulation assumes current migration policy settings. **b** Population projections are based on the Labour Supply Projection model and the New Arrival Tracker (appendix F). **c** These extrapolations are provided for illustrative purposes. It is likely that the estimated effect of total migration overstates the total contribution to GDP for a number of reasons, including the higher labour productivity of the increased-migration simulation cohort when compared with the population in general. **d** The growth projections for migration in the base case are extrapolated from the increased-migration simulation (see box 6.4). **e** Other effects include expansion in population and output due to natural population increase, export expansion and productivity growth.

Sources: Productivity Commission estimates; box 6.4; appendix F.

Under the base-case simulation, the mining and agriculture, forestry and fishing industries will have expanded total output by approximately 114 per cent and 65 per cent, respectively, by 2024-25. Although other factors account for the majority of this expansion, migration will contribute to the increased output in these industries (accounting for approximately 15.1 and 23.4 percentage points of

Box 6.4 **Estimates of the impact of total migration on industry output[a]**

The Commission contracted the Centre of Policy Studies to used general equilibrium modelling to examine the impact on the economy of an increase in the level of skilled migration (appendix G). The results of this analysis can be used to provide some insight into the effect of migration on the size of the various sectors in the economy. The modelling simulated the impact on the economy of an expansion in the skilled migration program, which increased the population by 4.2 per cent between 2003-04 and 2024-25. By year 21 of the simulation, this additional immigration is projected to expand real GDP by 8 per cent compared with the base year (2003-04).

The results of the increased-migration simulation can be extrapolated to provide insight into the likely contribution to population and output of total migration over the simulation period. In the base case, total population increases by 24.3 per cent by 2024-25, of which migration accounts for 14.4 percentage points. If a 4.2 percentage point population increase leads to an 8 percentage point increase in real GDP, then a 14.4 percentage point increase from migration is likely to increase real GDP by approximately 27.7 percentage points.

		Contribution to base case growth				*Increased-migration simulation*[f]
	Units	*Migration*[b]	*Other*[c]	***Total***[d]	*CAGR*[e]	
Population growth	%	14.4	9.9	**24.3**	1.0	4.2
Industry output growth						
Other manufacturing	%	35.8	35.2	**71.0**	2.6	10.3
Fabricated metal products	%	32.9	36.2	**69.2**	2.5	9.5
Chemical, petroleum, coal	%	30.2	47.9	**78.1**	2.8	8.7
Transport, storage, comm.	%	26.4	45.5	**71.9**	2.6	7.6
Electricity, gas, water	%	24.8	40.5	**65.3**	2.4	7.2
Food processing	%	16.6	41.7	**58.3**	2.2	4.8
Basic metal products	%	23.5	57.0	**80.5**	2.9	6.8
Agriculture, forestry & fishing	%	15.1	49.9	**65.1**	2.4	4.4
Mining	%	23.4	90.7	**114.0**	3.7	6.7
Real GDP growth	%	27.7	45.6	**73.3**	2.7	8.0

a These extrapolations are provided for illustrative purposes. It is likely that the estimated effect of total migration overstates the total contribution to GDP for a number of reasons including the higher labour productivity of the increased migration simulation cohort when compared with the population in general. **b** The growth projections for migration in the base case are extrapolated from the increased-migration simulation (note f). **c** Other effects include expansion in population and output due to natural population increase, export expansion and productivity growth. **d** These results represent the total growth that is projected under the base-case simulation. **e** CAGR: compound annual rate of growth under the base-case simulation. **f** These results represent the difference between an increased-migration simulation and a base-case simulation in 2024-25 as a proportion of the level in the year of the simulation. The increased-migration simulation assumes a 50 per cent increase in the annual skilled migration program. The base-case simulation assumes current migration policy settings.

Sources: Productivity Commission estimates; appendix F.

expanded output, respectively). The estimated impacts in box 6.4, however, represent the cumulative effects after 21 years. The annual growth in the mining and agriculture, forestry and fishing industries that is attributable to migration is likely to be in the order of only 0.56 and 0.76 percentage points, respectively.

Although this suggests that migration is not likely to be the major driver of growth in natural resource-using industries, it will increase demand on natural resources and the environment. This increase will be proportional to migration's contribution to the population. This will add to the drag on productivity and living standards that is associated with constraints on these resources.

Overall assessment on migration and environmental constraints

Natural resource constraints and environmental externalities are likely to impose a drag on productivity and living standards. That is, productivity and economic growth are likely to be lower than they would be if there were no such constraints. Growth in Australia's productivity and living standards has been possible in the past because the economy has been able to adjust, at least in part, to these constraints. However, the drag on growth still exists.

Migration could contribute to a larger drag on productivity and economic growth to the extent that it increases the demands on Australia's natural resources and environment. However, information necessary to quantify the impact of environmental limitations on productivity and economic growth, as well as to isolate the impacts of migration from other factors, was not available. For this reason, environmental impacts were not included in the general equilibrium modelling. This does not imply that the impact is small or does not exist.

Migration will contribute to the costs associated with externalities. However, non-urban externalities are unlikely to be closely linked to migration. To the extent that non-urban environmental externalities exist, they represent costs in terms of productivity and living standards. These costs would be minimised by implementing good regulatory practices, even with the current population.

7 Sectoral, economy-wide and distributional effects of migration

Key points

- Migration can affect economy-wide, sectoral and regional economic activity, wages, the distribution of income and government budgets.
- Migration leads to an expansion in aggregate output, investment, employment, and foreign investment. It also leads to a decline in the terms of trade.
- Migration leads to changes in the occupational composition of the workforce, and the sectoral composition of the economy.
- Skilled migrants are less reliant on transfer payments, and are more likely to earn higher incomes and pay more taxes.
- The growth in wages of residents who are in direct competition with skilled immigrants tends to be dampened by immigration, while unskilled resident workers tend to experience enhanced wage growth.
- Most of the economy-wide gain from migration is likely to accrue to the new immigrants themselves.

The theoretical and empirical literature suggests that changing the supply and composition of labour, through migration, not only impacts on the overall size of the economy but also affects industries differentially. Industries are likely to vary in the intensities with which they use labour and capital. They also differ in the intensities with which they use various types of labour, differentiated, for example, by occupations, level of educational attainment or field of qualification.

As outlined in chapters 4 and 5, an inflow of skilled migrants can change the relative supply of labour by occupation and this is likely to have flow on effects across industries. These impacts on industries depend, in part, on the interaction of labour supply with the demand for the various types of labour by industries. The interactions are conditioned by the degree of substitution between labour and capital, and substitutability between the various types of labour used by each industry. These issues are discussed in Chiswick (1985, 1989), Grossman (1982), Hamermesh and Grant (1979) and Quispe-Agnoli and Zavodny (2002).

To investigate the effects of an increase in skilled migration, the Commission engaged the Centre of Policy Studies (CoPS) to provide some quantitative insights into the effects of skilled migration on the Australian economy. CoPS simulated the economic impact of a permanent 50 per cent increase in skilled migration. The increases in labour supply were estimated by the Commission using the New Arrival Tracker (NAT) (appendix F). These increases were estimated for 67 skill categories based on the level of education and field of qualification used by the ABS in its *Education and Work Australia* survey (ABS 2005b).

The CoPS modelling results are highly dependent on the method and assumptions used to simulate the complex economic interactions associated with changes in the level and composition of labour. The framework embedded in the MONASH Model is set out in appendixes G and J. With these considerations in mind, some of the sectoral and regional effects of migration and population growth are examined in section 7.1. Other economy-wide effects are discussed in section 7.2 and some income distributional effects are considered in section 7.3.

7.1 Sectoral effects

Sectoral output

The simulated expansion in skilled migration is projected to increase aggregate industry output by about 4.6 per cent by 2024-25 compared with the base case (table 7.1). Although the output of all sectors increases, the increases are not uniform across sectors. The Construction industry experiences the greatest expansion in output. A faster growing economy requires a faster rate of capital formation. This in turn leads to an increase in the size of the Construction industry, which supplies a key input into construction of physical capital.

Increasing the supply of skilled labour associated with Health and Education is projected to stimulate output in these sectors. On the other hand, trade exposed sectors, such as Agriculture and Mining, experience slower growth rates in output under the increased-migration simulation. This arises partly because of the decline in the terms of trade (section 7.2), and partly because they are relatively capital-intensive sectors and the cost of investment rises.

Table 7.1 **Projected industry effects**

Per cent deviation between the base-case and increased-migration simulations by 2024-25[a]

Industry	*Output (Gross production)*	*Employment (Total hours worked)*	*Capital stock*	*Price of output*	*Unit cost of labour*	*Rental price of capital*
Agriculture, Forestry and Fishing	2.64[b]	4.92	4.55	4.00	2.16	2.23
Mining	3.15	4.04	2.86	0.31	-0.94	1.61
Manufacturing	4.88	5.01	4.58	0.62	0.51	0.73
Electricity, Gas and Water Supply	4.33	5.00	3.85	-0.19	-1.56	0.60
Construction	7.80	6.48	9.31	1.51	4.58	0.46
Wholesale Trade	5.20	5.14	5.32	-0.42	-0.06	-0.42
Retail Trade	3.95	4.15	4.48	0.09	0.59	-0.14
Accommodation, Cafes and Restaurants	3.99	3.87	4.34	0.19	0.52	-0.41
Transport and Storage	4.37	4.41	4.12	-0.03	0.16	0.41
Communication Services	4.51	4.61	4.18	-0.63	-1.20	-0.41
Finance and Insurance	4.76	5.08	4.28	-1.51	-2.84	-1.47
Property and Business Services	5.26	5.40	4.20	-1.86	-3.88	-1.13
Government Administration and Defence	4.13	4.15	3.29	-1.82	-2.82	-1.20
Education	4.73	4.75	2.67	-4.01	-4.43	-0.51
Health and Community Services	5.33	5.47	3.72	-5.14	-6.24	-2.87
Cultural and Recreational Services	4.56[c]	4.48	4.42	-0.68	-1.22	-1.07
Personal and Other Services	4.38[c]	3.79[d]	4.29[d]	-1.02	-1.37	-0.73
Ownership of Dwellings	3.51[c]	..	3.52	0.81	..	1.27
Aggregate change	4.64	4.59	4.24	-0.41	-1.67	0.50

[a] Due to the aggregation of results for 107 industries, caution should be used in interpreting the industry-average results shown in this table. [b] Land is a fixed factor in agricultural production, therefore the increase in output is less than the increase in labour and capital. [c] The increase in output is less than the increase in labour and capital due to the aggregation of sub-industries with different proportions of intermediate input usage. [d] Labour and capital increases do not appear consistent with changes in unit labour cost and rental price of capital due to the aggregation of industries. .. Not applicable.

Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

Capital stock

As discussed in chapter 3, migration leads to an increase in the aggregate quantity of capital demanded in the long run. The increase in capital depends on a number of factors including:

- changes in the growth rates of industries
- the capital intensity of industries
- changes to relative costs of labour and capital induced by a changes in labour supply and its composition.

Based on the CoPS modelling, the capital stock of the economy is projected to be about 4.2 per cent larger by 2024-25 than in the base case (table 7.1). As with output, the projected increase in capital stock varies across industries. Two key factors drive the differences between industries. First is the change in demand for output of the industry. Second is the change in the relative prices of labour and capital.

For example, consider Education, where the increase in capital stock is about 2.7 per cent, and is smaller than the increase in output (about 4.7 per cent). The reason for this is that there has been substitution of labour for capital, driven by the larger decrease in the unit cost of labour (about -4.4 per cent) relative to that for capital (about -0.5 per cent). The increase in the supply of skilled labour has favoured this industry, through a relative reduction in its unit labour cost.

On the other hand, consider Construction. The increase in capital stock is about 9.3 per cent, and is larger than the increase in output (about 7.8 per cent). In this industry, there has been a larger increase in the unit cost of labour (4.6 per cent) compared to the rental price of capital (about 0.5 per cent). In this industry, the increase in demand for less skilled labour has increased its unit labour cost. This change in relative prices has induced a substitution of capital for labour.

Employment

Under the increased-migration simulation, total employment (measured in hours worked) is projected to be about 4.6 per cent higher than in the base-case simulation by 2024-25. This outcome is pre-determined in the MONASH Model using the results from Commission's NAT model, which is described in chapter 4 and appendix F.

Employment by industry

The CoPS modelling provides projections about how the increase in labour supply is absorbed across industries (table 7.1). The differences in employment growth by industry are not only driven by relative changes in unit labour costs and the rental price of capital, but also by changes in the composition of output. By 2024-25, the Construction industry experiences the largest proportional increase in employment (about 6.5 per cent), partly attributable to the increased demand for its output to meet the investment taking place in the economy.

Other industries use highly skilled workers, such as in Health, Business Services and Finance. They experience relatively high levels of employment growth because of lower wage growth in the occupations that they use more intensively.

Employment by occupation

The simulated impact of skilled migration on employment varies across occupations. The extent of this variation depends in part on the changes to the skill mix of labour supply (labour composition effect) and partly on changes in the derived demand for occupations by industries (industry composition effect).

In the increased-migration simulation, the supply and employment of Professionals, Managers and Associate Professionals increases faster than overall growth in employment (figure 7.1). The employment of Labourers and Elementary Clerical, Sales and Service Workers also increases relative to the base case, because all industries grow, increasing requirements for all types of labour. Some migrants in the Skilled Program could, as secondary applicants, have lower skill levels than the primary applicants. These lower skilled migrants may be employed in lower skilled occupations. In addition, in the MONASH Model there is also some scope for skilled workers to be employed in lower skilled occupations, which is induced by changes in relative wages between occupations.

Figure 7.1 **Projected change in employment across occupations**

Per cent deviation in hours worked between the base-case and increased-migration simulations

Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

As illustrated later in this chapter, relative wages received by various occupations adjust in order to absorb the additional labour supply.

Regional effects

The effects of increased skilled migration differ across states and territories. The differences reflect two interrelated factors. First, skilled migration differentially affects the growth in output of sectors of the economy. Second, states and territories differ in their industrial composition. For example, Mining and Agriculture are relatively more important to the Western Australian economy than to other states and territories. The slower relative growth in output of Mining arising from skilled migration contributes to the relatively small expansion in output in Western Australia.

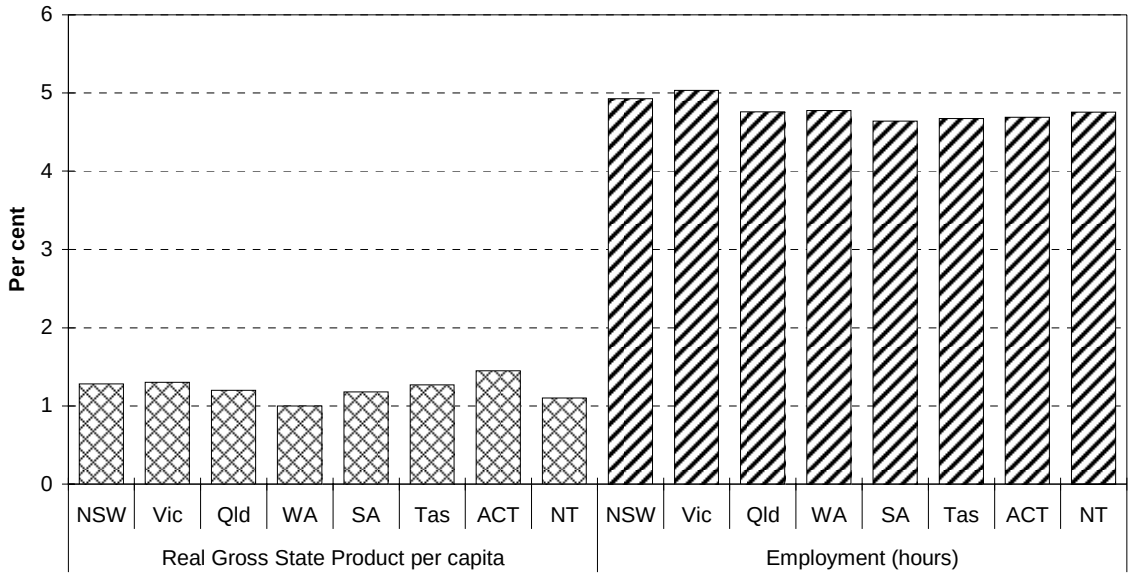
Real Gross State Product (GSP) per capita in the ACT and Victoria is projected to be over 1.3 per cent higher by 2024-25 under the increased-migration simulation (figure 7.2). For Western Australia, the projected increase in GSP per capita is about 1 per cent.

The effect on employment in the states and territories tends to follow a similar pattern to GSP per capita. Employment in Victoria is projected to be about

5 per cent higher in the increased-migration simulation. For Western Australia and Tasmania, the projected increase is slightly lower at about 4.6 per cent.

Figure 7.2 **Projected changes to output and employment by states and territories**

Per cent deviation between the base-case and increased-migration simulations



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

CoPS has also estimated output and employment for ABS geographic statistical divisions to 2012-13 (appendix H). In summary, there is a relatively faster rate of output and employment growth in metropolitan areas due to the concentration of expanding industries in these areas. Regional areas, particularly in Western Australia, grow more slowly due to the concentration of mining and agricultural activities.

A number of participants have suggested in their submissions that specific regions, and industries within regions, are especially sensitive to labour skills shortages (Patnaikuni, sub. 2; National Farmers Federation, sub. 21; Northern Territory Government, sub. 25; Western Australian Government, sub. DR37; Australian Chamber of Commerce and Industry, sub. DR38; South Australian Government, sub. DR44). The South Australian Government cited the medical workforce as an example where migration has played a significant role in addressing regional skill shortages:

> A study in 1998 showed that approximately 20 per cent of medical doctors in Australia attained their initial medical qualification overseas and the majority become permanent Australian residents or citizens. … Now and historically, overseas trained doctors have worked in rural and remote locations where it has been extremely difficult to attract

> Australian born doctors who have a preference for working in metropolitan locations. While the impact on the productivity of the economy in terms of the numbers of migrants may be minimal in general terms, the migration of overseas trained medical professionals in rural and remote areas has and is likely to continue to be important in enabling health services to be provided to these areas. (sub. DR44, p. 5)

Mining and agricultural production were also identified as industries where local workforce shortages in regional areas could constrain economic and productivity growth.

The role that migration could play in dealing with unanticipated increases in the demand for skilled workers has not been quantified by the Commission. However, a discussion of the issue is provided in chapter 9.

Anecdotal evidence suggests that some firms in regional areas may have excess demand for labour, at the wage they were prepared to offer. In this context, policies to assist in the alleviation of cyclical or short-term skills shortages, such as temporary migration, may reduce delays in large projects (which are often in regional areas), enhancing the economy's productive potential. However, migration policy is only one component of broader labour market adjustment processes and policy strategies to address labour requirements, particularly in the longer term.

7.2 Other economy-wide effects

Apart from the sectoral and labour market effects, migration can also have other economy-wide impacts, including on the external sector of the economy, prices, technical change and competition, and government finances.

Insights into some of these other economic effects can be gained from the modelling undertaken by CoPS. The effects of migration and population growth on productivity and income per capita discussed in this section relate to foreign investment, the terms of trade, capital–labour ratio, consumption price effects, technological progress, competition and government expenditure, transfers and taxation.

Foreign investment

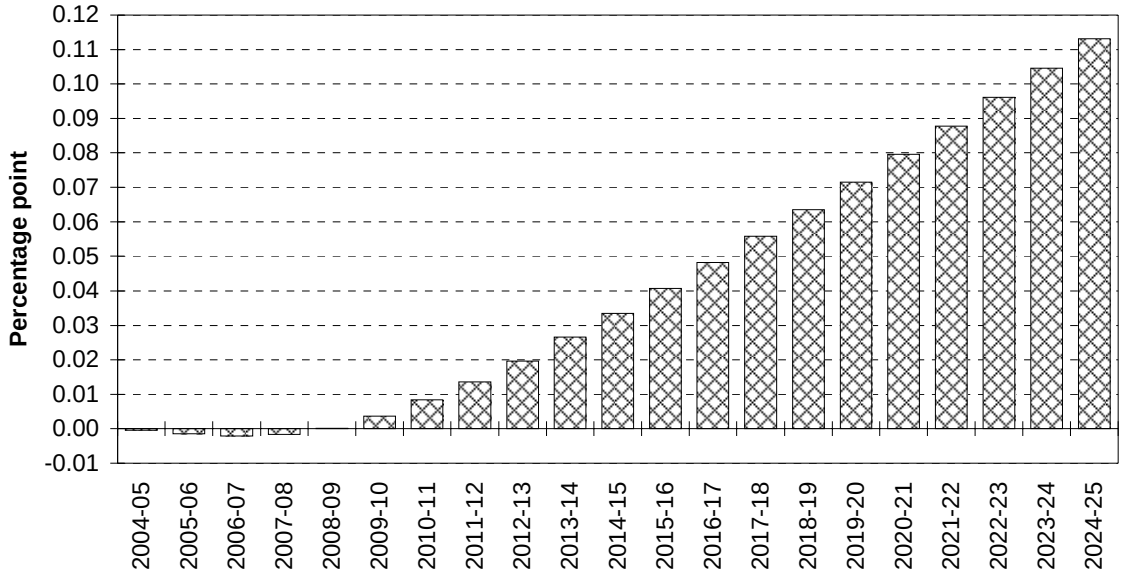
Migration increases the rate of growth of the labour supply and stimulates the demand for investment, all else equal. After taking into account migrant transfers (section 7.3), Australia's savings rate is unlikely to be sufficient to fully finance the higher rate of investment. Therefore, Australia would tend to rely on foreign investment and debt to fund much of the additional investment.

In the CoPS analysis, it is assumed that a large proportion of the migration-induced investment is sourced from overseas, through an increase in net foreign liabilities. Consequently, the ratio of net foreign liabilities to GDP increases very slightly over time (figure 7.3). The ratio is about 0.12 percentage points higher than in the base-case simulation by 2024-25.

The contribution of increasing foreign investment to income per capita (GNP) is presented in chapter 8.

Figure 7.3 **Projected ratio of net foreign liabilities to GDP**

Percentage point difference between the base-case and increased-migration simulations



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

Terms of trade

The terms of trade is the ratio of export prices to import prices. It can be an important consideration in the context of the long-term adjustment to economic change. It is generally agreed that the prices of Australian imports are largely unaffected by changes in Australian import volumes.

In contrast, in the modelling by CoPS,[1] it is assumed that the prices Australia receives for its exports, particularly its traditional exports, do vary with volumes, all

[1] Similar assumptions are used in other models, such as the Treasury Model (TRYM), the Murphy Model and the Global Trade Analysis Project Model (GTAP).

else equal. However, this assumption is not supported by some people (for example, DIMA, sub. DR43; Fred Argy, pers. comm., 23 January 2006).

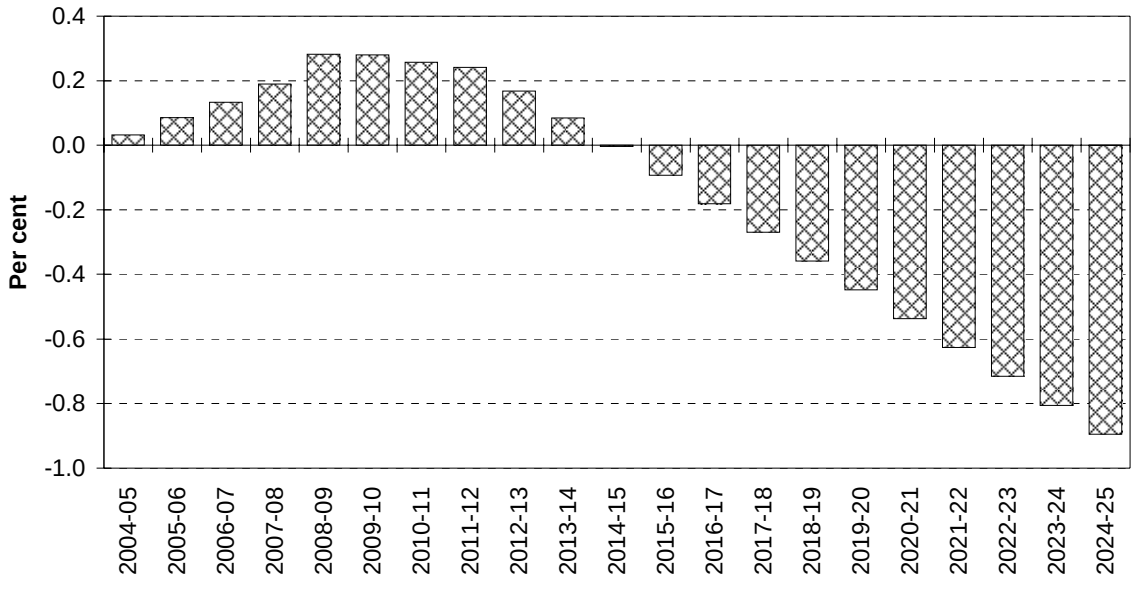
The expansion of the economy induced by migration increases the volume of imports. Increasing imports would tend to cause a deterioration in the balance of trade (as a proportion of GDP). However, the ratio of the balance of trade to GDP has been relatively stable since 1983-84. Consistent with this observation, imports, exports and the balance of trade tend to move together with GDP in the MONASH Model.

Consequently, in the increased-migration simulation, Australia would increase its volume of exports as the economy expands. The terms of trade is projected to be about 0.9 per cent lower than in the base-case simulation by 2024-25 (figure 7.4) as a result of this expansion in exports.

The fall in the terms of trade contributes to a decrease in income (real GNP) per capita, which is discussed in chapter 8.

Figure 7.4 **Projected change in the terms of trade**

Per cent deviation between the base-case and increased-migration simulations



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

Capital–labour ratio

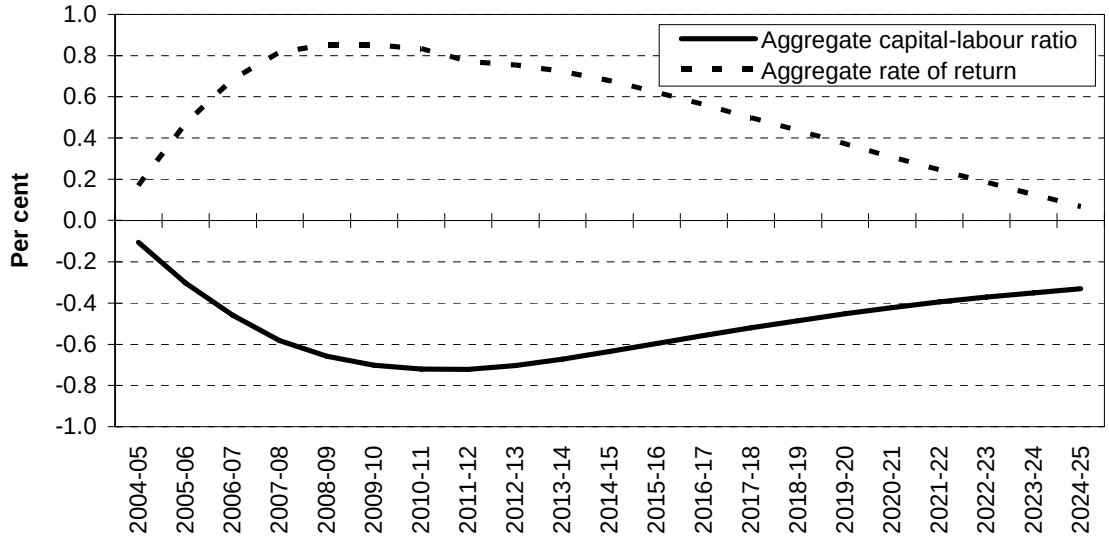
As discussed in chapter 3, the capital–labour ratio is an important variable in the analysis of long-run economic growth for two reasons. First, capital accumulation is

itself a key determinant of the growth process. Second, labour productivity depends, in part, on the availability of capital for each worker.

In the short run, the addition of extra skilled migrants translates into an increase in the rate of return on investment (figure 7.5) as the increase in capital stock is initially slow to adjust. This in turn induces a rise in the rate of investment, and a faster rate of growth in the stock of capital. Although the MONASH Model assumes that capital is initially slow to adjust to the expansion in the supply of labour, in the long term the increasing supply of labour is accommodated by a commensurate increase in the investment rate. In the long run, therefore, the aggregate rate of return in the economy adjusts back to that under the base case, and there is no deviation in the rate of return on capital by 2024-25.

Figure 7.5 **Projected change in capital–labour ratio and aggregate rate of return**

Per cent deviation between the base-case and increased-migration simulations



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

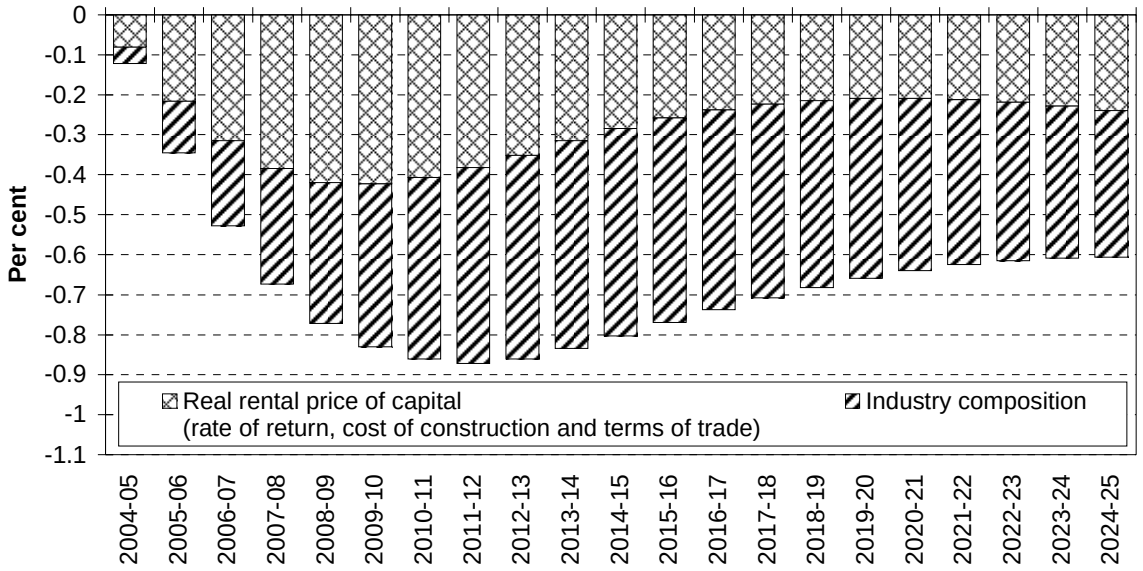
Notwithstanding that the aggregate rate of return is unaffected in the long run, the capital–labour ratio does decrease. This is due to a number of effects. First, the declining terms of trade contributes to a decrease in the real rental price of capital.[2] Second, there is an increase in the unit cost of labour used in the Construction industry, which also contributes to the increase in the construction cost of capital across sectors. At the economy-wide level, this generates a substitution away from capital towards labour. Third, as noted in section 7.1, the effects of changes in

[2] The price of construction is distinct from the rate of return of the investment.

labour supply generate non-uniform adjustments to sectoral output. Consequently, the aggregate capital–labour ratio also varies because of the induced change in the industry composition of the economy and the fact that industries have different capital–labour ratios (figure 7.6).

Figure 7.6 **Factors contributing to the change in the aggregate capital–labour ratio**

Per cent deviation between the base-case and increased-migration simulations



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

Consumption price effect

To estimate real GNP per capita, the nominal value of GNP is deflated in this study by the aggregate price index of private and public consumption. Deflating income (GNP) by the price of consumption provides an indication of the change in purchasing power of GNP arising from relative changes in domestic and import prices induced by skilled migration.

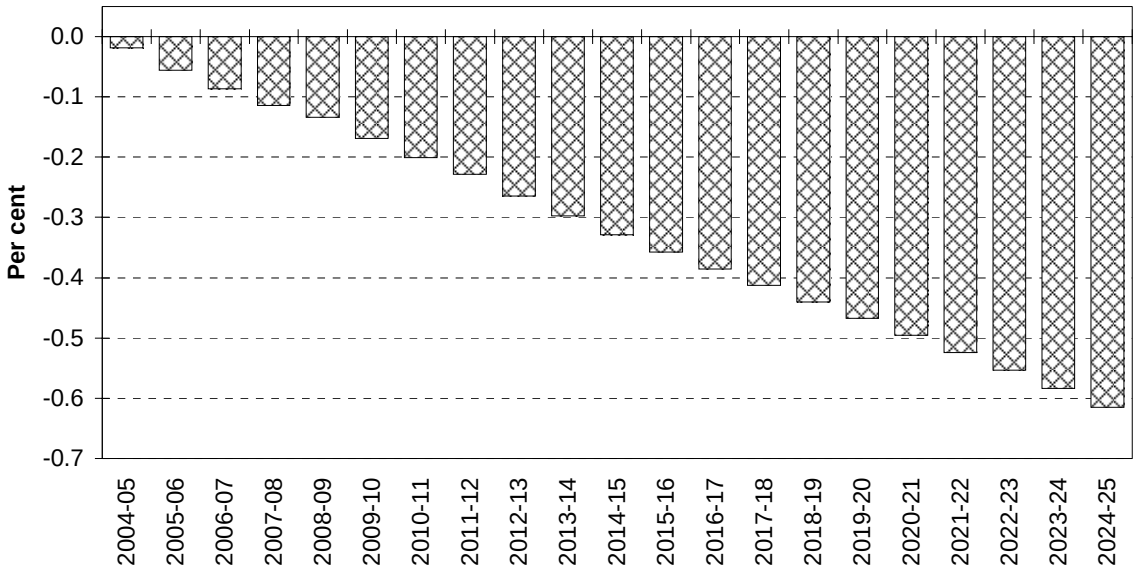
In the increased-migration simulation, the price of private and public consumption decreases over time (figure 7.7). The principal reason is that increased skilled immigration lowers the real wages of highly skilled occupations. The provision of government services tends to involve the employment of persons in highly skilled occupations. Thus, the real cost of producing government goods and services decreases.

On the other hand, migration stimulates the demand for investment. Domestic investment tends to use the output of the Construction industry which is less intensive in the use of skilled labour. The demand for less skilled labour increases relative to supply and, as indicated below, the relative wages of less skilled occupations rise (section 7.3). Consequently, the construction price of capital rises relative to the price of public and private consumption. The overall effect is that the purchasing power of income is increased by the change in the relative prices of consumption and investment.

The fall in the price of private and public consumption contributes to an increase in real income per capita, which is discussed in chapter 8.

Figure 7.7 **Projected price of private and public consumption**

Per cent deviation between the base-case and increased-migration simulations



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

Technological progress embodied in capital

In chapter 3, it was noted that positive net migration might result in a faster growing population and economy. Faster rates of population and economic growth require a more rapid rate of net investment than would otherwise be the case. It is possible that the additional investment could increase the rate at which new technology is adopted. If technological progress is embodied in the newly acquired capital, the capital stock would become more productive (Foster 1996).

As noted by Weil (2005), when discussing technological progress:

> New software represents a new and better technology. The physical capital and human capital inputs (the computer and the worker) do not change, but with the new software, they are more productive. … New technology is often built into capital goods. The linking of technology to specific pieces of capital is called embodied technological progress. … If technological change is embodied in capital, the technology is not upgraded until the capital good is replaced. … A country with a high investment rate will have, on average, capital goods that are younger (more recently produced). As a result, these capital goods will embody more recently developed technologies and the country with high investment will be technologically more advanced than one with low investment. (p. 230)

This point was emphasised by Professor Withers, who noted that '… new capital embodies latest technology and immigration increases the share of the capital stock embodying such new knowledge' (sub. DR35, p. 2).

There are projected rates of primary factor technical change which differ across industries. It is possible that the faster rate of investment contributes to an increase in the rate of technological change. The aggregate capital stock is projected to be about 4.2 per cent larger under the increased-migration simulation than in the base-case simulation (table 7.1). However, the general equilibrium model does not consider changes in the rate of technical change arising from greater investment in capital that could be embodied in the additional capital stock.

Trade effects

There are two ways in which migrants might affect external trade. First, emigrants might use their expatriate networks to provide specialist advice about overseas market access and business opportunities. Second, immigrants might have links to overseas markets that could result in an increase in aggregate demand for Australian exports. Increasing access to new export markets may lead to a reallocation of the nation's resources to outputs that have a higher marginal value, resulting in an improvement in aggregate productivity. According to Withers (sub. DR35), these international links and networks may be critical in overcoming Australia's disadvantages of geographic distance from major export markets.

According to Foster (1996), immigrants could contribute to Australia's export performance through their understanding of foreign cultures, business environments and markets. The Lowy Institute, in examining the experience of Australian emigrants, noted that:

> … immigrants' ties to their home countries can play a key role in fostering bilateral trade linkages, since those ties include knowledge of home country markets, language, preferences, and business contacts, all of which have the potential to reduce transaction costs and facilitate trade. (Fullilove and Flutter 2004, p. 35)

There might be potential for migrants to raise awareness of, and facilitate trade opportunities for, Australian exporters. However, Australia already has a high degree of 'international openness'. Australian businesses have opportunities to purchase marketing and trade services from overseas businesses providing advice and links into new markets. Australian businesses can also send marketing personnel overseas to acquire this information, or they could arrange for overseas residents to visit Australia to provide advice.

This raises the possibility that it is short to medium-term temporary migration that could make the largest contribution to trade. For example, overseas business consultants and managers travel across countries (including Australia), transferring knowledge and skills to various businesses and agencies. These migrants provide Australian businesses with the opportunities to access skills and facilitate contact with key businesses in the international markets, as required, without the need to increase permanent migration. In effect, temporary migration may contribute to a shift in export demand without increasing Australia's population size significantly in the long term. However, we have not attempted to measure the size of such impacts on reallocating resources to higher valued export markets.

Effects on competition

In some sectors of the economy — particularly in the non-traded goods and services sectors — there might be less competitive pressure if there are few firms competing in the domestic market. In these situations, a larger domestic population and market size arising from immigration could provide an opportunity for more firms to enter the market and thus increase competition and efficiency. For example, positive net migration might increase the demand for the services of utilities or transport. If there were no barriers to entry, this increase in demand might be met by new businesses (for example, a new domestic airline), thus increasing competition. Competing businesses could price more efficiently and adopt more efficient methods of production, resulting in higher productivity.

The extent to which these migration-induced changes in market size would enhance competition is unclear. Nevertheless, with net migration as a proportion of Australia's population at around 0.6 per cent each year, the effect of variations in the Migration Program on the competitiveness of the economy is likely to be small, even in the long-run. Consider the Transport industry as an example. In the increased-migration simulation, by 2024-25, the output of the Transport industry is projected to be about 4.4 per cent larger than in the base-case simulation. This increase is likely to have little influence on the degree of competition in this market arising from a larger market size and new entrants.

Government expenditure, transfer payments and taxation

Through its impact on government expenditure and revenue, immigration can influence economic efficiency and thus aggregate productivity and growth. Two possible pathways are via the usual macroeconomic and microeconomic effects of fiscal changes; and through the longer-run consequences of public spending for human and other capital.

This section will focus on the fiscal effects. Based on the available information, it is difficult to conclude, with a high degree of confidence, that immigrants significantly change overall per capita government consumption and investment.

Government expenditure

Past studies have attempted to examine per capita government expenditure on certain services for overseas-born and Australian-born population groups. In estimating differences in state and territory governments' expenditure on immigrants and the Australian-born population, Matthews (1992) concluded the following:

- The overseas-born population incurred higher per capita expenditure on public hospital services, including outpatient services, and lower expenditure on mental health, and family and children's health services.
- Differing age composition meant that the overseas-born population incurred lower expenditures per capita than the Australian-born population in most education categories.
- Expenditures on law, order and public safety were higher for the Australian-born population, reflecting the proportion of offenders to total population.
- The expenditure per capita on welfare services was lower for the overseas-born population, driven largely by lower child welfare expenditures in this group due to the relatively smaller proportion of overseas-born children.
- Expenditures on housing and community and economic services (for example, expenditure on industrial development, road maintenance and sewerage) reflect the relative contribution of birthplace groups to population growth, with overseas-born groups incurring much higher per capita expenditures.

In analysing the long-term effects of a continuing immigration program, Matthews also concluded that immigrants become progressively indistinguishable from the rest of the population, generally taking on many of the demographic and socioeconomic characteristics of the Australian-born population.

The Commonwealth Grants Commission (CGC), as part of its annual assessments regarding the distribution of GST revenues among the states and territories, has analysed the impact of immigrants on the demand for, and cost of, providing government services. In its 2004 Review Report, the CGC considered that states and territories experience different demands and unit costs in providing services to population groups with low English fluency, as well as providing culturally appropriate services to different groups. In its submission, the New South Wales Government (sub. DR45) indicated that immigrants may draw on basic services such as housing, language and education programs. However, the CGC was uncertain about the extent to which additional expenditures are incurred, and whether demand for services by different migrant groups is always higher than average.

There might be important implications associated with the life-cycle consumption of government services. As most immigrants arrive in Australia as young adults, their lifetime profile of public sector demands consequently differs from that of the average of the Australian-born population. The expenditure on, for example, education, training and health prior to the arrival of adult immigrants has been incurred elsewhere, resulting in savings for the Australian taxpayer (Alvarado and Creedy 1998; Withers 2003).

Government expenditure, such as on education, health, research and development, and government infrastructure, can affect productivity and growth. To the extent that additional migrants consume goods and services provided by government, any migration-induced change to government expenditure may flow on to these variables in the form of a higher level of expenditure due to a larger population size. However, based on the available information, it is difficult to conclude, with a high degree of confidence, that immigrants significantly change overall per capita government consumption and investment.

Government transfer payments

Transfer payments are transactions that do not involve the production of goods and services. They reflect, instead, the redistribution of tax revenues back to certain households and businesses. As highlighted in chapter 3, efficiency issues arise when transfer payments affect productivity and growth, through increased compliance and administrative costs, and through reduced incentives to supply labour and other inputs. If higher per capita cash outlays on transfer payments are financed through increased taxes, this can damage efficiency. Alternatively, higher per capita transfer payments could come at the expense of decreased government expenditure elsewhere. This can also affect productivity and growth if expenditure reductions

occur in areas which themselves promote productivity and growth (see earlier discussion).

The extent to which migration impacts on transfer payments depends on a variety of factors, including:

- whether immigrants are entitled to access social security payments
- the likelihood of immigrants gaining employment, improving their incomes and, thus, becoming less reliant on social security.

An increase in skilled migration could reduce per capita transfer payments. The Migration Program in Australia has become increasingly focused on skilled migration, with immigrants under the Skill Stream generally being under 45 years of age. According to IOM (2005):

> Experience in countries like Australia and Canada have shown that skilled immigrants have a lower propensity to depend on public welfare … (p. 171)

Focussing on migrants under the age of 45 years, Birrell et al. (2001) found that the welfare-recipient rates were noticeably lower for the overseas-born population aged under 45 years compared with the Australian-born population (table 7.2). Within the migrant group, immigrants from English-speaking countries or from groups where more than 80 per cent indicated they spoke English well, had lower welfare recipient rates compared with the Australian-born population across all age groups.

Table 7.2 **Welfare-recipient rates for Australian-born and overseas-born persons**

Age group and time of arrival[a]

	Overseas-born by age group				*Australian-born by age group*			
Arrival date in Australia	15–24	25–44	45–64	65+	15–24	25–44	45–64	65+
	%	%	%	%	%	%	%	%
Pre July 1986	8.5	11.1	26.4	80.9	..	..	..	..
July 1986-1990	8.3	10.8	24.6	84.5	..	..	..	..
1991-1996	10.9	16.9	36.4	56.0	..	..	..	..
All arrival periods[b]	9.2	12.0	26.5	65.8	16.0	16.1	27.7	66.4

[a] Excluding individuals receiving payments from the Department of Veterans' Affairs (503 996 recipients in 1996). [b] Includes arrival date not stated. .. Not applicable.

Source: Birrell et al. (2001).

Changes made in 1997 to the Social Security Act are not reflected in table 7.2. The changes include:

- a two-year waiting period for newly arrived immigrants (outside the Humanitarian category) before being eligible to receive most social security benefits
- age pension and disability support pension (unless the disability has been incurred post-arrival) benefits are generally subject to a ten-year exclusion period for new immigrants.

These changes, coupled with the more recent emphasis on skilled immigrants, are likely to have further reduced the reliance of new immigrants on transfer payments.

More recent studies, such as Access Economics (2004), have incorporated the changes to social security eligibility when estimating the impact of immigrants on social security payments. The impact of immigrants on transfer payments was found to vary across visa categories and over time. In the first ten years after arrival, Humanitarian migrants had the highest dependency on social security (table 7.3). Their dependency level, however, fell thereafter as they gained employment.

Table 7.3 **Social security expenditure on immigrants**

Per 1 000 migrants by duration of residence, constant 2004-05 prices

	Year 1	*Year 2*	*Year 4*	*Year 10*	*Year 15*	*Year 20*
	$'000	$'000	$'000	$'000	$'000	$'000
Humanitarian	2 118	2 419	2 610	2 863	2 648	2 317
Family Stream						
Parents	572	611	1 001	660	4 642	3 247
Parents contributory	340	391	827	678	5 114	4 420
Parents and other	579	933	1 189	929	1 580	1 742
Skill Stream						
Skilled Australian Sponsored	617	873	785	1 270	1 661	1 620
Business skills	177	256	315	1 091	1 881	2 503
Provisional business skills	9	13	188	1 091	1 881	2 503
Employer Nominated Scheme	403	462	300	1 196	1 669	1 749
Independent	630	754	873	1 015	1 429	1 327
Provisional independent	0	0	695	885	1 314	1 264
All streams	708	931	1 057	1 206	1 679	1 703

Source: Access Economics (2004).

Immigrants under the Skill Stream had a lower dependency on social security compared with most visa categories. This was especially true for immigrants in the provisional categories. These immigrants had a waiting period for many benefits and did not become eligible for these benefits until they have gained permanent residence (table 7.3).

Immigrants under the Family Stream, generally had a higher reliance on social security than immigrants under the Skill Stream. Social security payments rose again after ten years of residence as the age pension and disability support pension became available for these immigrants (table 7.3). Social security expenditure on family-type benefits (family payment and parenting payment) fell over time, as children from the original migrant group aged and became adults.

Past studies examining welfare expenditure have generally found small differences, particularly in the longer term, between the proportion of immigrants and Australian-born persons receiving social security payments. In assessing a range of studies, Foster (1996) concluded that:

> Overall, the evidence indicates that the overseas-born have not been disproportionate users of Australia's social security system. (p. 69)

Taxation and revenue

Taxes are relevant for economic growth because they have a direct impact on the efficiency with which outputs are produced. Taxes insert a wedge between the price that a supplier receives and the price that a consumer pays, which might affect economic behaviour and can involve 'deadweight costs' to national productivity.

Immigration might have an impact on per capita receipts from tax revenue. The estimated tax revenue collected from immigrants tends to vary according to their visa category. Generally, Skilled visa immigrants make the highest per capita contribution to tax revenue compared with immigrants entering under other visa categories – for example, visas in the Family Stream or Humanitarian category (Access Economics 2002, 2004).

The analysis in chapter 5 indicated that the income per hour worked of immigrants was slightly higher than that of Australian-born workers. This could indicate that immigrants contribute more to government revenues through taxation.

Matthews (1992) found that the overseas-born population groups made higher per capita contributions to government revenues than the Australian-born group in nearly all tax categories — revenues per capita were especially high for immigrants from the English-speaking group. Access Economics (2002, 2004) found that immigrants arriving under the Skill Stream of the Migration Program generally made strong positive revenue contributions to the government budget fairly soon after arrival.

Overall assessment

The studies that are reported here, although not definitive, indicate that immigrants, especially Skilled visa immigrants, do not draw disproportionately on government spending. There are fewer quantitative studies of the effects on the tax side of the budget. However, the evidence that, on average, employed migrants earn more than do non-migrant Australians, suggests that their tax payments could be higher. Thus, on balance, immigration perhaps adds more to tax revenues than it adds to public expenditures.

If migration does have a positive impact on budgetary outcomes, in the context of productivity and growth the most relevant consideration is the 'efficiency effects'. These effects would be conditional on how governments respond to the initial changes to expenditures and revenues arising from migration, and the extent of any externalities and distortionary costs. If increasing skilled migration results in an overall positive budgetary outcome, government has choices about reducing taxes, increasing the provision of services, increasing savings or retiring debt. Governments might, for example, increase the provision of those goods and services which might assist in productivity growth. On the other hand, governments might reduce tax rates, which could improve productivity. The efficiency implications of migration on the government sector have not been quantified in the modelling undertaken by CoPS.

7.3 Distributional effects

The focus of this study is on the average income per capita across all groups in the population. However, the economic impact of migration might be assessed from the viewpoints of various groups in the population. These groups include the existing residents (Australian-born and immigrants already settled in Australia) and/or newly-arrived or prospective immigrants.

Existing residents have an interest in the impact of current and future migration flows on their own income and wealth. Their interests could relate to the level of income or its relativity to that of new immigrants; or the fiscal implications of migration for tax rates and benefit rates; or the value of various migration-sensitive assets, like housing. Consequently, the political and policy debate often includes discussion of the economic effects on existing residents compared with new immigrants.

The impact of migration on the economic welfare of existing residents is widely considered to be the most appropriate criterion for assessing the welfare implications of migration. Consistent with this, a number of authors (for example,

Berry and Soligo 1969; Borjas 1995; Borjas, Freeman and Katz 1997) have elaborated on the concept of a 'migration surplus' to analyse these welfare effects. In essence, where the existing residents own the economy's fixed factors, it is argued that additional migration can increase the factor incomes of the existing residents — generating a migration surplus in the form of a rise in national income in excess of that which accrues to the new immigrants. The surplus arises because the reduction in wages to the pre-migration population induced by migration (and the increase in labour supply) is more than offset by the increase in returns to the fixed factors.

Borjas (1995, 2003) finds that migration tends to reduce the real wages of existing residents. However, more recent studies suggest that immigration generates a positive effect on wages (for example, Ottaviano and Peri 2005; Parasnis, Fausten and Smyth 2005). It is increasingly understood that the impact of immigration depends in part on how the skills of migrants compare with those of existing residents (Borjas 1999; Levine, Lotti and Pearlman 2003). However, it is difficult to draw firm conclusions on the size of the migration surplus itself (which includes more than labour income) based on evidence reported in the literature (Hanson 2005).

CoPS has provided the Commission with estimates of the impact of skilled migration on the welfare of the base-case population. After the first fifteen years of the simulation (2004-05 to 2019-20), in which there is an average net gain in per capita income for the base-case population, the growth in capital rental rates for the rest of the period is gradually more than offset by a reduction in wage growth. By 2024-25, this means that real annual income for the base-case population is reduced by $77 per capita relative to the base case. This reduction represents a 0.1 per cent reduction in income, relative to the projected 36 per cent increase in the base-case simulation.

These estimates should be interpreted with considerable caution. Firstly, the estimates themselves are small, and carry a degree of uncertainty.

Quantifying the migration surplus and income distribution consequences of immigration for existing residents and new immigrants is complicated, because income redistribution can occur through many pathways including:

- transfer payments
- provision of government services
- labour market outcomes
- changes in wealth.

Secondly, not all relevant factors have been taken into account. For instance, CoPS qualify the results and acknowledge that the estimates do not take account of net fiscal transfers that were referred to above. Further, the total change in average income for the base-case population obscures possibly large within-group variations, such as those for workers in different occupations, and between workers and capital owners. With the time and information available, it has not been possible to estimate the balance of these and other effects.

The section that follows discusses in some detail the effects of skilled immigration on wage rates and returns to assets, in general and in modelling conducted for the Commission by CoPS. Appendix G contains additional results.

Labour force composition and wages

The extent to which immigration affects domestic wages will vary across occupations. Past studies have generally found that, all else being equal, the higher the substitutability of foreign for domestic labour, the more likely it is that increased immigration will lower the wages of existing resident workers.

The impact of immigration on the wages of various groups has been examined in a number of studies, and most find it small. Gaston and Nelson (2001) reviewed past studies of the effect on domestic wages of differing population groups and concluded that:

> Overall, econometric research, which explicitly exploits production theoretic structure, tends to find strong substitutability between immigrants and other immigrants of the same vintage and national origin and, otherwise, widely varying patterns of complementarity and substitutability between immigrants and natives. More importantly, the elasticities between immigrant and native labour are consistently small, and are smaller yet when other channels of adjustment than the wage are explicitly permitted. (p. 13)

Any impact of immigration on domestic labour market opportunities is likely to be small. According to Card (2005), referring to the American evidence:

> The evidence that immigrants harm native opportunities is slight … (p. 2)

This conclusion has been corroborated by a number of Australian studies, such as Addison and Worswick (2002), Chang (2004), Pope and Withers (1993) and Saunders and King (1994).

These results notwithstanding, immigration may have more impact on particular groups of workers. However, wage inequalities may reflect factors other than immigration, as noted by Gaston and Nelson (2001):

> In the case of the United States, such conclusion [that immigration has a significant impact on wage inequality] seems an overly confident one to reach. Given the sheer size of the US labour market and the quantity of unskilled labour, more broadly defined, it is unlikely that immigration (or trade) would have contributed to the overall increase in wage inequality observed in the United States during that particular period. … there might have been fundamental change in the underlying demand for unskilled labour that is attributable to the increased availability of unskilled, migrant labour. … it might be the case that trade and immigration engender institutional responses that do leave some types of unskilled labour more vulnerable to economic shocks than others. (pp. 26–7)

In a recent Australian study of the determinants of inequality, Leigh (2003) found that there was no evidence of a negative causal relationship between migration and inequality.

In Australia, the Migration Program has a greater emphasis on skilled migration. Therefore, unlike the United States, there is a potential for wages to fall relatively for skilled resident workers and increase relatively for less-skilled resident workers. As noted by Corden (2003):

> Skilled immigration is likely to raise the relative real wages of the unskilled, through increased demand for labour services of various kinds. … This is a redistributive effect, … it is likely both to make the income distribution less unequal and to reduce unemployment of the unskilled, this being where most unemployment can be found. (p. 15)

Wage effects

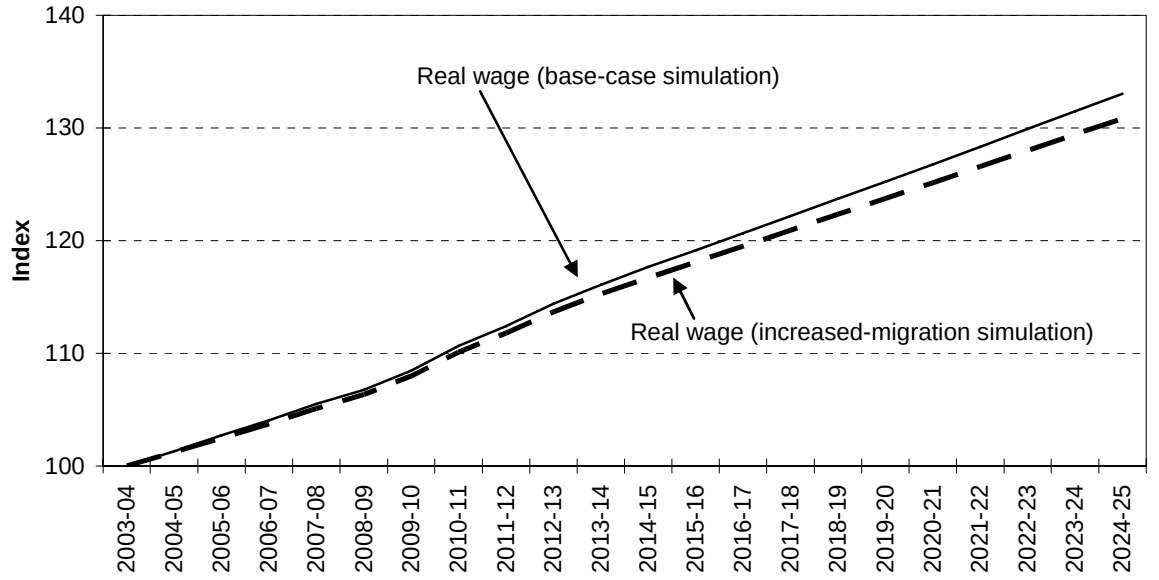
Domestic real wages might be affected by immigration through a number of mechanisms, including:

- the skill composition of immigrants relative to the resident population
- changes to the capital-labour ratio arising from an immigration-induced labour supply increase
- economy-wide effects such as the effect on the terms of trade, changes in consumption patterns, and sectoral shifts in activity.

Between 2004-05 and 2024-25, the aggregate real wage is projected to increase in the base-case simulation by about 33 per cent. The growth in the real wage mostly reflects the underlying trend in productivity growth. In the increased-migration simulation, the aggregate real wage is projected to increase at a slightly slower rate over the same period. By 2024-25, growth in the aggregate real wage is projected to be about 1.7 per cent lower than in the base-case simulation (figure 7.8).

Figure 7.8 **Projected growth in aggregate real wage**

Per cent deviation between the base-case and increased-migration simulations



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

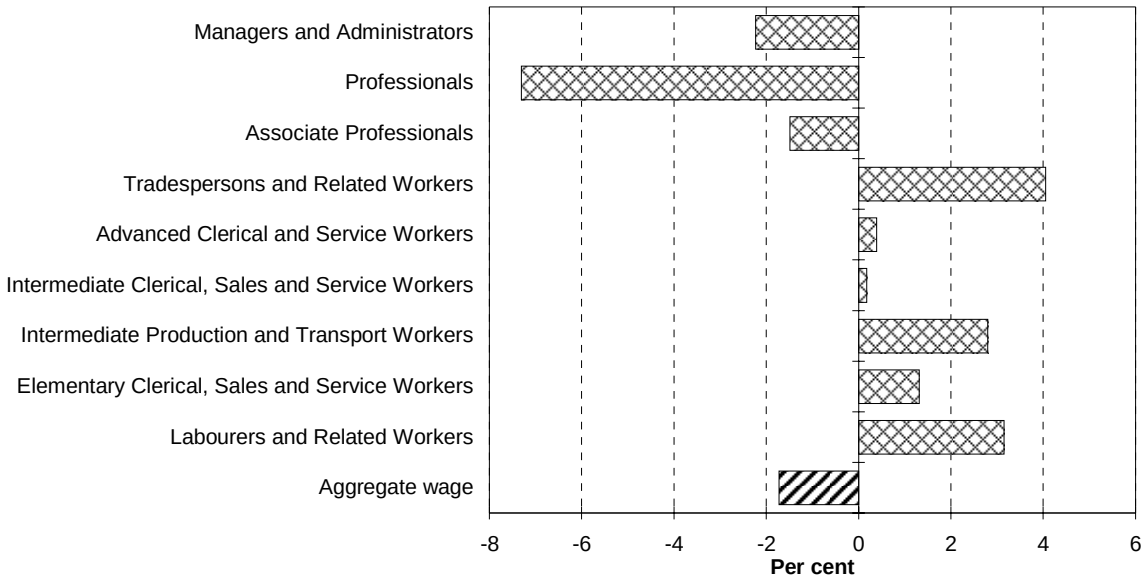
Changes in the supply of skilled and unskilled labour also have the potential to affect the relative wages of different occupations. The Skilled Migration Program increases the supply of skilled labour relative to unskilled labour.

For the economy to adjust to a permanently higher ratio of skilled to unskilled labour supply, the relative real wages adjust, all else being equal. As noted earlier, the growth in output arising from increased skilled migration differs across industries. Some of the industries that expand the most are relatively intensive in the use of occupations that require lower levels of skill. For example, by 2024-25, the Construction industry (which has a workforce that is predominantly lower skilled) is projected to be about 7.8 per cent larger than in the base-case simulation (table 7.1). Other industries, such as Finance, Government, Communication, Education and Health, (which have a workforce that is predominantly higher skilled) are projected to be about 4–5 per cent larger.

The projected impact of the increased-migration simulation on real wages for different broad occupations is represented in figure 7.9. By 2024-25, the real wage of Professionals is about 7.3 per cent lower than in the base-case simulation. The real wages of other higher skilled occupations, such as Managers and Administrators and Associate Professionals, are about 1–2 per cent lower. In contrast, the real wages of Tradespersons, Clerical Workers and Labourers are up to 4 per cent higher than in the base-case simulation.

Figure 7.9 **Projected changes in real wage by occupations**

Per cent deviation between the base-case and increased-migration simulations by 2024-25



Source: Productivity Commission estimates based on simulations by CoPS using the MONASH Model.

Capital return and ownership

In the short to medium term, immigration could lead to some capital dilution in the economy and so the rate of return on physical capital will increase. In turn, this might result in gains to the owners of domestic capital — depending on the extent to which capital is domestically owned. As at 30 June 2004, 69 per cent of total equity on issue in Australia was held by residents and 31 per cent by non-residents. In the short to medium term, therefore, the gains from the increase in the rate of return on capital are largely captured by residents.

The funds brought in by immigrants also impact on the gains to domestic residents. Some immigrants entering Australia might bring with them substantial sums of money to establish new business enterprises. However, most immigrants arriving in Australia are young and have not accumulated substantial financial wealth. Thus, the net migrant transfers (including remittances) across all immigrant groups entering Australia are likely to be small. In 2004-05, net migrant transfers to Australia were 0.2 per cent of GDP (about $1736 million). With net overseas migration estimated at 105 304 in 2004-05, this amounts to about $16 500 per arrival (ABS unpublished data). The average level of capital being provided by new arrivals appears relatively small.

The Commission separately estimated the level of transfers for Skilled visa immigrants, by weighting data from the Department of Immigration, Multicultural and Indigenous Affairs (DIMIA) *Longitudinal Survey of Immigrants to Australia 2* with information on migrant flows for 2004-05 supplied by Department of Immigration and Multicultural Affairs (DIMA). The Commission estimates that net transfers (including remittances) for skilled migrants during their first 18 months in Australia was $25 410 per arrival (2001 dollars). This is higher than ABS data for net transfers for all migrant groups.

Apart from financial capital, immigration could affect incomes generated from natural capital and resources for particular population groups. Urban land owners, in particular, might benefit from increased land values or rents. This would depend, however, on the geographical distribution of the population increase associated with immigration. According to OECD (2003b):

> … although highly educated Australians might lose out from competition due to increased emphasis on skilled immigration, such groups also own a disproportionate amount of Australian wealth and therefore benefit from rising asset prices. Australians with low levels of education and skills might lose out, especially in times of high unemployment and in areas where there are regional concentrations of refugees; the changes in property prices and rents that benefit the better-off might also act against those, mainly low income, people who do not own property. (p. 139)

However, population groups adversely affected by population growth and rising asset prices may be partly compensated through the distribution of any fiscal dividend that arises from immigration-related economic growth (Garnaut 2002). Distributional effects arising from immigration might also apply to government-owned resources, as noted by Peter and Verikios (1995):

> Usher (1977) highlighted that newly arrived immigrants, on becoming citizens of the country of destination, enjoy the right to a share in the goods and services provided for the population by the government. The newly-arrived immigrants also share in the burden of debt held by the government. However, if the government's equity is positive, meaning that the value of government-owned resources is greater than the government's debt, the additional immigrants will capture a share of that equity and the returns associated with it at the expense of the residents. (p. 6)

In assessing the impact of immigrants on the dilution of existing residents' 'equity' in the public sector capital stock (that is, the residents having to share the returns to government-owned capital with the newly arrived immigrants), Peter and Verikios (1995) found that, on balance, existing residents lose. The income loss estimated by Peter and Verikios is about $140 per head in 1991-92 (as a result of immigration of 180 000 persons per year, and with no change to the capital–labour ratio). However, as discussed in section 7.2, skilled immigrants may be net contributors to the budget (OECD 2003b).

Summary

The analysis suggests that economic output, employment and investment all increase as a result of skilled migration. However, there are considerable variations in these outcomes for different industries and occupations. These are due to a range of factors, including the extent to which different industries and occupations use skilled labour; the general effect of output demand, investment requirements, and labour demand; and the labour market adjustment process arising from increased migration and population growth.

While per capita incomes rise in Australia, there are important distributional effects at work. Estimates show that the improvements in welfare associated with increased migration are largely accrued by immigrants. Existing Australian residents working in skilled occupations could experience slightly slower growth in real wages. However, as in earlier research in Australia and overseas, these effects are small. Workers who do not compete with skilled immigrants (or compete less intensively) could experience slightly faster growth in real wages, especially in fast-growing, labour-intensive industries.

However, it is important to remember that there are many other ways in which the income (and wealth) of Australian residents may be affected. These include changes to taxation, government provision of goods and services, or transfer payments. CoPS has not modelled aspects of taxation, government services and transfer payments, or the effects of changes in the prices of goods and services on different income groups. Therefore, conclusions drawn about the overall effects on income distribution from the analysis in this study are highly qualified.

8 Overall impact on living standards

Key points

- The economic effects of migration arise from compositional differences and higher population growth.
  - The demographic and economic factors involved are wide-ranging and involve complex interactions, with both positive and negative economic effects.
- An overall assessment of the impact of migration and population growth on living standards needs to consider, to the greatest extent possible, channels through which the economy is transformed, and the balance of such effects.
- In this study, the Commission has used a general equilibrium model (MONASH Model) as part of its evaluation.
  - Modelling provides only a guide to some of these effects.
- Migration has a neutral to mildly positive effect on overall living standards.
  - Positive contributions arise from the increase in labour supply, the changing skill composition due to migration, and a consumption price effect.
  - Offsetting negative effects arise from decreased labour productivity, a decline in the terms of trade, and an increase in interest paid to foreigners.
  - These results are consistent with research both here and overseas.
- The effect of a 50 per cent increase in the level of skilled migration on productivity and living standards has been simulated. Compared with the base case:
  - population is higher by 3.3 per cent by 2024-25
  - the size of the economy (GDP) is 4.6 per cent larger by 2024-25
  - national income (GNP) increases by 4.0 per cent by 2024-25
  - income per capita is higher by about 0.71 per cent or $383 by 2024-25
  - average hours worked per capita are higher by 1.18 per cent by 2024-25.
- The distribution of these benefits varies across the population, with gains mostly accrued to the skilled migrants and capital owners. The incomes of existing resident workers grows more slowly than would otherwise be the case.
- Factors other than migration and population growth are more important to growth in productivity and living standards.
  - Growth in income per capita from technological progress and other sources of productivity growth, and long-term demographic changes, could be expected to be about 1.5 per cent per year, or $14 434, by 2024-25.

The preceding chapters have reported on how migration and population growth affect a diverse set of demographic and economic factors that can cause adjustment throughout the economy. The interactions are complicated, with both positive and negative economic effects on per capita income and productivity.

Migration flows influence the rate of population growth, the age distribution of population, labour supply (by region, occupation, industry and skill level), consumption, savings, new investment, imports and exports, the balance of trade, the terms of trade, government revenue and expenditure, the size of the economy, use of natural resources and land, and a number of other factors. Together, these factors influence productivity and income per capita — the primary focus of this research study.

An examination of each of these factors provides insights as to their individual impact on the growth in productivity and income per capita. However, such partial analysis may be inappropriate for drawing inferences about the overall economic effects. A complete assessment needs to consider all possible channels through which migration and population growth transform the economy, and the balance of such effects. Therefore, as part of its assessment, the Commission contracted the Centre of Policy Studies (CoPS) to undertake a general equilibrium analysis using the MONASH Model.

A modelling exercise of this type can provide insights into the overall impact of increasing the intake of migrants, while keeping all other factors constant. A key challenge in examining the economic impacts of migration is to separate out the effects of migration from the many other unrelated factors and influences at work in the economy.

The results of such a modelling exercise are driven by the underlying assumptions and simplification that, necessarily, are built into such an exercise. At the same time, some of the effects of migration and population growth are more amenable to measurement and estimation than others. It has not been possible for every economic effect associated with an increase in skilled migration to be quantified. Therefore, the modelling results reported here only provide a guide to the magnitude of some of the effects.

8.1 Overall effect of migration on living standards

To help understand the economy wide economic impact of migration and population growth, particularly skilled migration, the Commission modelled the

effects of increasing the skilled migrant intake by 50 per cent (about 39 000 extra migrants each year), over a 21-year timeframe. CoPS estimated the economic impact using the MONASH Model. The effect of migration in the model is estimated as the difference between the outcomes of a base-case simulation and the increased-migration simulation.

These estimates project what would happen if the assumptions underpinning the simulation were to hold, rather than forecasting what will actually happen.

Projected overall effect of an increase in skilled migration

Economy-wide impact of migration

Based on the modelling, the effect of increasing the skilled migration intake on Australia's per capita living standards is broadly neutral to mildly positive. The increased-migration simulation reveals that, by 2024-25, annual income per capita is about $383 (or about 0.71 of per cent) higher than it would otherwise have been under current migration settings (or base case). The absolute size of the economy also grows — with GDP projected to be about 4.6 per cent larger than otherwise by 2024-25. National income is projected to increase by 4 per cent by 2024-25, relative to the base case scenario.

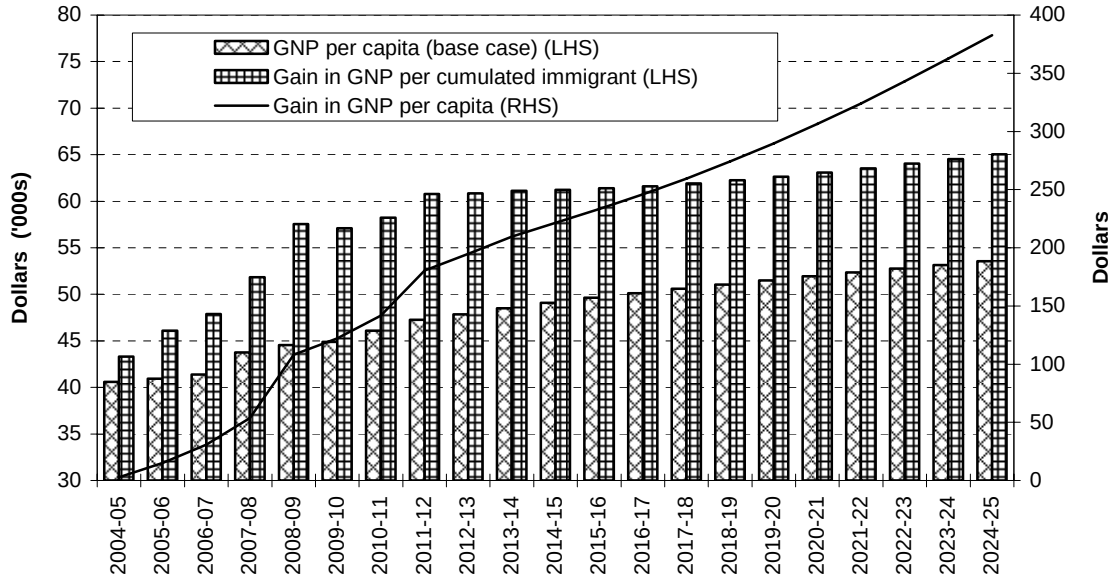
This result is consistent with other Australian studies that have concluded that the overall economic effects of immigration to be modest (for example, Williams 1995; Foster 1992, 1994). Modelling commissioned by the Department of Immigration and Multicultural Affairs (DIMA) (sub. DR43) projects a relatively modest gain in consumption per capita of 1.1 per cent (Econtech 2006b). Likewise, studies of other countries have also found the net effect of immigration on per capita income to be small (see Smith and Edmonston (1998) for the United States).

As noted in chapter 7, the distribution of the aggregate economic benefits associated with increasing migration may vary across the population. This is discussed below.

Contribution per migrant relatively large

Each migrant makes a relatively large contribution to income levels in the long run (figure 8.1). However, the impact of skilled migration on per capita income is small, reflecting that the simulated increase is small relative to Australia's overall workforce and population size.

Figure 8.1 **Contribution of skilled migration to real GNP per capita**
Constant 2003-04 dollars



Source: CoPS estimates based on simulations using the MONASH Model.

The distribution of the economic benefits varies across the population

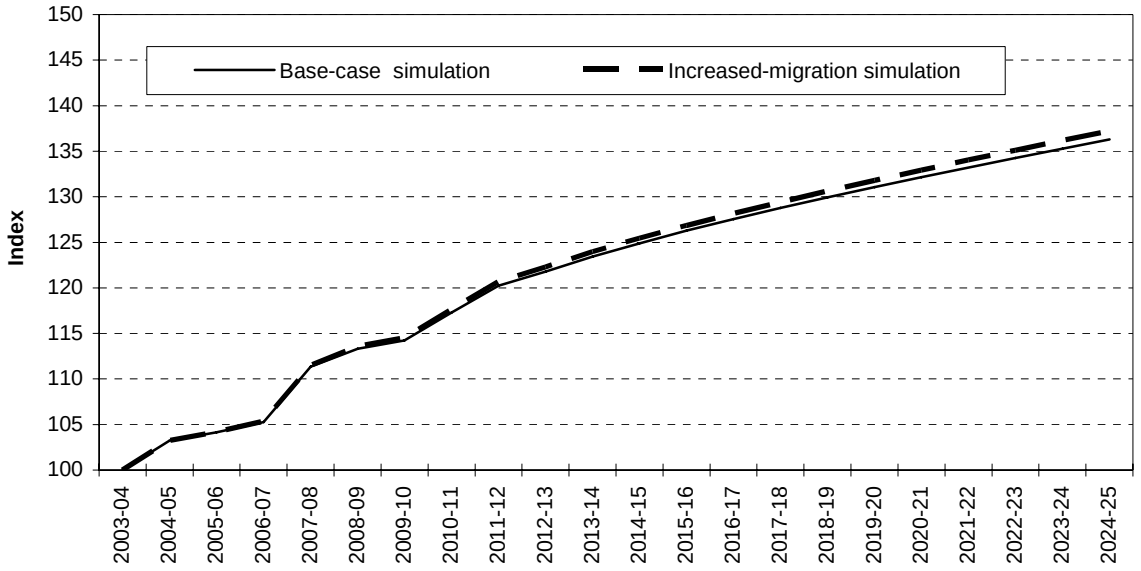
Most of the economic benefits associated with an increase in skilled migration accrues to the immigrants themselves. For existing residents, capital owners receive additional income, with owners of capital in those sectors experiencing the largest output gains enjoying the largest gains in capital income. On the other hand, the real average annual incomes of existing resident workers grows more slowly than in the base-case, as additional immigrants place downward pressure on real wages.

Other factors more important to productivity and living standards

The economic impact of skilled migration is small when compared with other drivers of productivity and income per capita. For example, over the same period, growth in income per capita from technological progress and other sources of productivity growth, and long-term demographic changes, could be expected to be about 1.5 per cent per year, or $14 434, by 2024-25 (Commission estimates).

The relative significance of an increase in skilled migration to overall per capita income growth is illustrated in figure 8.2. This compares projected per capita income over the next 21 years in the base case with that arising from the increased-migration simulation. It can be seen that the impact of migration is very small compared with other drivers of per capita income growth.

Figure 8.2 **Real GNP per capita index**



Source: CoPS estimates based on simulations using the MONASH Model.

8.2 Why a small impact?

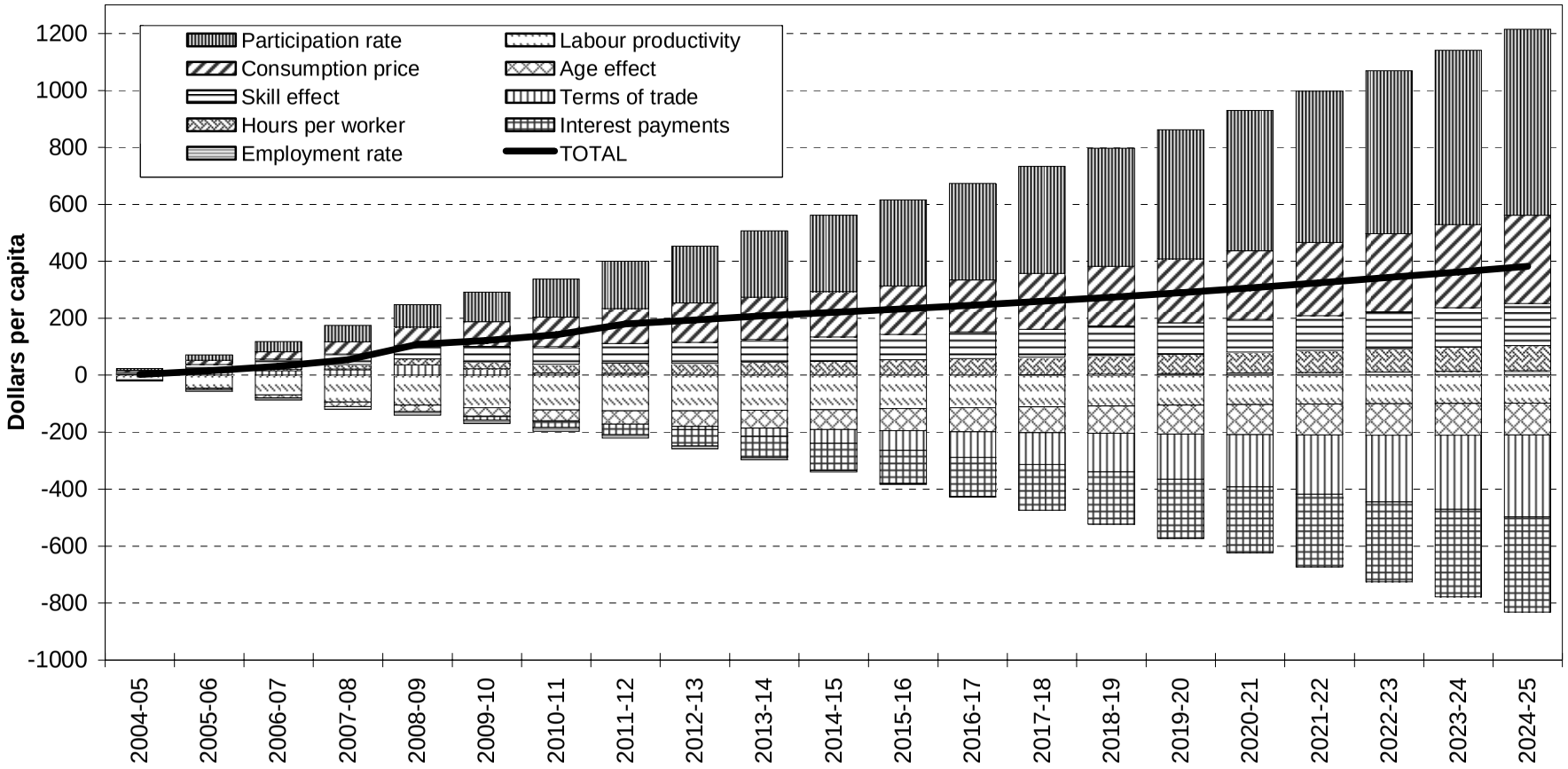
To better understand the simulated effects of an increase in migration on per capita income, CoPS decomposed the overall outcome into key drivers (both positive and negative) contributing to the overall effect. Six influences stand out:

- the supply of labour (positive)
- the skill effect of a more highly educated workforce (positive)
- a consumption price effect (positive)
- labour productivity (negative)
- the returns to foreign investment (negative)
- the terms of trade (negative).

The contribution arising from each of these effects are illustrated in figure 8.3 and discussed in more detail below. The increased-migration effects are presented in terms of the deviation from a 'business as usual' base-case simulation. It should be emphasised that the overall economic impact is small and the individual contributions of each of these factors are also small. Nevertheless, such an exercise provides insights into the mechanisms at work from an increase in skilled migration and the relative influence of particular factors, all else being equal.

Figure 8.3 **Contribution to deviations in real GNP per capita**

Constant 2003-04 dollars



Source: CoPS estimates based on simulations using the MONASH Model.

Supply and composition of labour

Labour supply

As noted in chapter 4, immigration has the effect of increasing the amount of labour supplied to the economy, and a compositional effect due to the differences in the skills and other characteristics of immigrants relative to the Australian-born population. Migrants may therefore affect the overall proportion of the population in work, the time spent at work and the skill level of the Australian workforce.

The increased-migration simulation shows a small, albeit positive, effect on labour supply per capita in the economy. Figure 8.3 captures the contribution from changes in the proportion of the working age population, employment rate, participation rate and the hours worked by each worker. In total, these changes effect a 1.18 per cent increase in labour supply per capita in Australia by 2024-25.

On its own, an increase in the participation rate boosts income per capita. By 2024-25 it contributes about $653 (1.20 per cent) to the change in GNP per capita. The increase in hours worked per capita and the employment rate make relatively small contributions (about 0.16 per cent and 0.03 per cent, respectively).

Skill effect

The ‘skill effect’ associated with increased migration, as discussed in chapter 5, can have an important effect on labour force composition. This is because, under the increased-migration scenario, the share of more highly educated workers in the labour market increases. On the other hand, this increase in the relative supply of skilled workers affects the relative wages of different occupations. As noted in chapter 7, the real wages for those in highly skilled occupations declines relative to the base case. This change to relative wages means that the potential contribution of the skill effect to national incomes is smaller than otherwise would be the case. Taking the balance of these two effects into account, the skill effect overall contributes about $148 (0.27 per cent) to the change in national income per capita by 2024-25.

Consumption price effect

Economic welfare increases if more can be consumed with a given level of income or income rises to allow more to be consumed. Another positive contribution to per

capita income revealed by the increased-migration simulation is a consumption price effect (figure 8.3).

As discussed in chapter 7, the price of private and public consumption decreases over time – in other words, the purchasing power of a given level of income increases relative to the base case. On the one hand, the real cost of producing public goods decreases since the real wages of relatively highly-skilled government workers declines. On the other hand, investment demand is stimulated as a result of migration. This leads to the construction price of investment increasing relative to the price of public and private consumption. The overall effect is that the consumption price falls, leading to an increase in income per capita of about $310 (0.57 per cent) by 2024-25.

Labour productivity

Under the assumptions embodied in the MONASH Model (appendix G), the main driver of the fall in economy-wide labour productivity following an increase in skilled migration is the projected decrease in the capital to labour ratio (also referred to as capital dilution).

In essence, the productivity of the workforce depends in part on what happens to the availability of capital. As reported in chapter 7, under the increased-migration simulation, the capital-labour ratio is about 0.3 per cent lower than for the base-case simulation by 2024-25. The decline in the terms of trade increases the construction price of capital (and hence the user cost, or rental price, of capital), and reduces the capital-labour ratio of each industry. This effect tends to reduce labour productivity, leading to a reduction in income per capita, relative to the base case, by $98 (0.18 per cent).

In addition, this reduction is also partly attributable to the change in the structure of the economy. Sectors that are relatively more intensive in their use of skilled labour also tend to be less intensive in their use of capital. Although there are economic gains associated with the skill composition effect, there is also a reduction in the value added from capital per hour worked. Therefore, aggregate labour productivity decreases.

Returns to foreign investment

As the economy grows and absorbs the increased labour supply, the nation’s stock of capital increases via an increase in investment. Under the assumptions of the MONASH Model, Australia’s savings rate is insufficient to finance fully the higher

rate of investment required. Foreign investment rises, increasing the level of net foreign liabilities. This, in turn, increases the annual income, or interest, to be paid to foreign investors, which contributes to a decrease in income per capita accruing to Australians. By 2024-25, the increased level of foreign-owned capital is contributing to a decrease in GNP per capita of about $334 (0.62 per cent).

Declining terms of trade

The faster growing economy also causes growth in Australia's level of imports. Under the increased-migration simulation, the volume of exports increases in response to a rise in the level of imports.

As reported in chapter 7, in the MONASH Model, it is assumed that the increase in exports is achieved by Australian exporters accepting slightly lower prices for their exported goods and services. But the prices of imports (set by international markets) are unaffected by the increase in import volumes. With declining export prices and unchanged import prices, the economy experiences declining terms of trade.

The decline in the terms of trade also contributes to a decrease in income per capita, as projected in figure 8.3. By 2024-25, the decline in the terms of trade is contributing to a reduction in annual GNP per capita of about $289 (0.53 per cent).

An open economy tempers the economic impact of migration

Beyond explanations revealed by the increased-migration simulation, an important factor influencing the modest economic impact of migration relates to the dynamic effects of trade. Australia has an open trading economy with imports around 20 per cent of GDP. This tempers the potential impact of immigration since imports effectively embody the human capital of overseas workers who stay put. Indeed, the majority of imports to Australia are finished manufactured goods such as IT equipment, which embody significant amounts of overseas knowledge and human capital. On the other hand, migrants may have links to, and knowledge of, international markets, which might help promote access to new export markets. Further, skilled migrants may possess skills that facilitate the adoption of new technologies and organisational practices, thus raising productivity and income per capita.

Standard economic models suggest that trade and immigration alter the national output of an economy and income distribution through the same mechanism — by increasing the economy's supply of scarce factors of production (Borjas 2005). In this way, it has been suggested that trade and migration are substitutes, particularly

between countries with similar levels of technological endowment (OECD 2000). Imports also capture the productivity gains achieved by the exporting country, through scale economies, lower costs, and other influences (OECD 2005a).

8.3 Comparison of modelling results

In a submission to the Commission, DIMA presented modelling by Econtech (2006b) on the economic effects of migration (sub. DR43). In essence:

- CoPS projects a gain in income per capita of 0.71 per cent. Econtech projects an increase in consumption per capita of 1.1 per cent.
- CoPS estimates a higher gain from the increased supply of labour, measured in hours worked, compared with the Econtech study.
- Econtech projects a higher gain from the increased productivity of labour, compared with CoPS modelling.
- migrant transfers induces a relatively higher increase in consumption per capita in the Econtech modelling compared to CoPS.
- the Econtech model assumes that none of the additional migrants entering Australia subsequently leave (no remigration).
- Econtech projects a higher relative speed of adjustment of the capital stock, in response to a migration-induced increase in labour supply, compared to CoPS.

It is generally understood that the results produced by economic models may vary, and that differing results are contingent on the underlying assumptions and methodological approaches employed. Notwithstanding this, it is important to note that both modelling approaches produce broadly similar results after twenty years. For example, the increase in population and consumption are relatively similar.

Appendix J of this report presents a comparison between the two modelling approaches.

Overall assessment

Migration and population growth affect a diverse set of demographic and economic factors that can cause adjustment throughout the economy. An assessment of the overall impact of migration and population growth on living standards needs to

consider all possible channels through which the economy is transformed, and the balance of such effects.

To be sure, there are limitations in undertaking quantitative analysis of the impact of migration and population growth. Such an exercise focuses only on those effects that are amenable to measurement. Other effects on productivity and living standards not modelled are discussed in chapters 6 and 7. The modelling exercise is also restricted by the underlying assumptions and simplifications that are necessarily imposed.

Despite these limitations, the Commission has concluded that the overall impact on productivity and living standards of a simulated (50 per cent) increase in skilled migration is small. Compared with the base case:

- population is higher by 3.3 per cent by 2024-25
- the size of the economy (GDP) expands 4.6 per cent by 2024-25
- national income (GNP) increases by 4.0 per cent by 2024-25
- income per capita is higher by 0.71 per cent or $383 by 2024-25
- average hours worked per capita is higher by 1.18 per cent by 2024-25.

A number of factors drive this result. A boost in per capita income derives largely from an increase in labour supply, the skill effect, and a consumption price effect. Offsetting impacts arise from decreased labour productivity, a decline in the terms of trade and an increase in interest paid to foreigners.

These results are consistent with research both here and overseas, which concludes that migration has relatively small but generally benign economic effects.

9 Impediments to productivity and economic growth from migration

Key points

- In Australia, there are no fundamental legislative or other impediments to realising the potential economic gains from migration and population growth.
- Australia's migration selection policy has been successful in raising the general skill level of immigrants and improving both their labour market outcomes and productivity.
- Changes to the migration selection criteria have improved the English language skills of immigrants.
  - Poor English language skills remain a significant impediment to the successful integration of migrants into Australia's labour market.
- Australia's regime for the assessment and recognition of overseas skills is well-developed and generally achieves its objectives. However, a number of improvements could be progressed:
  - a more uniform approach to occupational licensing and registration across states and territories
  - greater dissemination of information to prospective migrants on Australia's skill assessment and recognition processes and requirements
  - better alignment of skills assessment and recognition processes for migration purposes with occupation requirements to work in Australia, where practicable
  - incorporation of corrective steps into Trade Recognition Australia's assessment and recognition processes and procedures
  - review and update key skills assessment criteria.
- Skilled migrants working in Australia should not be unintentionally disadvantaged nor face excessive obstacles from Australia's tax system.
  - There are potential economic gains from tax reform aimed at removing unnecessary barriers and complexity for both temporary and permanent immigrants working in Australia.
- There is limited scope for government policy to influence emigration flows from Australia and encourage return migration to Australia.
  - However, there are potential economic gains for Australia from increasing its engagement with Australia's overseas diaspora, particularly those generated by diaspora business and knowledge networks.

In this chapter, the Commission examines whether there are any legislative and other policy impediments to Australia realising the full economic gains from migration and population growth.

Migration policies are typically considered from two perspectives. The first consists of those measures that regulate and control the intake of immigrants and include the numbers, composition and selection rules affecting immigrants. The second perspective relates to those measures that aim to integrate migrants into the Australian labour force, economy and society. These include, for example, policies and processes relating to the assessment and recognition of migrants' skills and qualifications, English language training and various settlement measures.

9.1 Efficacy of Australia's migration program

Migration selection policy

There has been an important shift in Australian migration policy in recent years toward a policy that places a greater focus on skilled and business migrants (chapter 2 and appendix C). This has resulted in a rising proportion of migrants entering Australia under the skilled and business categories compared with other visa classes.

A key tool in administering Australia's skill-based migration policy is the 'points test' for migrant selection. The points test promotes the selection of migrant applicants who have attributes typically associated with successful migrant settlement and an ability to add to the productive capacity of the Australian economy. Points are awarded for skill (education and occupational work experience), English language proficiency, age, an occupation in demand, a job offer, Australian qualifications, intention to reside in regional Australia, spouse skills, and (for Skilled Australian Sponsored only) a relationship with a permanent resident of Australia. Bonus points are also awarded for meeting one or more of three attributes: skilled work experience obtained in Australia, capital investment in Australia, or fluency in one of Australia's major non-English community languages.

The number of points assigned to each factor reflects an assessment of their relative importance in terms an applicant's potential contribution to Australia. An applicant is successful when their total points reach a threshold 'pass mark'.

Box 9.1 identifies the main changes to Australia's migration policy settings that have occurred in recent years and are likely to have impacted on the labour market performance of migrants.

Box 9.1 **Recent changes in Australia's migration policy**

- There has been a shift in favour of skilled migration categories (for example, Independent, Business Skills and Employer Nomination Scheme) compared with humanitarian/family immigrant categories.
- Changes to the eligibility criteria have resulted in more migrants with greater English language proficiency and a higher level of qualifications.
- The introduction of new temporary work migration categories and the expansion of other temporary work migration classes have increased the numbers of temporary migrants (chapter 2). Temporary migrants tend to be highly skilled, employed and have high levels of education.
- Preference is given to immigrants with Australian qualifications, and those immigrants on an Australian student visa are now able to apply onshore and be fast-tracked.
- With the exception of humanitarian immigrants, immigrants are excluded from most social welfare payments for the first two years in Australia.

Source: Hugo (2004a).

Attributes of migrants

Australia's migration policy has been successful in targeting migrants with settlement attributes and productive skills that generally improve labour market and economic outcomes. As noted by Cobb-Clark:

> The increased emphasis on productive skills in the procedures Australia used to select new immigrants in the late 1990s led to striking differences in the human capital endowments of new arrivals. Though the demographic composition … of immigrants remained much the same, individuals entering Australia in 1999-2000 had more education, better English language skills and more pre-migration labour market experience skills than did their predecessors. (2006, pp. 20–1)

These conclusions are consistent with the Commission's findings reported in chapter 5. Migrants have consistently had higher average skill levels than the Australian-born population. In particular, since the late 1990s, migrants have increasingly been more highly educated, with a greater proportion of recent migrants having qualifications at the postgraduate, bachelor degree or diploma level.

Labour market outcomes of migrants

Although it can be concluded that Australia's migration policy settings have delivered immigrants with the targeted attributes, the question arises as to whether the current settings have translated into successful labour market outcomes. The answer is broadly affirmative.

Empirical analysis of the Longitudinal Survey of Immigrants in Australia (LSIA) and ABS data indicates that the changes made to Australia's immigration selection policy have had a significant impact on the extent of migrant integration and engagement in the Australian labour force (Birrell, et al. 2001; Cobb-Clark 1999, 2006; Hugo 2004b; Richardson and Lester 2004; Richardson, Robertson and Ilsley 2001).

> The labour market performance of recent migrants in recent years has been substantially higher than their counterparts of the early 1990s. (Hugo 2004b, p. 167)
>
> Recent migrants to Australia appear to have performed well in the labour market compared to migrants in the early 1990s … [and to those in other OECD countries]. (Richardson and Lester 2004, p. 1)
>
> … [These] improvements in human capital endowments [education, English language skills and pre-migration labour market experience] completely explain the higher participation rates amongst immigrants arriving in Australia at the end of the 1990s. Moreover, approximately half of the fall in men's unemployment rates also stems from increases in productive skills. (Cobb-Clark 2006, p. 49)

Many of these researchers have concluded from the research evidence that the improved labour market performance of recent migrants is directly attributable to Australia's immigration selection policy:

> There is no doubt that changes in Australia's policies have been instrumental in improving the labour market success of migrants. (Richardson and Lester 2004, p. 40)
>
> … [These] results indicate that there is a large potential for immigrant selection policy to influence immigrant outcomes not just immediately after migration but in the medium term. (Cobb-Clark 2006, p. 49)

However, it is also acknowledged that changes in labour market conditions in Australia and income-support policy also appear to have been important.

The results of the Commission's own empirical research (chapters 4 and 5) concur with other Australian research reported above. Immigrants possessing the abovementioned productive attributes are much more likely to integrate successfully into the Australian labour market than those immigrants without such characteristics. Skilled immigrants display superior labour market performance in terms of, for example, unemployment rates, participation rates, hourly earnings, and working hours compared with unskilled immigrants.

Overall assessment

Australia's migration selection program has been successful in raising the skill level of immigrants. Migrants are now better educated, have greater English language proficiency and have more pre-migration labour market experience than their predecessors. This has translated into superior labour market outcomes for those migrants.

9.2 Migration policy and skill shortages

A large part of the current migration arrangements target migrants with particular skills and success factors that aim to address skill needs in the Australian labour market and contribute to the Australian economy (chapter 2 and appendix C). An issue raised by participants was the extent to which migration policy should be further targeted at addressing perceived specific skill shortages and the benefits that might flow from this.

Some participants considered that a skill migration policy made an important contribution to addressing growth-constraining skill shortages in the Australian labour market (Victorian Government, sub. 29; Western Australian Government, sub. DR37; Australian Chamber of Commerce and Industry, sub. DR42; Northern Territory Government, sub. 25; South Australian Government, sub. DR44).

> It is our view that migration and population growth generally have a positive effect on economic growth and productivity in the Northern Territory. This can be seen through improving labour market efficiency and filling specific skill shortages … (Northern Territory Government, sub. 25, p. 1)

> Migrants contribute to the economic development of Australia in many ways including … addressing specific skill shortages. (Professions Australia, sub. 19, p. 3)

In contrast, other participants considered migration policy had limited impact in addressing skill shortages:

> The CFMEU is of the strong view that migrant labour should not generally be used to remedy skill shortages in the Australian Economy … [the] dominant focus of governments should be on providing quality training to workers who are already in the country. (Construction Forestry Mining and Energy Union, sub. 13, p.12)

Some participants expressed the view that skilled migration displaced skills training in the Australian labour market:

> Temporary skilled migration is a substitute for capability building through skills training and in the long term reduces productivity by compromising the long term ability of Australia to broaden its skills base. (Australian Manufacturing Workers Union, sub. 20, p. 9)

Skill shortages derive from labour supply and demand factors

In a competitive dynamic market economy there will always be incidences of skill shortage. Firms and jobs are constantly being created, expanded, contracted and ceasing. The market will adjust over time to address such imbalances. This might involve adjustments in the price and/or quantity of labour or substitution with other types of labour. As Richardson (2005b) notes:

> We do not have a fixed quantity [of a particular skill] that is demanded. Rather supply will rise as the terms of employment become more attractive. And demand will fall as the costs of employing people with particular skills rise. These are the conditions that are necessary for the forces of supply and demand to work through the market to solve the problems of a shortage. (pp. 16–7)

However, the labour market adjustment process could be slow due to rigidities in wage and labour supply adjustment, information problems in labour markets, technological change, institutional and demographic factors (chapter 3). This can lead to protracted periods of skill shortage.

Just how skilled migration policy impacts on the labour adjustment process and the incidence of short- and long-term skill needs is complex. For example, in the longer term, domestic labour market responses to skill shortages depend on the returns to skill formation. Migration policy might affect such prices in the labour market. For this reason, when considering long-term skill needs, skilled migration and domestic labour supply need to be examined together. This issue extends beyond the scope of this study and is therefore not examined here.

Nature and size of potential skill shortages difficult to measure

Identifying and quantifying skill shortages in the labour market is problematic. Indeed, there is no universally accepted definition of when a labour shortage actually exists (OECD 2003a) and no objective empirical measure or direct indicators of skill shortages.

Differences in potential skill shortages can depend on a number of factors. For example, the type of shortage involved (absolute/relative, short/long term), their key features (sectors/skill level affected) and their determinants (skills mismatch, inadequate labour supply, persistent labour market rigidities) (OECD 2003a). Given such difficulties, real limits are placed on the extent to which future skill shortages can be reliably forecast or planned for in the long term.

Migration program flexible

The impact of the Australian migration program on the skill needs of the labour market comprises a number of components. Some components focus on those skilled migrants who will settle *permanently* in Australia (such as those migrating as part of Skilled Independent or the Employer Nomination visa categories). Others focus on *temporary* migration (such as the short and long stay Business Visitor categories), usually expected to be one to four years.

Some components of the Migration Program are demand-driven and not subject to capping (such as State/Regional Sponsored, Employer Nominated and Business Skills visa categories), while others are subject to capping (such as Skilled Independent and Skilled Australian Sponsored visa categories).

In this way, Australia's migration policy settings display a high degree of flexibility (such as the sub-categories and points test).

Permanent and temporary migration policy complementary

Permanent skilled migration forms part of a longer-term strategy to raise the general skill levels of the workforce by targeting migrant skills and attributes related to labour market success. This includes migrants' qualifications, training, work experience and English language ability (chapter 4). On the other hand, temporary migration arrangements can help respond to short-term imbalances in the labour market and unanticipated short-term demands. Indeed, many of the temporary visa categories are demand-driven and non-capped (for example, the Business Visitors visa category). This means that industry and employers can pursue overseas skilled workers, unconstrained. It is also in non-permanent migration to Australia that we observe very strong growth (chapter 2).

Migration policy just one aspect of overall skill strategy

As noted above, there is a variety of factors potentially contributing to skill shortages, highlighting the importance of a broad-based strategy. In this context, a number of participants emphasised the importance of migration policy as just one element of a raft of measures aimed at addressing skill shortage issues.

> It is also essential that migration policies operate within a broader policy framework that reflects the importance of investment in skill formation to productivity growth and international competitiveness … (Professionals Australia, sub. 19, p. 3)

> ACCI agrees that migration makes an important contribution to addressing labour and skill shortages … as part of a combination of initiatives. (Australian Chamber of Commerce and Industry, sub. DR42, p.1)

Overall assessment

Australia's migration policy settings display a high degree of flexibility. The permanent settlement and temporary migration aspects of Australia's migration program interact in different and complementary ways in addressing perceived skill shortages. While permanent skilled migration represents part of a long-term strategy to raise the general skill level of the workforce, temporary migration can respond to short-term imbalances and labour market demands. That said, short-term responses are likely to be effective within limits as it can be difficult to gauge the nature and size of current and future labour shortages. Importantly, migration policy is only one component of a broader strategy to address skill shortages and accommodate future labour market trends.

9.3 English language proficiency

A key finding from chapters 5 and 6 is that English language proficiency is an important factor influencing the labour market success and economic wellbeing of migrants. Poor English language skills are a significant impediment to the successful integration of migrants into Australia's labour market and society. This finding is supported by other research evidence (Chiswick and Miller 2006; Cobb-Clark 2006; McDonald and Worswick 1999).

The importance of English language proficiency for immigrants is increasing over time, as the skill level of immigrants has increased. The returns to English language proficiency are therefore higher now than once was the case. The greater premium on English language skills is also important as an increasing number of immigrants to Australia originate from non-English speaking countries.

The role of English language proficiency in migrant selection has been progressively strengthened by the Australian Government during the 1990s (box 9.2). For example, the Occupations Requiring English (ORE) list was expanded to cover the majority of skilled occupations for entry to Australia. The threshold English proficiency levels were also raised for various skilled migration categories.

Changes to the migrant selection policy aimed at targeting immigrants with English language skills have had a marked impact on the English language ability of recent migrants to Australia. Analysis of ABS Labour Force Survey data by the Commission reveals that the overall English language skills of immigrants have improved (chapter 5). Other empirical research supports this finding.

Chiswick and Miller (2006) observe clear differences across visa classes in the English language skills at the time of arrival. Specifically:

- the English language skills of immigrants who entered Australia under points-tested visa categories have English language skills superior to the skills of immigrants in the non-points tested categories
- recent migrants to Australia have superior English language skills than their predecessors, with the difference being greater for immigrants in the points-tested categories (the categories for which there was an increase in the English language requirements).

Box 9.2 Changes to English language entry requirements

English language requirements have increased for entry under the Skilled Migration Stream. Key changes to the points test for English ability include:

- In 1994, the points available for various levels of English ability were altered, and awarded as follows:
  - Able to communicate effectively in English in a range of situations (20 points).
  - At the level described for 20 points for three of the four skills of reading, speaking, understanding and writing, but at a lower level for the remaining skill (15 points).
  - Able to communicate effectively in English on familiar, everyday topics (10 points).
  - Able to handle basic communication in English on familiar everyday topics or fluent in at least two other languages other than English (5 points).
- In 1996, the language requirement for Occupations Requiring English (ORE) was changed to 'vocational English', defined as the ability to communicate effectively in English in at least three of the four skills: reading, speaking, understanding and writing (that is, the 15 point threshold).
- In 1997, points were introduced for English language ability for immigrants in the Skilled Australian Sponsored category.
- From 1997, where skilled primary applicants (or their family members aged 18 years and over) lacked functional English, they were required to pay for appropriate English language training.
- By 1998, the ORE list was expanded to cover almost all skilled occupations (85 per cent of points-tested applicants now have to meet this requirement).
- A major review of the points test in 1999 resulted in changes to English language proficiency required — now 15 points for 'vocational English' and 20 points for 'competent English'.

Sources: Chiswick and Miller (2006); DIMIA (1999b).

Notwithstanding improvements to the English language skills of recent migrants to Australia, concerns have been raised in regard to the integrity of aspects of the English language testing processes. For example, some consider that the vocational English test does not give an accurate representation of an applicant's ability to communicate in English. English language ability could still be a barrier to work for some migrants even though they successfully completed the English language test. Others note that, although migrants pay upfront and commit to English language courses upon arrival in Australia, some migrants do not undertake or complete those courses.

Overall assessment

English language proficiency is significantly related to migrant labour market success and performance. The progressive strengthening of the English language component of Australia's selection program has resulted in recent immigrants to Australia possessing superior English language skills than their predecessors and more successful labour market outcomes.

In light of the increasing numbers of skilled immigrants from non-English speaking backgrounds, and the increasing importance of English proficiency to labour market outcomes, it is important that the efficacy of the English language component of the migration program be monitored to ensure it continues to meet its objectives.

9.4 Distortions arising from the skilled migration program

Participants identified a number of areas where the Australian skilled migration program could be creating unintended distortions and outcomes. These arise from the various incentives facing different stakeholders (immigrants, migration agents, educational institutions, state/territory and Australian government agencies) involved in the migration process.

Some educational institutions could have a commercial incentive to design courses that meet regulated entry criteria for skilled migration, with maximum points and least cost to potential migrants. Migration agents could advocate particular education courses or regions where successful applications are most likely to occur. And immigrants could pursue prospects that provide the greatest likelihood of successful application. These could result in immigrants obtaining qualifications that do not readily lead to good employment opportunities. Alternatively, it could result in immigrants obtaining qualifications for which they have no commitment to

a profession or career. That is, the course is simply used as a means to migrate to Australia.

An often cited example relates to the immigration outcomes observed from the Skilled Independent Overseas Student (SIOS) visa subclasses. This visa category is designed to encourage onshore overseas students to apply for permanent residence once they have completed their training in Australia. Incentives to take up permanent residence include extra points for training in Australia and the waiving of the occupational experience requirement that other skilled applicants are required to meet.

There has been a significant uptake of the SIOS option. Birrell, Rapson and Smith (2005b) note that the number of such students who have become permanent residents under the onshore student program has grown rapidly in recent years, from 5480 principal applicants in 2001-02 to 11 460 in 2003-04. Notably, they show that the overseas students who gained a permanent residence visa in the onshore program did so primarily in just two occupations, computing and accounting, occupations that attract the maximum occupational points.

Engineers Australia pointed to the way educational institutions have responded to the SIOS policy:

> Australian migration policies have been changed to enable overseas students, on temporary visas, graduating from Australian Universities to apply, on shore, for permanent residency. In this way the distortions created by University funding policies are being managed to benefit the skilled migration intake. (sub. 4, p. 16)

The Migration Institute of Australia, in its submission to the Joint Standing Committee on Migration (JSCM), raised concerns regarding the waiving of occupational experience for onshore computing student graduates compared with overseas computing professions wishing to apply under the Skilled Independent scheme:

> Members have expressed concerns that the skills assessment criteria for recent [Australian] graduates are too easily met, whereas the work experience requirements for holders of overseas qualifications are excessive … [The] result of this is that a large number of international students have obtained skilled visas but who do not have the required skills to work in IT in Australia. At the same time, highly skilled and employable applicants with overseas qualifications can be excluded because they are unable to satisfy work experience requirements. (sub. 34 to JSCM, pp. 18–9)

With reference to the accounting profession, Birrell and Rapson (2005) express similar concerns:

> Under this reformed system, overseas students who apply in Australia for permanent residence within six months of completing an Australian course do not have to possess any job experience in their field. By contrast, other applicants, who apply from outside

> Australia, must have some relevant occupational experience. The new selection system has, in effect, traded off work experience and overseas training against youth, familiarity with English and Australian training. (p. i)

As is the case with all regulation, specific rules aimed at achieving a particular migration outcome can create distortions and result in unintended effects. The mix of incentives facing different stakeholders in the migration market means that responses by various parties can be difficult to predict. This uncertainty, and the possibility of unintended effects, underlines the importance of effective ongoing monitoring and review processes to ensure migration policy settings are achieving their objective.

9.5 Efficacy of skills assessment and recognition processes

Legislative and other barriers arising from Australia's skills assessment and recognition regime could impede the selection of skilled migrants and their integration into the Australian workforce. The efficiency and effectiveness with which migrants' skills are assessed and recognised in Australia by employers, professional associations or governments are examined in this section. For the purposes of this section, the reference to 'skills' refers broadly to the qualifications, training and work experience of immigrants.

Migrants who quickly find work that makes use of their skills are likely to be more productive in employment, better paid for the work they do and happier about their degree of integration into Australian society (Richardson and Lester 2004). Therefore, the extent to which immigrants are able to use their qualifications and skills is important. Indeed, the labour market represents an essential step in the overall process of integrating immigrants into host-country society (OECD 2004c).

Policy objectives

Skills assessment and recognition is required for:

- Skill Stream immigrants (temporary and permanent) who obtain assessment prior to immigrating
- families of Skill Stream immigrants who seek assessment, registration and upgrading after arrival
- Family Stream immigrants and humanitarian entrants who seek assessment, registration and upgrading after arrival

- Australian citizens returning with qualifications obtained overseas.

The overarching policy objective of the skills recognition arrangements in Australia is to ensure that those selected to migrate on the basis of their skills are able to integrate readily and rapidly into the Australian workforce. Additionally, others who migrate to Australia, who possess skills obtained overseas, should have effective pathways for assessment and recognition (Department of Immigration and Multicultural and Indigenous Affairs (DIMIA), sub. 80 to JSCM).

The skills assessment and recognition regime also performs a secondary function for migrants who are sponsored by Australian employers. First, it ensures that the sponsored immigrant does genuinely have the skills to fill a specific job position. Second, it ensures that a position has not been created for the sole purpose of obtaining a permanent visa.

In Australia, responsibility for assessment and recognition of qualifications and skills obtained overseas is currently shared between a number of government and non-government organisations. Box 9.3 provides an overview of the current institutional arrangements.

Box 9.3 **Institutional framework for recognition of overseas skills**

In Australia, powers and responsibility to make assessment and recognition decisions about overseas skills and qualifications are delegated to the following bodies:

- for Skilled Stream migration — the relevant peak professional bodies assess professional and managerial occupations, Trade Recognition Australia (TRA) in Department of Employment and Workplace Relations assesses trade occupations, and Vocational Education Training and Assessment Services (VETASSESS) assesses the general educational level of qualifications for unregulated occupations, under contract to DIMIA
- for employment purposes — professional bodies or employers
- for regulated occupations — state and territory regulatory authorities
- for academic purposes — educational institutions.

Key legislation facilitating recognition for all immigrants whose qualifications have been recognised for licensing or registration in any one state or territory is the *Mutual Recognition Act 1992.*

The National Office of Overseas Skills Recognition, now known as AEI-NOOR, has authority under the *Migration Act 1958* to approve assessing bodies, for subsequent gazettal by the Minister for Immigration, to undertake skills assessment for the General Skilled Migration program. This is confined to professional occupations that require registration or are self-regulating.

Source: DIMIA (2003).

Key issues

Compared with other countries, the Australian regime for assessing and recognising overseas skills is generally regarded as well-developed and successfully achieves its objectives (Cully and Skladzien 2001). That said, a number of issues have been raised by interested parties to this study. The Commission has also examined relevant evidence submitted by interested parties to the JSCM's (2005) inquiry into skills recognition, upgrading and licensing, being undertaken concurrently with this research study. The following issues have been raised.

The skills assessment and recognition scheme is complex

The Australian skills assessment and recognition arrangements for migrants are complex and might present potential obstacles for some migrants wishing to migrate and work in Australia. For example, the Queensland Government stated it:

> … has identified the complexity of [Australia's] … overseas skills recognition and licensing arrangements as an impediment to the effective use of migrants' skills in the Australian economy and a possible impediment to skilled migration. (sub. 26, p. 3)

Likewise, the Northern Territory Government concluded:

> The skills recognition process for many occupations can be confusing, time consuming and overly bureaucratic. It is imperative for any barriers that exist for potential independent migrants with trade/professional qualifications to gain permanent residency to be removed to increase the skills pool upon which employers can draw. (sub. 25, p. 11)

The responsibility for assessment and recognition of skills obtained overseas, for both skill stream applicants and employment purposes, is currently shared between state and territory regulatory bodies, Registered Training Organisations, TAFEs, professional bodies, and approved migration assessing bodies that cover a range of trades and professions (box 9.3). Multiple organisations at both the state and national levels, each with its own assessment and recognition processes, creates a level of complexity. The Queensland Government stated:

> It has been suggested that complications exist at state and national levels because of the great variation in recognition processes across occupations. This variation in processes in general, and the complexity of processes in some specific occupations, generates the perception that several impediments exist in the registration and/or licensing of skilled migrants under several visa categories. (sub. 83 to JSCM, p. 11)

And can lead to inconsistencies

Some participants to the JSCM inquiry raised concerns about inconsistencies in the assessment criteria, standards and processes that underpin the skills assessment and recognition regime in Australia (Engineers Australia, sub. 76 to JSCM; Tasmanian Government, sub. 77 to JSCM; Queensland Government, sub. 83 to JSCM; Western Australian Department of Education and Training, sub. 20 to JSCM; Migrant Resource Centre of South Australia, sub. 32 to JSCM; Australian Divisions of General Practice Ltd, sub. 25 to JSCM). Inconsistencies can arise from the broad powers given to multiple assessment bodies (government and non-government), across different occupations, states and territories.

In response to such inconsistencies, there have been calls for more strategic and simplified arrangements for the assessment and recognition of skills in Australia. Some participants advocated the need for greater mutual recognition of skills between Australian states and territories. Mutual recognition means that if a person is registered to carry out an occupation in one jurisdiction, they can be registered to carry out the equivalent occupation in any other jurisdiction without the need for further assessment of qualifications and experience. Likewise, some interested parties support establishing a more uniform national approach to occupational/professional registration and licensing (Queensland Government, sub. 83 to JSCM; Tasmanian Government, sub. 77 to JSCM; CPA Australia, sub. 39 to JSCM).

Poor access to information on the skills recognition process

There has been criticism of the lack of basic information available to prospective migrants about the specific requirements and processes for having their skills recognised in Australia. For example:

> Among the difficulties reported by commentators to the review, the major issues included … [a] lack of understanding or information about skills recognition processes at the point of visa application. (DIMIA 2003, pp. 125–6)

> Lack of information about state-based registration and licensing requirements have impacted adversely on the employment outcomes of some migrants who have obtained assessment prior to migration. (Western Australian Department of Education and Training, sub. 20 to JSCM, p. 4)

> There are considerable barriers that hinder effective and streamlined pathways to skills recognition, upgrading and licensing for both skilled stream migrants and refugees with overseas qualifications. These include barriers related to information and communication about how to access these pathways … (Migrant Resources Centre of South Australia, sub. 32 to JSCM, pp. 2–3)

In its recent review of Australia's skilled migration program, the JSCM examined the information provided by 33 accredited assessing authorities on their assessment and recognition processes and procedures (these are the assessing authorities for occupations on the Skilled Occupation List, and documented on *form 1121i*). Although 19 assessing agencies provided outlines of their skills assessment and recognition processes, the Committee found that, in the case of 14 assessing authorities, information was 'non existent' (JSCM 2004, p. 146).

Strategies to better streamline and coordinate the provision of information on skill assessment and recognition requirements in Australia have been suggested (CPA Australia, sub. 39 to JSCM; DIMIA 2003; DIMIA, sub. 80 to JSCM). For example, the Australian Government recently announced the proposed establishment of a national skills web portal (Vanstone 2005c). This aims to provide a gateway for new arrivals and potential skilled migrants to access information about skills recognition, licensing and registration processes in Australia.

Gap between migration assessment and employment assessment

Another issue often raised is the apparent contradiction arising from the skilled migration process. On the one hand, prospective immigrants might receive a positive skills assessment for migration purposes. Their skills, for migration purposes, are recognised as equivalent to Australian skills. On the other hand, upon arrival in Australia, these immigrants are faced with additional assessment and accreditation obligations in order to practise their occupation, notwithstanding the assessment of the skills as part of the migration process.

> … [An] area of concern is the gap between a positive migration skills assessment and unrestricted work rights in Australia for many occupations. (Tasmanian Government, sub. 77 to JSCM, p. 5)
>
> One area for possible improvement is the way in which skills recognition and statutory licensing arrangements interact. For example, TRA's assessments of trade skills in the international stream are made for migration purposes only … [potential] migrants often face a number of hurdles, involving various authorities, before they can put their skills to work. (Department of Employment and Workplace Relations, sub. 63 to JSCM, p. 11)
>
> Among difficulties reported by commentators to the review, the major issues included … [the] perception of a 'gap' between DIMIA's skills assessment at visa application and later skills or trade recognition practices undergone in Australia. (DIMIA 2003, pp. 125–6)

It has also been noted that there are shortcomings in communicating to prospective immigrants any additional requirements after arriving in Australia:

> Overseas assessment processes for immigration purposes fail to inform applicants that further recognition of their trade skills may be required onshore and fail to provide information about the length or cost of this process. (Western Australian Government, sub. 16 to JSCM, p. 2)

The Commission understands that further skills assessment might or might not be required after arrival in Australia. The situation differs across occupations, professions and jurisdictions. There could be legitimate reasons for additional assessment requirements for migrants after arrival in order to satisfy equivalency with Australian skills. For example, practical examinations might need to be completed onshore, additional training or practical experience in Australia could also be necessary, or specific state and territory based requirements might need to be satisfied.

Importantly, however, any additional post-arrival skills assessment and registration/licensing obligations, whether state/territory or occupation specific, need to be clearly communicated to potential immigrants as part of the skilled migration application process and general dissemination of information. The JSCM (2004), for example, sees merit in providing such information as part of the General Skilled Migration and Skilled Occupations List publications.

Where practicable, it makes sense to link the two processes, so that a positive skills assessment for migration purposes satisfies all occupational skill requirements to practise. This would mean that any registration or licensing requirements would be satisfied pre-arrival. As the Tasmanian Government noted:

> Any efforts to establish a more uniform, nationwide and streamlined assessment process that confers full licensing upon successful [migrant] applicants and eliminates further hurdles at state level, would make skilled migration easier for potential arrivals. (sub. 77 to JSCM, p. 5)

In this regard, the Commission notes that steps toward a more streamlined skills assessment process for prospective migrants have recently been announced by the Council of Australian Government (CoAG 2006). A single, pre-migration off-shore assessment process that will satisfy skilled migration and occupational licensing requirements is planned for five main source countries. The proposed assessment arrangements will apply initially to six priority skill shortage occupations, and later for all other trade occupations on Skilled Occupation List as mutual recognition of trade qualifications is achieved with the five countries.

Some professional occupations have established international agreements that mutually recognise overseas skills and qualifications. For example, the Australian Nursing Council has developed consistent international standards and polices that allow nurses registered in an overseas jurisdiction to gain immediate registration in

Australia. Similarly, Engineers Australia, the designated assessing authority for most engineering occupations, has formal mutual recognition agreements — the Washington Accord 1989 and the Sydney Accord 2001 — with engineering accreditation bodies in a number of countries (Engineers Australia, sub. 76 to JSCM).

Trade Recognition Australia (TRA) — some process issues

A number of participants to the JSCM inquiry raised issues regarding the skills assessment processes carried out by TRA. Concerns were expressed that there is no formal avenue for remedial action before rejection of an application. Specifically, there are no opportunities to discuss content of application, supply further information where an application is defective or incomplete, or to clarify information provided. Furthermore, detailed grounds for any rejection of an application by TRA are not given.

> … [If the] information provided on the application forms and the associated information relating to the assessment is not considered to be adequate, the application is refused. (Immigration Lawyers Association of Australia, sub. 82 to JSCM, p.19)
>
> Our members have expressed concern over the TRA assessment process and the difficulty in communication with TRA … (Migration Institute of Australia, sub. 34 to JSCM, p. 3)
>
> The policy of assessing organisations such as TRA to simply approve or reject applications, rather than afford applicants an opportunity to supply further or better information, may also be hindering or reducing the flow of skilled tradespeople to Australia. (Tasmanian Government, sub. 77 to JSCM, pp. 5–6)
>
> The process can take several months and there is no opportunity to comment or provide further information in the interim prior to TRA making a decision to reject an application. (Chamber of Commerce and Industry Western Australia, sub. 50 to JSCM, p. 1)

Some participants to the JSCM inquiry were also critical of the review and appeal procedures administered by TRA.

> Review applications are assessed in consultation with the primary decision maker … [TRA] advised us that it would be rare for a primary decision to be varied at review. There is a perception that the review processes may not be as independent as it should be. (Migration Institute of Australia, sub. 34 to JSCM, p. 22)
>
> Although there is the right to seek an Internal Review at a fee of $300, this process does not permit the submission of additional documentation in support of the review application. (Immigration Lawyers Association of Australia, sub. 82 to JSCM, p. 19)
>
> The performance of TRA has received widespread criticism for their inflexible approach to skills assessments and appeals processes. … [The] performance of TRA, in

both assessments and appeals, should be specifically assessed. (Western Australian Government, sub. 16 to JSCM, p. 2)

Skills assessment criteria too narrow

The Vocational Education Training and Assessment Services (VETASSESS) is responsible for assessing a range of management, administrative, professional and associate professional occupations for the DIMIA Skilled Migration program. Participants to the JSCM inquiry suggested that the assessment processes administered by VETASSESS be expanded (Immigration Lawyers Association of Australia, sub. 82 to JSCM; Migration Institute of Australia, sub. 34 to JSCM; Western Australian Department of Education and Training, sub. 20 to JSCM; VETASSESS, sub. 86 to JSCM; Master Builders Australia, sub. 17; Adult Multicultural Educations Services, sub. 9 to JSCM).

Currently, VETASSESS only considers formal qualifications from overseas, with no 'competency' or 'work experience' component to its assessment. However, VETASSESS can include competency and work experience in assessing onshore applicants. Participants to the JCSM inquiry have suggested that this approach artificially excludes highly skilled and experienced overseas workers and that the VETASSESS skills assessment process should be widened.

> We would recommend that skills assessment processes be widened to allow a range of methodologies such as competency. The Australian Standard Classification of Occupations is equally consistent with competency as well as education pathways, and VETASSESS have the capacity to assess competencies. (Immigration Lawyers Association of Australia, sub. 82 to JSCM, p. 26)

> Unlike some of the other assessing authorities VETASSESS is not required to assess the work experience of applicants … [Procedures] could be modified to assess work experience at the same time as the qualification assessment to eliminate another step in the overall process. (VETASSESS, sub. 86 to JSCM, p. 5)

> It is Master Builders position that consideration needs to be given to the overall skills of individuals rather than the formal certificate and qualifications they may hold. (Master Builders Australia, sub. 17, p. 7)

Outdated assessment criteria/profiles

Some participants to the JSCM inquiry raised concerns that the Australian Standard Classification of Occupations (ASCO) dictionary used for the classification of occupations for the General Skill Migration and Employer Nominations schemes is outdated, and that this adversely impacts on the potential success of skilled migrants and the goals of the program.

For example, the Queensland Government noted that the ASCO descriptors do not align with Australian trade qualifications — that are based on the national training framework. This inconsistency can negatively impact on an overseas tradesperson's prospects for recognition and licensing in Australia as the content of trade work overseas might be different, or the trade title given to the skilled immigrant too broad, to match Australian trade classifications or licensing requirements (Queensland Government, sub. 83 to JSCM, pp. 23–4).

Others expressed similar concerns:

> ASCO was devised by the Australian Bureau of Statistics for an unrelated purpose. It was then adopted by the DIMIA as a basis upon which General Skilled Migration and Employer Nominations Scheme occupations were to be classified … [Although] it is recognised that the ASCO is out of date and is currently under review, DIMIA has advised that its replacement is not expected to be available until late 2007. (Immigration Lawyers Association of Australia, sub. 82 to JSCM, p. 10)
>
> … [Skill shortages are] aggravated by the time consuming and outdated pre-migration and post migration assessment processes and the misfit of occupational categories. (Western Australian Department of Education and Training, sub. 20 to JSCM, p. 4)

Overseas skills and qualifications undervalued

Another issue raised by participants to both the JSCM inquiry and this research study is that Australian employers are failing to recognise or value overseas qualifications and employment experience (box 9.4). Therefore, although skills are recognised by assessing bodies as equivalent to Australian skills, immigrants can experience difficulties in gaining employment commensurate with their skills.

> The skills set of some permanent migrants are being under-utilised in the Australian labour market. For example, there are significant numbers of overseas qualified engineers (and other professionals particularly from non English speaking backgrounds) who have had difficulty securing employment in their chosen disciple despite their overseas qualification being recognised. (Professions Australia, sub. 19, p. 6)
>
> There is significant evidence, both anecdotal and documented, that asserts that skills, knowledge and expertise of migrants are not being maximised resulting in high unemployment and wasted resources. (Western Australian Government, sub. 16 to JSCM, p. 4)

Under-utilisation of migrant skilled labour might mean that workers are being employed well below their capacity or working in areas unrelated or marginally related to their skills and qualifications. This could result in a shortfall in the productivity gains that would otherwise have accrued from a particular skilled migrant.

Box 9.4 **Overseas skills undervalued**

There is evidence that some employers are undervaluing immigrants' skills even though they have been assessed and recognised as equivalent to Australian occupational skills:

> The skill-sets of some permanent migrants are being under-utilised in the Australian labour market, and it is clear that in some cases they are not valued as equivalent to Australian qualifications. (Engineers Australia, sub. 76 to JSCM, p. 6)
>
> MDA's experience suggests that … [the current skills shortage] may be exacerbated by a lack of awareness amongst employers of a range of skills, experience and qualifications held by migrants already in Australia, and an apparent preference for employing those whose first language is English. (Multicultural Development Association, sub. 13 to JSCM, p. 5)

And even active discrimination:

> The experience of MDA clients suggest that employer prejudices do still exist (whether overtly or covertly) and that something needs to be done to bring a change of employer attitudes in order to assist the skilled jobseekers that are already in Australia into work. (Multicultural Development Association, sub. 13 to JSCM, p. 5)
>
> In some occupations and professions, there is a perceived culture of 'exclusion' and 'limitation' of access. While migrants satisfy the DIMIA requirements and are allowed to migrate, they find it very difficult to be accepted by their industry bodies and to get employment in their occupations. (Queensland Government, sub. 83 to JSCM, p. 12)
>
> Barriers to employment and training for families of Skill Stream migrants, Family Stream migrants and humanitarian entrants include attitudes of potential employers, particularly for migrants who are visibly or religiously different and/or who come from countries where English is not the main language. (Western Australian Skills Advisory Board, sub. 17 to JSCM, pp. 3–4)

Although skill under-utilisation can be a feature of the Australian workforce more generally, the incidence and magnitude is likely to be greater for immigrants. As noted in chapter 4, the Commission has found that for a given education level, immigrants work in less skilled occupations than do Australian-born workers. This finding is consistent with other empirical evidence (Green, Kler and Leeves 2005). Importantly, the incidence of skill under-utilisation, or an 'occupational gap', is greatest among immigrants from non-English speaking countries (Flatau, Petridis and Wood 1995; Green, Kler and Leeves 2005).

Under-utilisation of migrant skills in the labour market could arise from poor information or lack of awareness by industry or employers of the occupational skills of immigrants. Implicit cultural attitudes can also influence exclusionary behaviour in the labour market.

Under-utilisation of migrant skills can also have a negative impact on productivity in the longer term as skills are increasingly disused.

> The inability of a significant proportion of [non-English-speaking country] migrants to practise in their occupation can, over time, lead to their de-skilling and hence loss of productive potential. (DIMIA, sub. 22, p. 17)

More generally, some participants point to deliberate 'closed shop' and restrictive entry practices by some regulated occupation and professional bodies (Federation of Ethnic Communities' Council of Australia, sub. 11; Glenn Withers, sub. DR35; Migration Institute of Australia, sub. 34 to JSCM; Migrant Resource Centre of South Australia, sub. 32 to JSCM). DIMIA noted:

> Employment opportunities relevant to overseas gained qualifications are reduced due to regulated entry to labour market, in particular the regulated and self-regulating professions, where in some fields stringent requirements effectively control entry. The Hilmer report (1995) found that such a regulatory regime may be more restrictive than necessary to protect public interest objectives for which they were imposed. (DIMIA, sub. 22, p. 15)

The Commission notes that issues relating to potential competitive restrictions in occupations and professions form part of a wider reform agenda proposed by the National Competition Policy Review Program (CoAG 2006).

Overall assessment

Given that Australia's migration policy is primarily focused on selecting immigrants who have specific skills, it is important that there are efficient and effective arrangements for the assessment and recognition of those skills. This would help ensure immigrants' timely integration into the Australian labour force — an essential step in the overall process of integration into the Australian economy and society.

Compared with other countries, the Australian regime for assessing and recognising overseas skills and qualifications is well-developed and generally achieves its goals. However, there is evidence that, in some instances, the skills assessment and recognition arrangements for Australia could be improved to better meet their objectives. Improvements are suggested in a number of areas.

First, multiple agencies and jurisdictions mean that the skills assessment and recognition arrangements in Australia are complex. This can create barriers and costs for prospective skilled immigrants wishing to live and work in Australia. There is scope for a more uniform approach to occupational/professional licensing and registration between Australian states and territories. Assessing bodies should continue to seek national registration and licensing systems, where the benefits justify the cost. This is consistent with other Commission research into the mutual recognition arrangements in Australia (PC 2003). The Commission supports the

recent CoAG commitment to a system of full mutual recognition of licensed trades across all Australian states and territories (CoAG 2006). The Commission also supports CoAG's commitment to a more streamlined off-shore and onshore skills assessment and recognition process for potential and existing immigrants (CoAG 2006).

Second, poor information on skills assessment and recognition processes and requirements in Australia can present obstacles for prospective immigrants. Although done well in many cases, skills assessing bodies could look to improve the dissemination of information to prospective immigrants about specific recognition, licensing and registration processes in Australia. The Commission supports measures and strategies to better coordinate and streamline such information at a national level.

Third, a perceived gap between skills assessment at visa application and, upon arrival, specific occupational requirements to work in Australia, adds a level of complexity, cost and uncertainty for prospective migrants. Where benefits can be identified, and practicalities allow, the Commission supports efforts to align both these processes, thereby eliminating additional requirements for skilled immigrants after arrival in Australia. This would mean a positive skills assessment for immigration purposes satisfies occupational skill, licensing and registration requirements to practise in Australia. That said, where skills recognition practicalities require additional, onshore assessment then effective communication strategies should be developed to make such obligations more transparent to prospective immigrants.

Fourth, restrictive and incomplete skills assessment procedures can unnecessarily exclude highly suitable migrants to Australia. A number of interested parties to the JSCM inquiry have identified shortcomings in TRA's assessment and review procedures that might create impediments for prospective immigrants wishing to live and work in Australia. Scope appears to exist to build remedial steps into TRA processes and for TRA to engage more fully with those immigrants seeking recognition and Australian equivalency of their trade skills.

Fifth, outdated or overly narrow skills assessment criteria or standards can also risk adversely affecting the success of prospective migrants and artificially exclude in-demand skills. There appears to be scope to broaden VETASSESS's assessment criteria to encompass a wider range of methodologies in its assessment of migrants' skills — such as work experience and competency (as is the case for onshore applicants). Likewise, the occupation descriptors in the ASCO dictionary should be updated to better align with Australian trade qualifications and the national training framework.

Finally, migrant skills that are under-utilised in the Australian labour market could result in a shortfall in the potential productivity gains that would have otherwise been achieved. Compared with Australian workers, the incidence of skill under-utilisation is larger for skilled migrants to Australia, with under-utilisation greatest among immigrants from non English speaking countries. Multiple factors drive this divergence, including poor labour market information and awareness of migrants skills, cultural attitudes and the poor English language skills of migrants.

9.6 Impediments arising from Australia's tax system

Migration and Australia's tax rates

The Business Council of Australia considered that key aspects of the Australian taxation regime created barriers to attracting and retaining skilled immigrants.

> Australia can not afford to continue to maintain barriers to attracting and retaining skilled employees. Unfortunately one of Australia's largest existing policy barriers is the current structure, burden and administration of its taxation system. (sub. 24, p. 4)

And, according to the Business Council of Australia, a reduction in tax rates is necessary to make Australia a more competitive destination for attracting and retaining immigrants.

> High marginal tax rates undermine Australia's competitiveness as a location for high-value occupations and activities …
>
> Lowering the top two highest marginal tax rates in the personal tax structure will help make Australia a more competitive destination for attracting and retaining skilled migrants. (sub. 24, pp. 3–4)

Competing internationally for skilled labour on the basis of low domestic tax rates can be considered a form of regulatory competition. Regulatory competition is the alteration of national regulation, in this case tax rates, in response to the actual or expected impact of internationally mobile factors (such as skilled labour) on national economic activity. As the empirical literature is still developing on the effects of jurisdictional competition on the basis of regulatory settings, the evidence of overall impacts is not clear. Regulatory competition is difficult to observe and assess, can result in a 'race to the bottom', and might be slow to occur or not occur at all (Sun and Pelkmans 1998).

Although effective tax rates might be a consideration for some migrants, mobile skilled workers pursue opportunities to migrate for many reasons, such as career, monetary, lifestyle or family. Factors influencing migration decisions might also change over time depending on individual circumstances. Indeed, survey evidence

of emigrants reported by Hugo, Rudd and Harris (2003) show that work-related factors dominate the reasons for emigration. In contrast, lifestyle and family are overwhelming reasons for returning to Australia. The researchers also reveal that 51 per cent of emigrants intend to return to Australia with another 32 per cent being undecided. This finding is supported by other survey work of Australian emigrants. The Victorian Endowment for Science, Knowledge and Innovation survey of emigrants reported more than 80 per cent of respondents indicated that they would return to Australia at some stage.

Taxation impediments for skilled migrants

Potential impediments arising from the taxation system can be a factor working against Australia's migration goals and the increased policy emphasis on attracting skilled immigrants. This could be particularly important for temporary business immigrants who might have no intention of settling permanently in Australia and face taxation obligations in both Australia and their home countries.

Such issues could affect a growing number of potential immigrants. As reported in chapter 2, the new temporary business visa category has been an important area of growth — between 1996-97 and 2004-05, the number of temporary business entrants increased from 314 000 to about 389 000 (chapter 2, figure 2.6).

The Commission notes that recent reform to the Australian taxation system has sought to simplify the tax arrangements applying to both permanent and temporary migrants and to remove potential impediments. The recent *Review of International Taxation Arrangements*, carried out by the Board of Taxation, led to the Government legislating a number of simplifications and improvements to the tax arrangements applying to foreign source income (Costello 2003). To date, four Acts have been passed by Parliament, legislating sixteen Board of Taxation recommendations. Moreover, the Australian Government has recently introduced further international tax reforms to address a number of taxation issues that disadvantage temporary residents in Australia (Costello 2005).

Although positively acknowledging recent reforms, the Business Council of Australia (sub. 24) recommended further reforms to reduce barriers to Australia's attractiveness for overseas skilled workers. In particular, it highlighted the Australian tax treatment of superannuation for temporary residents and the tax treatment of employee share schemes as priority areas for reform.

Overall assessment

Skilled immigrants wishing to live and work in Australia, either on a temporary or permanent basis, should not be unintentionally disadvantaged nor face excessive obstacles from Australia's taxation system compared with Australian citizens.

It is difficult to gauge the extent to which current tax rules and administration are creating difficulties for skilled immigrants to Australia. Certainly, there appears to be no slowdown in the increasing flow of skilled immigrants to Australia, across all skilled visa categories. Nevertheless, the Commission supports incremental taxation reform aimed at removing unnecessary barriers and complexity for skilled immigrants (both permanent and temporary) wishing to live and work in Australia. Potential remedial tax reform issues should therefore be identified and progressed by the relevant policy agencies.

However, issues regarding tax rates and the scope of the Australian tax system extend beyond the potential effects of attracting and retaining skilled immigrants. Tax policy settings form an integral part of the wider economic and social policy goals of government. It is a function of many factors, such as the type and level of government services to be provided to the community and particular distributional goals of government.

The optimal settings for Australian tax rates are therefore appropriately considered within a much broader policy context, rather than just the possible isolated impacts on skilled workers' incentives to live and work in Australia.

9.7 Australian emigration

The emigration debate is often polarised on the potential cost to the Australian economy arising from skilled Australians emigrating, thereby taking with them valuable human capital, and the potential policy settings available to stem such outflows.

It is not clear that there are any practical or attractive policy levers or institutions that could influence either the emigration of Australians overseas, or encourage their return home. As noted above, mobile Australians leave and return to Australia to pursue a range of opportunities, be they career, monetary, lifestyle or family. Moreover, as noted in chapter 2, there are important exogenous international trends that stimulate the increased movement of Australians — such as the information and transport revolutions, proliferation of new social networks and diasporas around the world, increasing economic integration and global labour markets for highly skilled people.

This means that the most fruitful policy focus shifts to the opportunities for mobilising or leveraging Australia's diaspora, or expatriate, population to the economic benefit of Australia. This explicitly recognises that, in a global economy, Australia's human resources are not confined to its borders. There is ample economic evidence that points to the positive feedback effects (or externalities) to an economy from emigration; particularly those generated by diaspora business and knowledge networks (Meyer 2001).

In their comprehensive research study into Australia's diaspora, Fullilove and Flutter (2004) conclude that expatriates can contribute to Australia by influencing trade, investment and philanthropic flows, connecting Australian people, business and other organisations to international developments and opportunities, and projecting a contemporary national image.

> The Australian diaspora represents a market, constituency, a sales force and an ambassadorial corps. In recent years Australian's have become more alive to the reality of our diaspora. We should now build on these early steps and work to engage the diaspora in our national life and create a global community of Australians. (p. x)

In its recent inquiry into Australian expatriates, the Senate Legal and Constitutional Reference Committee stated:

> The Committee found during its inquiry that Australian expatriates present many potential benefits, opportunities and new considerations for Australian policymakers. Most importantly, the Australian Government needs to make greater efforts to connect with and engage our expatriate community. (2005b, p. v)

Similarly, a recent report by The Global Commission on International Migration pointed to the potential economic gains to be derived from diaspora communities:

> Countries of origin can gain considerable advantage by harnessing the talents and resources of diaspora populations, which have grown significantly in size and scope as a result of the recent expansion of international migration …

And supported measures to mobilise diaspora networks:

> The Commission endorses the efforts being made to mobilize diaspora knowledge networks. (2005, pp. 29–30)

The economic possibilities arising from leveraging diaspora networks are also acknowledged by the expatriate communities themselves. Survey research of Australian expatriates by Hugo, Rudd and Harris (2003) reveals that nearly 80 per cent of respondents believed that their overseas residency had benefits for Australia by creating goodwill towards Australia, and through developing skills transferable back to Australia. Further, over 50 per cent of respondents thought that contacts they had made would be useful for other Australians. Others saw benefits

arising from linkages between Australia and the countries in which they were currently living.

There have been calls for the formulation of a diaspora policy aimed at maximising the potential gains from emigration by engaging more comprehensively with Australia's expatriates (Fullilove and Flutter 2004; Hugo, Rudd and Harris 2003; OECD 2003a; Legal and Constitutional Reference Committee 2005). Key elements of a diaspora policy have been suggested (box 9.5), and include: establishing a policy function to coordinate diaspora policies across the whole-of-government; undertaking a stocktake of the diaspora skills base; formulating programs that strengthen the linkages between the diaspora and Australia, especially business and research linkages; and promoting ways to improve Australia's expatriate community's access to government information.

Box 9.5 **A diaspora policy — key elements**

Key elements of a diaspora policy aimed at harnessing the talents and resources of Australia's diaspora population could include:

- *Institutional* — establishment of a policy function to facilitate the coordination of policies relating to Australian expatriates and further develop out-reach programs to expatriate communities.
- *Stocktake of diaspora skills* — establish an inventory of the skills base within the diaspora.
- *Strategic linkages* — increasing the strength of linkages between the diaspora and Australia, especially business and research linkages (such as creating short-term return fellowships, secondments, or sabbatical visits), thereby helping to mobilise diaspora knowledge networks.
- *Communication* — promoting greater access for expatriates to government information and greater communication between Australian expatriates (for example, more tailored websites for expatriates and extending the Department of Foreign Affairs and Trade's Online Registration Services).
- *Information on diaspora* — improving knowledge about the nature of Australia's diaspora, such as government agencies collecting more and better information on the demography of the Australian diaspora.
- *Diaspora philanthropy* — encouraging non-profit organisations to pursue fundraising opportunities offered by the diaspora.
- *Democracy* — engaging the diaspora in Australian democracy (through, for example, reforming overseas voting procedures to better accommodate expatriates).

Sources: Fullilove and Flutter (2004); GCIM (2005); Hugo, Rudd and Harris (2003); Legal and Constitutional Reference Committee (2005).

Compared with other countries, Australia is well-positioned to realise economic gains from its diaspora community. Australia's diaspora is large (currently around one million Australians); it is strategically situated, both professionally and geographically; there is a high level of goodwill within the diaspora towards Australia and vice versa; and although the economic consequences are mixed, there are tangible benefits that can accrue to Australia from its diaspora (Fullilove and Flutter 2004).

Overall assessment

There could be potential economic gains for Australia from the diaspora population, particularly those generated by diaspora business and knowledge networks. There is, however, limited scope for government policy to influence both emigration flows from Australia and encourage return migration to Australia.

A Submissions, visits and roundtable attendees

Table A.1 **List of submissions**

Individual or organisation [a]	*Submission number*
Australian Chamber of Commerce and Industry	DR42
Australian Housing and Urban Research	DR30
Australian Institute of Medical Scientists	DR34
Australian Manufacturing Workers Union	20
Australian Nursing & Midwifery Council	16
Australian Pharmacy Examining Council Inc	8
Braby, Robert	DR36
Buergelt, Petra	1
Business Council of Australia	24
Claus Environmental Engineering	12
Construction Forestry Mining and Energy Union	13, DR41
Crook, Brian	18
Curnow, Jill	23
Department of Education Science and Training	DR45
Department of Immigration and Multicultural Affairs (formerly Department of Immigration and Multicultural and Indigenous Affairs)	22, DR43
Dickinson, Geoff	6, 15, DR40
Engineers Australia	4
Federation of Ethnic Communities' Councils of Australia (FECCA)	11, DR39
Harfield, Richard	DR31
Master Builders Australia	17
National Farmers Federation	21
Northern Territory Government	25
NSW Government	DR46
Patnaikuni, Indubhushan	2
Professions Australia	19
Queensland Government	26
Small Business Development Corporation	7
Sorensen, Tony	5

Continued next page

Table A.1 **(continued)**

Individual or organisation [a]	*Submission number*
South Australian Government	28, DR44
Sustainable Population Australia (ACT)	10, DR38
Sustainable Population Australia (Tas)	9, DR33
Sustainable Population Australia Inc	14, DR32
Victorian Government Department of Premier and Cabinet	29
Warrnambool City Council	3
Western Australian Government	27, DR37
Withers, Glenn	DR35

[a] An asterisk (*) indicates that the submission contains confidential material not available to the public.

Table A.2 List of visits

Location/Interested parties

Adelaide

Department of the Premier and Cabinet
Flannery, Tim
University of Adelaide

Canberra

Cobb-Clark, Deborah
Department of Education Science and Training
Department of Immigration and Multicultural Affairs
(formerly Department of Immigration and Multicultural and Indigenous Affairs)
Jupp, James

Melbourne

Australian Council of Trade Unions
Birrell, Bob
Business Council of Australia
Wooden, Mark

Table A.3 Attendees at roundtables

Canberra — Wednesday 31 August 2005

Australian Chamber of Commerce and Industry
Birrell, Bob
Department of Education Science and Training
Department of Employment and Workforce Relations
Department of Immigration and Multicultural Affairs
(formerly Department of Immigration and Multicultural and Indigenous Affairs)
Dowrick, Steve
McDonald, Peter
Richardson, Sue
The Treasury
Tyers, Rod
Withers, Glenn

Continued next page

Table A.3 **(continued)**

Canberra — Friday 17 February 2006
Birrell, Bob
Department of Education Science and Training
Department of Employment and Workforce Relations
Department of Immigration and Multicultural Affairs (formerly Department of Immigration and Multicultural and Indigenous Affairs)
Econtech
McDonald, Peter
Miller, Paul
Robertson, Peter
The Treasury
Withers, Glenn
Melbourne — Wednesday 22 February 2006
ACT Government
ACTU
Business Council of Australia
Department of Immigration and Multicultural Affairs (formerly Department of Immigration and Multicultural and Indigenous Affairs)
Northern Territory Government
South Australian Government
Victorian Government
Western Australian Government

A.1 Consultations

The Commission hosted a workshop in Canberra on 31 August 2005 attended by representatives from certain Australian Government departments, industry bodies and academics with experience in migration and labour markets. The purpose of the workshop was to discuss approaches to estimating the economic impacts of migration and population growth.

The Commission also held two meetings with members of an independent reference panel established to review the modelling undertaken for this study. The first meeting, held in Melbourne on 11 November 2005, was attended by Peter Robinson (University of New South Wales) and Paul Miller (University of Western Australia) with John Ryan (Department of Immigration and Multicultural Affairs, formerly Department of Immigration Multicultural and Indigenous Affairs) attending as an observer. A second meeting, also held in Melbourne, on 17 November was attended by Rod Tyers (Australian National University).

Following the release of the position paper, two roundtable meetings were held. The first meeting, held in Canberra on 17 February, was attended by representatives of certain

Australian Government departments and academics. The second meeting, held in Melbourne on 22 February, was attended by representatives of various state and territory governments, representatives from the Business Council of Australia, and the ACTU.

B Trends in international migration

Each year, millions of people cross borders from one country to another. A subset of these people are migrants. Migrants are people who intend to live and make a home in a different country for an extended period of time. Temporary visitors, such as holiday makers and persons en route to a third country, are not generally classified as migrants. The definition of a migrant can vary across countries, but the United Nations has recommended a standard definition to aid in compiling statistics (box B.1).

The characteristics of migrants can be quite varied. They might be permanent settlers or temporary residents. Migrants can have working rights, for example as guest workers or students, and they might have access to government benefits and to programs that facilitate integration into society and the economy.

In this appendix, the international context in which migration to and from Australia takes place is considered. The nature and characteristics of worldwide migration flows and the policies that influence them are also considered, with a focus on member countries of the Organisation for Economic Cooperation and Development (OECD).

Box B.1 **Defining a migrant**

An international migrant is defined by the United Nations as 'any person who changes his or her country of usual residence' (UN 1998). A person's country of usual residence is defined as 'the country in which he or she has a place to live [or] where he or she normally spends the daily period of rest'. Long-term migrants are those who move for at least 12 months, while short-term migrants move for at least 3 months but less than 12 months. Short-term visitors to a country are not considered to be migrants if the visit is for purposes of recreation, holiday, visits to friends and relatives, medical treatment or religious pilgrimage.

However, not all countries define migrants using the UN classification. For example, the United States divides residents born in other countries into various categories, including 'non-immigrants'. Non-immigrants include students and foreign workers, many of whom would be considered migrants under the UN definition (Martin, Abella and Kuptsch 2006).

Source: UN (1998).

In section B.1 of this appendix, the reasons for international migration decisions are reviewed. Trends in the global drivers of international migration in the past decade are also examined. The remainder of the appendix is organised by considering the following key themes:

- the scale of global population movements (section B.2)
- the diversification of countries of origin of migrants (section B.3)
- the trends in temporary migration (section B.4)
- the trends in skilled migration (section B.5).

B.1 Reasons for international migration

There are many reasons for migratory movements, including the traditional push–pull factors (box B.2). Economic theory suggests an individual will migrate when the benefits of migrating outweigh the costs.

In addition, there are benefits to the world economy in general from international labour movements. As summarised by Winters (2002, p.1): '[T]he very heart of international trade, be it in goods, services or factors, lies in exploiting differences. The larger the differences, the larger the potential gains from opening up to international trade.'

The potential benefits from even limited movement of people have been estimated at hundreds of billions of dollars (Winters et al. 2003). This provides an economic incentive for countries to allow international migration. However, the distribution of these benefits between the destination and source countries is also important.

Although push–pull factors are useful for understanding international migration, they do not explain all movements. 'Network factors' are also important (box B.2), as are geographical factors and, for some countries, poverty constraints. Poverty constrains migration when the very poor find it difficult to finance a long-distance move, despite push–pull incentives to do so (Hatton and Williamson 2002). In such cases, increases in income reduce the push–pull motivation for migration, but also relax the poverty constraint. Since the latter effect dominates in very poor countries, increases in income can actually lead to larger migratory flows.

Geographical factors tend to make cross-country comparisons problematic. Immigration to the United States is dominated by unskilled flows from Mexico, both legal and illegal. In Europe, temporary migration is more prevalent than in isolated countries such as Australia and New Zealand because of the ease of

Box B.2 **Traditional push–pull factors for international migration**

The causes of migration are often discussed in terms of 'push–pull' factors. Push factors are the characteristics of the source country that influence the decision to emigrate. They include:

- economic and demographic factors — such as labour market conditions, limited health and education services, poverty and overpopulation
- political factors — such as poor governance, corruption, human rights abuses, conflict, insecurity and violence
- social and cultural factors — such as discrimination based on ethnicity, religion, gender or caste
- environmental factors — such as climate, resource depletion and natural or man-made disaster.

Pull factors are the characteristics of the destination country that influence the decision to immigrate to that country. They also include economic and demographic, political, social and cultural, and environmental factors.

Push–pull explanations for international migration do not fully explain international migration movements. More ambiguous 'network factors', which include communications, transport, language and cultural factors, are also important (Martin, Abella and Kuptsch 2006). Some of these network factors have changed rapidly over the past few decades, facilitating greater migration flows. These changes are discussed in the following section.

movement between countries. An extreme form of temporary migration occurs in several European countries, where a significant part of the labour force is made up of people who commute across national borders to work in a different country. In Luxembourg, almost 40 per cent of employment is held by these 'cross-border' workers.

Changing drivers of migration

Recent changes in 'network factors' have been influential in global population movements. The contributing factors are complex and often interrelated, but some of the major factors include increasing economic integration, the advances in information and transport systems, globalisation of labour markets, the development of a commercialised immigration industry and the proliferation of new social networks and diasporas around the world (Hugo 2004a).

Increasing economic integration has been characterised by a globalisation of the production process, increased international trade in goods, services, capital and

labour, and economic specialisation. Increases in regional integration agreements and the rise of multinational enterprises associated with increased economic integration have contributed to higher migration.

Improvements in the cost and accessibility of international transport and communications have allowed for greater migratory movement. The globalisation of labour markets has meant that many people now have knowledge of, and compete for, jobs in many countries.

There is a growing involvement of firms and individuals in organising the transnational movement of workers in the global labour market. Some have suggested that this has been the main factor in increasing the speed of migration and determining the direction of movement (Abella 2004).

Social networks and diasporas could also be facilitating migration by easing the settlement process and thus creating dynamic forces in the continuing flow of migrants. These have been emerging in recent decades, even for traditional immigration countries like Australia (Hugo, Rudd and Harris 2003).

Role of government policy

In addition to the push–pull factors and changing global drivers identified above, government policy plays a key role in influencing the nature of global population movements. There is a large supply of potential immigrants and government policies tend to regulate flows, especially in developed countries. This is evident from long immigration queues and the extent of illegal immigration. For example, the waiting list for entry to the United States totalled 3.6 million in the mid to late 1990s (Kramer 1997). In Australia, the intake of skilled immigrants has continued to reach its planned targets even though there have been increases in both the points requirements and the planned targets.

Illegal migration occurs throughout the world. This illustrates the role that government policy has in regulating flows — if migrant flows were not limited by government control, there would be no need for people to migrate illegally. However, it also means that there are limitations to the extent to which governments can control immigration.

Government policy can sometimes place restrictions on emigration of their own residents. For example, this was the case in China, the Soviet Union and East Germany (including some countries in Eastern Europe) in the past.

As a result of the ageing of the population in many developed countries, there has been an increasing discussion of the role migration could play in these countries.

For example, the United Kingdom and Germany have recently sought to manage immigration for the first time since the 1970s (Department of Immigration and Multicultural Affairs (DIMA), sub. 22). This is in contrast to countries that have traditionally been more reliant on immigration, such as Canada and Australia, which have long histories of managed immigration.

B.2 Increasing global population movements

Overall, migratory movements have been increasing over recent decades, with the number of international migrants more than doubling between 1980 and 2005 (GCIM 2005).

However, the increase in migrant numbers has not been uniform across countries. The difference is particularly stark between developing countries and developed countries. In developing countries, the number of international migrants fell from 1.6 per cent to 1.3 per cent of the population between 1980 and 2000. In contrast, in developed countries, immigrants made up 4.2 per cent of the population in 1980 and 8.7 per cent in 2000 (Martin 2005). Even between otherwise similar countries, immigrant numbers can vary significantly.

Even though there have been increases in migrant numbers, they have not reached the levels of the early twentieth century, when liberal migration policies and falling transport costs led to significant flows of people. For example, the annual immigration rate to the United States fell from about 12 per 1000 American residents in 1910 to 0.4 per 1000 in 1940 before rising to 4 per 1000 in the 1990s (Fischer 2003).

In this appendix, the focus will be on migration flows in and out of member countries of the OECD. This enables the investigation of migration trends to concentrate on those countries that are directly comparable to Australia. It also reflects the difficulties in obtaining consistent migration data across a broader range of countries. Even among OECD countries, there are significant difficulties in measuring international migration (box B.3).

Immigration to OECD countries

At the aggregate level, immigration to OECD countries has been trending up since the 1980s. During the 1980s and early 1990s, nearly all OECD countries experienced increasing immigration. Between 1993 and 1997, immigration levels stabilised or fell. There were further increases to record levels in 2001 before

Box B.3 **Comparing international migration is a difficult task**

Internationally, there is little standardisation of migration statistics. Consequently, there are varying degrees of comparability between countries. Partly, this reflects a great variety of migratory channels and migrant categories, which are not necessarily common across countries. For example, Germany records a number of short-term movements that would not be considered migration in most OECD countries. Measuring flows of migrants who enter illegally is particularly difficult, since such flows are, by their very nature, not recorded in official statistics.

Standardisation of migration statistics is also affected by the different methods used to gather the statistics. Some countries rely on population registers, which are designed to collect data for a variety of other administrative and statistical purposes. Others (including Australia) base migration statistics on residence or work permits and data on movements into and out of the country.

Source: OECD (2004c).

immigration intakes again stabilised after 2001 (OECD 2005b and previous editions).

Increasing immigration rates in the 1980s were driven by an acceleration of permanent flows as global mobility increased, in conjunction with increases in flows of asylum seekers. The two periods of levelling off since then can be traced to governments tightening entry procedures on migration. In 1993, procedures were tightened following the unprecedented rise in asylum seekers in the late 1980s. In 2001, migration was again constrained as a response to security and health concerns.

Notwithstanding these broad trends, immigration flows have varied by country. Table B.1 provides immigration trends in selected OECD countries between 1987 and 2002. Trends in permanent immigration were broadly similar across the traditional 'settlement countries' of Australia, Canada, New Zealand and the United States, peaking in the early 1990s. Immigration also grew in France, the United Kingdom and Japan. Immigration peaked in the early 1990s before falling considerably in Germany, largely due to decreases in inflows of asylum seekers and ethnic Germans from principal sending countries (central and eastern European Countries, former Yugoslavia, former Soviet Union and Turkey).

The magnitude of immigration intakes can also be compared across countries. In terms of sheer numbers, the United States continues to take more immigrants each year than any other OECD country. However, to evaluate the relative importance of immigration, inflows expressed as a percentage of the country's total population

Table B.1 **Immigration flows to selected OECD countries**

Percentage of total population[a]

	1987	*1992*	*1997*	*2002*
	%	%	%	%
Permanent additions:				
Australia	0.7	0.7	0.6	0.6
Canada	0.6	0.9	0.7	0.7
New Zealand	na	na	0.9	1.2
United States	0.2	0.4	0.3	0.4
Durations greater than one year:				
France	0.1	0.2	0.2	0.3
Switzerland	1.1	1.6	1.0	1.3
United Kingdom	na	0.3	0.4	0.7
Both short and long durations:				
Germany	0.7	1.5	0.7	0.8
Japan	0.1	0.2	0.2	0.3
Luxembourg	1.9	2.5	2.2	2.5

a Data comparability limited by differences in data collection and definition of a migrant (box B.3). **na** Not available.

Source: OECD (2005b and earlier editions).

(migration rate) are more useful. Luxembourg, New Zealand and Switzerland all have very high immigration intakes, with over 1 per cent of their population typically made up of new immigrants.

Given Australia's historical reliance on immigration, it is surprising that its rate of immigration is not high compared with other OECD countries. This is partly because of fundamental differences in the definition of migrants across countries. Data published by the OECD for Australia and the other settlement countries only include permanent immigrants, in contrast to many other countries, which include temporary immigrants (OECD 2005b).

Numbers of immigrants in OECD countries

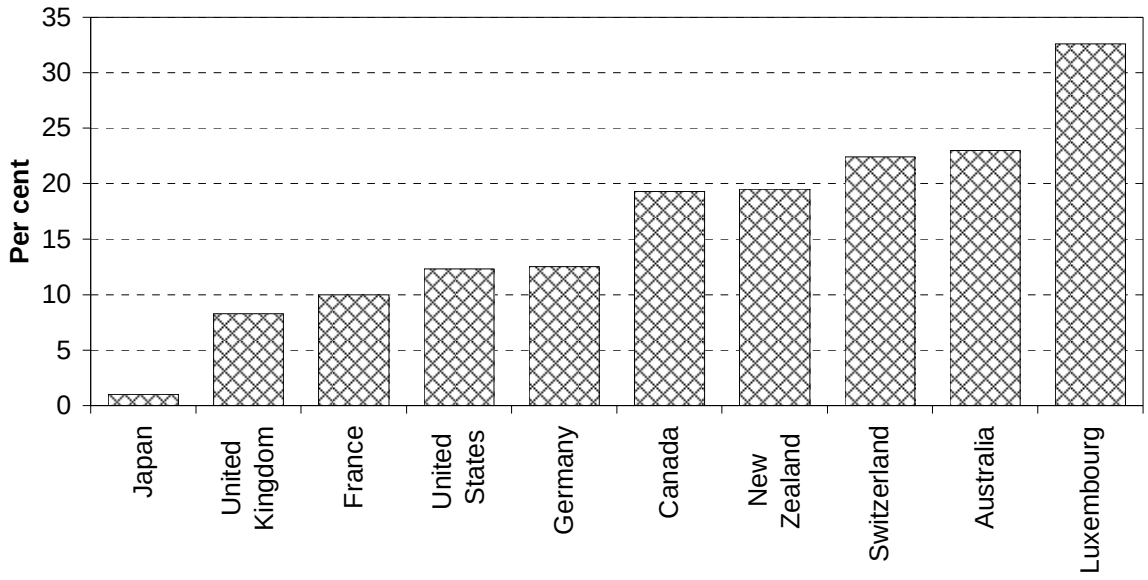
Given the difficulties in comparing immigration flows across countries, it is useful to compare numbers of immigrants (stock of migrants). Measures of foreign-born resident numbers are more consistent across countries and give some indication of the cumulative effect of immigration flows to destination countries. The OECD has compiled a database on the foreign-born population of almost all member countries.

Generally, the countries with high immigration flows tend to have large immigrant populations. For example, Luxembourg has both the highest annual immigration intake and the highest number of immigrants, as a proportion of its population. New

Zealand and Switzerland also have relatively large immigrant populations (figure B.1).

The data for Australia is somewhat unusual. Relative to its population, Australia has not had an especially large immigrant intake over the past 15 years. However, among OECD countries, Australia has the second highest proportion of immigrants in the population. This reflects the high levels and rates of immigration historically — Australian immigration was high in the late 1950s and 1960s (Withers and Pope 1993).

Figure B.1 **Immigrant populations in selected OECD countries**
Proportion of population, 1999–2002[a]



[a] Years vary by country, depending on the latest data available.

Sources: OECD database on immigrants and expatriates; OECD OLISnet.

Illegal immigration

Illegal immigration occurs when people would like to migrate but are unable to do so through legal channels.

Estimating illegal immigration is a difficult task and estimates are imprecise. By their very nature, illegal immigration flows are not captured in migration flow data. Illegal residents might be captured in stocks of foreign-born citizens, but this is dependent on their responses to census and other surveys. Even so, a number of countries have developed methods of estimation illegal immigration that shed some light on the magnitude of illegal immigration flows.

Notwithstanding all measurement difficulties, illegal immigration flows are clearly significant in many countries. In the United States, it is estimated that 10 million persons are present without authorisation (GCIM 2005), accounting for almost one third of the foreign-born population. In Spain, Italy and Greece, around 30 to 40 per cent of the foreign population received their residence permits in legalisation programs administered between 2000 and 2002. This suggests that a similar proportion of illegal immigrants were present prior to these programs.

Illegal immigrants are not nearly so prevalent in more isolated countries. In Australia and New Zealand, illegal immigrants represent about 2.5 per cent and 5.0 per cent of the immigrant population, respectively.

Several OECD countries have taken steps to counter illegal immigration in recent years. Japan has intensified police controls in areas with high foreign populations. Many countries, including Australia, Canada, Germany, Italy, Spain and the United States, have taken steps to dissuade illegal immigrants by increasing border controls since 2000.

Emigration from OECD countries

A trend over the past decade has been 'an increasing tendency for most countries to be countries of both immigration and emigration' (DIMA, sub. 22, p. 5). The proportion of people born in various OECD countries who are living in other OECD countries is shown in figure B.2. This proportion is a lower bound estimate for the total number of emigrants from each of these countries because it does not include emigrants living in non-OECD countries. However, it provides an indication of the relative significance of emigration.

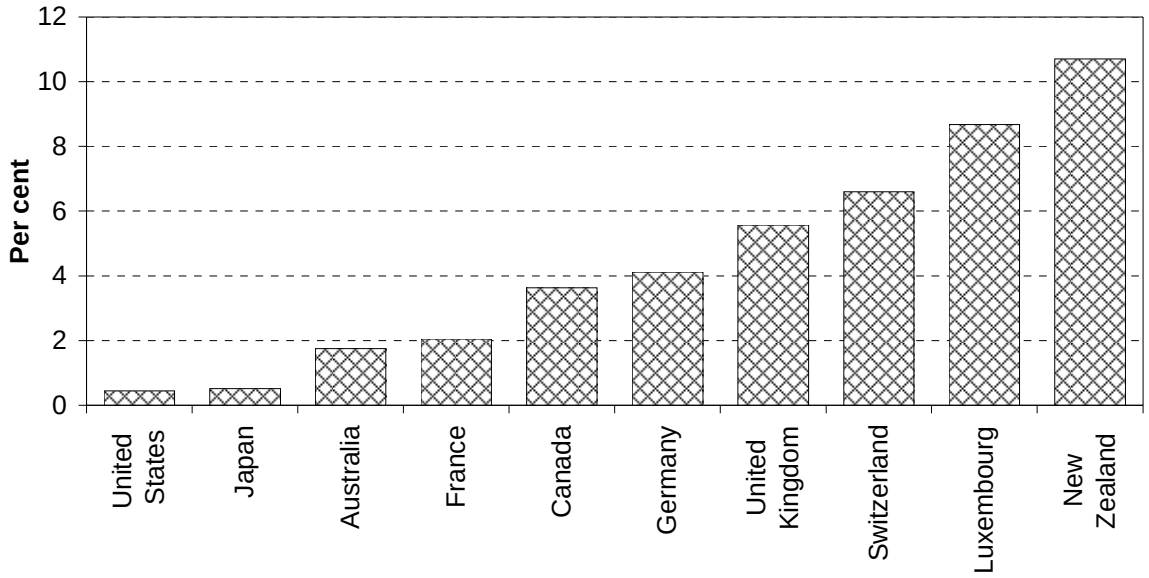
Many of the countries with large immigrant populations have large expatriate populations as well. This is especially the case for Switzerland, Luxembourg and New Zealand. Labour mobility between neighbouring countries can explain this pattern among the European countries, and for New Zealand where a large portion of expatriates live in Australia. The United States and Australia stand out as countries with much larger immigrant than expatriate populations.

B.3 Diversification of country of origin

Historically, immigrants to OECD countries have come from a small number of key source countries. These include neighbouring countries as well as traditional flows, for example from the United Kingdom to Australia.

Figure B.2 **Emigrants from selected OECD countries living in other OECD countries**

Percentage of source country population 1999–2002[a]



[a] Years vary by country, depending on the latest data available.

Sources: OECD database on immigrants and expatriates; OECD OLISnet.

The significance of these traditional source countries has begun to ease and since the early 1980s, there has been some diversification of migration movements and an increase in the range of countries involved. Migrants are increasingly coming from India and China. There are also several new source countries emerging such as Thailand, Indonesia, Malaysia, Hong Kong, Bangladesh, Pakistan and Sri Lanka.

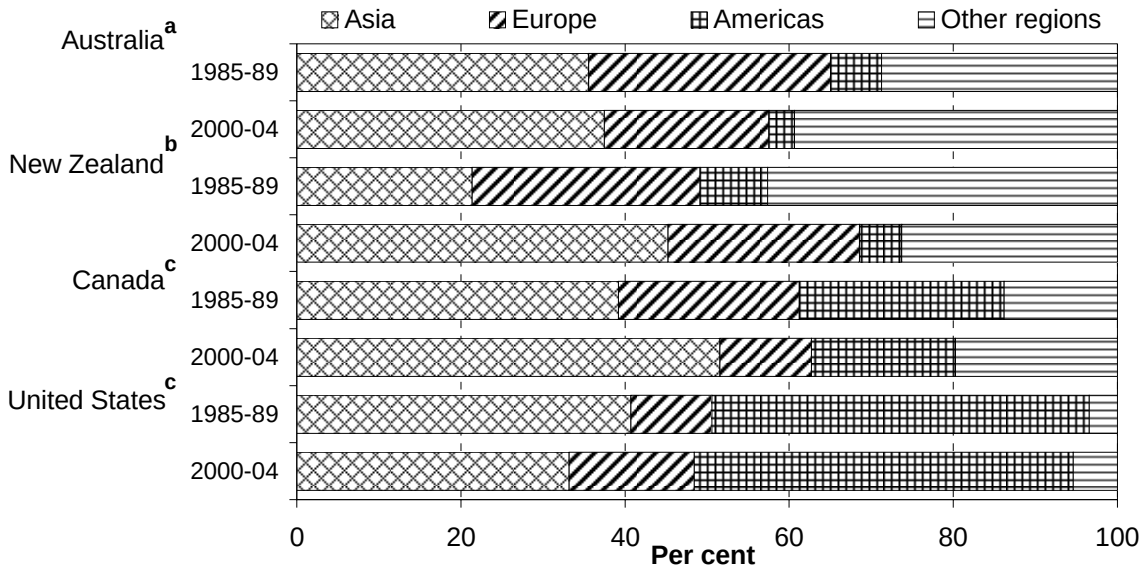
Many of the changing migration drivers discussed previously have influenced the diversification of countries of origin. For many of the new source countries, rapid income growth has been important in easing poverty constraints on migration. Migration from these countries is enhanced because of feedback mechanisms. For example, the presence of existing migrant networks in the destination country might mitigate both the economic and non-economic costs of migration (Coppel, Dumont and Visco 2001).

Some diversification of countries of origin is also driven by changes in government policy. This was particularly the case after the 1960s and 1970s, when the United States, Canada and Australia eliminated their selection systems based on national origins. This lead to a diversification of immigration flows for all three countries (IOM 2005).

The changing source countries of migrants are reflected in the number of immigrants to the traditional settlement countries coming from various regions. Europe, traditionally a key source region for immigrants to the United States and Canada, made only a small contribution to the US immigration intake and a decreasing contribution of Canada's immigration intake between 1985 and 2004 (figure B.3). During the 1990s, a growing proportion of Canada's and New Zealand's immigrant intakes came from Asia. The diversification of Australia's immigrant intake appears to have occurred earlier — between 1970–74 and 1990–94. The proportion of Australia's immigrants coming from developing countries increased from 20 per cent to 60 per cent during this period (IOM 2005).

Notwithstanding recent trends, in some countries the traditional source countries continue to be important. For example, the United Kingdom remains one of the major source countries for immigrants settling in Australia. Neighbouring countries are still a key source of migrants for many OECD countries, particularly in Europe. Migration between neighbouring countries in Europe is facilitated by European Union (EU) law, which guarantees free movement of persons between EU countries. An important development on this front was the accession of ten central and southern European countries to the EU on 1 May 2004, which might contribute to continued diversification of migration flows in the future.

Figure B.3 **Flows of immigrants to settlement countries by country of birth**
As percentage of total inflows, 1985–89 and 2000–04



a Inflows of permanent settlers. Does not include visas granted onshore before 1996-97. **b** Inflows of permanent and long-term arrivals. **c** Inflows of permanent settlers.

Sources: OECD (2005b and earlier editions); Statistics New Zealand (2005); DIMIA (2004a) and DIMA unpublished data.

B.4 Temporary migration

Temporary migration has increased dramatically since 1980. Most countries have a favourable policy attitude to this form of migration. In this section, flows of temporary workers and students are examined. Flows of temporary workers are based on OECD definitions, which are comparable across countries. These flows do not include short-term inflows, for example people entering under Business Short Stay visas in Australia.

Flows of temporary workers into selected OECD countries

Since the early 1990s, flows of temporary immigrants to most OECD countries have grown more rapidly than flows of permanent immigrants. Australia is typical of this trend: permanent migrant inflows to Australia were almost unchanged between 1992 and 2002, while entries of temporary workers tripled.

Although data are not readily available for all OECD countries, the existing data suggest that the trend towards greater temporary inflows in the 1990s was widespread (table B.2). Greater temporary inflows can be partly explained by the trends in globalisation discussed previously, but have also been driven by government policies.

Table B.2 **Entries of temporary workers into selected OECD countries**
Percentage of total population[a]

	1992	*1997*	*2002*
	%	%	%
Australia	0.23	0.44	0.65
Canada	0.25	0.25	0.28
New Zealand	na	0.67	1.61
United States	0.07	0.13	0.23
France	0.03	0.02	0.04
United Kingdom	0.11	0.15	0.25
Germany	0.41	0.33	0.42
Japan	na	0.11	0.16

a Data comparability limited by differences in data collection and the definition of a migrant (box B.3). **na** Not available.

Sources: OECD (2005b and earlier editions); OECD database on immigrants and expatriates; OECD OLISnet.

Temporary immigration policies in selected OECD countries

Generally, the objectives of temporary immigration are (OECD 1998):

- To meet immediate labour shortages — related to seasonal activity or short-term demand for specific skills in particular sectors of the economy
- To promote the movement of managerial staff and highly skilled workers
- To meet a variety of other objectives, which tend to vary by country. These include reducing the illegal employment of foreigners and providing an opportunity for nationals to travel and work overseas through reciprocal working holiday maker programs.

Reflecting these different objectives, most countries provide visas for different categories of temporary immigrants. Australia favours the admission of skilled workers, although working holiday makers are an exception. In many other countries — including France, Germany, the United States and (particularly since the introduction of a new 'Sector Based Scheme' in 2003) the United Kingdom — low skilled immigrants are often employed temporarily in specific activities such as agriculture, hospitality and construction.

To target the different categories of temporary workers, OECD countries typically operate several visa programs. For example, foreign nationals may work in the United States under the highly skilled program (H 1B and H 2B visas), under the provisions of the North American Free Trade Agreement (TN visa), as a worker of distinguished ability (visa O), as a seasonal agricultural worker (H 2A visa), as a trainee (H 3 visa) or as an exchange visitor (J 1 visa). Foreign nationals may also work under a myriad of other, more specific visa programs.

Flows are regulated through visa requirements and quotas. During the 1990s, most OECD countries encouraged flows of foreign workers by relaxing the entry requirements, particularly for highly skilled workers (OECD 2005b).

Students are a growing form of temporary migrants

An important trend in international migratory movements during the 1990s was the increase in international student movements. The number of foreign higher education students in the OECD increased by over 50 per cent between 1990 and 2001 (OECD 2004b). Australia is the fourth largest receiving country, and the growth in overseas student numbers in Australia has also been among the fastest in the OECD. Between 1990 and 2001, the stock of overseas students in Australia increased by almost 300 per cent (OECD 2004b).

The rapid growth in foreign student numbers over the past decade can be explained in part by the policy settings of many OECD countries (in particular Australia, New Zealand, the United Kingdom and Canada) to attract more foreign students. Although the reasons vary between countries, two major motives are to generate revenue from fee paying students and to recruit skilled migrants after graduation. Canada and the United Kingdom (at least for EU citizens) are more focused on recruiting skilled graduates (OECD 2004b).

B.5 Skilled migration

There is evidence that flows of skilled migrants — both to and between OECD countries — rose substantially during the 1990s (OECD 2002). However, this trend was not universal, with flows of skilled migrants dependent on the policy settings in various countries.

Measuring skilled migration flows is difficult, with the capacity to analyse these flows across countries limited by a lack of internationally comparable data (Auriol and Sexton 2002). The first problem relates to defining a skilled worker. In most of the existing literature, someone with a university degree or work experience in an occupation that generally requires a degree is considered highly skilled.

A second problem is that countries systematically measure inflows by visa type, but do not necessarily delineate inflows by skills of immigrants. Although people entering under skilled visas are likely to be highly skilled, this is not necessarily the case, particularly where primary applicants bring dependents. Likewise, entrants under other visa categories, such as family reunion, can still be highly skilled.

Notwithstanding these difficulties, it is still useful to compare numbers of people admitted under skilled immigration programs. This gives an indication of how inflows and policies vary across countries. Of particular relevance to Australia are trends in other settlement countries (the United States, Canada and New Zealand) since they remain among the few countries in the world admitting immigrants for permanent settlement (IOM 2005).

Of the settlement countries, the United States stands out as an exception. Entries under skilled categories fell as a proportion of overall immigration between 1991 and 2001. The United States is the only settlement country that does not rely on a points system to select permanent immigrants.

In the other settlement countries, skilled immigration became an increasingly important part of inflows through the 1990s. This was largely because of policy settings. Canada introduced points testing of skilled immigrants in the 1960s.

However, it was not its until immigration policy was reviewed in the mid-1980s that a belief emerged that the economic component of the inflow should be increased (Green and Green 1999). Between 1991 and 2001, the share of immigrants entering Canada under skilled categories tripled (IOM 2005). Skilled immigration also became an increasing share of inflows to Australia and New Zealand during this period, with both countries placing an increased emphasis on this type of immigration (Bedford, Ho and Lidgard 2001; Khoo 2002).

It is important to note that a large component of temporary flows are of highly skilled persons. In the United States, for example, around 65 per cent of temporary workers entering the country in the 1990s entered under a skilled visa, compared to less than 20 per cent of permanent immigrants (OECD 1998).

Drivers of skilled migration

Drivers of skilled migration are similar to those for other types of migration, but certain factors are particularly important. These include push–pull factors, as well as changes in the structure of economies worldwide.

Of the push–pull factors, wages play a particularly important role in skilled migration. This is especially true for migration from developing to developed countries. For example, wages for Information Technology specialists working in the United States are ten times those in India.

Changes in the structure of economies worldwide have affected the demand for skilled workers in developed countries through several trends. The increasing importance of service industries and a rapidly growing information economy have increased the demand for skilled workers. Also, with increasing globalisation, multinational firms have been able to locate manufacturing processes that use unskilled labour intensively in developing countries, while centralising skilled tasks in developed countries. This has increased the demand for skilled workers relative to unskilled workers in developed countries.

The increases in demand for skilled workers have meant that several OECD countries were facing skill shortages in specific industries over time, including Information Technology, health and education. These developments have led many commentators to suggest that developed countries are competing against each other to attract skilled migrants from around the world (Cobb-Clark and Connolly 1997; Salt 2002). This issue has also been highlighted by the OECD (2005b) and the Victorian Government (sub. 29, att. A).

Role of government policy

Worldwide barriers to skilled immigration have tended to decrease in recent decades, while barriers to unskilled immigration have increased (Hugo 2004a). Most OECD countries introduced measures to facilitate recruitment of skilled foreign workers during the 1990s. At the same time, many countries are placing increasingly stringent controls on family reunification flows, in some cases reducing family entries by as much as 25 per cent (OECD 2005b).

Governments play an important roles in encouraging skilled immigration. They respond to demands of the corporate sector, offering visas to employees sponsored by business and to persons in professions where there are considered to be shortages.

The policies used to attract skilled migrants vary by country. Canada, Australia, New Zealand and (since 2002) the United Kingdom use a points system as a means of selecting highly-skilled immigrants for permanent residency. The Czech Republic also introduced a points system in 2004. These schemes typically emphasise general skills rather than precise skill requirements.

Other countries target more specific skills, listing areas of labour shortages and allowing immigration of people with skills in these areas. For example, the United Kingdom maintains a 'Shortage Occupation List'. The United States uses skill-based immigration to rectify labour market shortages and mismatches. Some countries permit permanent entry of these workers, whereas other countries prefer to admit such workers temporarily during periods of skill shortages.

In addition, many countries offer fiscal incentives to highly-skilled immigrants. Countries offering large tax breaks for skilled workers include Sweden (25 per cent tax deduction), the Netherlands (30 per cent), Austria (35 per cent) and Korea (40 per cent) (OECD 2005b).

Most OECD countries have legislation in place to protect domestic labour. In many countries, including the United States, employers are required to prove that vacancies cannot be filled by existing residents.

C Australia's migration policy and flows

Migration has played a key role in shaping Australia's society and economy.

It has contributed significantly to Australia's population, with almost one quarter of the current Australian population born outside Australia. In terms of population growth since the early 1970s, approximately 41 per cent of the population increase has been due to net overseas migration.

In this appendix, Australia's migration policies and flows since the early 1990s are outlined. Detail on Australia's immigration policy over time is provided in section C.1 with a focus on recent decades. Sections C.2 and C.3 present details on immigration and emigration flows, respectively. In section C.4, the implications of Australia's net migration for population growth and size are examined.

C.1 Immigration policy

From federation in 1901 until 1973, Australia's immigration policy was based on the 'White Australia' policy, which favoured immigrants from certain countries. It involved active encouragement and assisted passage of immigrants from Britain and other European countries.

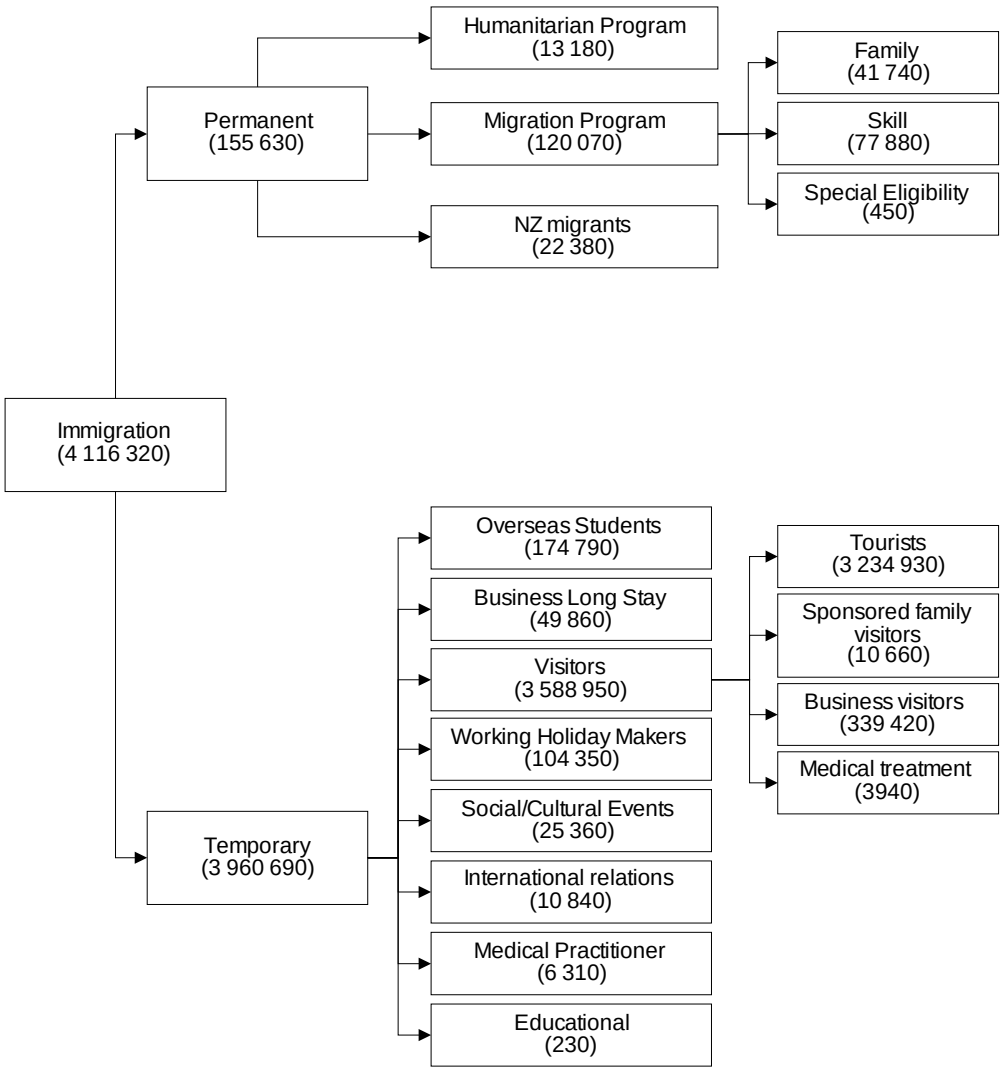
Following 1973, Australia's immigration policy moved away from the 'White Australia' policy, with the Government easing restrictions on immigration of non-Europeans. The migration program, instead, focused on well-qualified people, based on their suitability as settlers, their ability to integrate readily and their possession of qualifications useful to Australia (DIMIA 2005f). Since 1973, the migration policy has undergone considerable changes.

Following the 1988 FitzGerald Report (FitzGerald 1988), more effective and clearer selection procedures were developed. The current policy recognises several dimensions including economic development and labour market needs, as well as social, humanitarian and international obligations.

The nature of Australia's permanent migration policy has changed, with an annual immigration planned target and different eligibility categories being the key policy parameters of the selection system. The current policy also allows for greater temporary immigration options and facilitates more onshore processing arrangements for moving from temporary to permanent residency.

The remainder of this section considers Australia's permanent and temporary migration programs in greater detail. These programs are divided into a number of streams, which are further disaggregated into visa classes and sub-classes. Box C.1 displays the permanent and temporary migration programs at a high level of classification.

Box C.1 **Immigration visa categories and visas granted in 2004-05**



Source: DIMA unpublished data.

Permanent immigration

Immigrants seeking permanent residence in Australia are processed through the Humanitarian and Migration programs (box C.1). New Zealand citizens entering Australia permanently do not enter as part of Australia's annual Migration Program, but are included in settler arrival and net overseas migration figures.[1]

Humanitarian Program

Australia's Humanitarian Program aims to provide protection to refugees and others in need of humanitarian assistance. In 2004-05, Humanitarian visas accounted for around 8 per cent of the permanent residence visas granted (excluding NZ settler arrivals) (box C.1). The program comprises offshore and onshore components:

- The *offshore* component, under which the majority of visas are granted, has two main categories.
  - The Refugee category assists people who are subject to persecution in their home country and have been identified in conjunction with the United Nations High Commissioner for Refugees as in need of resettlement.
  - The Special Humanitarian Program assists people who have suffered substantial discrimination amounting to a gross violation of human rights in their home country. The program enables the resettlement of persons in Australia, who, while not refugees, are in humanitarian need. People applying under the program must demonstrate some connection with Australia. Their applications must be supported by a formal proposal from a permanent resident or citizen of Australia or body operating in Australia.
- The *onshore* component comprises Temporary Protection Visas (for people who arrive in Australia without a visa) and Permanent Protection Visas (for people who arrive in Australia on a temporary visa and fulfil other criteria).

Migration Program

In recent times, there has been an increasing emphasis on skilled migration. The Skill Stream share of the total Migration Program has generally been increasing

1 The Trans-Tasman Travel Arrangement, introduced in 1973, allows Australian and NZ citizens to enter each other's country freely to visit, live, work and remain indefinitely without the need to apply formally for authority to enter the other country. At 30 June 2004, an estimated 445 000 New Zealand citizens were present in Australia — 254 000 (or 57 per cent) had been in Australia for 12 months or more (DIMIA 2005g).

Table C.1 **Permanent visas granted under the Migration Program**
1988-89 to 2005-06 (planned upper limit)[a, b]

Year	*Family Stream*	*Skill Stream*
	no.	no.
1988-89	72 700	51 200
1989-90	66 600	52 700
1990-91	61 300	49 800
1991-92	55 900	41 400
1992-93	45 300	21 300
1993-94	43 200	18 300
1994-95	44 500	30 400
1995-96	56 700	24 100
1996-97	44 580	27 550
1997-98	31 310	34 670
1998-99	32 040	35 000
1999-00	32 000	35 330
2000-01	33 470	44 730
2001-02	38 090	53 520
2002-03	40 790	66 050
2003-04	42 230	71 240
2004-05	41 740	77 880
2005-06 (Planned)	42 000	97 500

a The 2005-06 data reflect the 'upper limit' planned levels. The total visas planned for the Migration Program in 2005-06 range from 130 000 to 140 000, but in this table the proportions are calculated against 140 000. **b** Migration Program numbers do not include NZ citizens or holders of Secondary Movement Offshore Entry (Temporary), Secondary Movement Relocation (Temporary) and Temporary Protection Visas. Numbers have been rounded and totals may not be the exact sum of components.

Sources: DIMIA (2005g); DIMA unpublished data.

since around the late 1990s, and more so since 2002-03. The number of Family Stream visa grants has increased since 1997-98, but its share of the total Migration Program has decreased (table C.1).

The Migration Program consists of two main streams and a minor stream:

- The *Skill Stream* where migrants are selected on the basis of their ability to contribute to the Australian economy. Migrants must satisfy a points test that includes skills, age, work experience and English language ability (box C.2). In 2004-05, the Skill Stream accounted for around 65 per cent of visas granted under the Migration Program (box C.1).
- The *Family Stream* that recognises the value and importance of family migration to Australia's social and economic goals. Migrants are selected on the basis of their family relationship to a sponsor (who is an Australian citizen, permanent resident or eligible NZ citizen) in Australia. This stream accounts for about 35 per cent of visas granted under the Migration Program (box C.1).

- The *Special Eligibility (minor stream)* where former Australian residents who have maintained ties with Australia can migrate to Australia.

Box C.2 **Skill Stream — points test**

Under the Skill Stream of the Migration Program, applicants are assessed using a points test that covers core criteria relating to skill, work experience, age and English language ability. Applicants must meet Australian standards for an occupation nominated from the Skilled Occupations List.[2]

Applicants gain points according to a number of characteristics. The Government sets the minimum points requirement, out of a maximum 145 points. There are different pass marks for different sub-classes of Skill Stream visas. For 2005-06, the pass marks were set between 110 and 120 points (DIMIA 2005i).

The main characteristics are:

- skills whereby points are awarded for occupations which require qualifications or specific training (maximum points available are 60)
- experience whereby points are awarded for years of employment in a particular occupation (maximum points available are 10)
- age whereby points are awarded for age categories 18–29, 30–34, 35–39 and 40–44 (a maximum of 30 points are available for the 18–29 age group and decreasing points as the age of applicant increases)
- English language skills whereby points are awarded on the basis on achievement in language tests (maximum points available are 20)
- Australian qualifications whereby points are awarded based on the nature of the qualification (maximum points available are 15)
- regional Australia whereby points are awarded for living and studying at least two years in certain regional areas of Australia (maximum points available are 5)
- occupation in demand whereby points are awarded where the nominated occupation is on the Migration Occupations in Demand List (MODL), with additional points for a job offer (maximum points available are 20)
- spouse skills whereby additional points are awarded if the applicant's spouse satisfies the minimum work experience, age and English language ability criteria (maximum points available are 5).

Source: DIMIA (2005i)

2 The Skilled Occupations List is not the same as the Migration Occupations in Demand List (MODL). The Skilled Occupations List (introduced in November 1996) 'lists' the occupational, educational and work experience details of skilled applicants from overseas. The list has more than quadrupled in recent years with over 7000 people registered at the end of June 2004, in over 300 occupations (DIMIA 2005i).

Some components of the Migration Program are demand driven, while others are subject to capping (table C.2). Components of the Migration Program that are demand driven and not subject to capping include:

- State-Specific and Regional Migration
- Business Skills
- Employer Nominated categories
- Distinguished Talent
- Spouses
- Dependent Children.

Increases in demand for the above mentioned visa categories beyond planned levels are offset by reductions in other components of the Migration Program such as:

- Skilled Independent
- Skilled Australian Sponsored
- Fiancés
- Interdependents
- Preferential/Other Family
- Special Eligibility.

Table C.2 **Prioritisation of visa categories in the Migration Program**

Skill	*Family*	*Special eligibility*
1. Business Skills, Employer Nominated Scheme, Distinguished Talent, and State-Specific and Regional Migration • Demand driven and not subject to capping 2. Skilled Independent and Skilled Australian Sponsored • Planning level adjusted subject to demand in Business Skills, Employer Nominated Scheme, and State-Specific and Regional Migration categories	1. Spouses and Dependent Children • Demand driven and not subject to capping 2. Fiancés and Interdependents • May be capped subject to demand for Spouse and Dependent child visas issued 3. Parents and Preferential/Other Family • May be capped subject to demand for Spouse and Dependent Child visas issued	1. May be capped subject to demand for other uncapped visas

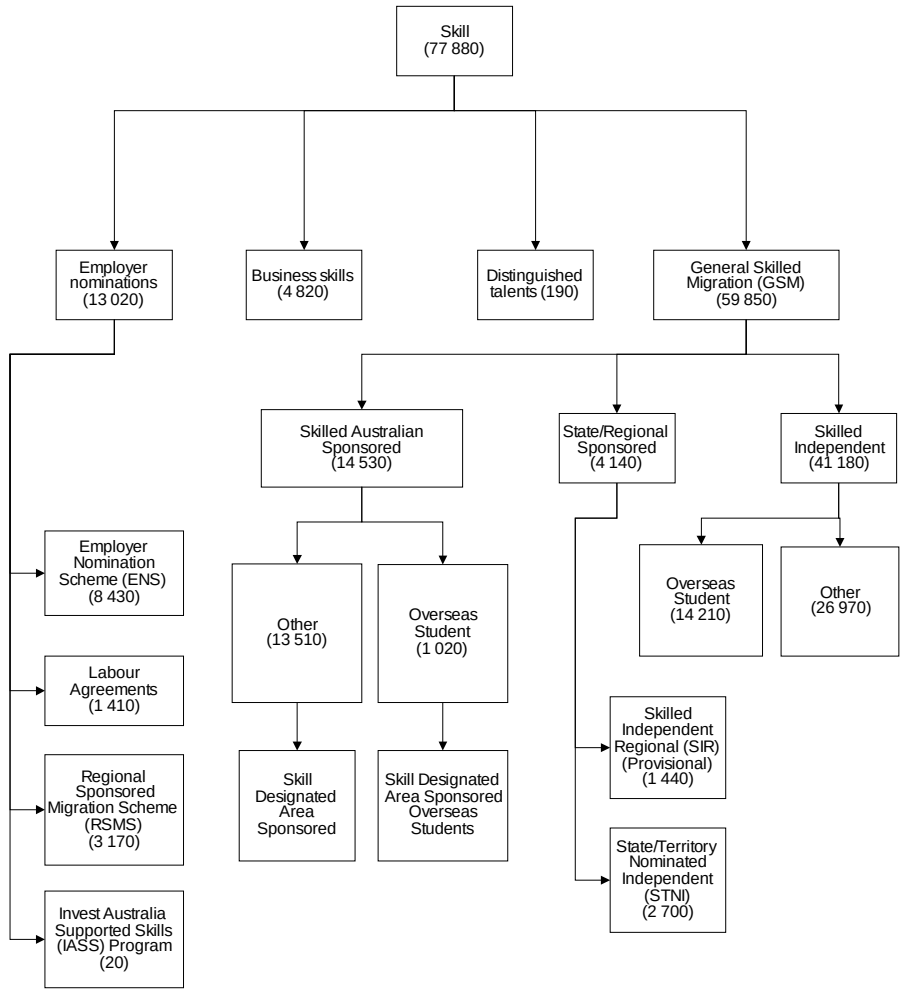
Source: Adapted from DIMIA (2005g).

Skill Stream

The Skill Stream consists of a number of categories for prospective migrants where there is demand in Australia for their particular occupational skills, outstanding talents or business skills. Some of the visa classes and sub-classes within the Skill Stream are capped.

In 2004-05, around 77 per cent of the visas granted under the Skill Stream were for the General Skilled Migration (GSM) category, which was driven mainly by the Skilled Independent visa category. This category accounts for 69 per cent of the visas granted under the GSM (box C.3).[3]

Box C.3 **Skill Stream visas by visas granted in 2004-05**



Sources: DIMIA (2005b); DIMA unpublished data.

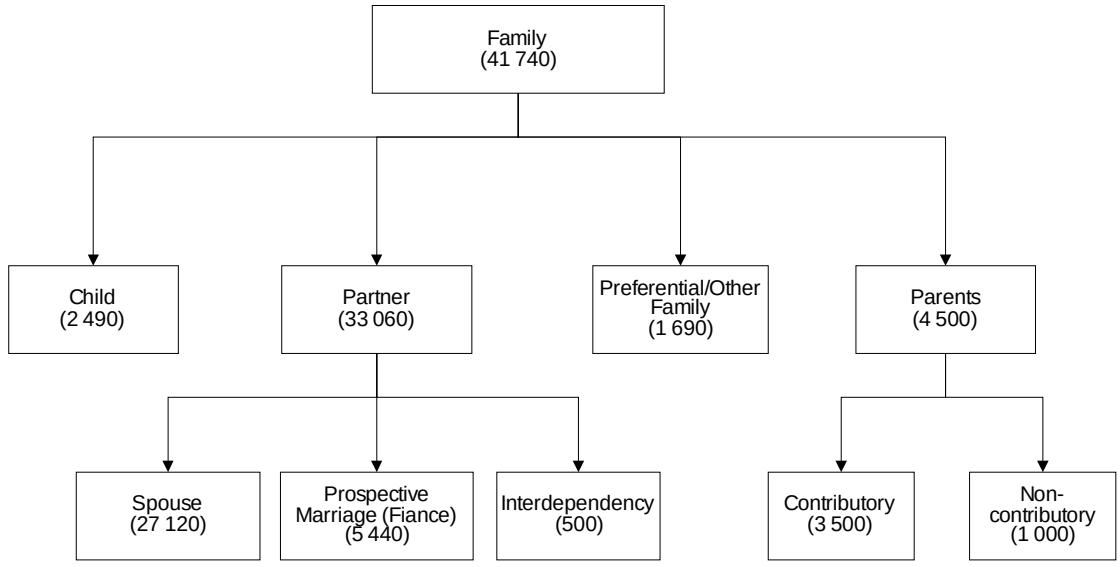
3 The main visa categories of the Skill Stream are listed in box C.3 and the definitions of these categories are included in table C.5.

Family Stream

The Family Stream of the Migration Program enables the immigration of immediate family members such as spouses, fiancés, dependent children, parents and certain other members of extended families.

Unlike the Skill Stream, there is no test for skills or language ability in the Family Stream. Limited places are available for parents and certain other family members. The main visa categories of the Family Stream are listed in box C.4.[4]

Box C.4 **Family Stream visas by visas granted in 2004-05**



Sources: DIMIA (2005b); DIMA unpublished data.

Key changes to the Migration Program

A number of changes have been made to the Migration Program in recent years.

The first major change has been the shifting of the balance of the Migration Program towards skilled immigration. In 1995-96 the Skill Stream accounted for around 30 per cent and the Family Stream accounted for around 70 per cent of the visas granted under the Migration Program. In 2005-06, the planned number of visas was around 70 per cent and 30 per cent for the Skill and Family Streams, respectively (table C.1) The increased focus on skilled migration has had a number of elements.

4 The definitions of these categories are also included in table C.6.

- In 1997, the composition of the Family and Skill Streams changed when the points-tested concessional family category shifted from the Family Stream to the Skill Stream and was renamed Skilled-Australian Linked (and later Skilled-Australian Sponsored). This shift represented a change in emphasis from the family reunion aspect to the labour market aspect of this migration flow (DIMIA 1999b).
- In July 1999, the points test for the Skill Stream (for GSM visas in particular) was strengthened to ensure the selection of highly skilled immigrants. Applicants must meet core criteria for skill, work experience, age (under 45 at time of application), English language ability and pass a points test. The points test recognises a range of skill-related factors (box C.2).
- Onshore applications, introduced on 1 July 2001, enable students who have recently completed their studies in Australia to be granted a GSM visa without the need to leave Australia at the end of their studies. Applicants with Australian qualifications who apply within six months of course completion are exempt from the recent work experience requirement.
- In July 2003, the study-qualifying period (at an education provider in Australia) for the purposes of the work experience exemption was increased from one to two years. On the basis of at least two years of Australian study, applicants with an Australian qualification (degree, diploma, trade certificate) are awarded five points. Applicants with an Australian Masters or Honours degree completed following an Australian undergraduate degree are awarded 10 points. Applicants with an Australian PhD obtained after at least two consecutive study years in Australia are awarded 15 points. A further five points is available if the two years study was at a campus in regional Australia or a low population growth metropolitan centre.

A second major change has been the introduction of a two-year waiting period on Family and Skilled Stream immigrants before they can access a range of social security payments (DPL 1996). This implicitly favours skilled immigrants who have a greater chance of labour market success.

Finally, there has been an increase in the regional focus of the Migration Program in recent years with a number of state specific and regional migration initiatives introduced (Ruddock 2003b). One initiative provides for employers, state and territory governments or relatives to sponsor prospective skilled immigrants and/or prospective business owners to regional areas.

- In April 2005, additional points were made available for state/regional sponsorship (Vanstone 2005a). Further, an increased use of Labour Agreements

is being encouraged to enable industries to fill regional labour shortages (Ruddock 2003b, Attachment 3).[5]

- Another initiative is the establishment of a skill matching database which is designed to link eligible skilled visa applicants with certain regions (DIMIA 2005g).

Temporary immigration

Australia's temporary entry program allows people from overseas to come to Australia on a temporary basis for specific purposes. Temporary entrants:

- are required to pay taxes on any income earned in Australia
- do not generally have access to social welfare or health care benefits
- must meet Australia's health and character requirements.

There are several different categories of temporary entry, which have evolved over time. There is no overall ceiling on the number of temporary immigrants. The duration of stay allowed under the temporary entry categories varies. It can range from as short as three months (for Tourist and Business short-stay visas) to four years (for some Overseas Student and Business long-stay visas). The temporary visa classes and sub-classes are listed in box C.5, at the broad level.

Currently, there are five main groups of temporary entrants. These are:

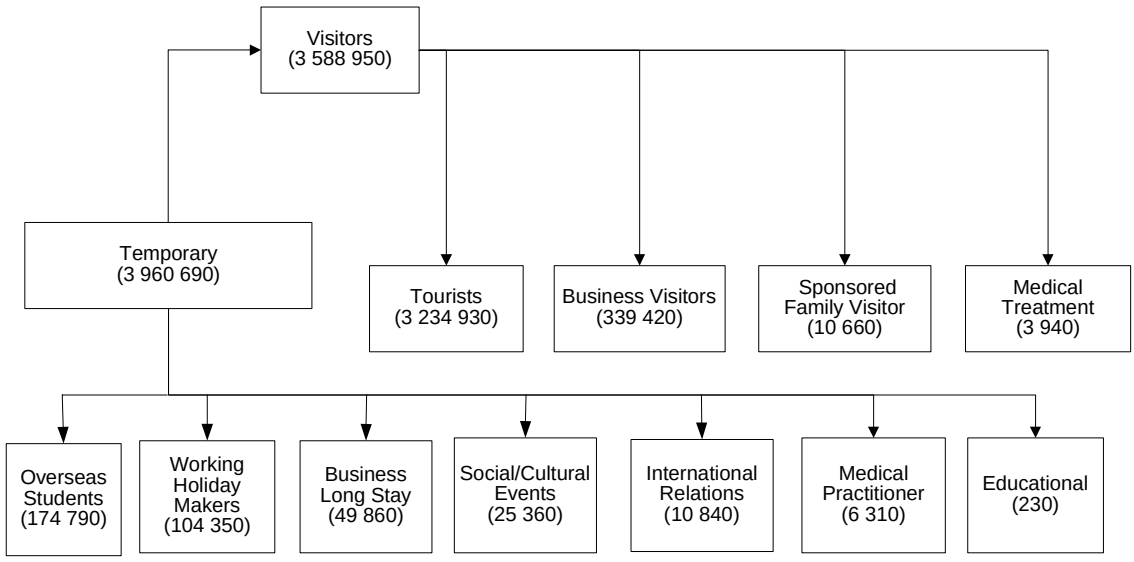
1. *Visitors*: these visas are granted mostly to tourists and some short-term business entrants, who are generally allowed to be in Australia for a three-month period. Over 3.5 million visas are currently granted annually in this category.
2. *Overseas Students*: student visas are granted to non-Australian citizens to study in Australia (generally as full-fee paying students) in full-time accredited and registered courses. A visa is generally granted for the duration of the course of study. The visas granted in this category have increased from 39 500 in 1991-92 to 174 800 in 2004-05. One factor contributing to the increase in this number was the Government's decision in the late 1990s to allow overseas students, on successful completion of their studies, to apply for GSM while in Australia.
3. *Working Holiday Makers*: these visas are granted to persons between the ages of 18 and 30 from the 18 countries with which Australia has reciprocal

[5] Labour Agreements, negotiated between the Australian Government and an employer or an industry association, enable Australian employers to recruit a specified number of workers from overseas in response to identified or emerging labour market (or skill) shortages.

arrangements (working rights are limited and there is a maximum stay of 12 months).

4. *Business entrants*: there are two types of temporary business entrant visas:
    a. *Business Visitor visa (short stay)*: for persons whose primary purpose for making a short trip to Australia is business related.
    b. *Business Visitor visa (long stay)*: for persons recruited by Australian or overseas companies as skilled personnel to enter as temporary business residents for periods of up to four years. This form of temporary entry enables businesses to sponsor skilled persons to fill positions that cannot readily be filled locally.
5. *Others*: various visa types are granted to people who come to Australia for a variety of social, cultural, economic and international relations purposes.

Box C.5 **Temporary visas granted in 2004-05**



Sources: DIMIA (2005b); DIMA unpublished data.

Recent policy changes

There are three recent policy changes that impact on the nature of Australia's temporary immigration:

- An expansion of working rights under the temporary migration scheme.
- An increased regional focus in the allocation of temporary visas.
- Increased flexibility to move from temporary to permanent residency.

Each of these policy changes is discussed below.

Working rights

A key change to Australia's migration policy in recent years is the expansion of categories of temporary immigration with working rights. Hugo (2004a) recently noted that historically Australia has had a strong opposition to attracting temporary and contract workers. However, this has changed in recent times. Australia now has a clear policy statement about the benefits of temporary immigration:

> Temporary residents bring new ideas, contacts, understanding, skills and technology and enable Australia to remain competitive — the key to further economic prosperity. Australia benefits from the energy, skills, commitment and diversity which temporary residents have brought to Australia and the contribution they make to the economy through spending and investment. (DIMIA 2005j)

There are several components of the changing policy to temporary immigrant working rights.

First, the Temporary Business Entry category of immigration was introduced in 1996, following an inquiry into temporary business entry. The inquiry was in response to concerns expressed by various groups that existing immigration procedures were too complex for bringing skilled people to Australia for temporary periods (Roach 1995, p. 1).

Second, international students were allowed to apply for working visas. The policy provides for international students to apply for working rights after they arrive in Australia and have begun their course of study. Working rights are limited to 20 hours work per week while their Australian education provider is in session but they may work full-time during holiday periods (Patterson 2000).

Finally, places under the Working Holiday Maker scheme have increased (Abbott and Ruddock 2002). The Working Holiday Maker program is designed to fill labour shortages in specific areas where seasonal workers are needed (such as agriculture and hospitality). Working holiday makers are permitted to do any kind of work, but it must be of a temporary or casual nature, and employment for longer than three months with any one employer is not allowed (DIMIA 2005k).

Regional initiatives

Another change to Australia's temporary entry policy are the recent initiatives to address labour shortages in particular regions.

From 1 July 2004, the Government introduced a temporary visa category (Skilled Independent Regional) for those who apply for permanent residency and fall just short of the points needed under the Skill Stream. The new category allows people to reside in Australia for three years provided they commit to live and work in regional Australia (DIMIA 2005g). State and territory governments and families can sponsor skilled immigrants under these visas (Vanstone 2005a).

Under the temporary business entrant program, special arrangements were introduced in 2002 for employers in regional Australia (DIMIA 2005j). They include departmental officials working closely with state, regional and local bodies that monitor local labour markets and conditions in rural and regional areas (Ruddock 2002).

Overseas students are encouraged to study in regional areas through initiatives that make it easier for students to gain permanent residency on completion of their studies if they have lived and studied in a regional area (discussed in the next section).

A Trade Skills Training visa has been introduced to help meet shortages in regional labour markets. On completion of a trade skills training apprenticeship, a temporary resident may apply for one of Australia's permanent regional skilled migration visas.

Working holiday makers who do a minimum of three months seasonal harvest work in regional Australia are eligible to apply for another Working Holiday Maker visa (DIMIA 2005g).

Moving from temporary to permanent residency

Often Australia's temporary immigrants are likely to be good candidates for permanent residency. They gain Australian work experience and people from non-English speaking background can improve their English language comprehension. To encourage this, Government mechanisms allow certain temporary immigrants to apply for permanent residency under the Migration Program.

First, from 1 July 2001, successful Australian-educated overseas students with qualifications in high demand became eligible to apply for permanent residency under the Skilled-Independent and Skilled-Australian Sponsored categories without leaving Australia. These initiatives built upon previous measures designed to retain successful overseas students. They include waiving work experience requirements for those who have obtained Australian qualifications in the six months prior to

lodging their visa applications and giving bonus points to applicants with Australian qualifications (Ruddock and Alston 2001).

Second, a regional element to the overseas student concessions was introduced. Under the Skill Stream, additional points are awarded where overseas students have lived and studied in regional areas for at least two years (Ruddock 2003b).

Third, working holiday makers are able to obtain a Skilled Independent Regional visa without leaving Australia (Vanstone 2005a). The Skilled Independent Regional visa, while still temporary in nature, is the first in the process to obtain permanent residency.

Fourth, in 2003, a two-stage process for the business skills immigrants to become permanent residents was introduced. A temporary business visa is initially granted, followed by a permanent residence visa once a business is fully established. Immediate permanent residence is only available for high calibre business migrants who have state/territory government sponsorship and support (Ruddock 2003a).

Finally, onshore asylum seekers are granted temporary protection visas on arrival and might be eligible to apply for permanent residency after three years (DIMIA 2004b).

C.2 Migrant flows to Australia

There are two sources of data for migrant flows to Australia:

- DIMA has comprehensive information on visas granted and visaed entries to Australia.
- DIMA maintains Overseas Arrivals and Departures data, which describes the arrival and departure of Australian residents and overseas visitors, through Australian airports and sea ports, as recorded on incoming or outgoing passenger cards.

In section C.2, DIMA information on issued visas and visaed entries is considered. In the second part of section C.2, ABS data on Overseas Arrivals and Departures is used to provide insight into migrant flows to Australia.

Immigration data

A summary of Australia's immigration flows for 2004-05 was presented in box C.1. Each of the permanent and temporary categories of migration are discussed in further detail in the sections that follow.

Permanent immigration over time

Over time, the flows of immigrants to Australia, in terms of permanent residency visa categories, reflect the policy elements and changes discussed in section C.1. Table C.3 provides greater detail on the Skill Stream component of the Migration Program.

Visas granted under the Employer Sponsored category have increased from about 4600 in 1995-96 to more than 13 000 in 2004-05. This represents an average annual growth of about 13 per cent.

Similar growth in the number of permanent visas granted has also occurred under the Skilled Independent category. In 2004-05, more than 41 000 visas were granted under this category, which was more than half of all the Skill Stream permanent visas.

Table C.3 **Skill Stream category outcomes**

Category	*1995-96*	*1996-97*	*1997-98*	*1998-99*	*1999-00*	*2000-01*[a]	*2001-02*[a]	*2002-03*[a]	*2003-04*[a]	*2004-05*[a]	*2005-06*[a]
	no.	no.	no.	no.	no.	no.	no.	no.	no.	no.	no.
Employer Sponsored[b]	4 640	5 560	5 960	5 750	5 400	7 510	9 560	10 540	10 400	13 020	15 000
Skilled Independent[c]	10 600	15 000	13 250	13 470	15 600	22 380	29 880	38 120	38 720	41 180	49 200
State/Regional Sponsored[d]	–	–	–	–	–	–	–	–	1 630	4 140	10 000
Skilled Australian Sponsored[e]	–	–	9 540	9 310	7 900	7 200	6 250	10 470	14 590	14 530	17 700
Distinguished Talent	200	190	180	210	110	230	210	180	230	190	200
Business Skills[f]	4 900	5 820	5 360	6 080	6 260	7 360	7 590	6 740	5 670	4 820	5 400
1 November Onshore	3 800	980	370	180	60	60	20	20	10	–	–
Total Skill	24 100	27 550	34 670	35 000	35 330	44 730	53 520	66 050	71 240	77 880	97 500
Proportion of total Migration Program	29.2	37.3	51.7	51.5	50.3	55.5	57.5	61.1	62.3	64.9	69.6

[a] Migration Program numbers do not include New Zealand citizens or holders of Secondary Movement Offshore Entry (Temporary), Secondary Movement Relocation (Temporary) and Temporary Protection Visas. Numbers have been rounded and totals may not be the exact sum of components. Figures for 2005-06 are planned targets. [b] Includes Employer Nomination Scheme, Labour Agreement, Regional Sponsored Migration Scheme. [c] Pre-1 July 1999, this category was known as Independent. [d] Includes state/territory Nominated Independent Scheme and Skilled Independent Regional. [e] Includes brothers, sisters, nieces, nephews, non-dependent children, working-age parents, grandchildren and first cousins who have been skill tested. [f] Net outcome as cancelled visas are returned to the Migration Program in that year. – Nil or rounded to zero.

Source: DIMA unpublished data.

Temporary entry

The changes in Australia's temporary immigration policy are clearly reflected in table C.4, which shows that the scale of temporary migration to Australia has increased considerably in the past nine years.

The main visa classes include the Overseas Student visa, Working Holiday Makers visa, Business Visitors visa (short stay) and Business Long Stay visa. In 2004-05, there were approximately 670 000 temporary visas granted in Australia for overseas students, working holiday visitors and business entrants, representing more than 3 per cent of the Australian resident population.

At the end of June 2002, nearly 70 per cent of the stock of Australia's temporary immigration population had working rights of some kind or another (table C.5). This was higher than that recorded in 1998, when significant policy changes had just commenced.

Table C.4 **Temporary visas granted**
1996-97 to 2004-05

	Overseas Students[a]	*Working Holiday Makers*	*Temporary Business Entrants*[b]	***Total***
	no.	no.	no.	**no.**
1996-97	68 611	52 748	314 074	**435 433**
1997-98	63 574	57 004	249 373	**369 951**
1998-99	110 894	64 973	243 225	**419 092**
1999-00	120 564	74 467	271 091	**466 122**
2000-01	146 565	76 576	297 465	**520 606**
2001-02	151 885	85 207	291 773	**528 865**
2002-03	162 575	88 758	292 039	**543 372**
2003-04	171 616	93 760	339 498	**604 874**
2004-05	174 787	104 605	389 279	**668 671**

a Overseas student visas include visas granted onshore and offshore. **b** Temporary business entrants include Business Visitors visas (short stay) and Business Long Stay visas.

Sources: DIMIA (*Population Flows: Immigration Aspects*, various editions); DIMA unpublished data; Hugo 2004a; Productivity Commission estimates.

Moving from temporary to permanent residency

In 2004-05, under the Migration Program 39 600 visas were granted for permanent residence to persons already in Australia on temporary visas, representing about 33 per cent of successful applicants (DIMA 2006). More than one third of this group were overseas students.

Table C.5 **Estimated stock of temporary entrants in Australia by main visa category**
1998 and 2002[a]

Visa category/class	*30 June 1998*		*30 June 2002*	
	('000)	%	('000)	%
With working rights				
Student	100.6	23.9	154.0	27.5
Working Holiday Maker	35.2	8.4	48.2	8.6
Business (long stay)	31.6	7.5	55.0	9.8
Business (short stay)	7.6	1.8	12.4	2.2
All others	28.4	6.7	105.4	18.8
Subtotal — working rights	203.4	48.3	375.0	66.9
No working rights	217.6	51.7	184.9	33.0
Total	**421.0**	**100.0**	**560.2**	**100.0**

a 1998 figures based on Kinnaird (1999), 2002 figures based on Hugo. (2004a).

Sources: Kinnaird (1999); Hugo et al (2004a).

In 2004-05, the main countries of citizenship for people granted onshore residence visas were the United Kingdom (17.6 per cent), China (11.6 per cent) and India (8.9 per cent).

Movements database

In addition to information on visa entry to Australia, the Australian Government collects information on overseas arrivals and departures, which records all movements into Australia based on a passenger arrival card system. Information is collected from all arrivals, who are categorised as either short-term, long-term or permanent, based on their stated intention (box C.6).

Overseas Arrivals and Departures data do not reconcile with issued visa data for several reasons. First, Overseas Arrivals and Departures data is a record of the number of *movements* of travellers rather than the number of travellers. Second, New Zealand citizens and certain other people do not need a visa to enter Australia, but still fill in passenger arrival cards. In addition, some people apply onshore for renewal of temporary visas or for permanent residency.

Nevertheless, the immigrant arrival data in the Overseas Arrivals and Departures data reveal trends similar to those evident in visa information (figure C.1). Historically, permanent arrivals have constituted a larger share of permanent and long-term arrivals, however long-term arrivals have increased significantly in the past ten years. Information on the characteristics of immigrants within the different categories is discussed in appendix D.

Box C.6 **Overseas Arrivals and Departures data**

Overseas Arrivals and Departures data is a compilation of data derived from the arrival and departure cards filled out by all people entering and leaving Australia. It describes the number of *movements* of travellers rather than the number of travellers.

The Overseas Arrivals and Departures system collects information on the following variables: citizenship; birthplace; birth date; gender; occupation; marital status; type of movement; origin/destination; reason; and address in Australia.

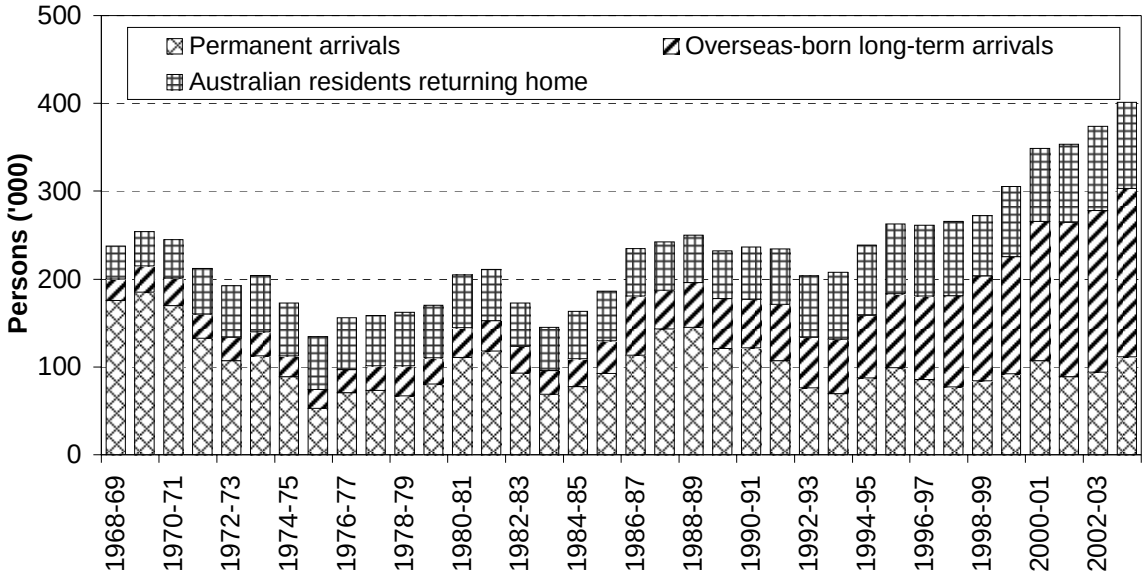
The movements database categorises arrivals and departures into three types of international population movement:

- *Permanent movement*: Persons migrating to Australia and residents departing permanently.
- *Long-term movement*: Visitors arriving and residents departing temporarily with the intention to stay in Australia or abroad for 12 months or more, and the departure of visitors and the return of residents who had stayed in Australia or abroad for 12 months or more.
- *Short-term movement*: Travellers who intend or actually stay in Australia or abroad for less than 12 months.

Source: DIMIA (2005e).

Figure C.1 **Permanent and long-term arrivals**

1968-69 to 2003-04[a]



[a] Long-term arrivals are sub-divided into overseas-born persons who intend to stay in Australia for more than 12 months and Australian residents returning home who have been abroad for more than 12 months.

Sources: Hugo (2004a); ABS (2004d); ABS unpublished data.

C.3 Migrant flows from Australia

In addition to large migration flows *to* Australia each year, there is a significant flow of people migrating *from* Australia (emigration). Australia has comprehensive data on emigration flows as a result of the Overseas Arrivals and Departures data. All departures are recorded as short-term, long-term or permanent depending on the traveller's stated intention.

A key distinction in permanent emigration from Australia is between former settlers leaving Australia to return to their home country, or moving to a third country, and Australian-born persons. Similarly, long-term emigration from Australia comprises Australian residents going overseas and temporary immigrants returning to their home country or a third country.

In the 1990s, there were significant increases in the Australian components of both permanent and long-term emigration. Over that decade, permanent departures increased by 146 per cent and long-term departures by 41 per cent (Hugo et al 2003, pp. 10–11). As a percentage of the Australian population, permanent and long-term emigration represented a change from 0.4 per cent to 0.6 per cent of the population over the same period. It has been suggested that these figures underestimate the outflow to the extent that some Australians are effectively living and working overseas, but return to Australia at least once a year, and are therefore recorded in the movements database as 'short-term' departures (Hugo et al 2003).

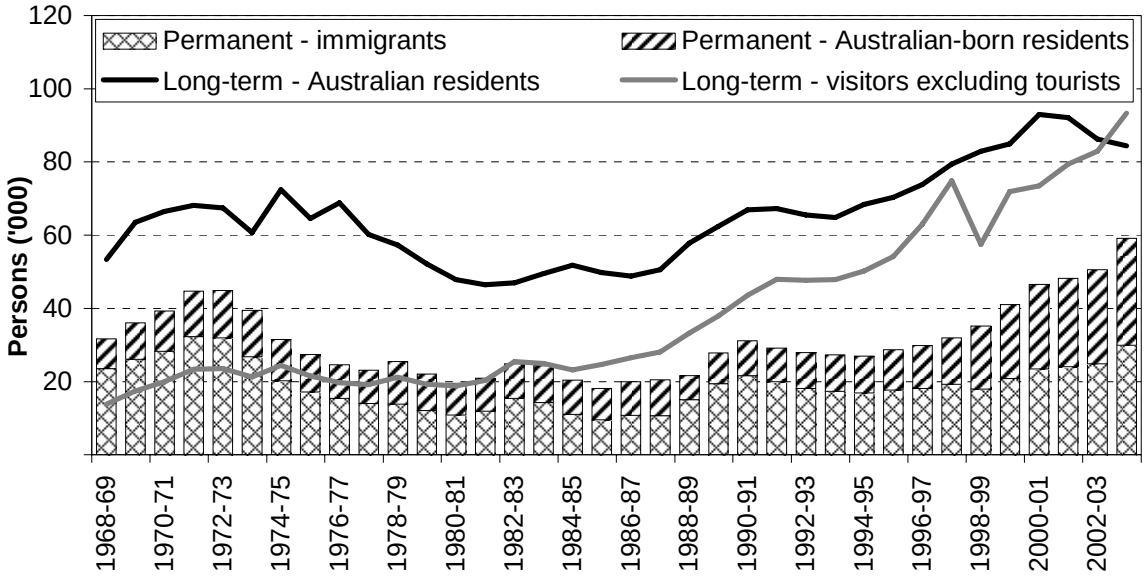
Overall, movement from Australia on a permanent or long-term basis has been trending up over the past two decades. Permanent and long-term departures both reached their highest levels in 2003-04 (figure C.2).

Possible policy drivers

The focus on skills in Australia's immigration policy could be impacting on Australia's emigration flows. Hugo et al (2003) make the point that with the increasing focus on economic criteria for selection in the Australian immigration program, it is likely that the extent of settler loss will increase.

In terms of temporary flows, the migration policy changes in Australia might be conducive to the temporary emigration of Australian residents. For example, Australia has a reciprocal Working Holiday Maker program with 18 countries, which provides opportunities for young Australians to emigrate and work overseas on a temporary basis. The increased flexibility to attract temporary workers to Australia is therefore partly offset by other countries' temporary migration policies.

Figure C.2 **Permanent and long-term departures**
1968-69 to 2003-04



Sources: Hugo (2004a); DIMIA 2005c.

C.4 Net migration and population size

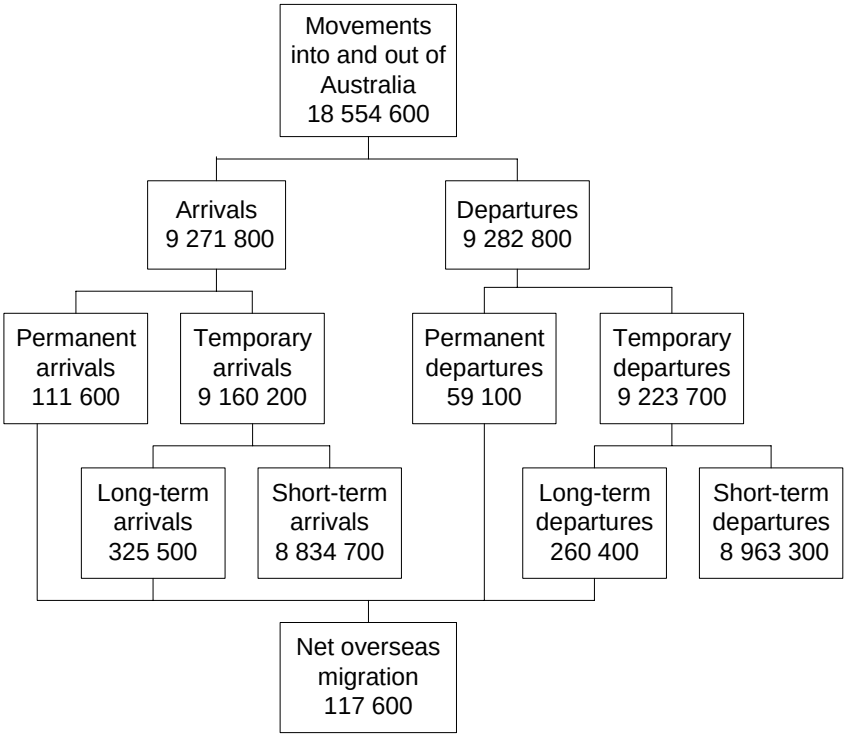
For Australia, net inflows of migrants have always been an important contributor to Australia's population growth. In turn, net inflows have strongly influenced population *numbers* in Australia. Almost one quarter of the Australian population was born overseas. In this section, net overseas migration and its contribution to population growth are considered.

Net overseas migration

Net overseas migration, at the simplest level, is the excess (shortage) of permanent and long-term immigration over permanent and long-term emigration. The classification of migrants as permanent or long-term depends on their stated intention on Passenger Arrival and Departure cards. Box C.7 demonstrates how the different arrivals and departures contribute to net overseas migration calculations.

Box C.7 **Components of net overseas migration**

2003-04[a]



a This has been adjusted for category jumping according to the ABS's new adjustment methodology.

Source: ABS (2005b).

The measurement of net overseas migration is made more complex, however, because the intentions of movers may change over time so that there is significant 'category jumping'. Individual travellers might also be counted multiple times. Attempts have been made to adjust net overseas migration figures, however, there is some debate in the literature about the most appropriate methodology (box C.8).

Over time, net overseas migration has varied considerably. The net overseas migration peak of about 190 000 persons was recorded for the year ending 2005, although this figure does not include any adjustment for category jumping or multiple movement (figure C.3(a)). A low of about 13 000 persons was recorded for the year ending 1975 (once again, with no adjustment for category jumping or multiple movement). The average annual level of net overseas migration in the period 1959–2005 was approximately 96 000 persons.

There are some interesting observations about the nature of net overseas migration over time.

Box C.8 **Difficulties in measuring net overseas migration**

Net overseas migration, as currently defined in the ABS statistics, consists of: (1) net permanent migration — new permanent settler arrivals in Australia, minus permanent departures of Australian permanent residents; (2) net long-term migration — arrivals minus departures of Australian permanent residents who were absent for more than one year, plus arrivals minus departures of visitors staying in Australia for one year or more; and (3) 'migration adjustment' accounting for changes to travel intentions from short term to permanent or long term and vice versa, (termed 'category jumping') and for double counting of certain movements.

Measurement of net overseas migration is contentious, with different 'adjustment' methodologies employed at various times. The ABS suspended adjustments to net overseas migration from September 1997, but has re-introduced them recently. Apart from the adjustment for differences between intended and actual duration of stay (category jumping), the new ABS net overseas migration adjustment also includes an element of adjustment for persons being added to or taken out of the estimated resident population many times in the same quarter. The revised net overseas migration estimate is approximately 111 000 for 2001-02, a decrease from the previously published net overseas migration of 134 000 (ABS 2004b, p. 63)

Some of Australia's leading demographers consider that even this large downward adjustment made by the ABS for 2001-02 may be too small (McDonald, Khoo and Kippen 2003). An alternative approach — the 'stock' method[1] — yields an estimate of net overseas migration of 96 000 for 2001-02, about 14 000 below the ABS' revised estimate and about 38 000 below the previously published ABS figure. While the stock method also has limitations, these results highlight some of the difficulties in measuring present levels of net overseas migration. The ABS acknowledges the need to continue developing new approaches (ABS 2004b).

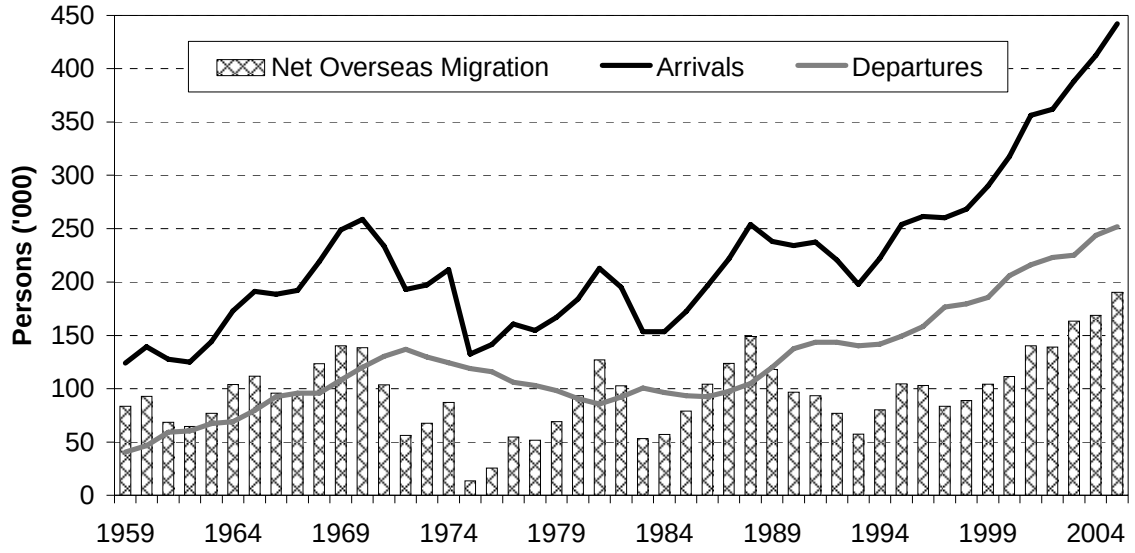
[1] The stock method defines Net Overseas Migration as follows: NOM = (net permanent and long-term movement of Australian residents) + (the change in the stock of persons on long-term temporary visas) + (conversions from onshore to permanent residence) + (newly issued temporary protection visas) + (the change in the stock of New Zealanders staying in Australia on a long-term basis).

Source: ABS (2004b); ABS (2004c).

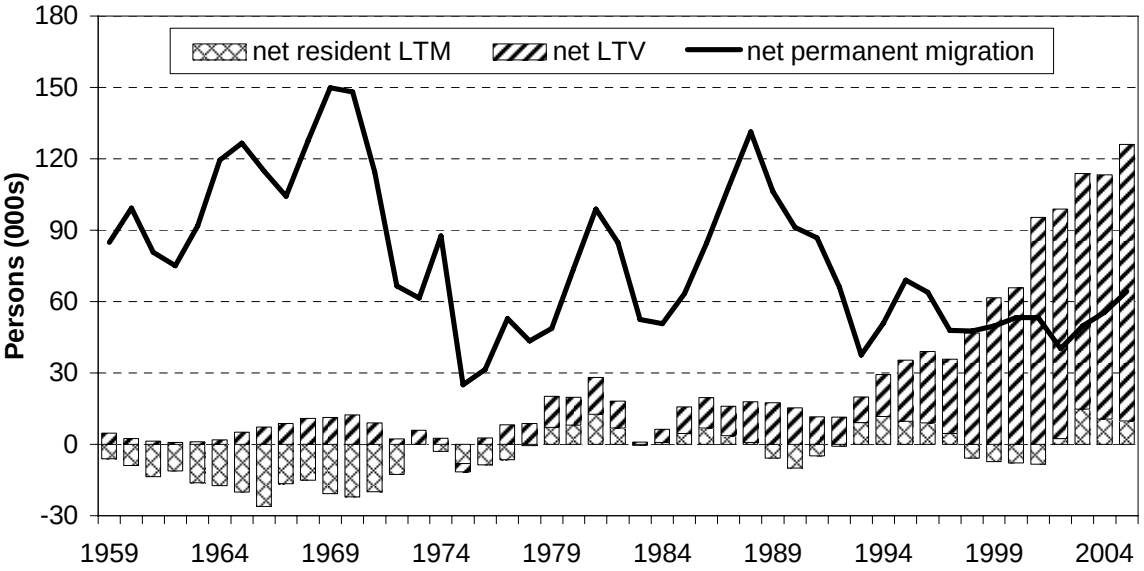
The net long-term migration component is increasing in importance as shown in figure C.3(b). According to ABS figures, for the year ending 2005, net inflows of permanent migrants were around 64 000. Net inflows of long-term temporary migrants were higher at about 116 000. In addition, net inflows of permanent migration have been fairly steady over the past ten years, while net inflows of long-term temporary migrants have risen significantly, by more than four times, over the same period.

Figure C.3 **Immigration, emigration and net overseas migration**
1959–2005 (calendar years)

(a) Australia's net overseas migration[a]



(b) Components of Australia's net overseas migration[a, b]



a These net overseas migration figures have been calculated as the excess of permanent and long-term immigration over permanent and long-term emigration. No adjustment has been made for category jumping. **b** LTV denotes long-term visitors and LTM denotes long-term migration.

Sources: ABS (2004c); ABS unpublished data.

Net resident long-term migration accounts for a smaller share of overall net migration. This suggests that Australian residents are leaving long-term and returning to Australia in roughly the same proportions.

Since the mid-1990s, net permanent migration has been lower, on average, than previously. This is due in part to increasing numbers of Australians emigrating permanently. This is reflective of Australia's change from a predominantly immigration country to both an immigration and emigration nation.

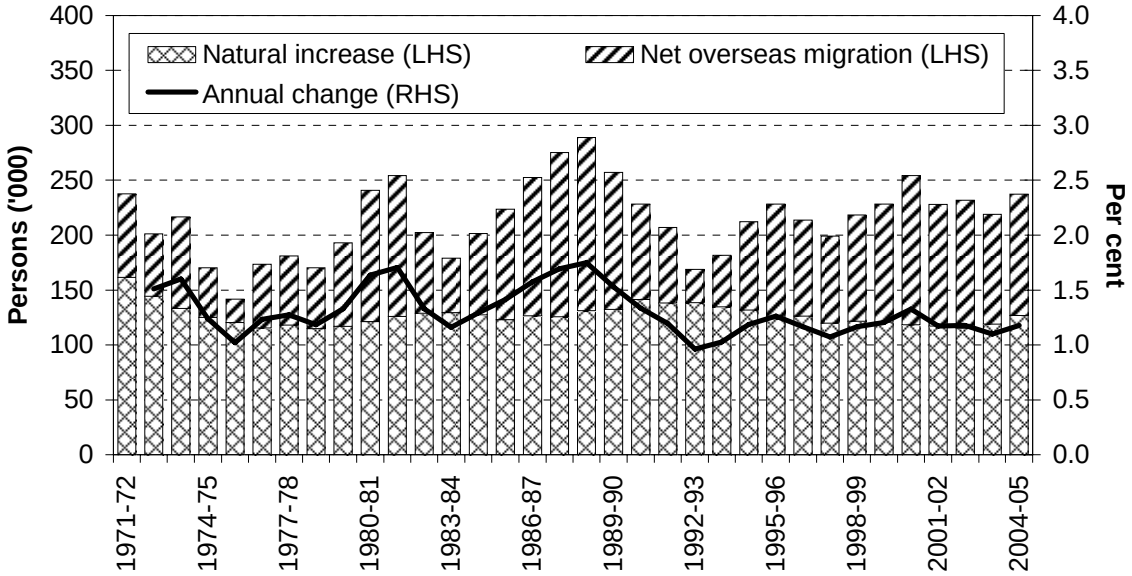
Population growth and size

Australia's population grew by 34 per cent (or 1.3 per cent per year) from 13.3 million to 20.2 million between 1971 and 2004. In total, net overseas migration was a significant contributor to this growth, although the yearly contribution fluctuated considerably (figure C.4). The net overseas migration peak of 157 436 persons in 1988-89 contributed 55 per cent to Australia's population growth in that year. The trough of 21 239 persons in 1975-76 contributed only 15 per cent to population growth in that year. Since 1972, 41 per cent of the population increase has been due to net migration.

In terms of the contribution of net overseas migration to Australia's population size, annual migration flows have had a considerable cumulative effect. This is reflected in the figures for the percentage of Australia's estimated resident population born overseas, which has increased almost continually over the past 50 years (figure C.5). In 1947, 10 per cent of the population was born overseas, while in 2001, 23 per cent of the population was born overseas. It is interesting to note, however, that the 2001 proportion of overseas-born in the population was about the same as a century earlier, having reached a low at the end of the Second World War (OECD 2004a, pp. 123–4).

There is also a second-generation effect of net immigration, as the children of immigrants represent a contribution to population growth that would not otherwise have taken place. Kippen and McDonald (2000, p. 14) estimated that between the Second World War and 2000, immigration was responsible for adding 7 million to the population and that if post-war immigration was zero, the national population would be 12 million instead of over 19 million.

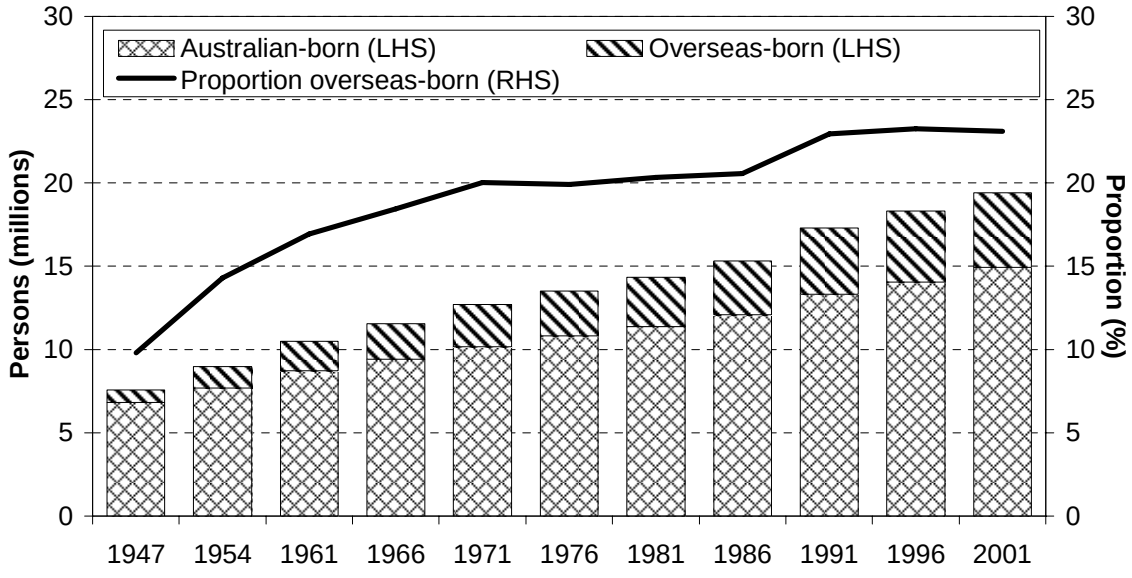
Figure C.4 **Australia's population growth**
1971-72 to 2004-05[a]



[a] Natural increase is the number of births minus the number of deaths. Net overseas migration is taken from ABS calculations. It is the excess of permanent and long-term immigration over permanent and long-term emigration adjusted for category jumping and multiple movements.

Source: ABS (2004c).

Figure C.5 **Australia's population by country of birth**
1947–2001, Census years



Sources: ABS (2004c); ABS Census (various editions).

C.5 Definitions

Table C.6 **Definitions of the visa categories and sub-categories**

Visa	*Definition*
Skill stream	
General Skilled Migration (GSM) — includes visas issued under the Skilled Independent and Skilled Australian Sponsored (see below).	Depending on their circumstances, applicants can apply offshore or onshore in the GSM categories. Applicants must meet core criteria for skill, work experience, age (under 45 at time of application), English language ability and, on the whole, pass a points test. Applicants with Australian qualifications who apply within six months of course completion are exempt from the recent work experience requirement. Onshore points tested visa sub-classes introduced on 1 July 2001 enable recently completed students to be granted a GSM visa without the need to leave Australia at the end of their studies.
Skilled Independent — (component of GSM)	Applicants (includes overseas students who recently completed their studies in Australia) are not sponsored by an employer or a relative in Australia. Applicants must pass a points test that includes skills, age, work experience and English language ability.
State/Regional Sponsored — (component of GSM)	Includes state/territory Nominated Independent (STNI) and Skilled Independent Regional (SIR) (provisional) visa categories.
• STNI	STNI allows State/Territory governments to nominate candidates whose skills are in demand in their jurisdiction, and who want to migrate to and settle in their State/Territory. Nominations do not guarantee work and applicants are responsible for finding employment.
• SIR	SIR provisional visa, introduced on 1 July 2004, provides potential GSM applicants who fall just short of the pass mark with a three year stay in Australia on the condition that they live and work in regional Australia. The visa is designed to attract skilled immigrants who can obtain 110 points in the GSM category and are sponsored by a State/Territory Government or Regional Certifying Body, to regional Australia or low population growth areas where a need has been identified for skilled workers.
Skilled Australian Sponsored — (component of GSM)	Applicants (includes overseas students who recently completed their studies in Australia) must pass a points test that includes skills, age, work experience and English language ability, and receive additional points for sponsorship by an Australian relative. Under this visa type, there is a visa subclass, Skilled Designated Area Sponsored, that allows Australian citizens and permanent residents to sponsor skilled relatives (including first cousins, nieces and nephews) to join them in designated areas identified by State and Territory governments. Currently all of Australia apart from Sydney, Newcastle, Wollongong, Perth and Brisbane are designated areas.

Continued over page

Table C.6 (continued)

Visa	*Definition*
Employer Nominations has four main visa sub-classes (see below).	Employer driven schemes enable Australian employers to nominate overseas personnel (non-Australian citizens or residents) to fill skilled permanent vacancies if suitably qualified workers cannot be found in Australia. Positions must be 'highly skilled', full time and available for a period of at least three years. The highly skilled nominee has to have completed at least three years of formal training (or has an equivalent amount of on the job training, usually 5 years), and has also completed three years of relevant post-training work experience. In most cases, the nominee must have a 'vocational' level of English or, if applying under regional arrangements, a 'functional' level of English.
• Employer Nomination Scheme (ENS)	Employers may nominate a person for a full time position (position has to be for at least a three year period). Streamlined arrangements are in place where an Australian employer is using the ENS to nominate a person who has already been working for the employer in Australia on a temporary residence visa. Nominees are generally expected to be under 45 years of age.
• Regional Sponsored Migration Scheme (RSMS)	Allows employers in regional or low population growth areas of Australia (that is, all areas except Brisbane, the Gold Coast, Newcastle, Sydney, Wollongong, Melbourne and Perth) to fill skilled positions that they are unable to fill from the local labour market. The position must be full time and for a two-year period. Nominees are generally expected to be under 45 years and have 'functional' English at the time of visa application.
• Labour Agreements	Includes both permanent and temporary entry visa sub-classes, with a formal arrangement negotiated between DIMIA, DEWR and an employer or industrial association for the former visa sub-classes. This visa category enables Australian employers to recruit a specified number of workers from overseas in response to identified or emerging skill shortages in the Australian labour market, with agreements covering a 2–3 year period.
• Invest Australia Supported Skills	Enables employers to transfer 'key' managerial and specialist employees of their company to Australia. Agreements are for 3 years, although individual visas, once granted, may extend beyond the period of agreement.
Business Skills	Encourages successful business people to settle permanently in Australia and develop new business opportunities. The majority of entrants are initially on a provisional (temporary) visa for four years, and are required to establish and actively manage a business in Australia before obtaining the benefits of permanent residence. After satisfactory evidence of a specified level of business or investment activity, Business Skills entrants may apply for permanent residence. High calibre business migrants may apply for a Business Talent visa to obtain direct permanent residence if they have high level business attributes and are sponsored by a State or Territory government agency.

Continued over page

Table C.6 (continued)

Visa	*Definition*
Distinguished Talent	For distinguished individuals with special or unique talents of benefit to Australia.
Family stream	
Partner	Includes Spouse (the majority of visas granted), Fiancés and Interdependency visa subclasses.
Child	Includes visas for dependent children, orphaned relatives and adopted children.
Preferential/Other Family	Includes visas for aged-dependent relatives, remaining relatives and carers.
Parents	Since 1999-00, the number of places available to parents each program year has been limited. A new 'contributory' parent category (introduced around mid 2003 for offshore and onshore applicants), however, has substantially increased the number of places available for parents to migrate each year on the basis that they or their sponsor make a contribution to their health and welfare costs. In the contributory category in 2003-04, parents were required to pay a second visa application charge of $25 000 per adult, and a ten-year $10 000 'Assurance of Support' bond for the main applicant and $4000 for adult secondary applicants.

Sources: DIMIA (various publications).

D Characteristics of Australia's migrants

D.1 Country of origin

Until the 1970s, the 'White Australia' policy restricted immigration from non-European countries. After the Second World War, immigrants arrived predominantly from the United Kingdom, Ireland and from other European countries (particularly from Yugoslavia, Greece and Italy). Over the past five decades the cultural mix of immigrants to Australia has diversified. According to DIMIA (2005a), the permanent arrivals in 2001-02 originated from more than 150 countries, including New Zealand (17.6 per cent), the United Kingdom (9.8 per cent), China (7.5 per cent), South Africa (6.4 per cent), India (5.7 per cent) and Indonesia (4.7 per cent).

The top ten source countries for permanent and long-term temporary arrivals for the period 1981–2004 are listed in table D.1. In 2004, the United Kingdom accounted for 14.3 per cent of permanent arrivals, while New Zealand accounted for 13.2 per cent. In addition, permanent arrivals from China and India together accounted for 17.3 per cent of permanent arrivals. Long-term temporary arrivals originated predominantly from China (11.5 per cent), followed by the United Kingdom (10.5 per cent) and India (5.2 per cent).

D.2 Demographic characteristics of immigrants

Net migration has a large impact on the size of Australia's population, but less impact on age structure (ABS 2005). The impact of immigration on Australia's age structure is dependent on the difference between the mean age of the population and the mean age of the immigrants and their children at the time of immigration. When the rate of fertility is at about the replacement level, immigrants have little impact on the age structure of the population. This is because the mean age of immigrants and their subsequent children tend to be marginally younger than the mean age of the existing population. However, when fertility falls to very low levels, the mean age of the existing population rises, and newly arriving immigrants and their

children will have relatively more impact on the population's age structure in the short to medium term.

Table D.1 **Permanent and long-term arrivals by top ten source countries**
1981 and 2004

	Permanent arrivals	*Long-term temporary arrivals*	*Top ten country of origin*	*Proportion of total arrivals*
	no.	no.	no.	%
2004				
UK	16 821	30 063	46 884	11.4
China	11 375	33 952	45 327	11.0
New Zealand	15 495	9 573	25 068	6. 1
India	8 906	15 429	24 335	5. 9
Malaysia	3 150	12 687	15 837	3. 8
Hong Kong	..	13 411	13 411	3. 3
Indonesia	2 367	10 445	12 812	3. 1
Japan	..	11 447	11 447	2. 8
South Korea	..	9 856	9 856	2. 4
United States	..	8 033	8 033	1. 9
Top Ten	**58 114**	**154 896**	**213 010**	**51. 6**
1981				
UK	36 279	12 083	48 362	22. 7
New Zealand	15 328	12 949	28 277	13. 3
Vietnam	12 285	..	12 285	5. 8
Malaysia	2 156	3 959	6 115	2. 9
United States	..	4 478	4 478	2. 1
Poland	3 721	..	3 721	1. 7
South Africa	3 347	..	3 347	1. 6
Germany	2 535	1 391	3 926	1. 8
Philippines	2 969	..	2 969	1. 4
Netherlands	2 188	..	2 188	1.0
Top Ten	**80 808**	**..**	**115 668**	**54. 4**

.. Not applicable.

Source: ABS unpublished data.

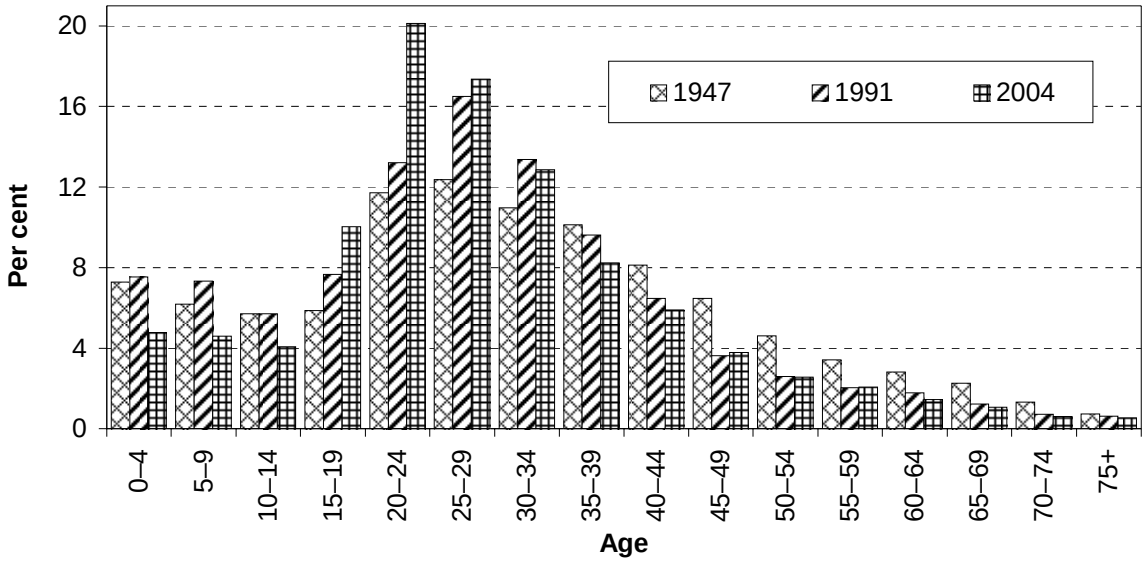
Age structure of immigrants

A larger proportion of immigrants are in the 15–34 year age group compared with the Australian-born population. In 2003-04, the proportion of newly arriving immigrants in this age group was 72 per cent compared with 28 per cent of the Australian resident population (ABS 2005).

The age of immigrants arriving to Australia was more widely distributed in the past when compared with recent years. Immigrants arriving in recent years were predominantly in the 20–24 year age group, while those arriving in 1947 were

predominantly in the 25–29 age group (figure D.1). More generally, in 1947 around 53 per cent of immigrants arriving to Australia were aged 20–44 years compared with 59 per cent in 1991, and just under 65 per cent in 2004. Immigrants aged 45 and over accounted for 22 per cent of arrivals in 1947 compared with only 12 per cent in 2004. Around 10 per cent of immigrants arriving in 2004 were in the 15–19 years age group compared with 8 per cent in 1991 and 6 per cent in 1947.

Figure D.1 **Age of immigrants as a proportion of total arrivals**
1947, 1991, 2004[a]



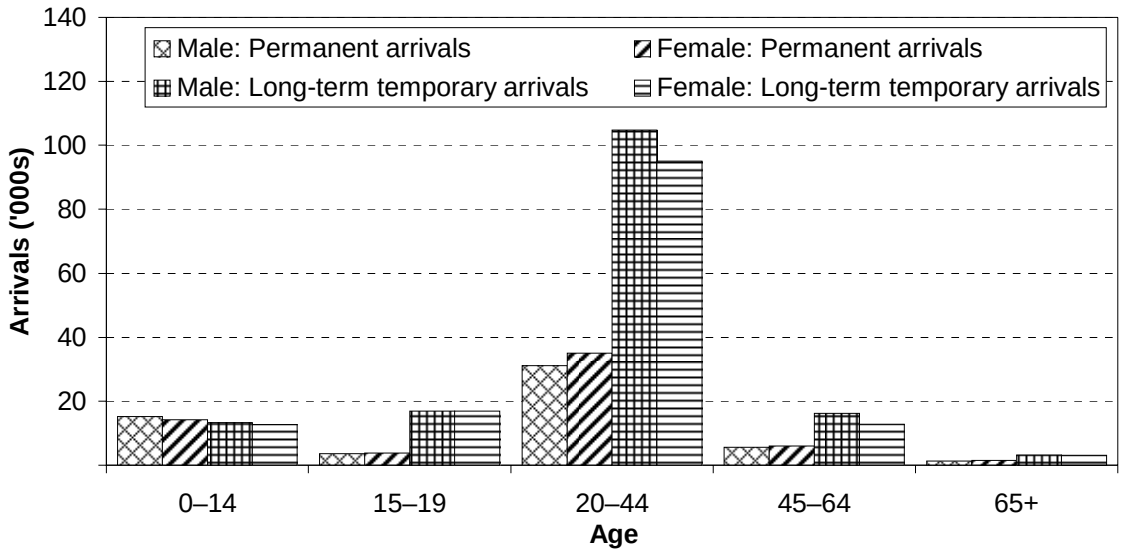
[a] Except for 1947 (which includes only permanent arrivals), the data includes long-term temporary and permanent arrivals.

Source: ABS unpublished data.

Gender balance of immigrants

In 2004, there were 211 336 male permanent and long-term temporary arrivals and 201 228 female arrivals. Males outnumbered female immigrants, particularly in the 20–44 and 45–64 years age groups (figure D.2). In addition, males outnumbered female immigrants in the long-term temporary arrivals category (154 469 male compared with 140 622 female). However, female permanent arrivals (60 606) outnumbered male permanent arrivals (56 867).

Figure D.2 **Permanent and long-term temporary arrivals by age and gender**
2004



Source: ABS unpublished data.

D.3 Geographic location

The settlement patterns of immigrants depend on a number of factors. These include the visa category for entry, their employment opportunities and social contacts. The established networks of earlier generations of immigrants can offer support in obtaining housing and jobs, and can create incentives for new arrivals to settle close to established communities of similar immigrants (Hugo 1995).

Settlement patterns by state and territory

Immigrants have a higher propensity to settle in New South Wales, followed by Victoria, Queensland and Western Australia (table D.2). In recent years, Queensland has experienced an increase in recent arrivals (immigrants arriving in the last five years). The proportion of recent arrivals settling in Queensland increased from 15.3 per cent in 1996 to 17.5 per cent in 2001. All other jurisdictions experienced slight decreases in the proportion of recent arrivals over the same period.

Table D.2 **Distribution of the population by birthplace**
1996 and 2001

	Australian-born		*Overseas-born*		*Overseas-born arriving in last five years*	
State/territory	*1996*	*2001*	*1996*	*2001*	*1996*	*2001*
	%	%	%	%	%	%
NSW	33.2	32.7	35.5	35.9	41.1	40.7
Vic	24.0	24.0	26.6	26.3	24.2	23.6
Qld	20.0	20.4	14.3	15.0	15.3	17.5
WA	8.9	9.1	12.2	12.1	11.6	11.3
SA	8.2	8.1	7.7	7.2	4.5	4.1
Tas	3.0	2.8	1.2	1.1	0.8	0.7
ACT	1.7	1.7	1.7	1.6	1.7	1.5
NT	1.1	1.2	0.8	0.7	0.8	0.7
Total[a]	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

a Includes 'Other Territories' which range from 0.01 to 0.03.

Source: Hugo (2004b).

In 2001, immigrants from a Language Other than English (LOTE) background individuals whose first language is not English - settled predominantly in New South Wales and Victoria (table D.3) Immigrants who originated from a Main English Speaking (MES) country in 2001 generally settled in New South Wales, Queensland, Victoria and Western Australia.

Table D.3 **Distribution of LOTE and MES overseas-born population [a]**
2001

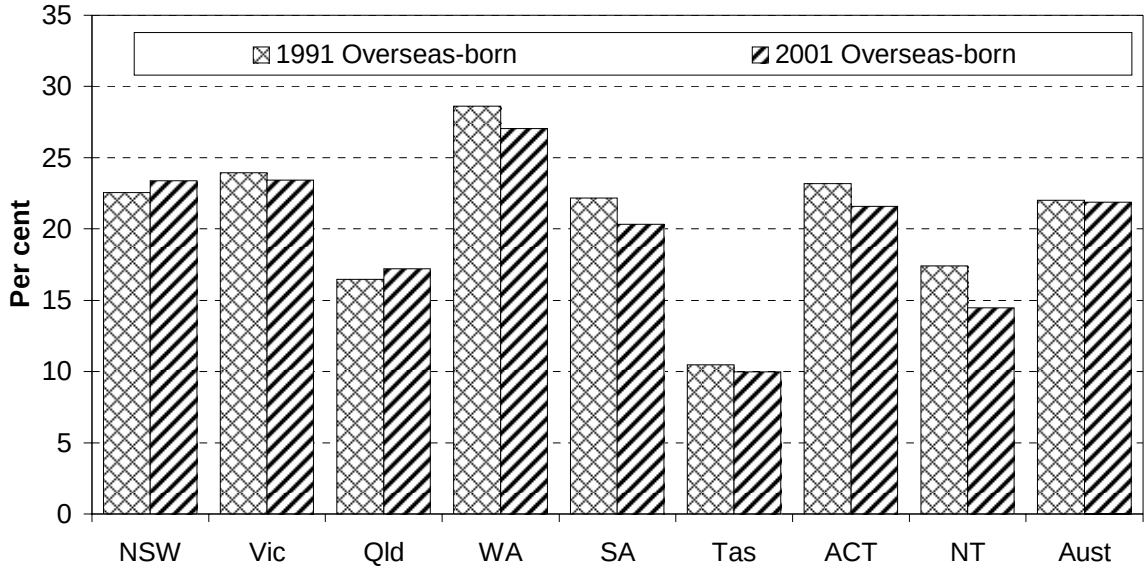
	Unit	*LOTE* [a]	*MES*[b]
NSW	%	40.7	28.4
Vic	%	31.0	19.0
Qld	%	10.7	21.8
WA	%	8.6	17.5
SA	%	6.0	9.1
Tas	%	0.7	1.7
ACT	%	1.7	1.6
NT	%	0.6	0.9
Total	**%**	**100.0**	**100.0**
Total number	m	2.5	1.6

a Note that the two measures are not directly comparable. LOTE refers to the background of an individual, while MES refers to the characteristics of the country of origin from which an individual originates. **b** Language other than English (LOTE) indicates whether an individual comes from a non-English speaking background. **c** Main English speaking (MES) indicates whether an individual comes from a country where English is the principal language spoken.

Source: Hugo (2004b).

In 2001, Western Australia had the highest proportion of overseas-born persons in its population (27 per cent) (figure D.3). On the other hand, Tasmania had the lowest proportion of immigrants, at just 10 per cent of its population. Between 1991 and 2001, New South Wales and Queensland were the only two jurisdictions that experienced increases in the proportions of overseas-born populations. Over the same period, the overseas-born population in New South Wales increased from 22.5 per cent to 23.4 per cent. While Queensland recorded an increase from 16.5 per cent in 1991 to 17.2 per cent in 2001.

Figure D.3 **Overseas-born persons as a proportion of total population**
1991 and 2001



Source: ABS unpublished data.

Regional settlement patterns

Rural

Over time, the proportions of both the immigrant and the Australian-born populations residing in rural areas have declined. However, the proportional decrease in the immigrant population has been much larger. In 1947, just under one-third of the Australian-born population and around a quarter of the overseas-born population resided in rural areas. By 2001, around 15 per cent of the Australian-born population and only 7 per cent of the overseas-born population were residing in rural areas.

Regional

While the proportion of the overseas-born population residing in regional centres has also decreased over time, the opposite effect has occurred in the Australian-born population. The proportion of the Australian-born population living in 'other urban' areas increased from 18.5 per cent to 25.3 per cent between 1947 and 2001. Conversely, the proportion of overseas-born residents residing in 'other urban' areas decreased from 13.5 per cent to 11.4 per cent during the same period (table D.4).

Table D.4 **Australian- and overseas-born by regional areas** 1947–2001[a]

	1947	*1991*	*1996*	*2001*
	%	%	%	%
Australian-born				
Major urban	49.7	57.7	57.7	59.9
Other urban	18.5	25.4	26.4	25.3
Rural	31.8	16.9	15.9	14.8
Total[b]	**100.0**	**100.0**	**100.0**	**100.0**
Overseas-born				
Major urban	61.8	79.5	80.0	82.0
Other urban	13.5	12.4	12.5	11.4
Rural	24.7	8.1	7.5	6.6
Total[b]	**100.0**	**100.0**	**100.0**	**100.0**

a In accordance with the Australian Standard Geographical Classification, 'major urban' areas are defined as urban areas with populations of 100,000 and over, 'other urban' areas are defined as urban areas with populations of 1000 to 99 999, and 'rural' areas are defined as the remainder of the state or territory. **b** Excludes persons for whom birthplace was not stated and overseas visitors.

Source: Hugo (2004b).

Major urban

The number of the overseas- and Australian-born persons residing in major cities, regional and rural areas by state and territory are shown in table D.5. In 2001, around 66 per cent of Australia's total population resided in major cities, 32 per cent lived in inner or outer regional centres and 3 per cent lived in remote or very remote areas. Within the two population groups, immigrants tend to have a greater propensity to settle in Australia's major cities compared with the Australian-born population. In 2001, around 83 per cent of the overseas-born population resided in major cities compared with around 61 per cent of the Australian-born population. In the same period, around 36 per cent of the Australian-born population lived in inner or outer regional areas compared with 16 per cent of overseas-born population. Around 3 per cent of the Australian-born population lived in remote and very remote areas compared with 1 per cent of the overseas-born population in 2001.

Table D.5 **Australian- and overseas-born by regional areas and jurisdiction**

2001

	Born in Australia	*Born Overseas*[a]	*Birthplace not stated*	*Overseas visitor*	***Total***
	no.	no.	no.	no.	no.
New South Wales					
Major cities	2 890 789	1 312 165	285 834	51 657	**4 540 445**
Inner regional	1 104 836	125 359	69 043	6 717	**1 305 955**
Outer regional	413 429	34 710	26 908	1 888	**476 935**
Remote/very remote	40 624	2 633	3 381	168	**46 806**
Total[b]	**4 450 680**	**1 475 079**	**385 409**	**60 577**	**6 371 745**
Victoria					
Major cities	2 234 684	965 276	190 433	28 175	**3 418 568**
Inner regional	821 123	94 631	50 798	3 109	**969 661**
Outer regional	215 635	19 862	13 216	1 460	**250 173**
Remote/very remote	5 083	428	233	56	**5 800**
Total[b]	**3 277 042**	**1 080 356**	**254 699**	**32 853**	**4 644 950**
Queensland					
Major cities	1 362 082	411 489	90 805	32 521	**1 896 897**
Inner regional	760 831	114 845	44 196	10 774	**930 646**
Outer regional	530 092	77 765	37 145	21 653	**666 655**
Remote/very remote	132 330	11 889	10 785	4 048	**159 052**
Total[b]	**2 786 286**	**616 241**	**183 112**	**69 500**	**3 655 139**
Western Australia					
Major cities	809 036	406 145	61 831	14 284	**1 291 296**
Inner regional	165 392	40 474	11 137	929	**217 932**
Outer regional	141 268	25 611	9 572	1 090	**177 541**
Remote/very remote	125 277	22 622	11 838	2 830	**162 567**
Total[b]	**1 241 775**	**495 251**	**94 982**	**19 244**	**1 851 252**
South Australia					
Major cities	753 305	247 282	43 720	6 371	**1 050 678**
Inner regional	146 544	25 018	8 064	642	**180 268**
Outer regional	147 299	17 795	7 909	610	**173 613**
Remote/very remote	52 007	6 269	3 130	532	**61 938**
Total[b]	**1 099 585**	**296 465**	**62 862**	**8 349**	**1 467 261**
Tasmania					
Inner regional	243 563	31 234	14 273	1 440	**290 510**
Outer regional	132 450	13 018	8 335	290	**154 093**
Remote/very remote	9 430	1 014	607	72	**11 123**
Total[b]	**386 034**	**45 377**	**23 430**	**1 811**	**456 652**
ACT					
Major cities	227 740	66 652	14 064	2 748	**311 204**
Inner regional	615	88	25	15	**743**
Total[b]	**228 355**	**66 740**	**14 089**	**2 763**	**311 947**

Continued next page

Table D.5 **(Continued)**

	Born in Australia	*Born Overseas*[a]	*Birthplace not stated*	*Overseas visitor*	***Total***
Northern Territory					
Outer regional	77 377	20 150	8 949	2 943	**109 419**
Remote/very remote	79 169	8 851	6 136	4 797	**98 953**
Total[b]	**157 959**	**29 354**	**15 416**	**7 935**	**210 664**
Australia					
Major cities	8 277 636	3 409 009	686 687	135 756	**12 509 088**
Inner regional	3 243 451	431 684	197 558	23 633	**3 896 326**
Outer regional	1 657 550	208 911	112 034	29 934	**2 008 429**
Remote/very remote	445 138	54 456	36 209	12 565	**548 368**
Total[b, c]	**13 629 481**	**4 105 648**	**1 034 120**	**203 101**	**18 972 350**

[a] Includes 'inadequately described', 'at sea' and 'not elsewhere classified' [b] Includes 'Migratory' region. [c] Includes 'Other Territories'.

Source: ABS unpublished data.

The usefulness of census data in examining the settlement patterns of recent arrivals is limited insofar as it records a person's place of residence at the time of the Census. Recent arrivals might initially settle in one area, but subsequently move to another area within or even outside the state/territory in the period between censuses. Such movements made within the five years of arrival are not recorded in the Census data.

The first Longitudinal Survey of Immigrants to Australia suggests that recent arrivals who settled initially in non-metropolitan areas, subsequently moved to capital cities shortly after arrival (Hugo 2004b). In metropolitan New South Wales, Victoria and Western Australia, the proportion of immigrants remaining in their initial region of settlement was much higher than was the case for equivalent non-metropolitan areas. In Victoria, for example, only 18.3 per cent of immigrants who initially settled in non-metropolitan areas were still living in these regions. Although similar regional relocation was observed in Queensland, some non-metropolitan areas of Queensland, particularly south-east Queensland, did not observe such trends (Hugo 2004b).

Settlement patterns over time

Over time, there might be some convergence in the internal migration patterns of the overseas-born toward those of the Australian-born. According to Hugo (2004b) there appears to be a pattern whereby after a period of longer residence in Australia, the overseas-born move more to non-metropolitan areas like the Australian-born population.

In 2001, the majority of overseas-born persons in most states and territories resided in the capital city Statistical Division (table D.6). In New South Wales, for example, 83.6 per cent of the overseas-born population resided in Sydney, followed by Illawarra (4.9 per cent) and Hunter (3.5 per cent). Of the immigrants arriving in 1985 or earlier, a smaller proportion resided in Sydney (77.3 per cent) compared with those arriving after 1985 (table D.6).

Table D.6 **Overseas-born by period of arrival and place of residence**
2001

	Period of arrival in Australia				
Statistical division	*1985 or earlier*	*1986–1990*	*1991–1995*	*1996–2001*	***Total*[a]**
	no.	no.	no.	no.	no.
New South Wales					
Central West	7 822	823	645	1 140	**11 136**
Far West	803	65	55	92	**1 074**
Hunter	36 921	3 909	2 809	4 781	**51 388**
Illawarra	54 700	4 217	3 259	6 026	**71 663**
Mid-North Coast	18 743	1 604	1 120	1 611	**24 273**
Murray	5 772	538	371	715	**7 808**
Murrumbidgee	6 948	863	842	1 902	**11 184**
North Western	4 703	504	308	616	**6 469**
Northern	6 469	793	550	1 238	**9 526**
Off-Shore Areas & Migratory	127	23	18	20	**212**
Richmond-Tweed	16 681	2 084	1 375	2 104	**23 399**
South Eastern	17 844	1 726	1 140	1 598	**23 409**
Sydney	606 183	187 046	147 511	234 514	**1 233 538**
Total	**783 716**	**204 195**	**160 003**	**256 357**	**1 475 079**
Victoria					
Barwon	27 034	2 310	1 587	2 557	**35 194**
Central Highlands	8 755	706	463	854	**11 476**
East Gippsland	5 818	371	294	404	**7 466**
Gippsland	15 546	941	544	1 032	**18 915**
Goulburn	11 818	940	847	2 086	**16 589**
Loddon	9 422	811	513	952	**12 368**
Mallee	4 703	527	423	930	**7 029**
Melbourne	560 565	121 008	91 146	137 580	**954 048**
Off-Shore Areas & Migratory	118	17	12	10	**160**
Ovens-Murray	7 177	579	410	671	**9 247**
Western District	3 938	368	255	728	**5 582**
Wimmera	1 763	115	102	197	**2 283**
Total	**656 657**	**128 693**	**96 596**	**148 001**	**1 080 357**

Continued next page

Table D.6 **(Continued)**

Statistical division	Period of arrival in Australia				
	1985 or earlier	*1986–1990*	*1991–1995*	*1996–2001*	***Total*[a]**
Queensland					
Brisbane	175 685	47 198	34 870	63 916	**338 128**
Central West	463	88	50	149	**802**
Darling Downs	9 841	1 305	946	2 371	**15 244**
Far North	21 759	3 802	3 100	4 928	**35 772**
Fitzroy	9 669	1 299	957	2 043	**14 728**
Mackay	9 212	1 226	959	1 728	**13 886**
Moreton	82 661	17 871	12 465	27 091	**147 898**
North West	2 331	368	248	501	**3 614**
Off-Shore Areas & Migratory	167	17	15	36	**254**
Northern	13 037	2 092	1 470	2 681	**20 406**
South West	774	109	64	165	**1 175**
Wide Bay-Burnett	17 826	1 950	1 264	2 034	**24 335**
Total	**343 425**	**77 325**	**56 408**	**107 643**	**616 242**
Western Australia					
Central	6 340	755	507	930	**9 005**
Kimberley	2 664	342	207	469	**4 664**
Lower Great Southern	6 125	576	344	657	**8 106**
Midlands	4 929	547	344	698	**6 862**
Off-Shore Areas & Migratory	275	40	28	38	**399**
Perth	238 981	59 346	39 124	62 848	**418 333**
Pilbara	4 311	945	634	1 009	**7 669**
South Eastern	4 364	1 071	868	1 546	**8 226**
South West	22 183	2 482	1 644	2 375	**30 154**
Upper Great Southern	1 314	173	87	170	**1 833**
Total	**291 486**	**66 277**	**43 787**	**70 740**	**495 251**
South Australia					
Adelaide	182 462	20 024	15 538	23 124	**251 953**
Eyre	1 837	87	79	133	**2 262**
Murray Lands	5 120	343	289	601	**6 692**
Northern	8 387	392	278	445	**10 954**
Off-Shore Areas & Migratory	65	7	5	17	**99**
Outer Adelaide	13 006	792	532	738	**15 697**
South East	3 831	266	185	520	**5 031**
Yorke and Lower North	3 324	99	86	94	**3 773**
Total	**218 032**	**22 010**	**16 992**	**25 672**	**296 461**
Tasmania					
Greater Hobart	15 896	1 712	1 252	2 265	**22 172**
Mersey-Lyell	5 994	475	384	658	**7 856**
Northern	9 042	816	580	1 167	**12 144**
Off-Shore Areas & Migratory	98	4		4	**109**
Southern	2 422	220	126	174	**3 094**
Total	**33 452**	**3 227**	**2 342**	**4 268**	**45 375**

Continued next page

Table D.6 **(Continued)**

Statistical division	Period of arrival in Australia				
	1985 or earlier	*1986–1990*	*1991–1995*	*1996–2001*	***Total*[a]**
Australian Capital Territory					
Australian Capital Territory - Bal	24		3	22	**52**
Canberra	41 893	7 517	5 683	9 064	**66 690**
Total	**41 917**	**7 517**	**5 686**	**9 086**	**66 742**
Northern Territory					
Darwin	12 459	2 286	1 647	2 660	**20 150**
Northern Territory - Bal	5 035	830	580	1 742	**8 851**
Off-Shore Areas & Migratory	200	36	21	57	**353**
Total	**17 694**	**3 152**	**2 248**	**4 459**	**29 354**

a Includes year of arrival 'not stated'.

Source: ABS unpublished data.

The overseas-born population were more dispersed in Queensland, with only 54.9 per cent residing in Brisbane (table D.6). Moreton accounted for a further 24 per cent of immigrants residing in Queensland, while Far North, Wide Bay-Burnet and Northern together accounted for around and additional 13 per cent of immigrants residing in Queensland.

Focussing on the five jurisdictions with the highest number of overseas-born persons, a greater proportion of immigrants from Non-main English Speaking (NES) countries reside in capital cities compared with immigrants from Main English Speaking (MES) countries (table D.7).

Table D.7 **Main English Speaking and non-Main English Speaking immigrants by place of residence**
2001

Statistical division	*Born in MES Country*[a]	*Born in NES Country*[b]
	%	%
New South Wales		
Sydney	71.9	88.9
Hunter	6.1	2.3
Illawarra	7.1	3.9
Richmond-Tweed	3.4	0.8
Mid-North Coast	3.5	0.8
Northern	1.2	0.4
North Western	0.8	0.3
Central West	1.4	0.5
South Eastern	2.7	1.1
Murrumbidgee	1.0	0.7

Continued next page

Table D.7 **(Continued)**

Statistical division	*Born in MES Country*[a]	*Born in NES Speaking Country*[b]
Murray	0.9	0.4
Far West	0.1	0.1
Total	**100.0**	**100.0**
Victoria		
Melbourne	79.3	91.9
Barwon	5.2	2.5
Western District	1.2	0.2
Central Highlands	2.1	0.7
Wimmera	0.4	0.1
Mallee	0.8	0.6
Loddon	2.4	0.6
Goulburn	2.5	1.1
Ovens-Murray	1.4	0.7
East Gippsland	1.4	0.4
Gippsland	3.2	1.2
Total	**100.0**	**100.0**
Queensland		
Brisbane	51.1	59.8
Moreton	27.4	19.6
Wide Bay-Burnett	4.5	3.2
Darling Downs	2.5	2.4
South West	0.2	0.1
Fitzroy	2.8	1.9
Central West	0.2	0.1
Mackay	2.5	2.0
Northern	3.2	3.5
Far North	5.1	6.8
North West	0.6	0.6
Total	**100.0**	**100.0**
Western Australia		
Perth	80.7	89.4
South West	7.9	3.7
Lower Great Southern	2.1	1.1
Upper Great Southern	0.5	0.2
Midlands	1.8	0.9
South Eastern	2.1	1.0
Central	2.2	1.4
Pilbara	1.7	1.3
Kimberley	1.0	0.9
Off-Shore Areas & Migratory	0.1	0.1
Total	**100.0**	**100.0**

Continued next page

Table D.7 **(Continued)**

Statistical division	*Born in MES Country*[a]	*Born in NES Speaking Country*[b]
South Australia		
Adelaide	80.8	89.0
Outer Adelaide	7.9	2.7
Yorke and Lower North	1.9	0.7
Murray Lands	2.2	2.3
South East	2.0	1.4
Eyre	0.9	0.6
Northern	4.2	3.2
Total	**100.0**	**100.0**

[a] Includes United Kingdom, Ireland, New Zealand, United States, Canada and South Africa. [b] Includes 'born at sea', 'not elsewhere classified' and 'inadequately described'. Excludes Birthplace not stated.

Source: ABS unpublished data.

Recent Government policies encouraging settlement patterns

Since 1996-97, the Australian, State and Territory governments have encouraged immigrants to settle in regional Australia, through a number of State–Specific and Regional Migration (SSRM) initiatives. These initiatives encourage newly arrived migrants to settle in areas other than Sydney, Newcastle, Wollongong, Perth, and Melbourne conurbations and South Eastern Queensland. Generally, special consideration is given to visa applicants if they agree to settle outside these designated areas. Immigrants who gain entry under the Regional Scheme are then discouraged from moving to Sydney or Melbourne until they receive permanent residency. It takes longer for these immigrants to receive their permanent residence. They initially receive a four-year temporary visa, but would have to run a business successfully for at least two years before qualifying for permanent residence (Hugo 2004b).

Over 37 600 visas have been granted since the introduction of SSRM initiatives in 1996-97. The number is expected to increase, particularly following the introduction of the Skilled Independent Regional visa on 1 July 2004. Recent figures indicate that 18 697 visas were granted under SSRM initiatives in 2004-05, representing approximately 24 per cent of the total Skill Stream of the Migration Program. This is an increase of 47 per cent on the 2003-04 level and is the highest since the introduction of the initiatives in 1996-97. Most of the visas granted have been for immigrants settling in Victoria and South Australia. Since 1999-2000 about half of the SSRM visas granted have been to immigrants deciding to reside in Victoria (table D.8).

D.4 Emigration

In 2003-04, 59 078 overseas- and Australian-born persons emigrated from Australia permanently (table D.9). Just over half of the emigrants departing Australia permanently were born overseas, the largest number since the early 1970s. A record 29 140 Australian-born persons departed permanently in 2003-04 (table D.9).

In 2003-04, about 55 per cent of Australian-born emigrants departed permanently for three countries, namely the United Kingdom, New Zealand and the United States (table D.10).

The largest proportion of overseas-born emigrants from Australia are those born in New Zealand (about 7 000 in 2003-04) (table D.11). Emigrants born in the United Kingdom were the second largest group, with about 4600 persons departing permanently in 2003-04. Emigrants born in the South East Asian region, China and Hong Kong, also accounted for a large proportion of permanent departures in 2003-04.

Table D.8 **Distribution under state specific migration mechanisms**

	Victoria	*South Australia*	*Other States*	***Total***
	no.	no.	no.	no.
1998-99				
Regional Skilled Migrants Scheme	43	436	286	**765**
State/Territory Nominated Independent	0	169	0	**169**
Regional-Linked	9	29	29	**67**
Skilled-Australian Linked[a]	801	396	547	**1 744**
State/Territory Sponsored Business Skills[b]	23	4	32	**59**
Regional Established Business in Australia	0	0	0	**0**
Total	**876**	**1 034**	**894**	**2 804**
1999-2000				
Regional Skilled Migrants Scheme	30	373	261	**664**
State/Territory Nominated Independent	0	9	0	**9**
Regional-Linked	131	16	48	**195**
Skilled-Australian Linked[a]	1 485	297	602	**2 384**
State/Territory Sponsored Business Skills[b]	13	4	27	**44**
Regional Established Business in Australia	0	3	10	**13**
Total	**1 659**	**702**	**948**	**3 309**

Continued next page

Table D.8 **(Continued)**

	Victoria	*South Australia*	*Other States*	***Total***
2000-01				
Regional Skilled Migrants Scheme	75	437	509	**1021**
State/Territory Nominated Independent	47	36	2	**85**
Regional-Linked	712	67	223	**1 002**
Skilled-Australian Linked[a]	968	184	423	**1 575**
State/Territory Sponsored Business Skills[b]	25	16	81	**122**
Regional Established Business in Australia	0	10	31	**41**
Total	**1 827**	**750**	**1 269**	**3 846**
2001-02				
Regional Skilled Migrants Scheme	86	384	622	**1 092**
State/Territory Nominated Independent	203	51	3	**257**
Regional-Linked	1 122	137	338	**1 597**
Skilled-Australian Linked[a]	689	94	191	**974**
State/Territory Sponsored Business Skills[b]	19	25	132	**176**
Regional Established Business in Australia	10	12	18	**40**
Total	**2 129**	**703**	**1 304**	**4 136**

a Refers to applicants under this category who obtained bonus points because their sponsor lived in a designated area. **b** Includes applicants processed under offshore subclass 129 (state/territory sponsored business owner), offshore subclass 130 (state/territory sponsored senior executive), onshore subclass 842 (state/territory sponsored business owner) and onshore subclass 843 (state/territory sponsored senior executive).

Sources: Hugo (2004a), Ruddock (2002b).

Table D.9 **Permanent and long-term emigration of Australians[a]**

Year	*Australian-born permanent departures*	*Aust residents long- term departure[b]*	***Total***	*Share of Australian population*	*Overseas-born permanent departures*	*Overseas visitors: long-term departure*	***Total***	*Share of Australian population*
	no.	no.	**no.**	%	no.	no.	**no.**	%
1988-89	6 560	57 733	**64 293**	0.4	15 087	33 258	**48 345**	0.3
1989-90	8 399	62 300	**70 699**	0.4	19 458	37 899	**57 357**	0.3
1990-91	9 490	66 883	**76 373**	0.4	21 640	43 629	**65 269**	0.4
1991-92	9 178	67 191	**76 369**	0.4	19 944	47 971	**67 915**	0.4
1992-93	9 803	65 446	**75 249**	0.4	18 102	47 744	**65 846**	0.4
1993-94	9 927	64 786	**74 713**	0.4	17 353	47 921	**65 274**	0.4
1994-95	10 092	68 377	**78 469**	0.4	16 856	50 156	**67 012**	0.4
1995-96	11 005	70 253	**81 258**	0.4	17 665	54 133	**71 798**	0.4
1996-97	11 698	73 777	**85 475**	0.5	18 159	62 971	**81 130**	0.4
1997-98	12 771	79 422	**92 193**	0.5	19 214	74 872	**94 086**	0.5
1998-99	17 250	82 861	**100 111**	0.5	17 931	57 420	**75 351**	0.4
1999-2000	20 234	84 918	**105 152**	0.5	20 844	71 850	**92 694**	0.5
2000-01	23 081	92 945	**116 026**	0.6	23 440	73 440	**96 880**	0.5
2001-02	24 146	92 071	**116 217**	0.6	24 095	79 375	**103 470**	0.5
2002-03	25 612	86 211	**111 823**	0.6	24 885	82 900	**107 785**	0.5
2003-04	29 140	84 336	**113 476**	0.6	29 938	93 282	**123 220**	0.6

a Caution is needed when examining the data. The data are based on the 'intentions' of people moving out of Australia and these intentions might change over time. **b** Long-term departures are defined as those departing temporarily with the intention to stay abroad for 12 months or more. 'Australian residents' includes Australian citizens, New Zealand citizens indicating permanent residence and non-citizens on permanent residence visas.

Source: Hugo (2004b).

Table D.10 **Permanent departures of Australian-born by intended country of residence**

2003-04

	Emigrants	*Share of total Australian-born departures*
	no.	%
United Kingdom	5 961	20.5
New Zealand	5 711	19.6
United States of America	4 390	15.1
China (excl. HK and Taiwan)	723	2.5
Hong Kong	1 538	5.3
Singapore	1 680	5.8
Total countries	**29 140**	**100.0**

Source: DIMIA (2005c).

Table D.11 **Overseas-born permanent departures by birthplace**

	2000-01		*2001-02*		*2002-03*		*2003-04*	
	no.	%	no.	%	no.	%	no.	%
Oceania[a]	5 871	25.1	6 374	26.5	6 965	28.0	7 926	26.5
United Kingdom & Ireland	4 155	17.8	4 106	17.1	4 215	17.0	4 979	16.6
Western Europe	854	3.6	813	3.4	917	3.7	932	3.1
Northern Europe	150	0.6	164	0.7	206	0.8	189	0.6
Southern Europe	508	2.2	478	2.0	448	1.8	457	1.5
South-Eastern Europe	762	3.3	697	2.9	767	3.1	871	2.9
Eastern Europe	258	1.1	242	1.0	253	1.0	285	1.0
North Africa & Middle East	831	3.6	752	3.1	831	3.3	1 149	3.8
South-East Asia	2 459	10.5	2 641	11.0	2 593	10.4	3 515	11.7
North-East Asia	1 203	5.1	1 381	5.7	1 325	5.3	1 684	5.6
China[b]	2 430	10.4	2 424	10.1	2 129	8.6	3 126	10.4
Hong Kong[c]	1 725	7.4	1 743	7.2	1 735	7.0	2 025	6.8
South Asia	408	1.7	409	1.7	419	1.7	554	1.9
Central Asia	22	0.1	17	0.1	27	0.1	25	0.1
North America	1 074	4.6	1 051	4.4	1 153	4.6	1 147	3.8
South & Central America & the Caribbean	220	0.9	263	1.1	281	1.1	367	1.2
Sub-Saharan Africa	445	1.9	482	2.0	558	2.2	678	2.3
Total[d]	**23 404**	**100.0**	**24 071**	**100.0**	**24 851**	**100.0**	**29 938**	**100.0**

[a] Oceania excludes Australia. [b] Excludes the Special Administrative Regions and Taiwan. [C] Special Administrative Region of China. [d] Includes former Union of Soviet Socialist Republics, Baltic States and 'Not Stated'.

Sources: DIMIA (2005c), DIMIA (2004a).

E Labour market analysis

In chapters 4 and 5, the Commission compared the skills and labour market outcomes (labour force participation rate, unemployment rate, hours worked and income per hour worked) of immigrants and Australian-born workers. Data were also presented on the skills and labour market outcomes for subgroups of immigrants. These subgroups included those who had recently arrived in Australia, those with lesser English skills and immigrants living in regional areas. Further, the Commission presented estimates of the contribution that different factors (such as education level, age and English ability) made to observed differences in the labour market outcomes of immigrant and Australian-born workers.

In the first part of this appendix, the nature of the data and variables used in the analysis is discussed. In section E.2, aspects of the method used in the labour market analysis are outlined. Finally, additional results, not reported in chapter 4, are presented.

E.1 Data and variables

For the labour market analyses undertaken in chapters 4 and 5, data were sourced from the 1986, 1991, 1996 and 2001 Australian Censuses of Population and Housing.

The ABS provided the Commission with unpublished, highly disaggregated group data based on the working-age population (aged 15 years and over). The groups were the result of disaggregating the working age population by gender, state or territory of residence, region (capital city or other), industry of employment, age group, level of post-school education, occupation, country of birth, years since arrival in Australia, and English language ability. The data provided information on the group averages of variables such as participation rates, unemployment rates, hours worked and weekly income for around 66 000 groups in each Census.

Dependent variables

Four labour market statistics were used as dependent variables in the regression and decomposition analysis:

- participation rate (number of people in the labour force divided by number of working-age people)
- unemployment rate (number of people unemployed divided by number of people in the labour force)
- hours worked (per week)
- hourly income (weekly income for each group divided by hours worked per week).

Explanatory variables

A large set of explanatory variables were used to estimate the participation rate, unemployment rate, hours worked and hourly income models. Each variable was a binary (1,0) representing the category (Greene 2003, p. 116–7).

The means and standard deviations for some of these variables are presented in table E.1.

Age variables

Four age category variables were defined:

- 15 to 24 years
- 25 to 44 years
- 45 to 64 years
- 65 years and over.

These variables were included in each regression model.

Education variables

Four post-school education category variables were used. Each category corresponded to one or more ASCED categories. The variables were:

- no post-school education qualifications
- certificate level qualifications

Table E.1 **Group means**

Australian population aged over 15 years, 1986 to 2001 censuses

	Units	*1986*	*1991*	*1996*	*2001*
Hourly Earnings	$/hr	9.6	13.4	15.8	18.5
Participation rate	%	61.4	63.0	61.9	63.0
Unemployment rate	%	9.2	11.6	9.2	7.4
Age					
15 to 24	%	21.4	21.2	18.6	17.6
25 to 44	%	41.0	41.3	40.5	39.0
45 to 64	%	25.0	24.6	27.0	29.5
65 and over	%	12.6	12.9	13.9	13.9
Education					
No post-school qualifications	%	69.6	69.7	65.7	60.5
Certificate level	%	20.4	46.0	15.4	17.9
Bachelor degree/diploma level	%	8.5	55.6	15.8	18.0
Postgraduate level	%	1.5	62.5	3.1	3.6
Other demographics					
Live in a regional area	%	36.3	36.5	36.4	36.1
Female	%	50.3	50.1	50.3	50.5
Immigrant	%	24.9	25.8	26.3	26.3
English ability of immigrants					
Not well or not at all	%	2.8	3.0	2.9	2.8
Very well or well	%	8.0	8.7	9.2	9.7
Native speaker	%	14.1	14.1	14.2	13.9
Years since immigrant's arrival in Australia					
Recent (<5)	%	2.6	4.4	3.3	3.6
Medium (5 to 15)	%	5.4	4.9	6.2	5.9
Long term (15+)	%	16.9	16.5	16.8	16.8
Industry					
Accommodation, cafes and restaurants	%	1.9	2.4	2.7	2.9
Agriculture, forestry and fisheries	%	3.3	2.7	2.5	2.4
Communications	%	1.2	1.0	1.1	1.1
Construction	%	3.8	3.6	3.7	4.0
Culture and recreation	%	1.0	1.1	1.4	1.5
Electricity, gas and water	%	1.1	0.8	0.4	0.4
Education	%	3.9	4.0	4.1	4.3
Finance and insurance	%	2.6	2.7	2.3	2.3
Government admin. & defence	%	3.5	3.4	2.9	2.7
Health	%	4.7	5.0	5.5	5.8
Manufacturing	%	8.4	7.7	7.3	7.2
Mining	%	0.8	0.7	0.7	0.5
Personal services	%	1.8	2.0	2.1	2.2
Property and business services	%	3.7	4.4	5.7	6.6
Retail trade	%	7.8	8.0	7.9	8.7
Transport and storage	%	3.1	2.7	2.5	2.6
Wholesale trade	%	3.3	3.6	3.4	3.1

Source: Productivity Commission estimates based on unpublished ABS data.

- bachelor level qualification, which includes bachelor degree, advanced diploma and diploma
- postgraduate level qualifications, which includes postgraduate degree, graduate diploma and graduate certificate.

These education variables were used in each regression model, except for the model with hours worked as the dependent variable. In the model with hours worked, education was replaced by categories of occupation, which explained more of the variance in hours worked across groups.

Demographic variables

Two demographic variables relating to gender and location were included:

- lives in a regional area — all persons who lived outside capital cities
- female.

Both of these variables were included in each model.

Migrant specific variables

A collection of immigrant specific variables was included. The variables indicated the length of time an immigrant had been in Australia and their English language ability. These variables were included in most of the regression models. However, time in Australia related only to immigrants, it was not included in the decomposition analysis.

Time since arrival in Australia

Three variables were used to measure the length of time that immigrants had been in Australia:

- recently arrived — in Australia less than five years
- medium term — in Australia for between five and fifteen years
- long term — in Australia for more than 15 years.

English language ability

Three variables were used to measure the English language proficiency of immigrants:

- English only — immigrant's who reported that they only speak English at home

- speak English ‘very well’ or ‘well’
- speak English ‘not well’ or ‘not at all’.

Industry of employment

Seventeen industry groups were used as variables. The groups were based on the one-digit industry codes from the Australian and New Zealand Industry Classification. The industry variables are:

- accommodation, cafes and restaurants
- agriculture, forestry and fisheries
- communications
- construction
- culture and recreational services
- electricity, gas and water
- education
- finance
- government, administration and defence
- health
- manufacturing
- mining
- personal services
- professional and business services
- retail trade
- transport and storage
- wholesale trade.

Occupations

Five occupation groups were used. The groups were based on the Australian Standard Classification for Occupations second edition. The nine one-digit groups were combined, where appropriate according to the Australian Standard Classification for Occupations occupational skill index:

- managers and administrators, and professionals
- associate professionals

- tradespersons and related workers, and advanced clerical and sales and service workers
- intermediate clerical, sales, service, production and transport workers
- other employed.

Data issues

There are a number of limitations to using the Census to obtain measures of labour market performance. These relate to both the nature of the data and the way that they are collected:

- All data collected from the Census are self-reported (unlike data collected for the ABS's labour force surveys) and might suffer from bias or human error.
- Income data collected from the Census are given in bands, which are asymmetrically compressed at the upper end of the income distribution. Further, the income that is reported includes earnings from all sources, including rental properties and other investments.
- Hours worked data are not an average over the year, but taken from the week before the census. This might have significant implications in certain industries and for shift or part-time workers.

The impact of these issues on the validity of the results is tempered by the comparative nature of the analysis. The analysis is about comparing labour market outcomes of immigrants relative to that of Australian-born workers. In this situation, the possibility of bias or systematic error in the Census income or hours worked data would only present a problem if it asymmetrically affected the statistics for immigrants and Australian-born workers.

Notwithstanding the limitations, the Census remains the most appropriate data set for comparing, at a highly detailed level, the labour market outcomes of immigrants and Australian-born workers over time. In comparison, other potentially suitable data sets have greater limitations, such as not reporting information on both hours worked and income (such as the ABS *Labour Force Survey*), having too small a sample (ABS *Survey of Income and Housing*), or only collecting labour market data on immigrants (the Department of Immigration and Multicultural Affairs, *Longitudinal Survey of Immigrants to Australia*).

E.2 Method

In chapters 4 and 5, the labour market performances of immigrants and Australian-born workers were compared through weighted, ordinary least square regressions on grouped data. The labour market variable of interest (participation rate, unemployment rate, hours worked and hourly income) was regressed on a set of explanatory variables drawn from the broader human capital literature, previous empirical studies and model specification tests.

To assist in identifying whether the regression models were correctly specified (and more specifically, test whether significant interaction effects had been omitted), a stepwise regression procedure was used (Greene 2003, p. 152).

Decomposition analysis

In order to better clarify the sources of difference in the earnings of immigrants and Australian-born workers (or between other groups of interest), a Blinder-Oaxaca decomposition technique was used (Greene 2003, p. 53).

The Blinder-Oaxaca technique divides the difference in the estimated labour market outcome between immigrants and Australian-born workers into two parts:

- a part reflecting differences in characteristics (composition) between immigrants and Australian-born workers
- a part reflecting differences in parameters (or differences after controlling for composition) between immigrants and Australian-born workers.

Regression equations are estimated for immigrants and Australian-born workers and used in conjunction with these groups' mean values for each variable to decompose the sources of difference. For example, using the Blinder-Oaxaca technique, we estimate the hourly income of immigrant workers ($E[HI_{I,,i}]$) for Census period i and subtract the estimated hourly income of Australian-born workers for the same period ($E[HI_{AB,i}]$):

$$E[HI_{I,i}] - E[HI_{AB,i}] = x'_{I,i}\beta_I - x'_{AB,i}\beta_{AB}$$

where $x'_{I,i}$ and $x'_{AB,i}$ are the sets of mean values for each explanatory variable, and β_I and β_{AB} are the estimated coefficients on each explanatory variable for immigrant and Australian-born workers respectively.

The difference in estimated hourly income can be decomposed as follows:

$$E[HI_{I,i}] - E[HI_{AB,i}] = x'_{AB,i}\beta_I - x'_{AB,i}\beta_{AB} + x'_{I,i}\beta_I - x'_{AB,i}\beta_I$$
$$= x'_{AB,i}(\beta_I - \beta_{AB}) + (x'_{I,i} - x'_{AB,i})\beta_I$$

The first term on the right-hand side above can be described as the unexplained, non-compositional component of the hourly income difference. The second term is the component of the hourly income difference that is due to differences in endowments of human capital and other explanatory factors (differences in composition). Differences in composition include the English ability of immigrants. All Australian-born people have the highest level of English proficiency. This means that parameters cannot be estimated for the English ability of Australian-born people. Instead, for the purposes of the Blinder-Oaxaca decomposition, it is assumed that lesser English ability would have the same effect on an Australian-born person's labour market outcomes as it does on those of an immigrant.

The Blinder-Oaxaca decomposition method can suffer from 'obvious index-number problems' (Blinder 1973, p. 438). The problem relates to choosing which set of coefficient estimates to use when attributing wage differentials to differences in characteristics — the coefficient estimates for the Australian-born population, or the coefficient estimates for the immigrant population. We follow Blinder's lead in choosing to use the majority group (in this case, the Australian-born population) for the base set of coefficients. As explained in Blinder (1973), this choice is the most useful for economic interpretation of the decomposition results.

This procedure is identical for decomposition involving participation rates, unemployment rates, and working hours.

E.3 Additional results

The following tables present regression results for participation rates (table E.2), unemployment rates (table E.3) and working hours (table E.4).

Table E.2 **Participation rate regression results[a]**

	1986	*1991*	*1996*	*2001*
Adjusted R-square	0.92	0.94	0.95	0.95
Participation rate for 25 to 44 year old, Australian-born, no qualifications, in a capital city	85.27	86.32	83.90	82.22
Age				
15 to 24	-7.13	-10.69	-8.66	-8.68
45 to 64	-18.46	-16.61	-13.40	-11.15
65 and over	-66.96	-69.99	-69.56	-68.54
Education				
Postgraduate level	19.66	18.80	21.06	20.90
Bachelor degree/diploma level	17.62	16.63	17.91	17.65
Certificate level	13.61	12.53	12.01	12.57
Other demographics				
Live in a regional area	-1.83	-2.43	-2.69	-2.98
Female	-23.42	-18.23	-15.34	-13.01
Immigrant	3.59	1.86	1.90	2.72
English ability of immigrants				
Not well or not at all	-7.41	-9.05	-17.35	-22.40
Very well or well	-5.10	-4.59	-6.20	-9.48
Years since immigrant's arrival in Australia				
Recent (<5)	0.30[c]	-1.51[c]	-9.55	-7.87
Medium (5 to 15)	1.33[c]	1.96	0.96[c]	-1.40[b]

Model also includes interactive effects between immigrants' age, education, English ability and years since arrival in Australia.

[a] All reported coefficients are significant at the 1 per cent level, unless otherwise indicated. Regression of group data weighted by persons. [b] Significant at the 5 per cent level. [c] Not significant at the 5 per cent level.

Source: Productivity Commission estimates based on unpublished ABS data.

Table E.3 **Unemployment rate regression results[a]**

	1986	*1991*	*1996*	*2001*
Adjusted R-square	0.76	0.84	0.81	0.81
Unemployment rate for 25 to 44 year old, Australian-born, no qualifications, in a capital city	8.25	11.56	9.66	8.27
Age				
15 to 24	8.40	8.77	6.82	6.04
45 to 64	-2.16	-2.60	-1.59	-1.89
65 and over	-4.46	-4.53	-6.13	-5.21
Education				
Postgraduate level	-6.77	-8.33	-6.76	-5.27
Bachelor degree/diploma level	-6.97	-7.57	-6.43	-5.23
Certificate level	-5.68	-4.89	-4.44	-3.61
Other demographics				
Live in a regional area	3.59	2.29	2.56	2.00
Female	-0.62	-2.57	-2.01	-1.54
Immigrant	-1.35	-0.84	-0.83	-1.06
English ability of immigrants				
Not well or not at all	14.03	18.52	15.87	12.56
Very well or well	2.24	3.99	3.91	2.88
Years since immigrant's arrival in Australia				
Recent (<5)	12.42	9.27	9.81	5.14
Medium (5 to 15)	2.99	2.64	0.50[b]	1.07
Model also includes interactive effects between immigrants' age, education, English ability and years since arrival in Australia.				

a All reported coefficients are significant at the 1 per cent level, unless otherwise indicated. Regression of group data weighted by persons in labour force. **b** Not significant at the 5 per cent level.

Source: Productivity Commission estimates based on unpublished ABS data.

Table E.4 **Working hours regression results**[a]

	1986	*1991*	*1996*	*2001*
Adjusted R-square	0.70	0.76	0.81	0.83
Hours worked for 25 to 44 year old, Australian-born, 'other occupation' in manufacturing industry and in a capital city	37.34	37.14	36.84	37.92
Age				
15 to 24	0.02[c]	-1.90	-2.72	-4.90
45 to 64	-0.72	-0.43	-0.31	0.16
65 and over	-8.32	-8.59	-9.39	-10.73
Occupation				
Managers and professionals	4.54	5.06	5.68	7.53
Associate professionals	2.15	3.12	4.82	5.73
Tradespersons and advanced clerical	1.27	1.85	2.53	3.01
Intermediate clerical/sales	1.71	2.26	2.54	2.73
Other demographics				
Live in a regional area	-0.31	-0.11	-0.35	0.00[c]
Female	-6.39	-6.33	-6.02	-7.09
Immigrant	0.14	0.19	0.02[c]	0.07[c]
English ability of immigrants				
Not well or not at all	-0.69	-0.76	-1.07	-2.26
Very well or well	-0.13[c]	-0.14[b]	-0.31	-0.80
Years since immigrant's arrival in Australia				
Recent (<5)	0.63	0.28	-0.19[c]	-0.59
Medium (5 to 15)	0.38	0.49	0.36	0.14[c]
Industry				
Accommodation, cafes and restaurants	-7.44	-8.50	-8.81	-8.39
Agriculture, Forestry and Fishing	0.46	-0.42	-0.76	0.69
Communications Services	-2.80	-2.15	-1.22	-2.44
Construction	-1.28	-1.31	-1.14	-0.56
Culture and Recreational Services	-6.98	-7.92	-7.60	-7.89
Electricity, Gas and Water Supply	-6.68	-6.40	-7.22	-6.80
Education	-1.55	-0.73	-1.15	-1.07
Finance and Insurance	0.59	0.69	-4.03	-4.09
Government Administration and Defence	-1.24	-1.46	-5.09	-5.70
Health and Community Services	-3.94	-4.09	-5.70	-5.60
Mining	-0.64	0.36[b]	1.56	8.26
Personal and Other Services	-4.23	-5.90	-6.65	-6.31
Property and Business Services	-5.46	-6.58	-7.15	-6.30
Transport and Storage	-3.75	-5.74	-8.69	-7.98
Retail Trade	-1.12	-0.49	-0.53	-1.20
Wholesale Trade	0.56	-0.67	-0.83	-0.90
Model also includes interactive effects between occupation and industry as well as between immigrants' age, English ability and years since arrival in Australia				

[a] All reported coefficients are significant at the 1 per cent level, unless otherwise indicated. Regression of group data weighted by employed persons. [b] Significant at the 5 per cent level. [c] Not significant at the 5 per cent level.

Source: Productivity Commission estimates based on unpublished ABS data.

F Effects on labour supply of an increase in skilled migration

The Commission has been asked to examine the effects of migration and population growth on productivity, economic growth and the skill levels of the Australian population. In addition, industry, occupation and regional effects are to be identified, where possible. It is difficult to isolate the effects of migration by simply analysing real world data, such as that collected by the ABS. There are too many other factors that are important in explaining observed outcomes.

An alternative approach is required. Therefore, to shed light on these effects, the Commission has simulated the impacts on the economy of a 50 per cent increase in the level of Skilled visa immigration. The effect of migration is estimated as the difference between the outcomes in the economy of a base-case simulation and the increased-migration simulation.

The first step in this approach is to simulate the effects of increased Skilled visa immigration on labour supply.

Outlined in this appendix is a description of two demographic models, the Labour Supply Projection model (LSP) and the New Arrival Tracker (NAT). These models are used to project the population and labour supply effects of a change in the number and visa composition of immigrants. The appendix is structured in seven parts:

- section F.1 describes the role of the two demographic models
- section F.2 presents summary results of the projections
- section F.3 explains the modelling framework embedded in NAT
- section F.4 describes the key assumptions of the demographic modelling
- section F.5 outlines the data used to calculate parameters for NAT
- section F.6 compares labour market outcomes by visa group
- section F.7 presents a table of qualification classifications.

F.1 Role of the two demographic models

The LSP model was originally developed for the Commission's report on ageing (PC 2005b). For the purpose of this study, LSP has been modified so that it can be used to project Australia's labour supply by detailed categories of qualifications.

NAT was developed specifically for this study to quantify the additional contributions of new arrivals[1] to the projections of labour supply derived from LSP. The projections in NAT are based on assumptions about the demographic, labour market and qualification profiles of future immigrants.

The two models are used to project a base-case simulation and an increased-migration simulation. The base-case simulation projects the supply of labour over the next 20 years, using the medium scenario projections from the ageing study. It includes an assumption that migration continues into the future, fixed at the level in 2003-04. The increased-migration simulation includes a permanent 50 per cent increase in the level of Skilled visa immigration from 2004-05.

F.2 Summary of results

This section presents a summary of results from NAT and LSP for:

- population size
- labour supply, defined as hours worked per capita
- hours supplied by qualification level and field.

The labour market projections are determined by two sets of factors:

- parameters on participation rates, unemployment rates, hours worked and qualifications for various age–gender groups
- changes in the shares of age–gender groups as people age and the cumulative number of additional immigrants increases.

One of the key focal points of this appendix is about how the labour supply characteristics of new arrivals, in particular the 'additional' new arrivals in the increased-migration simulation, differ from the base-case population. It is the

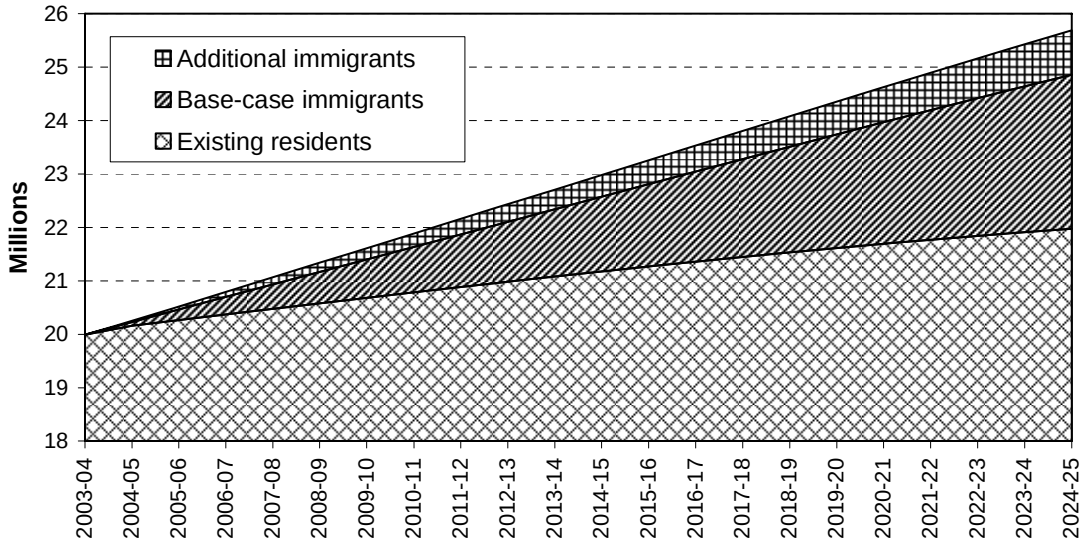
[1] For the purposes of this analysis, persons arriving under the Migration and Humanitarian Programs in Australia after 30 June 2004 are called 'new arrivals'. This includes children or family that accompany the primary applicant, and their children subsequently born in Australia.

differences between the additional immigrants and the base-case population that change the composition (and size) of the aggregate labour supply over time.

Population

Migration is a significant source of population increase in Australia. In the base case, there are projected to be about 2.89 million more persons in Australia by 2024-25, because of the cumulative effect of immigration.[2] This increases to 3.72 million in the increased-migration simulation. Over the same period, the natural increase in population is about 1.98 million (figure F.1).

Figure F.1 **Population projections with two migration scenarios**
Base-case and increased-migration simulations



Source: Productivity Commission projections from NAT and LSP (scenario 2, PC 2005b).

Labour supply

In this study, labour supply is expressed in terms of hours worked per head of population. This can be expressed as the product of four ratios:

$$\frac{Hours}{POP} = \frac{POP15+}{POP} \times \frac{LF}{POP15+} \times \frac{EMP}{LF} \times \frac{Hours}{EMP}$$

$$= \frac{POP15+}{POP} \times \frac{LF}{POP15+} \times (1-UR) \times \frac{Hours}{EMP}$$

2 This includes the children born to immigrants once in Australia.

where POP15+ is the population aged 15 and over, EMP is the number of persons employed, UR is the unemployment rate and LF is the labour force (persons in work or looking for work). Also:

$\frac{POP15+}{POP}$ = proportion of the population of working age

$\frac{LF}{POP15+}$ = participation rate

$1-UR = \frac{EMP}{LF}$ = employment rate

$\frac{Hours}{EMP}$ = average hours worked per worker

The factors determining labour supply for the base-case and the increased-migration simulations in 2004-05 and 2024-25 (the first and last years of the projections) are shown in table F.1.

Table F.1 **Summary of projected labour supply**

		2004–05		*2024–25*	
	Units	*Base-case simulation*	*Increased-migration simulation*	*Base-case simulation*	*Increased-migration simulation*
Population	Number	20 228 190	20 247 771	24 855 754	25 687 942
Proportion of working age	%	80.20	80.20	82.56	82.39
Participation rate	%	63.52	63.53	59.91	60.64
Unemployment rate	%	5.58	5.59	4.90	4.88
Hours per worker	Hrs/week	33.56	33.56	32.57	32.62
Hours worked per capita	**Hrs/week**	**16.14**	**16.14**	**15.32**	**15.50**

a Taking a moving average of the population (consistent with LSP), leaves 19 582 additional persons in 2004-05, approximately half the full increase of 38 940 additional immigrants per year.

Source: Productivity Commission projections from NAT and LSP (scenario 2, PC 2005b).

Several points can be made about the projections:

- The effect on labour supply (measured as hours worked per head of population) of the additional immigration is positive but small.
- Between 2004-05 and 2024-25, the decrease in participation rates, unemployment rates and average hours in both projections is due mostly to ageing. Increasing migration only partly offsets the effects of ageing.

- By 2024-25, the effect of the increased immigration is to increase participation rates and average hours per worker compared with the base case. This reflects the younger age profile of new arrivals, and the fact that Skilled visa immigrants tend to have better labour market outcomes than the rest of the population.
- The increase in immigration reduces the proportion of working-age persons in the population. This is because the additional immigrants have a higher share of children compared with the base-case population.

The overall effect of the additional immigrants is to increase the number of hours worked per head of population by 1.2 per cent. Almost 90 per cent of this increase is due to the increase in participation rates. It is worth noting that the hours worked by the base-case population are assumed to be the same in both simulations.

It is the difference in labour market and demographic characteristics that matters

The aggregate effects shown in table F.1 depend on the difference between the characteristics of the additional immigrants and the base-case population, as well as the relative size of the two groups. For example, in 2024-25, the hours worked per head of population increases by 1.2 per cent because:

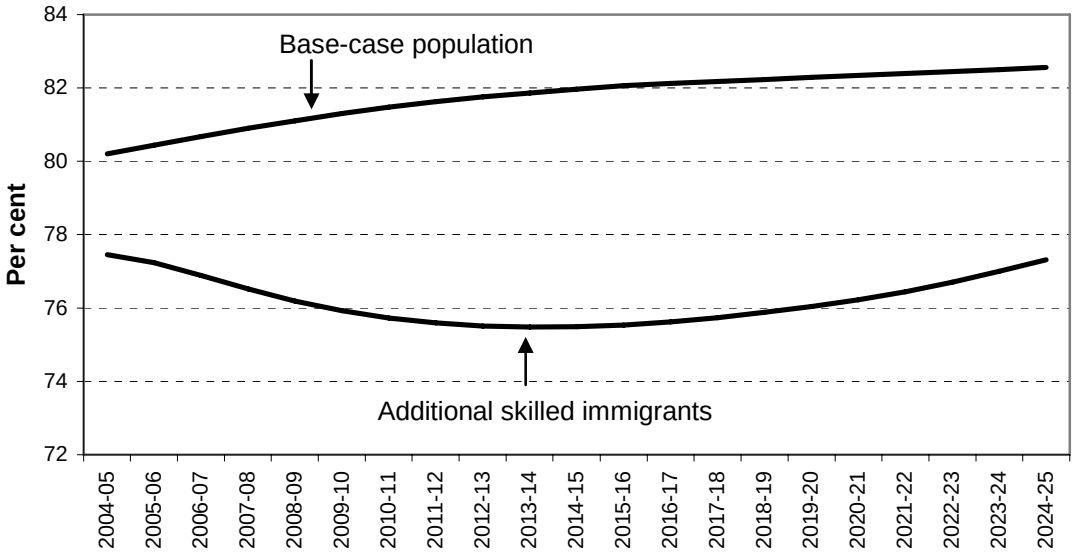
- the additional immigrants work 37 per cent more hours per additional immigrant; but
- the additional immigrants only represent 3.2 per cent of the population.

The next five figures contain two panels each. The additional immigrants and the base-case population are compared in panel (a). The *effect* of the differences is shown in panel (b). The increased-migration simulation in panel (b) is the weighted average of the base-case population and the additional immigrants in panel (a).

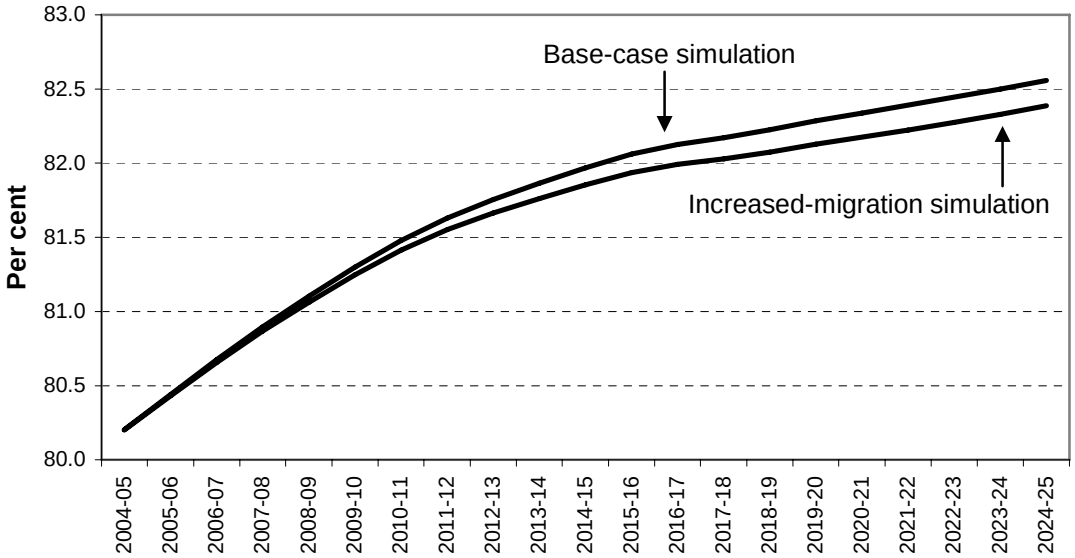
The working-age share of the additional immigrants is lower than that of the base-case population (figure F.2). The additional immigrants are generally of prime child-bearing age, and therefore they have relatively more children compared with the base-case population. By 2024-25, the working-age share of the population in the increased-migration simulation is about 0.2 percentage points lower than in the base case, as shown in panel (b).

Figure F.2 **Projected working-age share**
2004-05 to 2024-25

(a) Difference between the additional immigrants and the base-case population



(b) Effect on the total population (weighted average)



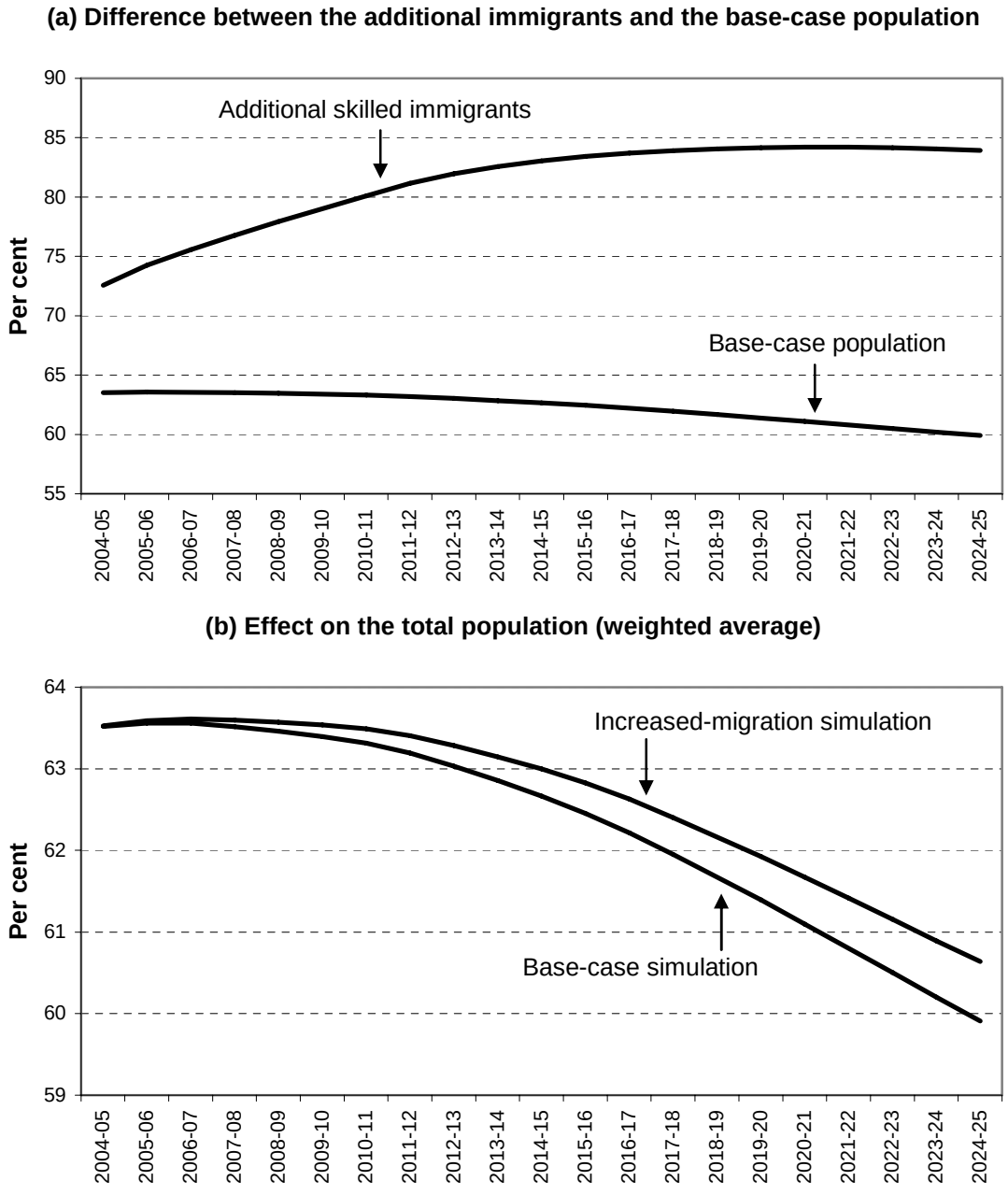
Source: Productivity Commission projections from NAT and LSP (scenario 2, PC 2005b).

The additional immigrants have higher participation rates than do those in the base-case population (figure F.3). This is primarily due to the age–gender profile of Skilled visa immigrants. Skilled visa immigrants tend to be of prime working age and are more likely to be male. Both of these characteristics are associated with higher participation rates. In addition, Skilled visa immigrants have higher participation rates than existing residents of the same age and gender.

The gap between the participation rates for the base-case population and the additional immigrants increases as the immigrants acclimatise to the Australian labour market (explained further in section F.3).

The additional immigrants pull up the participation rates in the increased-migration simulation by 0.7 percentage points (1.2 per cent) in 2024-25, as shown in panel (b).

Figure F.3 **Projected participation rates**
2004-05 to 2024-25

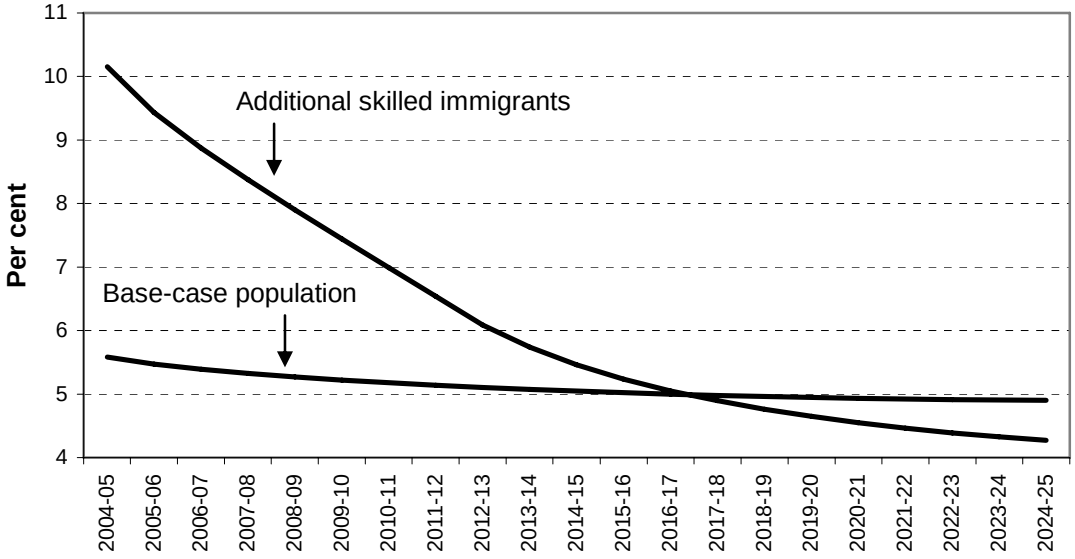


Source: Productivity Commission projections from NAT and LSP (scenario 2, PC 2005b).

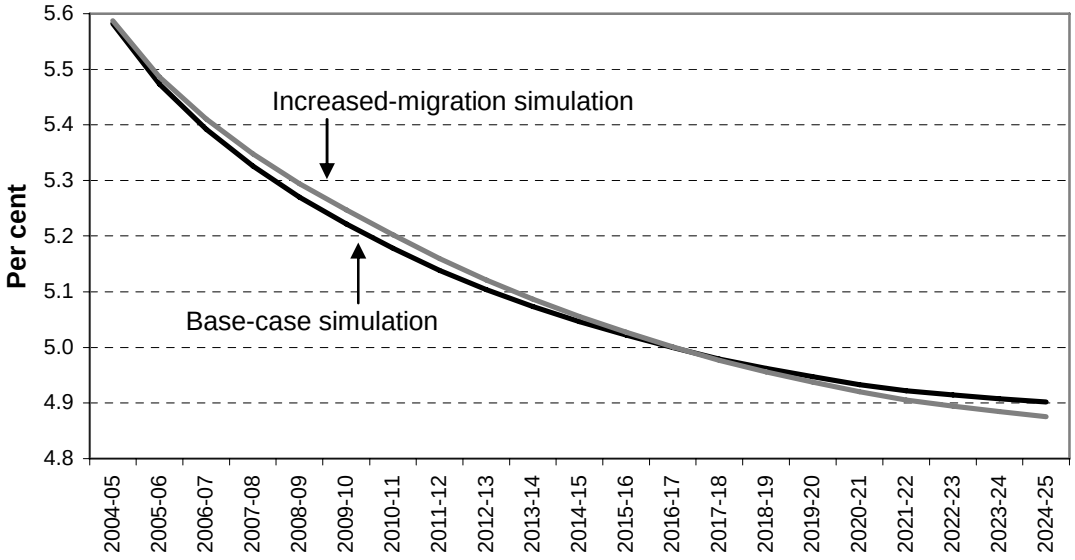
The additional immigrants have higher unemployment rates than the base-case population for the first 13 years of the projections (figure F.4). This is due to a combination of the younger age structure and high initial unemployment rates of recent arrivals. However, as successive cohorts of immigrants adjust to the labour market, the unemployment rate of the cumulative stock of additional immigrants falls. The unemployment rate is higher in the increased-migration simulation before 2016-17, but by 2024-25, it is 0.03 percentage points lower (0.5 per cent).

Figure F.4 **Projected unemployment rates**
2004-05 to 2024-25

(a) Difference between the additional immigrants and the base-case population



(b) Effect on the total population (weighted average)

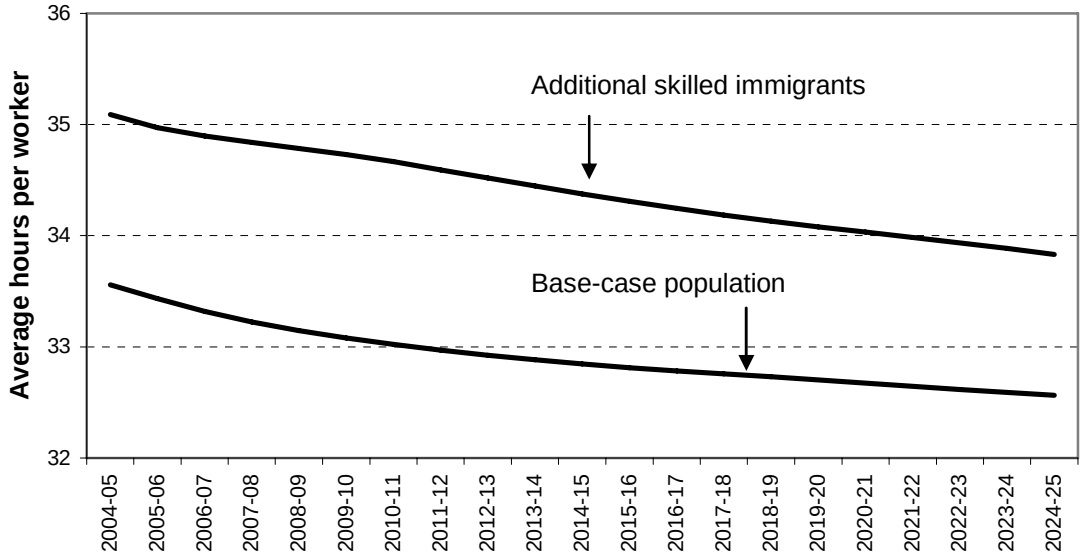


Source: Productivity Commission projections from NAT and LSP (scenario 2, PC 2005b).

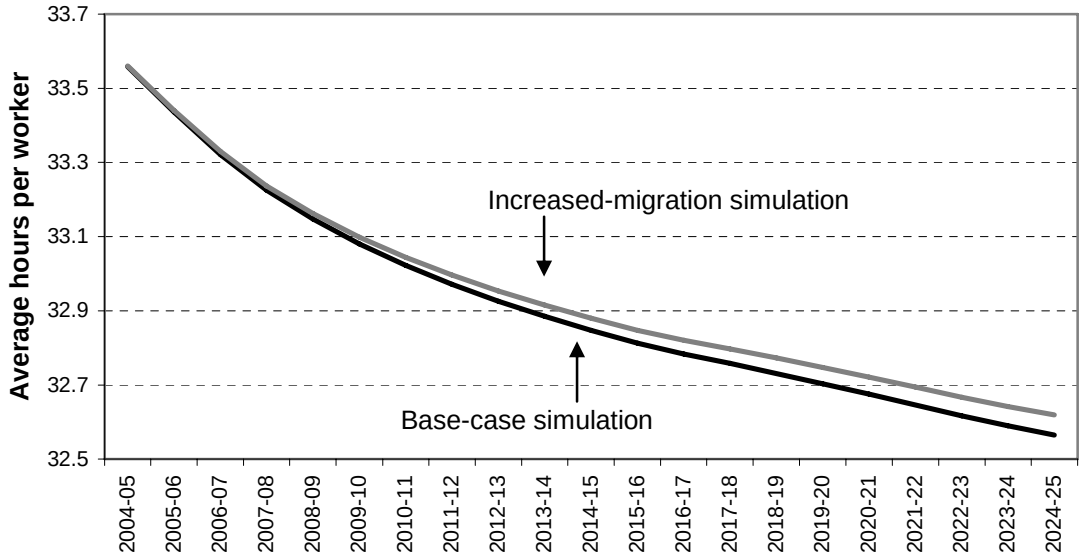
The additional immigrants work more hours per week than does the rest of the population (figure F.5). This is due to the age and gender structure of the additional immigrants compared with the base-case population. The additional immigrants tend to be prime working-age males, which is associated with working longer average hours. Therefore, average hours per worker is 0.16 per cent higher in the increased-migration simulation by 2024-25, as shown in panel (b).

Figure F.5 **Projected average hours per worker**
2004-05 to 2024-25

(a) Difference between the additional immigrants and the base-case population



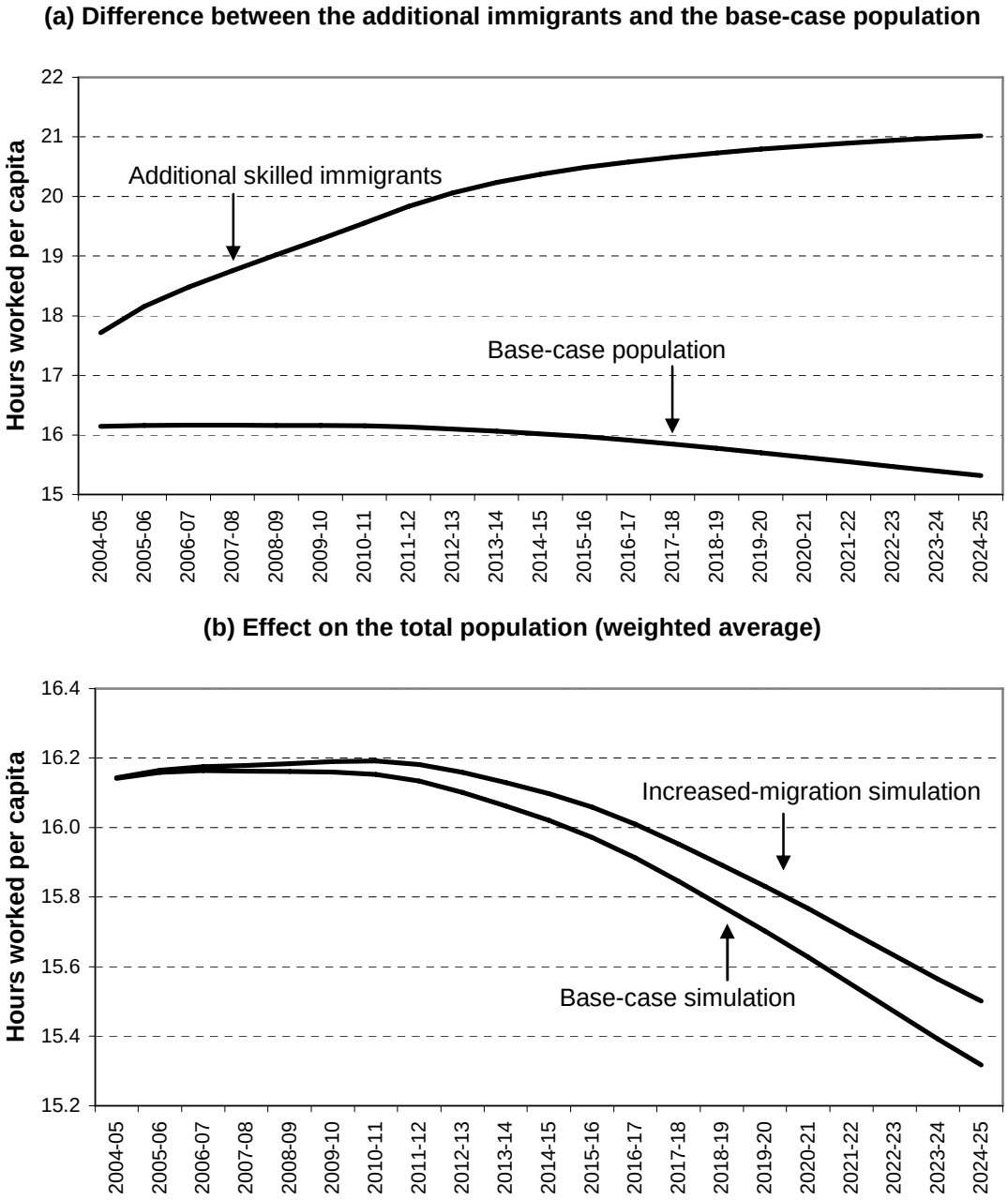
(b) Effect on the total population (weighted average)



Source: Productivity Commission projections from NAT and LSP (scenario 2, PC 2005b).

The combined effect of the four ratios determines the change in labour supply per capita (figure F.6). The additional immigrants work more hours per capita — almost 40 per cent more by 2024-25, as shown in panel (a). The weighted average effect is a 1.2 per cent increase in hours worked per capita in the increased-migration simulation, shown in panel (b).

Figure F.6 **Overall effect on labour supply**
2004-05 to 2024-25



Source: Productivity Commission projections from NAT and LSP (scenario 2, PC 2005b).

Hours by 67 qualifications

The main input into the MONASH Model is the change in the number of hours of work supplied by qualification.

The qualification mix for the base-case population in 2004-05 is shown in table F.2:

- 47 per cent of hours are supplied by persons with no post-school qualification
- the most common level of post-school qualification is certificate III or IV, accounting for 20 per cent of hours worked, followed by bachelor degrees, 16 per cent
- diplomas, postgraduate degrees and graduate diplomas represent 9, 4 and 3 per cent of hours worked respectively
- engineering and related technologies is the most common field, providing 13 per cent of hours worked; management and commerce is almost as large, accounting for 10 per cent of hours worked.

The qualification mix of the additional immigrants is shown in table F.3.[3] The skill mix of additional hours worked is significantly higher:

- only 27 per cent of the additional hours worked are by persons with no post-school qualification (these would be secondary applicants, such as spouses or older children of the primary applicant)
- the most common level of qualification is a bachelor degree, accounting for 34 per cent of the additional hours
- postgraduate degrees, diplomas and certificates III or IV represent 13, 12 and 11 per cent of the additional hours respectively
- management and commerce, and engineering are the most common fields, providing 18 and 16 per cent respectively of the additional hours worked.

[3] The qualification profile of the additional immigrants is the same as for all Skilled visa immigrants. It includes secondary applicants, which in 2004-05 represented approximately half of all Skilled visa immigrants — that is, the share of primary applicants is around 50 per cent.

Table F.2 **Share of hours worked by qualification for the base-case population**

Per cent, 2004-05

	ASCED level of qualification						
ASCED field of education	*Postgraduate degree*	*Graduate diploma*	*Bachelor degree*	*Advanced diploma or diploma*	*Certificate III or IV*	*Certificate I or II*	*No post-school qualification*
Natural and physical sciences	0.609	0.084	1.174	0.167	0.050	0.005	..
Information technology	0.246	0.159	0.968	0.501	0.239	0.027	..
Engineering and related technologies	0.351	0.109	1.778	1.212	9.254	0.215	..
Architecture and building	0.059	0.022	0.382	0.276	3.761	0.021	..
Agriculture, environmental and related studies	0.091	0.010	0.304	0.354	0.596	0.090	..
Health	0.445	0.573	2.186	1.079	0.662	0.038	..
Education	0.299	0.908	1.973	0.717	0.162	0	..
Management and commerce	0.819	0.563	3.256	2.613	1.931	0.327	..
Society and culture	0.642	0.486	3.042	0.952	1.014	0.056	..
Creative arts	0.076	0.069	0.937	0.669	0.305	0.018	..
Food, hospitality and personal services	0	0	0.050	0.302	2.152	0.106	..
No educational attainment	..	..	..	..	..	..	47.453
Subtotal	**3.638**	**2.984**	**16.051**	**8.843**	**20.126**	**0.904**	**47.453**

.. Not applicable

Source: Total population shares from CoPS, extrapolated from unpublished Survey of Education and Work data, 1996–2004. See complete qualification key in table **F.4**.

Table F.3 **Share of hours worked by qualification for the additional immigrants**

Per cent, 2004-05

	ASCED level of qualification						
ASCED field	*Postgraduate degree*	*Graduate diploma*	*Bachelor degree*	*Advanced diploma or diploma*	*Certificate III or IV*	*Certificate I or II*	*No post-school qualification*
Natural and physical sciences	2.258	0.064	2.633	0.266	0.039	0.035	..
Information technology	1.331	0.409	3.043	1.500	0.243	0.196	..
Engineering and related technologies	1.919	0.106	5.615	2.649	5.837	0.217	..
Architecture and building	0.176	0.037	0.720	0.333	1.477	0.021	..
Agriculture, environmental and related studies	0.318	0.024	0.492	0.299	0.163	0.022	..
Health	1.148	0.233	3.983	1.402	0.213	0.046	..
Education	0.361	0.350	1.300	0.567	0.012	0	..
Management and commerce	3.635	0.530	9.004	3.311	0.740	0.874	..
Society and culture	2.030	0.211	5.651	0.692	0.159	0.119	..
Creative arts	0.168	0.048	1.117	0.616	0.125	0.048	..
Food, hospitality and personal services	0	0	0.076	0.407	1.655	0.114	..
No educational attainment	..	..	..	..	..	..	26.608
Subtotal	**13.345**	**2.013**	**33.634**	**12.042**	**10.665**	**1.693**	**26.608**

.. Not applicable

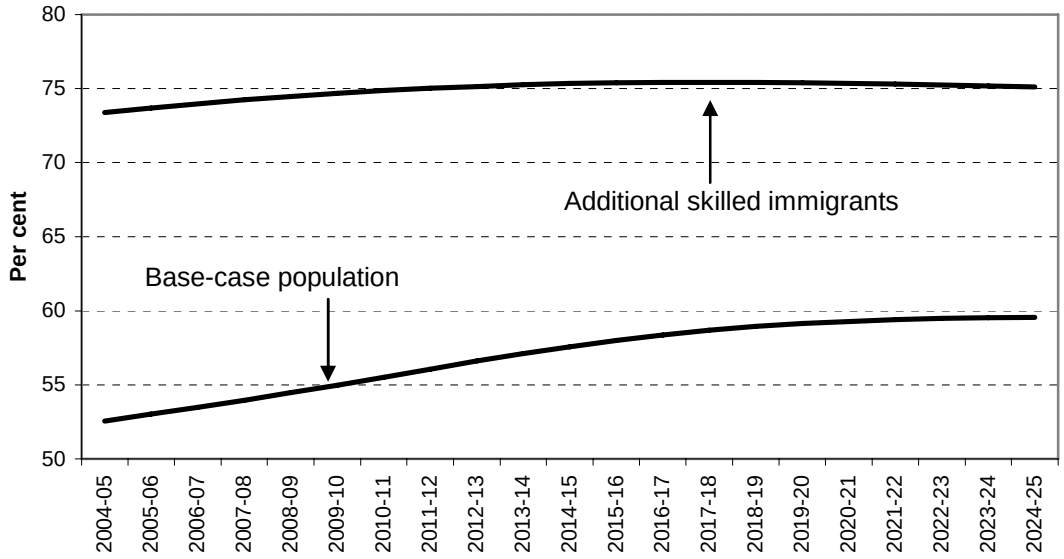
Source: Productivity Commission projections from NAT. See complete qualification key in table F.4.

The qualification shares change over time

Australia's education levels are increasing over time. The share of hours worked by persons with a post-school qualification is increasing. Furthermore, the trend is toward postgraduate diplomas and degrees. This up-skilling of the labour supply is incorporated into the projections of the base-case simulation. It is assumed that the skills of immigrants change at the same rate.[4] The trends in qualification shares are estimated using extrapolations from unpublished data from the Survey of Education and Work, 1996–2004 (see ABS 2005b for the latest release).

For the base-case population, the share of hours worked by persons with a post-school qualification increases from 52.5 per cent to 59.6 per cent, as shown in figure F.7.

Figure F.7 **Trends in the skilled share of hours worked**
All qualifications other than 'no post-school qualification', 2004-05 to 2024-25



Sources: Productivity Commission projections from NAT; total population trends from CoPS, based on analysis of unpublished data from the Survey of Education and Work, 1996–2004 (see ABS 2005b).

4 The rates of change were applied by broad level of qualification, gender and five-year age groups. For example, the share of hours worked by 35 to 39 year old males with postgraduate degrees increases by 33 per cent over the 20 years of the projection. Among the new arrivals, the proportion of hours in each *field* within a qualification *level* is unchanged. For example, of the (base-case) hours worked by 35 to 39 year old male immigrants with postgraduate degrees: 27 per cent are in management and commerce; 20 per cent are in engineering; 17 per cent are in natural and physical sciences; 12 per cent are in health; and 8 per cent are in information technology.

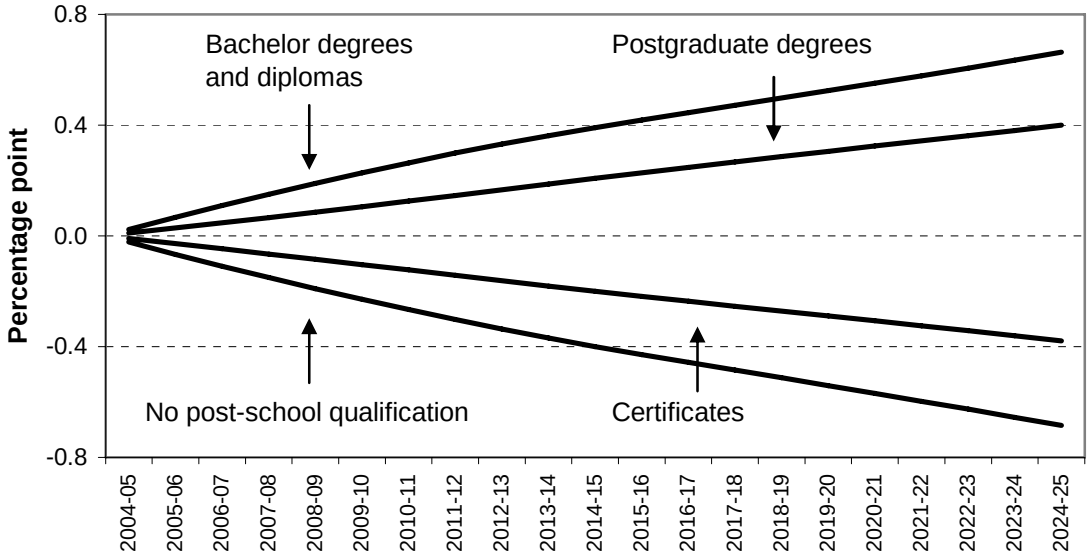
Although new arrivals are assumed to up-skill at the same rate as existing residents, the share of skilled hours worked by the additional immigrants increases only slightly, from 73.4 per cent to 75.1 per cent:

- The additional immigrants have a high proportion of skilled persons, 62 per cent compared with around 50 per cent in the total working-age population.
- Furthermore, immigrants with qualifications significantly outperform non-skilled immigrants in their first few years in Australia's labour market. In other words, immigrants that are more qualified are more likely to be working. This explains around half of the gap between the skill share of the base-case population and the additional immigrants in 2004-05.
- However, the change in the composition of hours worked by new arrivals counteracts the upward trend in skills across all age–gender groups:
  - The labour supply of less skilled new arrivals increases faster than skilled new arrivals, because they have further to 'catch up'.
  - The number of hours worked by cohorts with low rates of post-school qualifications increases as a share of all hours worked by new arrivals. For example, the share of additional hours worked by females over 55 increases from 0.2 per cent in 2004-05 to 2.7 per cent in 2024-25. Approximately half of the hours worked by this cohort are by persons with no post-school qualifications.

As shown in figure F.8, by 2024-25:

- the share of hours worked by persons with postgraduate degrees and graduate diplomas is 0.4 percentage points (4.9 per cent) higher as a result of the additional immigration
- the share of hours worked by persons with bachelor degrees and diplomas is 0.7 percentage points (2.3 per cent) higher
- the share of hours worked by persons with certificates is 0.4 percentage points (1.7 per cent) lower. This is because the additional immigrants are less likely to have certificate III or IV or 'trade' qualifications
- the share of hours worked by persons with no post-school qualification is 0.7 percentage points (1.7 per cent) lower.

Figure F.8 **Difference in the share of hours worked by qualification levels**
Increased-migration simulation minus base case for the total population



Sources: Productivity Commission projections from NAT; total population trends from CoPS, based on analysis of unpublished data from the Survey of Education and Work, 1996–2004 (see ABS 2005b).

F.3 Modelling framework

In this study, the purpose of the two demographic models is to generate the labour supply projections for the MONASH Model simulations.[5] Appendix G summarises the key aspects of the MONASH Model.

Calculating the increased-migration simulation using NAT and LSP

The combination of NAT with LSP is a critical step to analysing the effect of migration. Neither model can, by itself, project results for the entire population *while* allowing for variations in the characteristics of immigrants. NAT does not project the number of existing residents or their labour outcomes. LSP assumes that any 'extra' immigrants in Australia have the same characteristics as existing residents of the same age and gender.

The calculation of the increased-migration simulation is a three-step process:

[5] However, the projection models can be used to estimate the effect of different policy or structural changes on the supply of labour more generally.

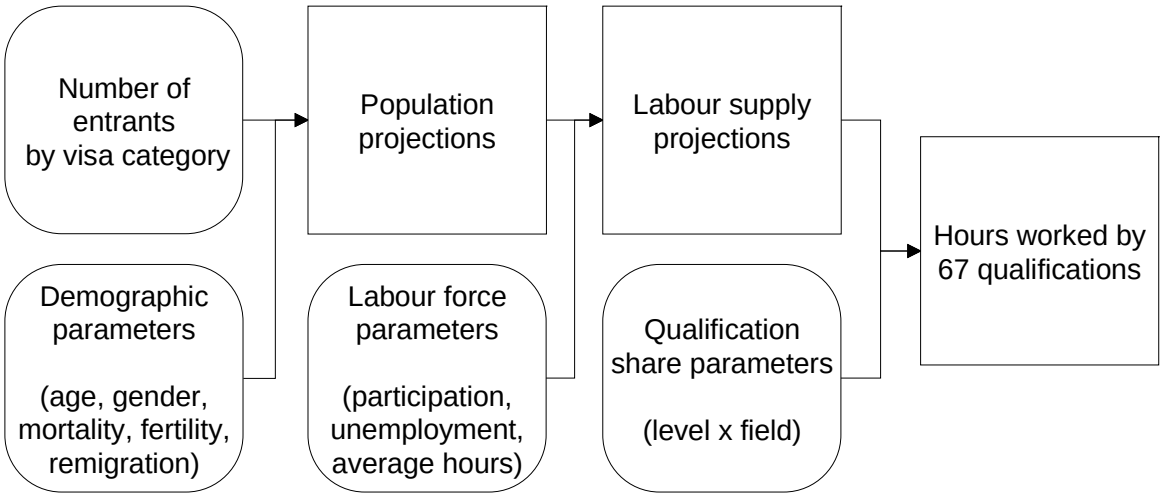
1. Use NAT to project the base-case number of new arrivals, including the labour force, employed persons and hours worked.
2. Subtract the step 1 projections from the base-case projections for the total population obtained from LSP. This provides the 'residual', a projection of the labour outcomes for the total population *excluding* the new arrivals.
3. Use NAT to project the increased-migration simulation for new arrivals, and add the results to the 'residual' from step 2.

This process generates projections for Australia's total population, labour force, workers and hours worked, allowing for the different characteristics of new arrivals.

Three key aspects of NAT

NAT projects three different types of results: population numbers, labour market projections and hours worked by qualification. The results progress from the population projections to the labour market projections, then to the hours worked by qualification (figure F.9).

Figure F.9 **Progression of the projections in NAT[a]**



a Square boxes represent results; rounded boxes represent input data and parameters.

Population projections

NAT projects the number of new arrivals still in Australia at the end of each financial year, by single-year age and gender. The results depend on the number of new arrivals entering each year, the age and gender structure of arrivals (estimated by visa category), mortality, fertility and remigration rates.

To generate the projections, NAT applies the structure of LSP to a small section of the total population. Specifically, NAT uses the cohort-component method: a cohort of persons of a certain age and gender move from age x in one year to age x + 1 in the next year. Some persons exit the cohort, through mortality and emigration, and others enter, via immigration and fertility (births enter into age 0).

For mortality and fertility, NAT uses the medium life expectancy and fertility scenarios from LSP. However, the focus on new arrivals in NAT requires a more detailed 'directional' treatment of migration. The definition of 'new arrivals' also defines immigration: the arrivals each year under the Migration and Humanitarian Programs. The model accounts for emigration through a propensity to leave Australia based on age, gender and time in Australia (section F.5).

Labour market projections

NAT uses the population numbers to project the labour force, number of workers and hours worked. These results depend on the projected population numbers, as well as the parameters for participation rates, unemployment rates and average hours worked. All labour calculations are by five-year age group and gender.

An important feature of the labour market projections in NAT is the acclimatisation path. This adjusts the participation and unemployment rates of new arrivals based on how many years they have been in Australia. New arrivals as a group tend to have lower participation and higher unemployment rates in their early years in Australia, but these improve over time, stabilising after eight years (section F.4).

For example, the participation rate of a 40–44 year old male who came to Australia one year ago with a Skilled visa is 1.7 per cent higher than the population-average participation rate of 40–44 year old males.[6] Ten years later, the same person has a participation rate that is 10 per cent higher than the average participation rate of 50–54 year old males (section F.4 explains the assumption behind this).

Analysis of the 2001 Census and 2004 Labour Force Status and Other Characteristics of Migrants survey indicates that, relative to existing residents, recent arrivals participate less and have higher unemployment rates, controlling for other demographic characteristics, such as age, gender, education and English language ability. Inferior labour market performance in the early years might reflect delays or problems with qualification recognition, and a lack of informal networks, which help people find a job.

6 Per cent differences from the average, *not* percentage points.

This is consistent with results of time series analysis of date from the Longitudinal Survey of Immigrants to Australia that indicate outcomes for immigrants have improved over the past decade. More recent new arrivals have better labour market outcomes than previous cohorts after 18 months (Cobb-Clark 2006), but they still participate less than existing residents with similar characteristics.

Over time, immigrants adapt to the local labour market. Analysis of the 2001 and 1996 Censuses indicates that the effect on participation rates of having arrived ten years ago (on average) is insignificant. In other words, after ten years, immigrants are acclimatised to the Australian labour market.

Onshore applicants will have been in Australia for a significant amount of time before being 'counted' as a new arrival when they apply for permanent migration. Around 40 per cent of Skilled visa immigrants in 2004-05 were onshore applicants.

To account for the increasing share of onshore applicants in Skilled immigration, the acclimatisation path was shortened from ten to eight years, by bringing forward the starting point. Effectively, Skilled immigrants start with two years of acclimatisation.

The children of immigrants, in effect, adopt the visa type of their parents for determining labour market outcomes[7] (and qualifications). This is true whether the child arrives as a secondary applicant, or is subsequently born in Australia.

Qualification mix

NAT allocates the projected hours worked into 67 qualifications. The qualifications represent the highest *level* of qualification obtained in one of 11 *fields* (table **F.4**). The categories are an aggregation of narrow levels and broad fields from the Australian Standard Classification of Education.

Hours are allocated into qualifications by five-year age group and gender. The children of immigrants adopt the visa type of their parents for qualifications in the same way as for labour market outcomes.

7 The participation rate of a given age–gender cohort is a weighted average of participation rates for that age–gender cohort for each visa. The same is true for unemployment rates and qualification profiles. These weights change over time as people age and new immigrants arrive. Once the children of immigrants reach working age, the weighting by visa reflects this. Therefore, all of the additional children in the increased-migration simulation are 'counted' as Skilled visa immigrants for the calculation of labour market outcomes (and qualifications).

F.4 Assumptions

This section focuses on three key assumptions[8] involved in the demographic and labour market modelling:

1. The increase in new arrivals does not displace base-case workers.
2. There is an eight-year acclimatisation path, which means that in their early years in Australia, new arrivals have lower labour force participation and higher unemployment, but after eight years in Australia they have the same outcomes as Australians with the same demographic and qualification characteristics.
3. Each year, new arrivals with the same visa have the same age–gender structure.

First, combining the projections from NAT and LSP assumes that LSP already incorporates any differences between existing residents and new arrivals. The labour supply of Australians and new arrivals is not necessarily the same. Instead, the participation and unemployment parameters in LSP are aggregate rates, equal to a weighted average of the rates of existing residents and new arrivals. Similarly, any displacement of existing residents is also 'built in' to the aggregate participation and unemployment rates in LSP. However, NAT assumes that there is no 'extra' displacement in the increased-migration simulation.

Second, it is assumed that, after eight years, new arrivals have the same participation and unemployment rates as existing residents of the same age, gender *and qualification*. Therefore, the average participation rates of new arrivals for a certain age and gender might be higher than for the total population, *solely* because new arrivals are on average more educated than the total population (and better education is associated with better labour market outcomes).

Third, the age and gender structures of new arrivals coming in each year reflect the profile of current recent arrivals to Australia, allowing for broad visa category (Skilled, Family and Humanitarian). Specifically, the average person entering with a Skilled visa, in each year of the projection, is the same as the average Skilled visa entrant in 2004-05.

Interpreting the projections — a 'what if' analysis

The results from the models are projections and not forecasts. The models project what would happen *if* the scenarios (and assumptions) were to hold. The models do not forecast what *will* happen. Rather, the models are used to attempt to isolate the

8 Technical Paper (forthcoming) provides a more detailed discussion of these and other assumptions, as well as the mechanics of NAT.

important factors that drive the phenomena of interest, making it easier to understand and track the mechanisms at work.

Results from the models, particularly the deviations between the two projections, also provide a useful indication of the direction and magnitude of changes. For example, when used to project a 50 per cent increase in Skilled visa immigration, NAT projects that by 2024-25:

- average hours per worker of the total population increases by 0.16 per cent relative to the base case. The additional immigrants work 3.9 per cent more hours per worker, but they only represent 4.2 per cent of the workforce
- Australia's aggregate participation rate increases by 1.2 per cent (0.7 percentage points). The additional immigrants participate 40 per cent more (24 percentage points), but only represent 3 per cent of working-age persons.

F.5 Data

The structure of NAT requires:

- the age and gender structure of new arrivals
- mortality, fertility and remigration rates
- labour supply parameters for new arrivals, including participation, unemployment and average hours per worker
- the share of hours worked by qualification.

The age structures, mortality, fertility and remigration rates are estimated by single-year age and gender. Labour force participation, unemployment and average hours per worker are defined by gender and five-year age categories, beginning with those aged 15 to 19 and ending with an open-ended category of 70 and over.

Qualifications are split into 67 categories, an aggregation of Australian Standard Classification of Education levels of educational attainment by broad field of study (table **F.4**).

The profiles were constructed from four sets of data:

1. Age, gender, visa category and occupations from unpublished Department of Immigration and Multicultural Affairs (DIMA) data on arrivals in 2004-05.
2. Unpublished data from the Survey of Education and Work (2000-01), which provides a link between occupations and skills.

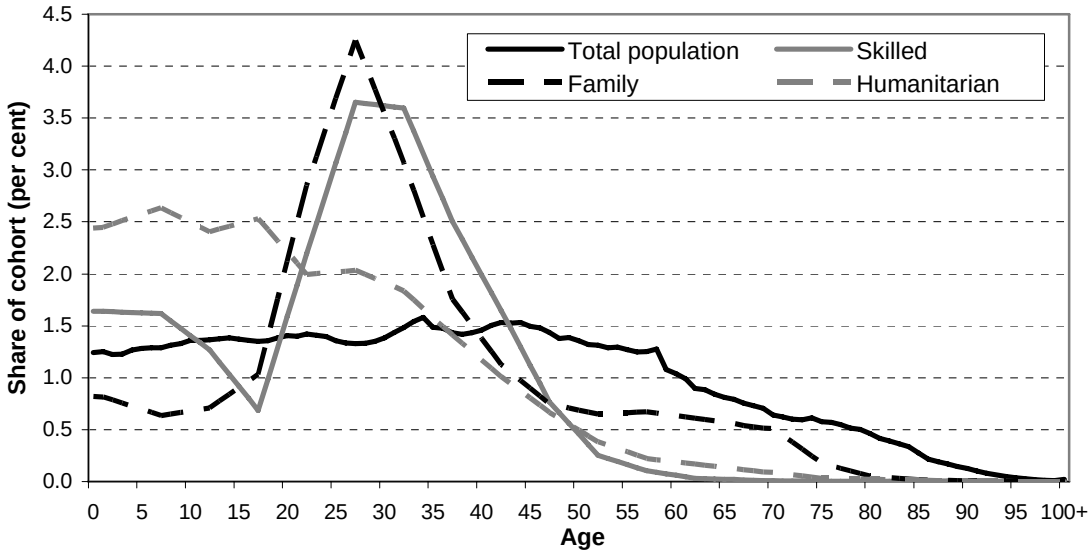
3. Labour market status and hours worked by age, gender, qualification and immigrant status from the 2001 Census. To avoid biases that might arise from using data from a single year, those who had arrived in the three years before the Census (1999, 2000 and 2001) were designated as 'recent arrivals'. The rest of the population was regarded as 'existing residents', regardless of birthplace.
4. Labour market parameters were adjusted for each broad visa category with estimates obtained from the 2004 ABS Labour Force Status and Other Characteristics of Recent Arrivals survey.

Age and gender structure

NAT requires an age and gender profile of new arrivals by visa category, obtained from the unpublished DIMA data. Data on onshore applicants were included in the age structure, after some smoothing of age and gender using 2002–2005 profiles.

The age distribution for each of the visa groups and the population is compared in figure F.10. New arrivals are significantly younger than the total population. The age structure also varies across visa groups. Humanitarian visa entrants are very young, and Family visa entrants have the highest share of persons over 60. In the Skilled visa group, there is a high proportion of persons of prime working-age, as well as a significant number of children.

Figure F.10 **Age profile of total population and new arrivals by visa group**
2004-05



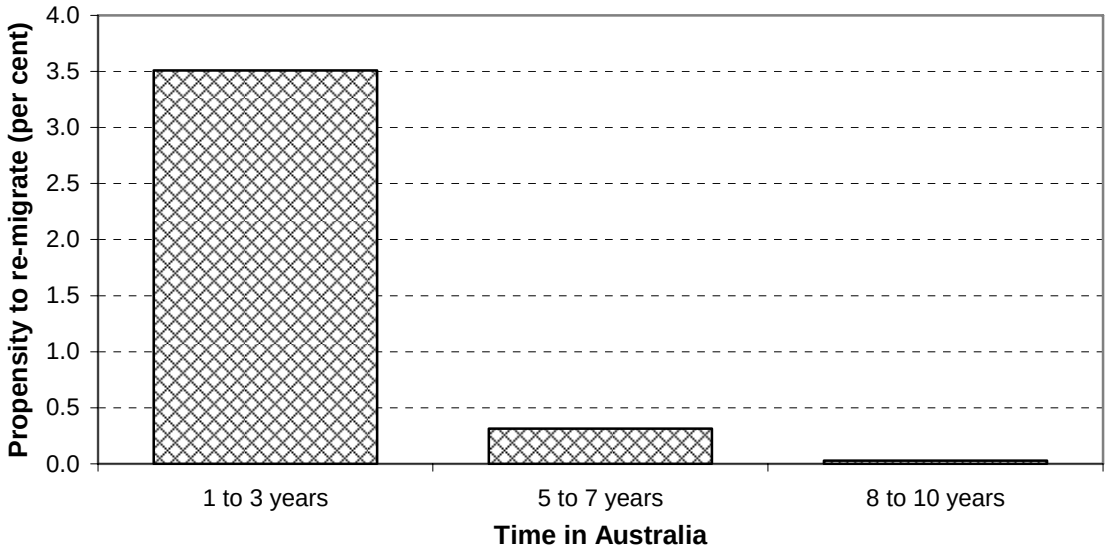
Sources: Productivity Commission estimates based on unpublished DIMA data; Productivity Commission projections from LSP (scenario 2) for total population (PC 2005b).

Remigration

In NAT, new arrivals are assigned a propensity to remigrate based on age, gender and time in Australia. These propensities were calculated on a cohort basis from unpublished DIMA data. For example, the number of persons[9] leaving in 2004-05 who had been in Australia for five to seven years was compared with the number of arrivals in 1998–2000.

The data show that remigration rates are highest for the first few years in Australia. After one to three years, around 3.5 per cent of immigrants leave Australia each year. Remigration is very low after five years or more, around 0.25 per cent, decreasing to less than 0.1 per cent after eight years (figure F.11).

Figure F.11 **Propensity to remigrate from Australia**
Departures in 2004-05, aggregated across age and gender



Source: Productivity Commission estimates based on unpublished DIMA data.

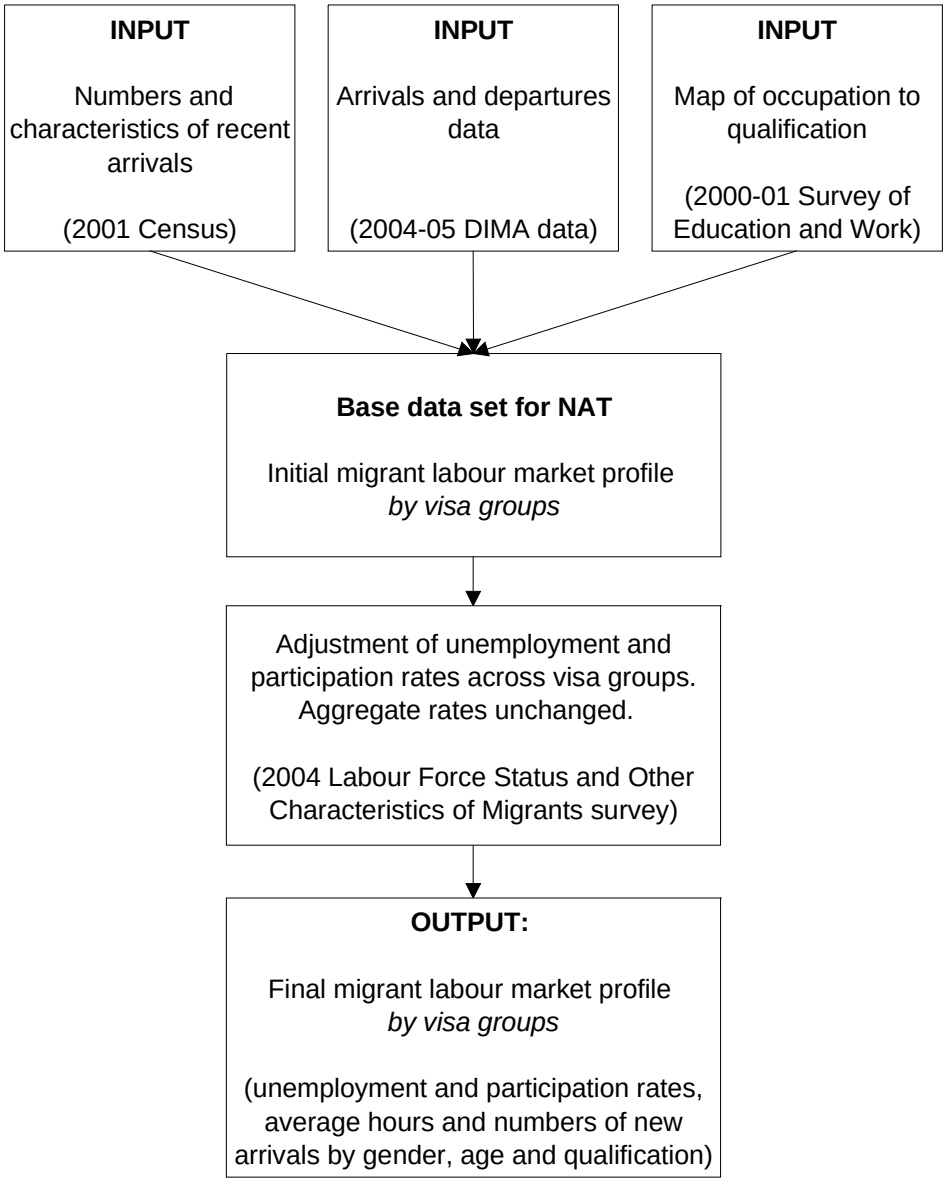
Labour market parameters

The labour market parameters (participation, unemployment, average hours) were obtained from the 'base data set', constructed for NAT through a combination of the 2001 Census, unpublished Survey of Education and Work data, and unpublished DIMA data. This provided estimates of the labour market characteristics of recent arrivals by visa group.

9 The cohort was restricted to persons who arrived under the Migration and Humanitarian Programs.

Figure F.12 **Producing the database for the New Arrival Tracker**

Combining Census, DIMA and Survey of Education and Work data



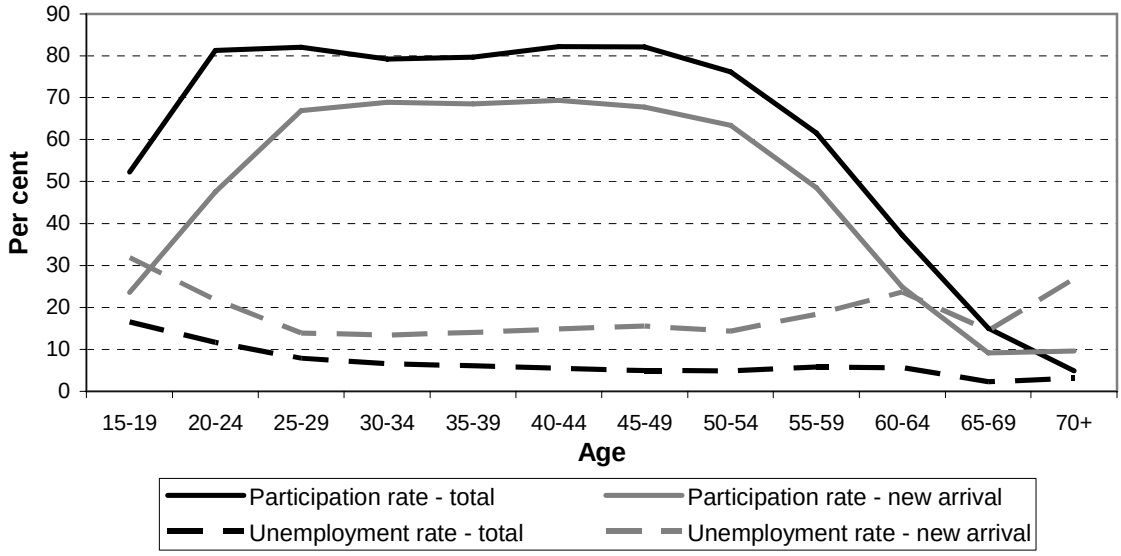
However, the 'proportional breakdown' approach used in the base data set dampened the difference between visa groups. To account for observed differences between the labour market outcomes of different visa groups, in particular the better labour outcomes of Skilled visa immigrants, the 2004 Labour Force Status and Other Characteristics of Migrants survey was used. This modified the participation and unemployment rates across visa groups, but left the aggregate participation and unemployment rates of immigrants' unchanged (figure F.12).

Acclimatisation path

In the first few years after arrival, the difference between immigrants and the rest of the population is significant: immigrants display lower participation rates and higher unemployment rates (figure F.13). This is consistent across age groups.

Figure F.13 **Participation and unemployment rates for immigrants and the total population**

2001, aggregated across gender



Source: Unpublished 2001 Census data.

Male new arrivals work fewer hours on average compared with the total male population (figure F.14). Female new arrivals work slightly longer hours compared with the total female population.

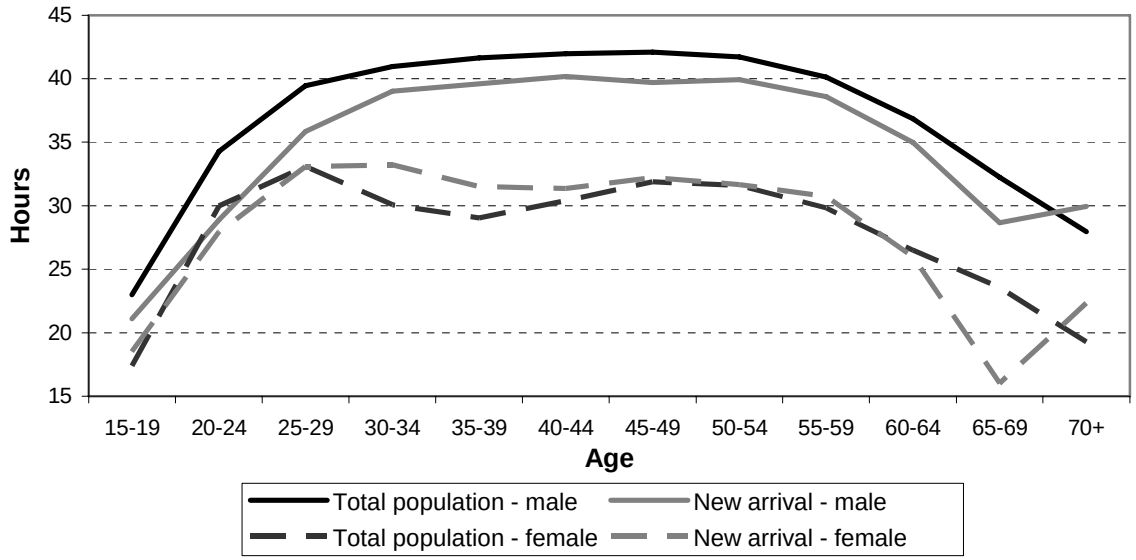
Share of hours worked by qualification

NAT assigns hours into qualification by five-year age group and gender. The share of hours worked in each qualification is a weighted average of qualification profiles by visa category, trended over time in line with the total population:

- The initial profiles of hours worked by qualification come from the base data set and reflect the qualification mix of new arrivals as estimated from the 2001 Census.
- These profiles were updated from 2001 to 2004-05 by applying trends in qualifications for the total population, estimated by CoPS from analysis of unpublished data from the Survey of Education and Work, 1996–2004.

Figure F.14 **Average hours worked per week for immigrants and the total population**

2001, by gender



Source: Unpublished 2001 Census data.

- Furthermore, the qualification profile of new arrivals continues to trend over the 21-year projections, in line with the rest of the population, using the same extrapolated trends from the Survey of Education and Work.

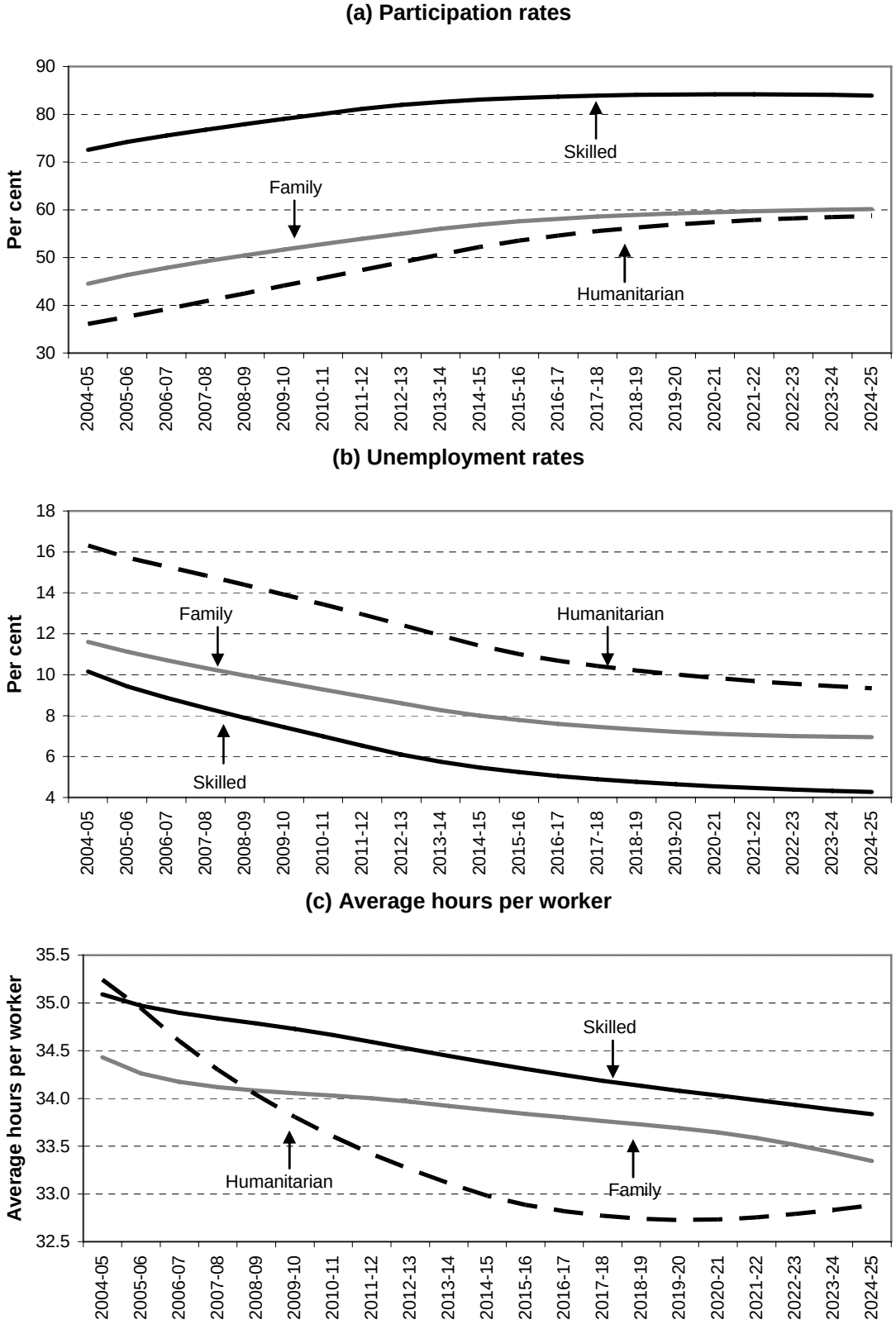
F.6 Labour market outcomes by visa group

Immigrants arriving under the Skilled migration program have significantly better labour market outcomes compared with Family and Humanitarian visa immigrants (figure F.15). Skilled visa immigrants display significantly higher participation rates, lower unemployment rates and higher average hours worked.

The better outcomes arise because:

- age–gender specific labour market outcomes of Skilled visa immigrants are better than Family and Humanitarian immigrants' outcomes, which accounts for around 70 per cent of the difference
- Skilled visa immigrants tend to be persons of prime working-age (who display superior labour market outcomes), which accounts for around 30 per cent of the difference.

Figure F.15 **Labour market outcomes of new arrivals by broad visa group**
2004-05 to 2024-25, aggregated across age and gender



Source: Productivity Commission projections from NAT.

F.7 Qualification classification

Table F.4 **Qualification category, highest level of education and field of study**

Qualification Category	*Level*	*Field*
1	Postgraduate degree level	Natural and Physical Sciences
2	Postgraduate degree level	Information Technology
3	Postgraduate degree level	Engineering and Related Technologies
4	Postgraduate degree level	Architecture and Building
5	Postgraduate degree level	Agriculture, Environmental and Related Studies
6	Postgraduate degree level	Health
7	Postgraduate degree level	Education
8	Postgraduate degree level	Management and Commerce
9	Postgraduate degree level	Society and Culture
10	Postgraduate degree level	Creative Arts
11	Postgraduate degree level	Food, Hospitality and Personal Services
12	Graduate Diploma and Graduate Certificate level	Natural and Physical Sciences
13	Graduate Diploma and Graduate Certificate level	Information Technology
14	Graduate Diploma and Graduate Certificate level	Engineering and Related Technologies
15	Graduate Diploma and Graduate Certificate level	Architecture and Building

Continued next page.

Table F.4 **(Continued)**

Qualification Category	*Level*	*Field*
16	Graduate Diploma and Graduate Certificate level	Agriculture, Environmental and Related Studies
17	Graduate Diploma and Graduate Certificate level	Health
18	Graduate Diploma and Graduate Certificate level	Education
19	Graduate Diploma and Graduate Certificate level	Management and Commerce
20	Graduate Diploma and Graduate Certificate level	Society and Culture
21	Graduate Diploma and Graduate Certificate level	Creative Arts
22	Graduate Diploma and Graduate Certificate level	Food, Hospitality and Personal Services
23	Bachelor Degree level	Natural and Physical Sciences
24	Bachelor Degree level	Information Technology
25	Bachelor Degree level	Engineering and Related Technologies
26	Bachelor Degree level	Architecture and Building
27	Bachelor Degree level	Agriculture, Environmental and Related Studies
28	Bachelor Degree level	Health
29	Bachelor Degree level	Education
30	Bachelor Degree level	Management and Commerce
31	Bachelor Degree level	Society and Culture
32	Bachelor Degree level	Creative Arts
33	Bachelor Degree level	Food, Hospitality and Personal Services
34	Advanced Diploma and Diploma	Natural and Physical Sciences

Continued next page.

Table F.4 **(Continued)**

Qualification Category	*Level*	*Field*
35	Advanced Diploma and Diploma	Information Technology
36	Advanced Diploma and Diploma	Engineering and Related Technologies
37	Advanced Diploma and Diploma	Architecture and Building
38	Advanced Diploma and Diploma	Agriculture, Environmental and Related Studies
39	Advanced Diploma and Diploma	Health
40	Advanced Diploma and Diploma	Education
41	Advanced Diploma and Diploma	Management and Commerce
42	Advanced Diploma and Diploma	Society and Culture
43	Advanced Diploma and Diploma	Creative Arts
44	Advanced Diploma and Diploma	Food, Hospitality and Personal Services
45	Certificate level III and IV	Natural and Physical Sciences
46	Certificate level III and IV	Information Technology
47	Certificate level III and IV	Engineering and Related Technologies
48	Certificate level III and IV	Architecture and Building
49	Certificate level III and IV	Agriculture, Environmental and Related Studies
50	Certificate level III and IV	Health
51	Certificate level III and IV	Education
52	Certificate level III and IV	Management and Commerce
53	Certificate level III and IV	Society and Culture

Continued next page.

Table F.4 **(Continued)**

Qualification Category	*Level*	*Field*
54	Certificate level III and IV	Creative Arts
55	Certificate level III and IV	Food, Hospitality and Personal Services
56	Certificate level I and II	Natural and Physical Sciences
57	Certificate level I and II	Information Technology
58	Certificate level I and II	Engineering and Related Technologies
59	Certificate level I and II	Architecture and Building
60	Certificate level I and II	Agriculture, Environmental and Related Studies
61	Certificate level I and II	Health
62	Certificate level I and II	Education
63	Certificate level I and II	Management and Commerce
64	Certificate level I and II	Society and Culture
65	Certificate level I and II	Creative Arts
66	Certificate level I and II	Food, Hospitality and Personal Services
67	No educational attainment	No educational attainment
67	Year 12 and below	Mixed Field Programmes

Source: Level and field categories based on the Australian Standard Classification of Education, used in the Survey of Education and Work (ABS 2005b).

G Economic effects of increasing skilled migration: Modelling summary

The Productivity Commission has been asked to examine the role and mechanisms by which migration and population growth affect Australia's productivity and economic growth.

To assist in examining these issues, the Commission requested the Centre of Policy Studies (CoPS) to model the economic effects of increasing the intake of skilled migrants by 50 per cent, using a modified version of the MONASH Model. CoPS provided a consultancy report, which is available from the Commission's website.

The modelling described in this report has greatly benefited from the input of participants in two Roundtables and personal communications with Mr Chris Murphy of Econtech. As a result, the modelling is significantly different from the modelling that was presented in the Commission's Position Paper, released in January 2006. Specifically, the modelling in this report now accounts for a faster rate of investment, the impacts of the additional immigrants' children (as described in appendix F) and the effect of the capital brought by the additional immigrants.

In addition, by the end of the simulation period (2024-25), the rate of return on capital has returned to its base-case level. This is interpreted to mean that the capital–labour ratio has reached its new long-term level.

The remainder of this appendix summarises key aspects of the modelling and results.

G.1 Framework and modifications to the MONASH Model[1]

The MONASH Model is a dynamic, multi-regional computable general equilibrium (CGE) model of Australia, developed and maintained by CoPS at Monash

1 Adapted from Department of Employment and Workplace Relations (2005).

University. The model is fully documented by Dixon and Rimmer (2002). In this model, employment is disaggregated by region, industry and occupation.

The MONASH Model is highly disaggregated, featuring 107 industries, 81 occupations, 67 skill groups and 56 geographic regions. This level of detail makes the model well suited to the task of analysing the effects of a change in the Skilled Migration Program.

In particular, the MONASH Model explicitly captures both sides of the market for each type of skill, allowing workers to change the occupations to which they supply particular skills and allowing industries to change the mix of occupations from which they source labour. This means that any skill effect from increased migration is calculated within the model rather than being imposed exogenously on the model, and that any distributional effects of the increased migration can be identified. Further, the modelling results show where the additional skills end up, in terms of industries, occupations and regions. This analysis is discussed in appendix H.

Forecasts of employment by workers' qualifications, in terms of level of education and field of study, have been produced for the population as a whole and for immigrants as an intermediate step in producing the estimates of the effects of population dynamics (growth and ageing) and migration (appendix F).

The estimated effect of the additional immigration was derived by comparing the results of different MONASH Model simulations.

A base-case simulation was prepared under the assumption that population growth proceeds as expected, based on modified ABS population projections that were used by the Productivity Commission in previous work on modelling developments in labour force participation rates, unemployment rates and average hours worked per week by gender and age group (Productivity Commission 2005b). These projections were combined with modelling of qualifications by level of education and field of study to produce forecasts of employment by qualification, exogenously from the MONASH Model.

The base-case simulation is also based on the standard MONASH Model macroeconomic and industry growth assumptions, which take into account forecasts from Access Economics (2005). The base case was modified from the standard MONASH Model projections, in which employment and hours worked are determined by labour demand (under the assumption that there is excess labour supply in all industries and occupations). In the standard MONASH Model applications, wage rates are set exogenously, based on scenarios supplied by Access Economics, and employment levels are determined within the MONASH Model.

In contrast, in the base-case simulation for this project, employment levels are determined exogenously as described above and the MONASH Model is used to determine wage rates (box G.1). This approach was chosen because the labour market performance of immigrants differs from that of the Australian population. This difference can be accommodated in the MONASH Model by measuring changes in employment of immigrants rather than changes in their labour supply. This modelling modification allows employment in all industries and occupations to be consistent with the exogenously determined changes in employment by qualification, which in turn are influenced by changes to labour supply that result from population dynamics and migration. These changes in labour supply are imposed at the national level and the resulting industry employment levels are distributed among the regions.

There is some debate about the speed at which the economy would adjust to a change such as an increase in skilled migration, but it is likely that the adjustment is slow (Robertson, P., University of New South Wales, Sydney, pers. comm., 17 Feb 2006). Although, in the modelling, the economy reaches a new short-run equilibrium each year, the speed of adjustment determines the length of time required for the economy to reach a new long-run equilibrium.

This speed of adjustment is influenced by investors' reactions to the increased migration. In the MONASH Model, investors are believed to hedge against any possible change in the new migration level by holding back on their investment, relative to what they might do if they thought that the new level was permanent.

Box G.1 **Modelling wage relativities**

Initial wage relativities imply some occupations pay higher wages as a premium for skills, reflecting a higher contribution to value added of skilled workers. As the supply of skilled workers increases relative to the supply of unskilled workers, the labour productivity of skilled workers will fall. This will result in a decline in the wages of skilled workers relative to those of unskilled workers, unless there is an increase in the demand for skilled workers.

De Laine, Laplagne and Stone (2000) argue that complementarity between skills and new technologies has led to an increase in the demand for skilled workers across the Australian economy over the period 1978 to 1998. This results in firms' demand for labour shifting towards the use of more skilled workers, which matches the increase in the supply of skilled workers in the base case. This is modelled by maintaining, in the base case, initial wage relativities across occupations over the simulation period.

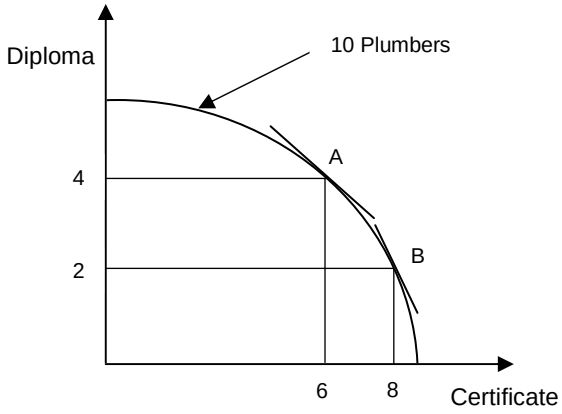
In the increased-migration scenario, these trends towards the use of skilled labour are preserved, but wage relativities and skill premiums adjust to the deviation caused by the additional immigrants.

In this study the assumed adjustment speed ensures that the long-run equilibrium is reached by 2024-25, indicated by the rate of return in the increased-migration simulation returning to the level in the base-case simulation.

The labour market environment in the base-case simulation assumes that total employment grows at an average annual growth rate of 1.5 per cent. While this growth is less than the average annual growth of 2.1 per cent in the five years to 2004-05, slower employment growth is expected, assuming that world and Australian economic growth slows and that it would be the difficult to achieve further reductions in unemployment in Australia (over the five years to 2004-05, the unemployment rate fell from 6.6 per cent to 5.2 per cent).

Workers with different qualifications can supply labour to different occupations according to a transformation function. The schematic in figure G.1 illustrates how changes in returns to occupations lead to changes in the occupational choices of diploma holders. A Constant Elasticity of Transformation (CET) function is used to allocate workers with different qualifications to all occupations. The CET parameter is set at 0.35.[2] The total supply of plumbers, for example, is obtained by adding up all the plumbers supplied through this process.

Figure G.1 **Transforming qualifications into occupations: an illustration**



As relative returns to certificates decrease (relative price line shifts from A to B), more plumbers are sourced among workers with certificates and less are sourced among workers with diplomas. This situation might arise when there is an increase in the supply of certificate holders relative to that of other qualifications.

[2] Limited sensitivity analysis showed that results are not overly sensitive to this value of the elasticities. This value yields results in terms of employment by occupation that are consistent with recent employment outcomes.

As in the standard MONASH Model, the demand for plumbers is governed for each industry by a Constant Elasticity of Substitution (CES) function. The elasticity of substitution for this function is set at 0.25.

Although the CET and CES functions are defined for all pairs of qualifications and occupations, an underlying matrix defines what transformations and substitutions are actually possible. For example, although it is possible for a person with a medical degree to be a taxi driver, it is not possible for someone with no post-school qualifications to supply labour as a medical practitioner.

Whereas persons with different skills are considered imperfect substitutes in this modelling approach, Australian-born and immigrant workers with the same skills are perfect substitutes in the MONASH Model. However, there might be differences in training or experience which make immigrants imperfect substitutes or even make them complementary to Australian-born workers. Such an increase in the variety of skills might contribute to the productivity of other workers in the economy (box G.2).

Box G.2 **Are migrants substitutes or complements?**

Many empirical studies conclude that migration has a small positive effect on average productivity and wages. In a recent analysis, Ottaviano and Peri (2005) argue that the effect might be larger. They propose that immigrants might not be perfect substitutes for domestic workers, even if they have the same formal qualification. This might be due to differences in training, occupational choices and various other, often unobserved, characteristics. Thus, for example, a Chinese-born cook, an Italian tailor, a French architect, a Polish plumber or a German engineer are different from their domestic counterparts. Therefore, rather than competing with domestic workers, some foreign workers might complement their skills and increase the productivity and wages of domestic workers more than one would expect.

In their analysis, Ottaviano and Peri allow for the possibility that workers from different origins might be either substitutes or complements. They use various empirical methods to establish the nature of the relationship in the United States in the 1990s. They find that 'contrary to the findings of previous literature, overall immigration generates a large positive effect on the average wages of US-born workers' (p. 1). In their historical simulation of the 1990s, they calculate that an inflow of workers corresponding to 8 per cent of the US labour force increased the average wage of US-born workers between 2 and 2.5 per cent. In their analysis, a small difference between domestic and migrant workers generates these wage gains. Therefore, they conclude that 'sharpening our understanding of the complementarities and substitutability between the US and foreign born in different sectors and skills … are crucial steps in quantifying the benefits of immigration' (p. 27).

Continued next page.

Box G.2 (continued)

No comparable analysis has been done for Australia so far. The MONASH Model used in this study assumes that migrants and Australian-born workers are perfect substitutes if they have the same qualification. To the extent that the effects found by Ottaviano and Peri are relevant for the Australian economy, this model might underestimate the gains from migration. In the same vein, immigrants who alleviate skill shortages might be seen as complementary to Australian-born workers and are likely to contribute more to productivity growth than has been accounted for in this study.

Source: Ottaviano and Peri (2005).

G.2 MONASH Model simulations

A 50 per cent increase in skilled migration corresponds to an increase in the annual intake of migrants in the order of 39 000 persons. After 21 years, this increase adds about 832 000 persons to a population projected to consist of about 25.7 million persons, and translates into a 4.6 per cent increase in labour input. The additional immigrants tends to be more qualified than the rest of the population. The details of these demographic projections are found in appendix F.

The emphasis of this study is on the labour market aspects of immigration. Specifically, the study was designed to concentrate on labour market outcomes as measured by the employment of workers who are characterised by the qualifications that define the type of labour they can supply. Since this is done in a general equilibrium context, the modelling accounts for sectoral impacts and impacts on factor and good markets. In addition, aggregate effects and effects on incomes per person can be estimated.

The effects of increasing the skilled migrant intake are estimated by comparing two 21-year MONASH Model simulations:

1. A base-case simulation: a projection of the Australian economy, which incorporates macroeconomic and industry level projections, including changes in tastes.
2. An increased-migration simulation: a projection which incorporates the increase in the skilled migrant intake.

The base-case simulation is characterised by an increase in the size of the Australian economy and rising returns to labour and capital. It is also characterised by an increase in the educational qualification of the population.

The difference between the base-case simulation and the increased-migration simulation allows for the effects of the increased-migration to be isolated from all other influences. Most of the results in this report are presented in terms of cumulative deviations from the base case. They are analogous to the 832 000 additional immigrants or the 4.6 per cent increase in labour supply mentioned above.

An increase in the skilled migrant intake has two main initial effects: an increase in the amount of labour supplied to the economy; and a compositional effect due to the differences in the skills of immigrants relative to the skills of the rest of the population. These effects, along with projected changes in the structure of the economy and assumptions about capital adjustment and export markets, combine to produce the detailed and overall impacts of increasing the migrant intake.

G.3 Aggregate effects

Increasing the amount of labour increases the size of the economy and real GDP (table G.1). Private and government consumption grow approximately with economic activity. The reduction in the capital–labour ratio decreases the marginal product of labour and increases the marginal product of capital and its rate of return. The increase in the rate of return increases investment, but, due to some stickiness in investors' reactions, investment tends to lag the increase in labour. As a result, during the 21-year simulation period, the capital–labour ratio is lower than it would have been without the additional immigrants.

Table G.1 **Aggregate effects on the economy from increasing skilled migration after 21 years**

Cumulative per cent deviations, 2024-25

Variable	*Per cent*
Real GDP	4.62
Real private consumption	4.07
Real investment	7.96
Real public consumption	4.07
Export volumes	3.52
Import volumes	4.79
Employment (hours)	4.59
Capital stock	4.24
Capital–labour ratio	-0.33
Real wage	-1.68
Returns to capital	0.50
Rate of return	0.06
Terms of trade	-0.90

Source: MONASH Model simulations.

Investment grows more than domestic savings and thus needs to be financed to a large extent by foreign capital. The inflow of additional foreign capital is mirrored by an increase in the current account deficit. Initially, this increase results from an increase in imports (especially import-intensive investment goods) and a reduction in exports. In the later years of the increased-migration simulation, the net capital inflow is reduced due to a lower need for investment capital, and payments to service net foreign liabilities increase. Thus the balance of trade has to improve and Australian exports have to increase. Because exporters are assumed to face downward sloping demand for their products, this increase in exports comes at the expense of a decrease in the prices received for our exports, which leads to a worsening of Australia's terms of trade (Box G.3). This effect would be mitigated if, either:

- prices faced by Australian exporters were less sensitive to an expansion in export volumes, or
- increasing skilled migration could be linked to *significant* outward shifts of the demand schedules faced by Australian exporters.

There is no reason to believe that either of these alternative assumptions is more appropriate than the assumptions that are currently incorporated in the MONASH

Box G.3 **Terms of trade effects in the MONASH Model**

The terms of trade are defined as the ratio of the price (index) of the export commodities to the price of the import commodities. A deterioration of the terms of trade implies that a given volume of exports can buy less imports and thus — all else equal — a reduction of the real purchasing power of domestic production. This reduces the gains from the additional immigration.

Such a deterioration might be induced by an increase of import prices or a reduction of the price of exports. The MONASH Model assumes that Australia does not influence the world prices of its imports. Export prices, in contrast, depend on the volume of exports. Foreigners are assumed to substitute between imports from Australia, imports from other countries and their own products. If Australian exports are to increase, all else equal, this will require export prices to decrease in order to increase Australian market share.

The sensitivity of export prices to changes in export volumes are specified by the elasticity of demand for exports for each commodity in the model. Most export demand elasticities are set around -5. This means that a 1 per cent reduction of the prices received by Australian exporters increases demand for Australian exports by 5 per cent.

Model, especially given the time period of the modelling undertaken. Both the increased-migration scenario and the base-case scenario include assumptions about the growth of the Australian economy and of the rest of the world, including its effect on growth in export markets.

G.4 Changes in income per person

This section considers the impact on incomes from the additional immigration. The change brought about by increased immigration is assessed using the following three measures:

- the change in real GNP per person
- the change in real GNP per additional immigrant
- the change in real GNP per person among the base-case population.

The following sections detail a framework for decomposing real GNP per person and measuring the change in income among the base-case population.

Changes in real GNP per person

In this section, real GNP per capita is decomposed to clarify the main drivers of the changes. The full results are presented in the relevant chapters.

Real GNP is interpreted as a measure of purchasing power, because it is deflated by an index of the prices of goods and services in the basket of private and public consumption. In addition, real GNP can be linked to real GDP (an indicator of economic activity) and remittances to foreigners (which play a part in supplying some of the additional capital required by the increased labour):

$$GNP_R = \frac{GNP}{P_{CG}} = \frac{GDP - NFL \times R}{P_{CG}} = \frac{P_{GDP} GDP_R - NFL \times R}{P_{CG}}$$

where:

GNP_R	is real GNP (deflated by the public and private consumption deflator)
P_{CG}	is the composite price index for private and public consumption
P_{GDP}	is the GDP price deflator
GDP_R	is real GDP (deflated by the GDP price deflator)
$NFL \times R$	is net foreign liabilities multiplied by the rate of interest on net foreign liabilities.

GNP is deflated by a composite deflator of public and private consumption to account for changes in the purchasing power of income in terms of the entire basket of public and private goods and services.

This expression highlights the role of net foreign liabilities. Increased immigration requires an increase in investment. Part of this investment is financed by foreign capital which results in an increase in net foreign liabilities and a reduction in GNP.[3] This increases the gap between (real) GDP and GNP.

Real GNP per person can be calculated by dividing by the population, and real GDP can be decomposed into a sequence of ratios that represent the contributions from components of labour:

$$\frac{GNP_R}{POP} = \left(\frac{P_{GDP}}{P_{CG}}\right)\left(\frac{GDP_R}{EH}\right)\left(\frac{EH}{H}\right)\left(\frac{H}{L}\right)\left(\frac{L}{LS}\right)\left(\frac{LS}{WAP}\right)\left(\frac{WAP}{POP}\right) - \left(\frac{NFL \times R}{P_{CG} \cdot POP}\right)$$

where

GDP_R/EH	is real GDP per effective hour worked — a measure of labour productivity using quality-adjusted labour inputs (section G.5)
EH/H	is effective hours per hour worked — a measure of the skill effect
H/L	is hours per worker
L/LS	is the ratio of workers to labour supply — the employment rate
LS/WAP	is the ratio of labour supply to the working-age population — the participation rate
WAP/POP	is the ratio of working-age population to the total population.

In this equation, the main effect of increased immigration is to increase the number of hours of labour supplied through an increase in the participation rate LS/WAP (table G.2).

The ratio of the GDP deflator to the public and private consumption price index can be decomposed into a terms of trade term (P_X/P_M) and a consumption price effect term (A):

$$\left(\frac{P_{GDP}}{P_{CG}}\right) = A\left(\frac{P_X}{P_M}\right)$$

[3] Although included, migrant transfers are not sufficient to fund the entire required increase in investment.

Table G.2 **Effects on real GNP per capita from increasing skilled migration after 21 years**

Contributions to the cumulative per cent deviation in real GNP per capita, 2024-25

Factors affecting real GNP per capita	*Per cent*
Terms of trade	-0.53
Relative price effect	0.57
Labour productivity	-0.18
Skill effect	0.27
Hours per worker	0.16
Employment rate	0.03
Participation rate	1.20
Age effect	-0.21
Interest	-0.62
Real GNP per capita	0.71

Source: MONASH Model simulations.

The *A* term is a complex aggregate of price ratios. It can be interpreted as the effect of the relative price of investment. This can be seen by expressing P_{GDP}/P_{CG} in percentage changes (lower case indicates percentage changes):

$$p_{GDP} - p_{CG} = S_C p_C + S_I p_I + S_G p_G + (S_X p_X - S_M p_M) - S_C^* p_C - S_G^* p_G$$

where:

S_C is the share of consumption in GDP — and similarly for other components of GDP

S_C^* is the share of private consumption in *private and public consumption* — and similarly for S_G^*.

The term $(S_X p_X - S_M p_M)$ is the terms of trade. The remainder is the *A* term, in percentage changes:

$$a = S_I p_I - (S_C^* - S_C) p_C - (S_G^* - S_G) p_G$$

which is the difference between the change in the price of investment goods and the price of consumption. In the increased-migration simulation, this term reflects an increase in the price of investment relative to the price of consumption. This relative decrease in the price of consumption goods and services is a positive contribution to purchasing power.

This positive contribution also counteracts the negative impact of the decline in the terms of trade that was discussed above.

Changes in income among the base-case population

In analysing the effects of additional skilled migration, one of the key areas to examine is the effect on incomes of the current Australian resident population and its descendants (excluding all immigrants arriving after 2004 and their descendants). Developing a detailed quantitative answer to this question was not possible in the time available. However, analysis of the results from the MONASH Model simulations provides an answer to a slightly different question: 'to what extent does the base-case population in 2024-25 gain from the increased-migration?'

In this analysis, the effect of *additional* skilled immigrants on the incomes of *everyone else* in Australia (including the immigrants from the base case) is measured by comparing their real per capita income in the base-case simulation and in the increased-migration simulation.

Real per capita income of the base-case population is split into several components, according to the source of the change:

- wage income
- capital income
- land income
- indirect tax revenue
- net foreign interest payments.

This analysis does not include any effects of net fiscal transfers from the additional immigrants to the base-case population or administration costs associated with the additional immigrants.

There are a variety of assumptions made in measuring changes in each income component. These assumptions are as follows.

Wage income: Increased skilled migration does not affect employment of the base-case population and thus wage income is only affected by changes in wage rates.

Capital: In line with ABS (2005a), it is assumed that there is a 28 per cent foreign ownership share in the base case but that income from this capital is taxed at 30 per cent. The increased-migration simulation begins with the same breakdown of capital income (28 per cent foreign ownership taxed at 30 per cent) but allows the share of capital stock owned by the base-case population to change as they save and as foreign-owned capital enters the country. This leads to changes in capital income. Migrant transfers do not influence income for the base-case population directly,

since income from this capital accrues to migrants. However, the base-case population does benefit from a smaller increase in interest payments on net foreign liabilities.

Land: The base-case population owns all the agricultural land and thus gets all the rental income from it. A fixed endowment of land means this income only changes with changes in rental rates.

Indirect tax revenue: The base-case population receives a per capita share of indirect tax revenue.

Net foreign interest payments: The base-case population is assumed to own the same share of the capital stock in the base case and in the increased-migration simulation. The rest is assumed to be owned by foreigners and the additional immigrants. Interest payments are assumed to be proportional to this allocation. To the extent that the amount of capital owned by foreigners has increased, this increases the amount of net foreign interest payments that must be paid out of GDP.

By 2024-25, real income per person for the base-case population is $77 lower than it would have been without the additional skilled immigration (table G.3). The increase in labour from additional skilled migration constrains real wage growth and thus real wage income for the base-case population. However, the base-case population's income from other sources is higher as a result of additional immigration:

- Higher land rentals and a larger capital stock owned by the base-case population lead to an increase in net rents.
- The expansion in imports relative to GDP increases indirect tax income.

This loss in real income applies to:

1. persons in Australia in 2003-04 (and their descendants) who are still resident in 2024-25
2. immigrants from the base-case Migration and Humanitarian Programs (and their descendants) who arrived in Australia after 2003-04 and who are still resident in 2024-25.

A separate calculation for the first group might result in:

- a smaller loss in real wage income as the average wage among this group would decline less due to their higher share of unskilled workers
- no change to indirect tax revenue as this is a per capita calculation

Table G.3 **Changes in real income per capita for the base-case population**
By income source, 2024-25

Income source	*Change in real income ($)*[a]
Real wages	-334
Real net rents[b]	154
Real taxes	103
Real income per capita	-77

[a] Difference between real income in the base case and real income for the base-case population (excluding additional skilled immigrants) in the increased-migration scenario. [b] Includes capital and land rentals, less net foreign interest payments.

Source: MONASH Model simulations.

- a larger increase in per capita income from land rentals, assuming all agricultural land is owned by the base-case population in 2003-04
- a larger increase in capital rents as capital ownership is concentrated in the hands of the base-case population in 2003-04
- a larger increase in net foreign interest payments, which reduces income, as this is proportional to capital ownership, which itself is concentrated among the base-case population in 2003-04.

The overall effect of these factors on the real per capita income for this group is ambiguous.

Distribution of the changes in income

Although there is an income loss for the base-case population, changes in the components of real income suggest there might be significant distributional effects among members of the base-case population:

- Individuals relying on wage income tend to lose and individuals relying more on capital income tend to gain from increases in skilled immigration.
- Among wage earners, those with higher skills tend to lose relatively more wage income than those with lower skills.
- As higher skilled workers are more likely to own capital, losses in wage income might be offset to some degree by gains in capital income.

G.5 Productivity and skill effects

Different types of workers contribute different amounts of input to the economy. When the different types of labour are accounted for separately, the ratio of changes to value added and changes in inputs is identically equal to one.

However, if workers' inputs are aggregated in terms of persons or hours (undifferentiated by skill, occupation or contribution to value added) there appears to be a change in aggregate productivity.

In a recent report on *Quality-adjusted Labour Inputs*, Reilly, Milne and Zhao (2005) express the two different measures in the following fashion:

$$\Delta \ln A = \Delta \ln Q - \frac{1}{2}\left(s_k(t) + s_k(t-1)\right)\Delta \ln K - \frac{1}{2}\left(s_l(t) + s_l(t-1)\right)\Delta \ln L \quad (1)$$

$$\Delta \ln B = \Delta \ln Q - \frac{1}{2}\left(s_k(t) + s_k(t-1)\right)\Delta \ln K - \frac{1}{2}\left(s_l(t) + s_l(t-1)\right)\Delta \ln H \quad (2)$$

where the first expression measures labour input in quality-adjusted units, the second expression measures labour input as a sum of undifferentiated hours, and:

$\Delta \ln A$	is the growth in MFP based on quality-adjusted labour inputs
$\Delta \ln B$	is the growth in MFP based on labour inputs unadjusted for changes in quality
$\Delta \ln Q$	is the growth in output
$\Delta \ln K$	is the growth in the capital stock
$\Delta \ln L$	is the growth in quality-adjusted labour inputs
$\Delta \ln H$	is the growth in hours of labour inputs
s_k and s_l	are the capital and labour shares in value added.

The bias that arises from using (2) to measure growth in MFP is:

$$\Delta \ln A - \Delta \ln B = -\frac{1}{2}\left(s_l(t) + s_l(t-1)\right)\Delta \ln \frac{L}{H} \quad (3)$$

In the context of the simulations, this bias is interpreted as the 'skill effect', which is a compositional effect due to the addition of workers who contribute more value added than the average worker. Thus, although additional skilled immigrants add 4.6 per cent more hours to employment, the skill effect means they contribute 4.9 per cent more 'effective' hours (when weighted by wages).

G.6 Compositional effects

There can be a compositional effect to the extent that the skill mix of immigrants differs from that of the rest of the population.[4] This effect is due to the additional immigrants increasing the supply of certain skills and the flow-on effect this has on the supply of labour to certain occupations. A well-targeted selection of skills can reduce pressures for wages to rise in occupations that might be in short supply.

In the base-case simulation, the skill base of the population is assumed to improve. That is, the proportion of the labour supply with less skilled workers decreases over the 21 years of the simulation. The skill profile of the skilled migrants is superior to that of the Australian-born population (appendix F). The skilled program is assumed to be able to maintain the qualification profile above the profile of the rest of the population in several ways:

- the rapidly increasing education of the world population, especially in some developing countries means that the pool of workers from which skilled migrants can be chosen is becoming more skilled
- the processes and criteria by which an immigrant might qualify as a skilled migrant might be tightened
- the education system and the immigration programs are exogenous in the modelling. That is, changes in relative wages will not:
  - change education decisions of individuals, or
  - lead to targeting of immigrants with particular skills.[5]

G.7 Industry effects

Industries expand in line with the expansion in private and public consumption, investment and exports (table G.4). Industries display four types of responses, most of which are conditioned by the expansion effect, but some of which are a result of the composition of the migrant intake:

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4 Differences between the demographic characteristics of immigrants and those of the Australian-born population affect factors that influence mainly the supply of labour (such as the participation rates). To the extent that the skill profile of immigrants differs significantly from that of the Australian-born population, demographic characteristics can also affect the overall skill mix, but this is small relative to the contribution of these factors to the aggregate labour supply and expansion effect.

5 If the modelling allowed the education system and migration programs to respond to such changes in relative wages, there might be an increase in the supply of skilled workers used in the construction sector, damping the increase in wages for some occupations and ultimately reducing the increase in the relative price of investment.

1. An increase in population and labour supply expands industries linked to construction and its suppliers as they respond to the increase in demand for housing.
2. An increase in the supply of skilled workers slows wage increases in skilled occupations, reduces the relative costs of industries that are intensive in the use of these occupations, and leads to an increase in the activity of these industries, especially if they produce goods whose demand increases when their prices fall.
3. The growth of industries that are capital intensive, such as the mining industry, tends to slow because they compete for capital with the housing sector.
4. With a fixed amount of land, the Agriculture, Forestry and Fisheries sector is unable to expand its activity as much as the other sectors in spite of a decrease in labour costs.

Table G.4 **Effects of increasing skilled migration on industry output**
Cumulative per cent deviations in output, 2024-25

Industry sector	*Per cent*
Agriculture, Forestry and Fisheries	2.64
Mining	3.15
Manufacturing	4.88
Electricity, Gas and Water	4.33
Construction	7.80
Wholesale Trade	5.20
Retail Trade	3.95
Accommodation	3.99
Transport and Storage	4.37
Communications	4.51
Finance	4.76
Property and Business Services	5.26
Government Administration and Defence	4.13
Education	4.73
Health	5.33
Recreational Services	4.63
Personal Services	4.38

Source: MONASH Model simulations.

Occupational effects

Increasing the supply of certain skills increases the supply of occupations that are intensive in these skills. However, except in cases where they cannot be easily transformed into many occupations (as in the case of a medical degree), skills can be used to supply to many different occupations. As a result, the skill mix of

immigrants does not constrain the way in which the economy can grow.[6] This means that if the Skilled Migration Program targets certain skills, it is relatively easy to convert these skills into a wide variety of occupations.

Although increasing the supply of skilled workers tends to reduce pressures for wages to rise, this is not uniform across occupations. Results for individual occupations depend on (i) how an increase in a skill category can affect the supply of an occupation and (ii) results for industries in which they are employed intensively. For example, the increase in construction activity creates a corresponding increase in the demand for construction trades, and puts upward pressure on the wages of these occupations, in spite of an increase in their supply (table G.5).

Table G.5 **Effects of increasing skilled migration on occupational wages and employment after 21 years**

Cumulative per cent deviations, 2024-25

Broad occupation	*Real wages*	*Employment (hours)*
	%	%
Managers and Administrators	-2.23	5.53
Professionals	-7.31	6.48
Associate Professionals	-1.49	4.74
Tradespersons and Related Workers	4.06	4.04
Advanced Clerical and Service Workers	0.40	4.16
Intermediate Clerical, Sales and Service Workers	0.18	4.05
Intermediate Production and Transport Workers	2.80	3.91
Elementary Clerical, Sales and Service Workers	1.31	3.77
Labourers and Related Workers	3.15	3.87
All Occupations	-1.72	4.59

Source: MONASH Model simulations.

Skill premiums

According to economic theory, the remuneration of factors of production reflects their productivity, that is, their contribution to output. Thus, differences between the wages of skilled and unskilled workers, the so-called ‘skill premium’, results from the higher productivity of skilled workers.

6 This is confirmed by an experiment in which the supply of workers with IT qualifications was increased by 25 per cent. Results indicated that as returns to IT occupations declined, workers with IT qualifications supplied work to other occupations. This occurred in spite of relatively small CET transformation parameters which were set at 0.35.

The premium on skills can change over time if the supply of factors of production, technology or demand change. All other things being equal, an increase in the supply of one factor of production reduces the productivity and remuneration of this factor. The influence on the remuneration of other factors might be positive (for complementary factors) or negative (for substitutes).

A higher intake of migrants changes the composition of skills and leads to changes in productivity and relative wages of all skills. If immigration is concentrated around skilled labour, the skill premium is reduced (other conditions being equal). Thus, the skill premium can be used as an indicator of productivity differentials and of the 'gains' from migration for groups within the population with different skills.

The MONASH Model database for 2003-04 shows that the average skilled worker was paid 24.8 per cent more than the average unskilled worker.[7] There are substantial differences between occupations. Thus, workers with postgraduate or bachelor degrees in Health (typically doctors) were paid 67.7 per cent more than the average unskilled worker, and workers in Management and Commerce (working in a variety of occupations) were paid 32.3 per cent more than the average unskilled worker.

The base case of the MONASH Model reflects the assumption that the skill premium will stay stable in the coming decades. In the increased-migration simulation, the addition of skilled workers reduces the average skill premium by 3.1 percentage points to 21.6 per cent by 2024-25. The skill premium of workers with postgraduate or bachelor degrees in health declines by more than 15 percentage points to 52.4 per cent by 2024-25 due to a disproportionate influx of these skills. The skill premium for workers in management and commerce decreases by 4.4 percentage points to 27.9 per cent in 2024-25.

7 Unskilled workers are defined as having no post-school qualifications.

H Detailed employment effects by occupation and region

This appendix outlines detailed employment effects of the simulated increase in skilled migration, discussed in appendix G. It provides details of where new jobs are created, in terms of industry, occupation and region. This information is calculated using the Labour Market Extension (LME) to the MONASH Model for the eight-year period from 2004-05 to 2012-13. The annual additional intake of approximately 39 000 skilled migrants adds up to an extra 290 000 persons in this period.[1]

In order to specify how the increase in skilled migration affects employment, the results are presented in terms of changes in the number of employees rather than hours worked. Overall employment levels increase by 182 600 jobs or 1.67 per cent by the year 2012-13.

The impact is calculated as the difference between the results of a simulation with this increase in skilled migration ('increased-migration simulation') and a simulation where there is no increase in skilled migration ('base-case simulation').

Growth of output and employment differs widely across industries, occupations and regions. This can be explained by changes in demand for the output of specific industries, as well as in supply of specific skills to the economy.

The following are the main results from this analysis:

- Output increases at different rates across industries. On average, output grows by 1.69 per cent. Construction displays a growth rate far above average (3.69 per cent). Property and Business Services, Health and Community Services and Wholesale Trade grow at a rate of about 2 per cent, and thus somewhat faster than the average of the economy. On the other hand, Mining (0.04 per cent) and Agriculture (0.48 per cent) benefit least from the influx of skilled migrants by the year 2012-13.

[1] In the first (half) year of the simulation (2004-05), the migrant intake is increased by 19 500. See appendix F for more information about population projections and the increased-migration scenario.

- The number of persons employed grows by 1.67 per cent — that is, almost the same rate as output. Most additional employment is created in occupations which are represented heavily in large and fast growing industries, in particular in construction-related occupations. In other cases, a high share of specific skills among the skilled immigrants drives down the wages of occupations which absorb these skills and boost the growth of the respective industries. This is particularly evident in the Health sector.
- Due to the different industrial compositions of regions, areas are affected differently by the increase in skilled labour. Therefore, most of the employment growth (almost 75 per cent) is expected to be in urban areas where most of the industrial production and services are located. Western Australia and the Northern Territory experience lower rates of employment growth. This is due to their dependence on Mining and Agriculture, which are capital intensive and export oriented industries with relatively low growth rates in the increased-migration simulation.

These results are presented and discussed in more detail in the rest of this appendix. The first section of this appendix provides an overview of the MONASH LME. The second section provides an overview of the changes in industry output which play a large role in shaping employment outcomes. The third section examines the effect on employment in specific occupations. The final section outlines the employment effects for different states and regions.

H.1 MONASH Labour Market Extension

Detailed employment outcomes from the increase in immigration have been calculated using the MONASH LME. The LME was developed for the purpose of forecasting labour demands to facilitate the efficient allocation of training resources (Meagher 1997). It has been adapted to allow a detailed analysis of employment changes between the base case and the increased-migration simulation, as described in appendix G.

The LME produces detailed employment outcomes based on results from the MONASH Model for hours worked in each of 81 occupations and 107 industries. These results can be disaggregated into 158 industries (ANZSIC 3-digit classification) and 340 occupations (ASCO 4-digit classification) by the LME for each year over the eight-year period (from 2004-05 to 2012-13). Results in this appendix are presented for a higher level of aggregation. Similarly, the LME provides a regional disaggregation of employment projections for 57 statistical divisions.

Employment levels are converted from hours worked to persons employed by applying average hours worked for each industry–occupation combination.

Technically, effects on regional employment reflect changes in regional *demand* for labour. Constraints on labour supply are imposed at the national level only. By assumption, labour is mobile across regions and responds to changes in regional labour demand.

An increase in employment in a specific occupation or region due to additional immigrants does not necessarily mean that these positions are filled by migrants. To a large extent immigrants may be employed in occupations and regions where the new jobs are created. Immigrants are likely to be more flexible and able to move to where the jobs are. Furthermore, many jobs are created as a response to immigration and the specific skills that are supplied by the additional migrants. However, this is not true for all jobs. Some adjustments are brought about by changes in demand rather than supply of skills induced by immigration. For example, the increase in investment demand creates jobs in Construction, for which Australian workers are better qualified than Skilled Visa immigrants. Thus, new jobs or changes in relative wages may create an opportunity and incentive for Australian workers to make career changes and get better paid jobs.

H.2 Changes in output and employment by industry

The larger supply of labour increases overall employment levels by 182 600 jobs or 1.67 per cent by the year 2012-13 (table H.1).[2] Output grows at about the same rate (1.69 per cent).

Output growth due to increased immigration varies between industries. The largest deviation is in the Construction industry (3.69 per cent) and is more than double the economy-wide average, whereas the output of Agriculture (0.48 per cent) and Mining (0.04 per cent) is hardly affected by the increase in immigration.

Employment growth in each industry reflects its output growth. The Construction industry has the highest per cent increase in employment (3.87 per cent), whereas Mining (-0.03 per cent) experiences a small negative change. The size of a sector, as well as its rate of growth, affects the absolute numbers of additional jobs from migration. Thus, Retail Trade and Manufacturing contribute substantially to the employment increase because of their size, even if their growth rate of 1.50 and 1.12 per cent respectively is below the national average. On the other hand, Cultural

[2] Employment in hours increases by more because skilled immigrants work more hours per person.

Table H.1 **Change in output and employment by ANZSIC industry division** 2012-13[a]

	Output		*Employment*	
Industry	*$Million*	*Per cent*	*Jobs*	*Per cent*
Agriculture, Forestry and Fishing	151.4	0.48	2 712	0.75
Mining	23.4	0.04	-44	-0.03
Manufacturing	1 408.4	1.22	13 773	1.12
Electricity, Gas and Water Supply	357.1	1.52	1 251	1.69
Construction	2 113.9	3.69	32 591	3.87
Wholesale Trade	1 161.6	2.08	9 549	1.87
Retail Trade	969.8	1.72	25 343	1.50
Accommodation, Cafes and Restaurants	318.9	1.51	7 041	1.28
Transport and Storage	797.1	1.37	5 897	1.15
Communication Services	539.1	1.81	3 171	1.75
Finance and Insurance	1 653.2	1.80	5 942	1.62
Property and Business Services	2 459.0	2.04	26 196	1.92
Government Administration and Defence	713.6	1.71	7 504	1.51
Education	659.1	1.40	9 705	1.16
Health and Community Services	1 260.6	2.02	21 064	1.90
Cultural and Recreational Services	342.3	1.92	4 607	1.83
Personal and Other Services	385.9	1.73	6 317	1.50
All industries	**15 314.9**	**1.69**	**182 620**	**1.67**

a Per cent deviation between the base case and the increased-migration simulation.

Source: MONASH Labour Market Extension.

and Recreational Services and utilities (Electricity, Gas and Water Supply) contribute relatively little to overall employment growth, despite above average growth rates. Again, Construction exhibits the greatest increase in the level of employment (almost 32 600 extra jobs).

The growth of output and employment across industries can be explained by demand as well as supply factors:

- The increase in population and labour supply alters the structure of final demand, especially by inducing higher investment into production facilities and housing. This explains why the output of the Construction industry grows more than the average. Other industries linked to Construction, such as Manufacturing and Transport, also expand as a result of this increased demand.
- The increase in investment influences demand conditions in a second, indirect way. Domestic savings increase less than investment. Thus, foreign capital is needed to finance the additional investment. This capital inflow has to be matched by a deficit in the balance of trade, which goes along with an improvement in the terms of trade. For this reason, trade-exposed industries tend

to grow less than industries with a low trade share. In particular, Mining and Agriculture suffer from this effect in the first eight-year period.[3]

- The influx of skilled workers changes supply conditions in two important ways. Firstly, the increase in the labour force leads to a capital dilution in the economy and a higher price of capital. As a result, capital-intensive industries such as Agriculture and Mining grow less than average. Secondly, the supply of skilled workers increases, reducing their relative wages and thus the costs of production for industries that employ these skills intensively. The notable increase in the output of the Health sector (2 per cent) can be explained by the high share of Health workers among the additional immigrants. This reduces relative costs and increases the output of this sector, whose demand is otherwise closely linked to GDP.

This snapshot of the effects of migration in the eighth year of the increased-migration simulation does not capture the dynamics of the development over time. Not only will the overall size of the impact increase as more immigrants arrive and the economy expands, but also the structure of the effects on industries, occupations and regions will change over time.

An important driver for this is the terms of trade. As described in appendix G (section G.3), the terms of trade initially appreciate — that is, the average price of exports increases relative to the price of imports. An appreciation in the terms of trade has a negative effect on demand, output and employment of exporting and import-competing industries.

Later on, the terms of trade depreciate and trade-exposed industries become more competitive. Therefore, industries such as Mining and Agriculture will fare better in later years. This should be kept in mind throughout this appendix. General trends can be seen from the results of the MONASH Model (appendix G). Detailed analysis with the LME, however, is not available for later years.

H.3 Changes in employment by occupation

While the increase in Skilled Visa immigration leads to an increase in employment in all 81 ASCO occupations, this growth is spread differently across occupations. Employment growth rates vary through the interaction of the following mechanisms:

[3] This effect is reversed in later periods when less capital flows in and a trade surplus is necessary to service net foreign liabilities.

- Employment growth by occupation depends on the relative growth of industries (industry growth effect), since industries have different shares of occupations among their employees.
- The additional influx of Skilled Visa immigrants changes the composition of occupations employed in each industry (occupational share effect). Since workers with a specific skill are most effective in a limited set of occupations, an increase of skilled workers exerts pressure on the wages in those occupations that use their skills, and induces an increase in the share of those occupations.
- In addition, the number of additional employees in an occupation (given the per cent increase) depends on the level of employment in the base case.

Tables H.2 and H.5 show the increase in employment by occupation.

The increase in the employment of Sales Assistants illustrates the different mechanisms for employment growth. Sales Assistants are generally employed in the Retail industry, which is both relatively large and labour intensive. Although output and employment of the Retail industry both increase at a slower rate than other industries (table H.1), the relative size of the industry leads to a large increase in the

Table H.2 **Increase in employment by occupation**

Ten occupations with the largest increases in the number of jobs, 2012-13

Rank	*Occupation*	*Jobs* [a]	*Per cent difference* [b]	*Difference as share of total increase*	*Share of total base level employment*
		no.	%	%	%
1	Sales Assistants	8 823	1.37	4.8	5.9
2	Structural Construction Trades	7 370	1.83	4.0	3.7
3	School Teachers	5 706	1.47	3.1	3.5
4	Nursing Professionals	5 595	2.35	3.1	2.2
5	Misc Bus & Admin Assoc Professionals	5 485	3.46	3.0	1.4
6	Computing Professionals	5 468	2.98	3.0	1.7
7	Road & Rail Transport Drivers	4 858	2.64	2.7	1.7
8	Carers & Aides	4 418	2.02	2.4	2.0
9	Building & Engineering Professionals	4 043	1.24	2.2	3.0
10	Farmers & Farm Managers	3 829	2.17	2.1	1.6
	Total	**182 617**	**1.67**	**30.4**	**26.7**

[a] Difference in number of people employed between the base case and the increased-migration simulation, by 2012-13. [b] Per cent deviation between the base case and the increased-migration simulation.

Source: Table H.5.

number of Sales Assistants employed. This can also be seen in the third and fourth columns in table H.2**.** Sales Assistants contribute 4.8 per cent to employment growth, while their share in employment is 5.9 per cent in the base case. This means that the occupation is growing less than proportionately, and its employment share is declining. The same holds true for School Teachers, who are located in the third position in the employment table, even though the per cent increase is relatively small.

The increase in employment of Structural Construction Trades can be explained by both the size and growth of the Construction industry. A combination of industry growth and the changing skill mix is the likely reason for the increase in the employment of Nurses and Miscellaneous Health Professionals. Due to an increase in the supply of labour by persons with health-related skills, the wages in these occupations fall (relative to the base case). This reduces the costs of health services and increases Health sector employment and output at a faster rate than the economy-wide average.

H.4 Changes in employment by region

Table H.3 shows the effect of increased migration on employment by state and territory.[4]

The majority of the additional employment from increased migration (79.5 per cent) occurs in New South Wales, Victoria and Queensland. This concentration is mainly due to the absolute size of these states, which represent 77 per cent of employment in the base case. On the other hand, additional employment in the ACT — despite having the highest employment growth rate — is insignificant in terms of absolute numbers due to its small size in the Australian economy.

Differences in regional employment growth reflect different growth rates of the industries that are located in a region (industrial composition). However, the differences between regions are less significant than those between industries or occupations discussed above.

The two regions with the lowest rates of employment growth (Western Australia and the Northern Territory) rely most on the industries with the lowest employment growth rates, in particular Mining and Agriculture. In 2004-05 these industries contributed 24.2 and 27.8 per cent to the total output of Western Australia and the

[4] Tables H.6 to H.9 contain more detailed information on changes in output and employment by state and territory.

Table H.3 **Employment change by state and territory**

Employment numbers in '000s of jobs, 2012-13

	NSW	*Vic*	*Qld*	*WA*	*SA*	*Tas*	*ACT*	*NT*	*Australia*
2004-05 employment	3 186.9	2 443.4	1 938.8	1 013.9	729.0	215.6	178.6	93.9	9 800.0
Base-case projection 2012-13	3 495.3	2 725.7	2 209.8	1 187.6	784.6	220.6	192.9	112.2	10 928.8
Change due to increased migration[a]	62.1	46.3	36.7	16.7	12.0	3.3	3.8	1.7	182.6
Per cent difference due to increased migration[b]	1.78	1.70	1.66	1.41	1.52	1.51	1.95	1.49	1.67

a Deviation between the base case and the increased-migration simulation. **b** Per cent deviation between the base case and the increased-migration simulation by 2012-13.

Source: MONASH Labour Market Extension.

Northern Territory respectively. This compares with a combined share of only 6.1 per cent for these two industries for the rest of the Australian economy.[5] On the other hand, New South Wales and Victoria have a broader base of industrial production and services, and therefore grow faster than the national average.

Table H.4 focuses on the difference between urban and rural growth.[6] About three quarters of the additional employment is created in urban areas. In all states, employment growth rates are substantially higher in urban than in regional areas. This occurs because the industries that expand the most (Construction, Wholesale Trade, Business Services and other types of services) are mostly located in urban areas.

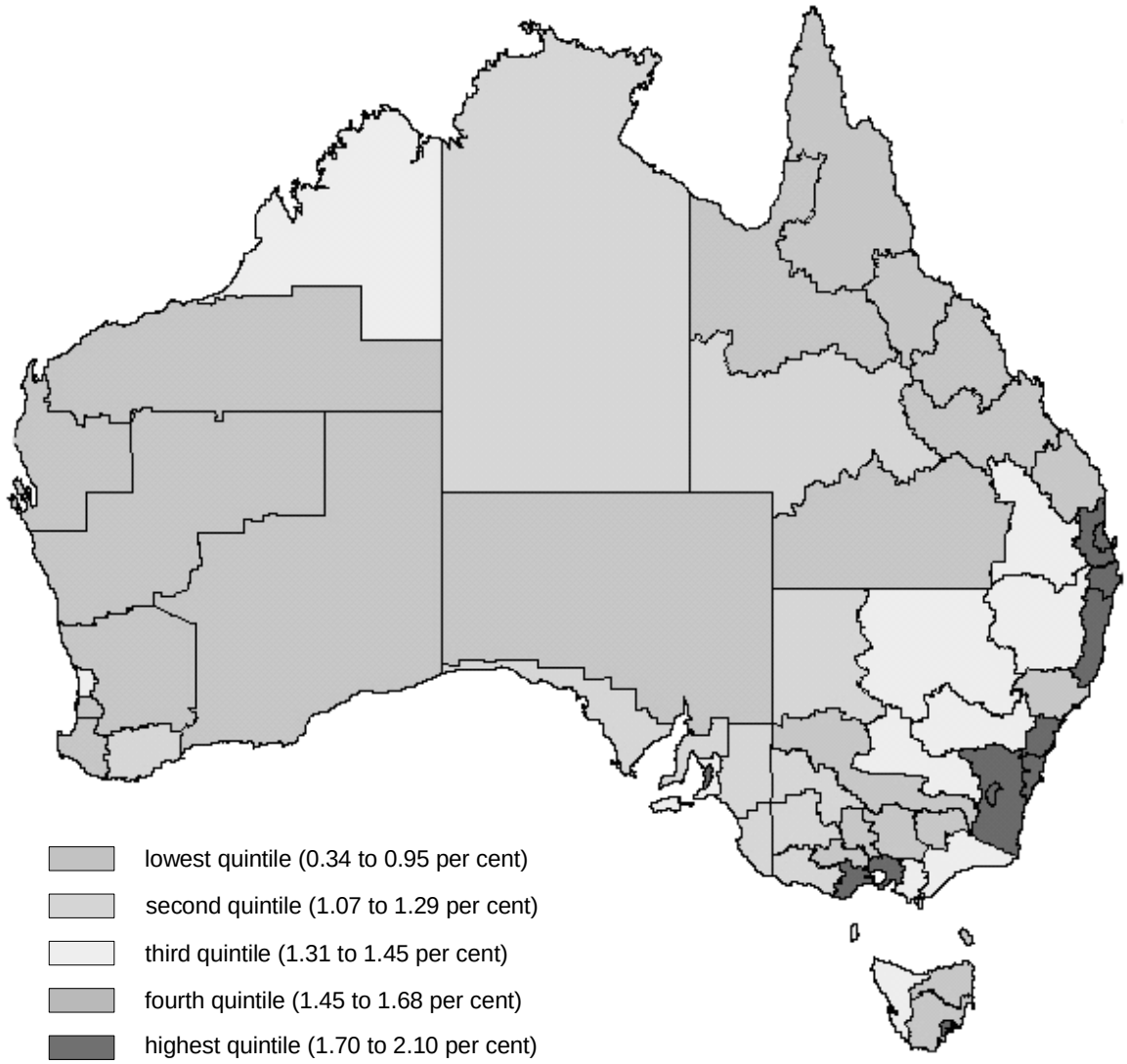
Table H.10 and figures H.1 and H.2 present a more detailed picture of the regional effects on output and employment. Figures H.1 and H.2 show that the growth in economic activity and employment is highly concentrated in the south-east of the country, especially the eastern seaboard.

[5] Although increased migration leads to a relatively small increase in employment in Western Australia, the state's employment is projected to increase by over 16.5 per cent between 2004-05 and 2012-13 in the base case.

[6] Detailed information on changes in output and employment by statistical division is available in table H.10.

Figure H.1 **Per cent change in regional output**

Statistical division grouped by per cent change quintile, 2012-13[a]

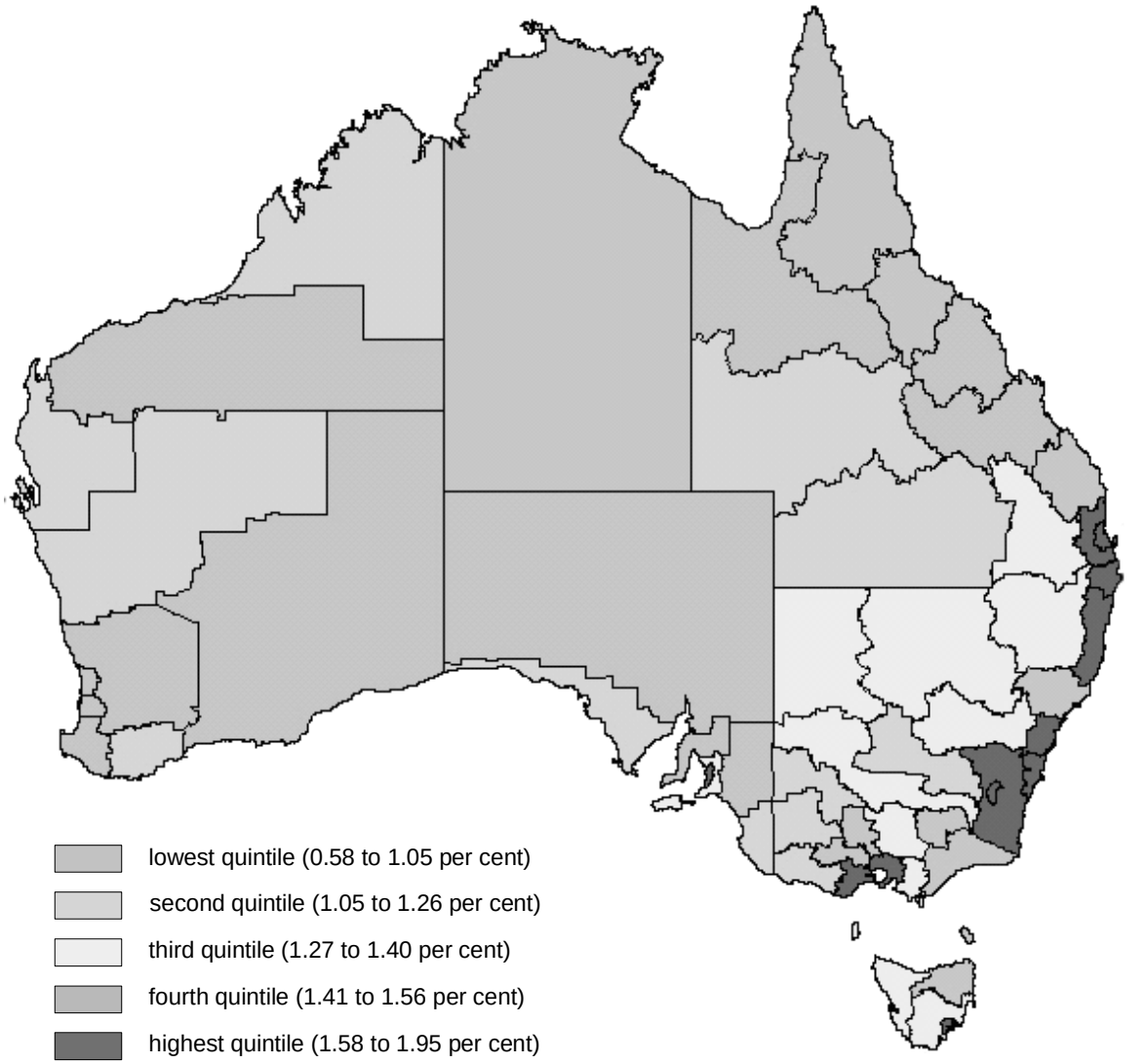


a Quintile based on per cent deviation between the base case and the increased-migration simulation by 2012-13. The range of per cent deviations included in each quintile are in brackets.

Source: MONASH Labour Market Extension.

Figure H.2 **Per cent change in regional employment**

Statistical division grouped by per cent change quintile, 2012-13[a]



a Quintile based on per cent deviation between the base case and the increased-migration simulation by 2012-13. The range of per cent deviations included in each quintile are in brackets.

Source: MONASH Labour Market Extension.

Table H.4 **Deviation in output and employment by regional status**
2012-13

	Output		*Employment (jobs)*	
State/Region	*Difference* [a]	*Change* [b]	*Difference* [a]	*Change* [b]
	$m	%	('000)	%
New South Wales				
Sydney	4 022	1.95	44 729	1.91
Rest of NSW	1 408	1.62	17 386	1.51
Total	**5 429**	**1.85**	**62 115**	**1.78**
Victoria				
Melbourne	3 190	1.84	36 393	1.79
Rest of Vic	816	1.49	9 952	1.44
Total	**4 006**	**1.76**	**46 345**	**1.70**
Queensland				
Brisbane	2 042	1.89	27 447	1.84
Rest of Qld	729	1.26	9 302	1.30
Total	**2 771**	**1.67**	**36 749**	**1.66**
Western Australia				
Perth	1 154	1.39	13 821	1.56
Rest of WA	260	0.78	2 868	0.95
Total	**1 414**	**1.22**	**16 689**	**1.41**
South Australia				
Adelaide	794	1.73	10 504	1.62
Rest of SA	112	1.09	1 450	1.05
Total	**906**	**1.63**	**11 954**	**1.54**
Tasmania				
Greater Hobart	117	1.78	1 635	1.70
Rest of Tas	123	1.48	1 688	1.35
Total	**239**	**1.61**	**3 322**	**1.51**
Australian Capital Territory				
Total[c]	**383**	**2.10**	**3 772**	**1.95**
Northern Territory				
Total[c]	**164**	**1.22**	**1 673**	**1.49**
Australia				
Urban	11 701	1.88	134 528	1.79
Rural	3 612	1.44	42 646	1.37
Total	**15 315**	**1.69**	**182 620**	**1.67**

[a] Difference between the base case and the increased-migration simulation. [b] Per cent deviation between the base case and the increased-migration simulation by 2012-13. [c] The Northern Territory and the ACT are not divided into statistical divisions.

Source: MONASH Labour Market Extension.

H.5 Concluding remarks

The analysis in this appendix shows that the employment effects of increased migration differ between industries, occupations and regions.

These differences are driven by demand and supply factors. The increase in labour supply raises the capital–labour ratio and the price of capital. This increases the production costs of capital-intensive industries, such as Mining, and increases the capital stock through higher investment. The additional investment is largely financed by capital inflows from abroad. This is mirrored by a deterioration in the trade balance and goes along with an appreciation in the terms of trade. Accordingly, trade-exposed industries perform relatively poorly during this period. On the other hand, additional investment boosts demand for Construction and related industries.

The changes in labour demand that are induced by these mechanisms do not necessarily match the skills that are supplied by the additional immigrants and the occupations in which they would like to work. Any mismatch will trigger wage adjustments which induce firms to substitute scarce occupations and give workers an incentive to move into these occupations. This leads to a reduction in the skill premium, especially for skills in health-related occupations and in education, whereas professionals in construction and related areas benefit from higher wages.

The importance of these mechanisms changes over time, mainly as macroeconomic conditions change. General trends can be seen from the results of the MONASH Model. Detailed analysis with the LME, however, is not available for later years.

Table H.5 **Change in employment by occupation**

ASCO 3 digit classification, 2012-13

Occupation	*Jobs*	*Change*
	no.	%
Sales Assistants	8 823	1.37
Miscellaneous Business and Administration Associate Professionals	7 370	1.83
School Teachers	5 706	1.47
Nursing Professionals	5 595	2.35
Building and Engineering Professionals	5 485	3.46
Computing Professionals	5 468	2.98
Accountants, Auditors and Corporate Treasurers	4 858	2.64
Structural Construction Tradespersons	4 418	2.02
Road and Rail Transport Drivers	4 043	1.24
Miscellaneous Business and Information Professionals	3 829	2.17
Carers and Aides	3 690	1.11
Intermediate Numerical Clerks	3 428	1.48
Shop Managers	3 382	1.55
Electrical and Electronics Tradespersons	3 366	1.72
Engineering, Distribution and Process Managers	3 162	2.19
General Clerks	2 955	1.51
Sales and Marketing Managers	2 936	2.20
Natural and Physical Science Professionals	2 901	3.55
Miscellaneous Health Professionals	2 901	2.67
Miscellaneous Elementary Sales Workers	2 872	1.43
Miscellaneous Intermediate Production and Transport Workers	2 869	1.36
Cleaners	2 830	1.25
Finance Associate Professionals	2 773	2.19
Intermediate Sales and Related Workers	2 678	1.56
Social Welfare Professionals	2 629	2.26
Advanced Numerical Clerks	2 602	1.62
Miscellaneous Intermediate Clerical Workers	2 588	1.51
Miscellaneous Specialist Managers	2 574	2.09
Hospitality Workers	2 565	1.36
Secretaries and Personal Assistants	2 536	1.40
Artists and Related Professionals	2 424	1.69
Farmers and Farm Managers	2 377	1.07
Hospitality and Accommodation Managers	2 306	1.37
General Managers and Administrators	2 304	2.28
Building and Engineering Associate Professionals	2 287	1.90
Receptionists	2 226	1.28
Mining, Construction and Related Labourers	2 174	1.86
Miscellaneous Intermediate Service Workers	2 165	1.45
Miscellaneous Generalist Managers	2 153	1.95

Continued next page

Table H.5 (continued)

Occupation	*Jobs*	*Change*
	no.	%
Miscellaneous Social Professionals	2 120	2.56
Medical Practitioners	2 077	3.13
Sales, Marketing and Advertising Professionals	2 056	2.07
University and Vocational Education Teachers	1 989	2.47
Resource Managers	1 988	2.19
Process Workers	1 934	1.21
Automotive Tradespersons	1 856	1.29
Miscellaneous Managing Supervisors (Sales and Service)	1 850	1.64
Mobile Plant Operators	1 756	1.33
Elementary Service Workers	1 754	1.35
Elementary Food Preparation and Related Workers	1 693	1.21
Mechanical Engineering Tradespersons	1 678	1.31
Material Recording and Despatching Clerks	1 562	1.45
Agricultural and Horticultural Labourers	1 255	1.09
Final Finishes Construction Tradespersons	1 204	1.80
Fabrication Engineering Tradespersons	1 178	1.28
Keyboard Operators	1 160	1.40
Miscellaneous Tradespersons and Related Workers	1 154	1.30
Miscellaneous Labourers and Related Workers	1 116	1.29
Plumbers	1 105	1.82
Food Tradespersons	1 102	1.21
Product Packagers	1 030	1.13
Horticultural Tradespersons	1 030	1.33
Miscellaneous Education Professionals	1 030	1.74
Elementary Clerks	985	1.35
Miscellaneous Professionals	984	2.18
Medical and Science Technical Officers	946	2.20
Miscellaneous Associate Professionals	911	1.51
Police Officers	877	1.51
Miscellaneous Advanced Clerical and Service Workers	812	1.38
Hairdressers	800	1.28
Miscellaneous Intermediate Machine Operators	769	1.38
Intermediate Stationary Plant Operators	724	1.18
Intermediate Mining and Construction Workers	667	1.14
Wood Tradespersons	660	1.71
Enrolled Nurses	534	1.49
Miscellaneous Health and Welfare Associate Professionals	522	1.78
Printing Tradespersons	400	1.34
Textile, Clothing and Related Tradespersons	344	1.57
Welfare Associate Professionals	343	1.34
Intermediate Textile, Clothing and Related Machine Operators	313	1.20
Skilled Agricultural Workers	107	0.86
Total	**182 617**	**1.67**

Source: MONASH Labour Market Extension.

Table H.6 **Deviation in output by state and industry**

Per cent, 2012-13[a]

Industry	*NSW*	*Vic*	*Qld*	*WA*	*SA*	*Tas*	*ACT*	*NT*	*Aust*
Agriculture, Forestry and Fishing	0.45	0.47	0.50	0.45	0.49	0.62	0.74	0.45	0.48
Mining	0.12	0.08	0.07	0.02	0.00	-0.01	-0.14	-0.05	0.04
Manufacturing	1.23	1.24	1.22	1.16	1.28	1.00	1.47	1.69	1.22
Electricity, Gas and Water Supply	1.74	1.66	1.44	1.12	1.59	1.25	2.03	1.11	1.52
Construction	3.94	3.85	3.60	3.02	3.71	3.64	4.04	3.07	3.69
Wholesale Trade	2.17	1.95	2.29	1.78	1.86	2.05	3.06	2.05	2.08
Retail Trade	1.80	1.72	1.76	1.46	1.59	1.66	1.95	1.56	1.72
Accommodation, Cafes and Restaurants	1.57	1.59	1.47	1.28	1.39	1.35	1.76	1.28	1.51
Transport and Storage	1.46	1.45	1.30	1.13	1.25	1.33	1.85	1.42	1.37
Communication Services	1.90	1.81	1.80	1.46	1.72	1.71	2.01	1.52	1.81
Finance and Insurance	1.87	1.82	1.79	1.36	1.71	1.69	2.13	1.57	1.80
Property and Business Services	2.11	2.04	2.13	1.73	1.91	2.03	2.27	1.82	2.04
Government Administration and Defence	1.71	1.71	1.71	1.71	1.71	1.72	1.71	1.71	1.71
Education	1.44	1.43	1.40	1.38	1.34	1.29	1.26	1.11	1.40
Health and Community Services	2.06	2.02	2.04	1.91	1.96	1.94	2.15	2.03	2.02
Cultural and Recreational Services	2.01	1.87	1.89	1.66	1.82	1.82	2.22	1.72	1.92
Personal and Other Services	1.82	1.75	1.71	1.49	1.69	1.70	1.94	1.61	1.73
All industries	**1.85**	**1.76**	**1.67**	**1.22**	**1.62**	**1.61**	**2.10**	**1.22**	**1.69**

a Per cent deviation between the base case and the increased-migration simulation.

Source: MONASH Labour Market Extension.

Table H.7 **Increase in output levels by state and industry**

Millions of dollars, 2012-13[a]

Industry	*NSW*	*Vic*	*Qld*	*WA*	*SA*	*Tas*	*ACT*	*NT*	*Aust*
Agriculture, Forestry and Fishing	29.1	37.8	33.9	25.3	17.0	5.8	0.5	2.1	151.4
Mining	7.6	2.0	9.3	6.3	0.0	0.0	0.0	-1.8	23.4
Manufacturing	468.9	437.5	239.3	135.6	96.0	21.4	4.0	5.7	1 408.4
Electricity, Gas and Water Supply	93.1	102.7	55.4	47.8	36.2	11.4	6.4	4.1	357.1
Construction	696.3	464.8	450.7	248.7	134.6	36.2	55.4	26.5	2 113.9
Wholesale Trade	413.0	316.9	226.9	99.0	59.0	13.8	20.8	12.3	1 161.6
Retail Trade	317.8	243.1	228.0	85.1	54.0	15.9	17.6	8.3	969.8
Accommodation, Cafes and Restaurants	119.6	61.7	77.7	24.5	18.0	6.0	7.0	4.4	318.9
Transport and Storage	251.2	224.8	159.3	73.5	51.6	12.2	13.5	11.0	797.1
Communication Services	212.5	147.7	92.2	35.3	24.7	8.8	10.4	7.5	539.1
Finance and Insurance	724.1	518.8	201.0	85.6	71.7	19.6	24.9	6.7	1 653.2
Property and Business Services	991.8	639.5	384.3	224.5	110.5	19.2	66.5	23.0	2 459.0
Government Administration and Defence	220.7	117.2	142.7	69.1	46.9	16.2	85.0	15.9	713.6
Education	207.0	171.2	137.6	56.0	44.8	13.4	17.6	11.5	659.1
Health and Community Services	409.7	338.2	210.6	127.9	96.3	28.5	31.6	17.7	1 260.6
Cultural and Recreational Services	151.7	78.5	48.0	25.5	16.7	5.6	10.8	5.5	342.3
Personal and Other Services	115.5	103.8	73.7	44.1	28.1	5.5	11.1	4.1	385.9
All industries	**5 429.3**	**4 006.2**	**2 770.6**	**1 413.8**	**906.1**	**239.3**	**383.1**	**164.3**	**15 314.9**

a Deviation between the base case and the increased-migration simulation by 2012-13.

Source: MONASH Labour Market Extension.

Table H.8 **Deviation in employment by state and industry**

Per cent, 2012-13[a]

Industry	*NSW*	*Vic*	*Qld*	*WA*	*SA*	*Tas*	*ACT*	*NT*	*Aust*
Agriculture, Forestry and Fishing	0.68	0.80	0.77	0.66	0.82	0.86	0.94	0.60	0.75
Mining	0.16	0.29	-0.18	-0.04	-0.14	-0.17	2.14	-0.59	-0.03
Manufacturing	1.12	1.19	1.10	1.07	1.09	0.86	1.18	1.40	1.12
Electricity, Gas and Water Supply	1.84	1.95	1.41	1.37	1.65	1.48	1.85	1.27	1.69
Construction	4.08	3.92	3.79	3.36	3.79	3.77	4.09	3.62	3.87
Wholesale Trade	2.01	1.80	2.02	1.53	1.61	1.76	2.75	1.77	1.87
Retail Trade	1.60	1.50	1.53	1.24	1.35	1.41	1.69	1.32	1.50
Accommodation, Cafes and Restaurants	1.36	1.35	1.24	1.05	1.15	1.12	1.56	1.03	1.28
Transport and Storage	1.25	1.22	1.09	0.89	0.96	0.98	1.79	1.20	1.15
Communication Services	1.89	1.86	1.64	1.25	1.58	1.58	1.94	1.24	1.75
Finance and Insurance	1.70	1.65	1.59	1.18	1.49	1.38	1.98	1.32	1.62
Property and Business Services	1.99	1.93	1.96	1.62	1.76	1.85	2.39	1.74	1.92
Government Administration and Defence	1.45	1.58	1.39	1.48	1.57	1.54	1.82	1.36	1.51
Education	1.23	1.20	1.11	1.12	1.10	1.15	0.98	0.80	1.16
Health and Community Services	1.95	1.93	1.91	1.77	1.75	1.73	2.02	1.98	1.90
Cultural and Recreational Services	1.94	1.79	1.80	1.58	1.72	1.79	2.25	1.74	1.83
Personal and Other Services	1.63	1.50	1.50	1.23	1.44	1.48	1.73	1.26	1.50
All industries	**1.78**	**1.70**	**1.66**	**1.41**	**1.52**	**1.51**	**1.95**	**1.49**	**1.67**

a Per cent deviation between the base case and the increased-migration simulation.

Source: MONASH Labour Market Extension.

Table H.9 **Increase in employment levels by state and industry**

'000s of jobs, 2012-13[a]

Industry	*NSW*	*Vic*	*Qld*	*WA*	*SA*	*Tas*	*ACT*	*NT*	*Aust*
Agriculture, Forestry and Fishing	0.60	0.70	0.61	0.33	0.32	0.14	0.01	0.01	2.71
Mining	0.04	0.02	-0.06	-0.02	-0.01	0.00	0.00	-0.02	-0.04
Manufacturing	4.07	4.44	2.57	1.29	1.10	0.20	0.05	0.05	13.77
Electricity, Gas and Water Supply	0.39	0.36	0.20	0.14	0.09	0.03	0.01	0.02	1.25
Construction	11.34	7.56	7.28	3.18	1.91	0.56	0.45	0.31	32.59
Wholesale Trade	3.44	2.42	1.96	0.83	0.60	0.14	0.09	0.06	9.55
Retail Trade	8.51	6.26	5.65	2.25	1.59	0.48	0.41	0.20	25.34
Accommodation, Cafes and Restaurants	2.57	1.72	1.50	0.52	0.40	0.14	0.15	0.05	7.04
Transport and Storage	2.15	1.47	1.24	0.45	0.33	0.09	0.07	0.09	5.90
Communication Services	1.16	0.99	0.53	0.19	0.18	0.05	0.05	0.01	3.17
Finance and Insurance	2.60	1.68	0.87	0.34	0.30	0.07	0.07	0.02	5.94
Property and Business Services	9.47	6.53	4.96	2.45	1.55	0.35	0.71	0.17	26.20
Government Administration and Defence	2.09	1.44	1.39	0.78	0.55	0.20	0.83	0.23	7.50
Education	3.14	2.43	1.97	0.98	0.65	0.23	0.19	0.11	9.71
Health and Community Services	6.74	5.63	3.97	1.99	1.68	0.44	0.39	0.23	21.06
Cultural and Recreational Services	1.61	1.21	0.88	0.36	0.25	0.09	0.15	0.06	4.61
Personal and Other Services	2.19	1.47	1.23	0.63	0.46	0.12	0.15	0.07	6.32
All industries	**62.11**	**46.34**	**36.75**	**16.69**	**11.95**	**3.32**	**3.77**	**1.67**	**182.62**

a Difference between the base case and the increased-migration simulation by 2012-13.

Source: MONASH Labour Market Extension.

Table H.10 **Regional changes in employment and output by statistical division**

Sorted by per cent change in employment, 2012-13

Region	*State*	*Employment*		*Output*	
		'000s of jobs	Per cent change	$Million	Per cent change
Australian Capital Territory	ACT	3 772	1.95	383.1	2.10
Sydney	NSW	44 729	1.91	4021.7	1.95
Brisbane	Qld	19 921	1.84	1 498.6	1.86
Moreton	Qld	7 526	1.82	543.0	2.00
Melbourne	Vic	36 393	1.79	3 189.9	1.84
Illawarra	NSW	3 296	1.73	273.4	1.83
Mid North Coast	NSW	1 988	1.72	151.4	1.96
Greater Hobart	Tas	1 635	1.70	116.7	1.78
Richmond Tweed	NSW	1 589	1.69	119.4	1.92
Adelaide	SA	9 723	1.66	734.4	1.76
South Eastern	NSW	1 579	1.65	126.3	1.81
Barwon	Vic	2 120	1.58	172.1	1.70
Central Highlands	Vic	1 118	1.56	89.4	1.68
Perth	WA	13 821	1.56	1 154.0	1.39
Loddon Campaspe	Vic	1 329	1.55	110.3	1.67
Far North	Qld	2 018	1.51	152.8	1.62
Northern Territory	NT	1 673	1.49	164.3	1.22
Ovens Murray	Vic	748	1.49	61.7	1.56
Hunter	NSW	4 143	1.47	344.8	1.49
Wide Bay Burnett	Qld	1 648	1.46	121.2	1.53
Northern	Qld	1 648	1.44	128.5	1.46
Northern	Tas	891	1.42	65.7	1.53
East Gippsland	Vic	561	1.41	46.3	1.39
Darling Downs	Qld	1 653	1.40	127.1	1.45
Goulburn	Vic	1 447	1.39	116.1	1.46
Gippsland	Vic	1 088	1.37	97.8	1.32
Southern	Tas	192	1.34	13.2	1.49
Central West	NSW	1 136	1.32	92.3	1.37
Murray	NSW	756	1.31	62.0	1.45
Northern	NSW	1 105	1.31	89.5	1.45
Outer Adelaide	SA	781	1.30	59.6	1.44
Far West	NSW	126	1.28	10.3	1.20
Mersey Lyell	Tas	605	1.27	43.7	1.42
North Western	NSW	709	1.27	56.7	1.31
Western District	Vic	687	1.26	52.9	1.25
Kimberley	WA	233	1.25	21.4	1.38

Continued next page

Table H.10 (continued)

Region	*State*	*Employment*		*Output*	
		'000s of jobs	Per cent change	$Million	Per cent change
Murrumbidgee	NSW	958	1.24	81.6	1.41
Central West	Qld	93	1.24	7.9	1.23
Wimmera	Vic	297	1.21	24.5	1.23
South East	SA	401	1.20	30.6	1.29
Upper Great Southern	WA	345	1.18	29.3	1.18
Mallee	Vic	558	1.16	45.1	1.24
Eyre	SA	178	1.08	13.9	1.13
South West	Qld	173	1.07	14.4	0.89
Central	WA	365	1.05	33.1	0.95
South West	WA	1 195	1.04	104.1	0.90
Mackay	Qld	864	1.04	72.2	0.90
Yorke Lower North	SA	187	1.04	14.9	1.07
Murray Lands	SA	345	0.99	25.1	1.08
Northern	SA	339	0.96	27.7	0.94
Fitzroy	Qld	1 041	0.95	89.5	0.89
Midlands	WA	252	0.87	23.9	0.80
Lower Great Southern	WA	94	0.86	8.2	0.77
North West	Qld	165	0.77	15.2	0.59
South Eastern	WA	226	0.61	22.3	0.46
Pilbara	WA	158	0.58	17.5	0.33

Source: MONASH Labour Market Extension.

I Referee reports on modelling

To improve the quality of the modelling, the Productivity Commission asked three independent experts to act as referees and provide input to the modelling process. The referees were asked to comment on the appropriateness of the assumptions and modelling techniques, and to advise on any possible improvements. Each referee provided useful insights to improve the modelling at a workshop held prior to the release of the position paper. In addition, following the release of the position paper, each referee provided a written report on the modelling.

This appendix contains reports from the three referees: Paul Miller, Peter Robertson and Rod Tyers. Their comments relate to the modelling in the position paper, and have contributed to the final version used in this report.

I.1 Report from Paul Miller

The immigration process and post-arrival economic progress of immigrants have been studied extensively in the economics of immigration literature. This research has been quite extensive in scope, though a few key issues have tended to dominate the discussion. These include: the distinctions among immigrants according to the motive for immigration; the implications for the relative social and economic outcomes of immigrants and the native-born of the country of destination of the favourable selectivity in immigration for some immigrant groups; the role of the post-arrival adjustment process in determining immigrants' well-being and their contribution to the national output in the immigrant receiving country; and the fact that many immigrants move between countries as part of family units. The theoretical basis for these matters was presented in Chiswick (1978, 1979). The large volume of empirical literature since Chiswick's pioneering theoretical work has led to the following stylised facts being widely accepted in the economics of immigration literature.

First, economic immigrants are self-selected for immigration and will typically have above average levels of ability and other skills related to economic success. Selectivity on the basis of productivity related characteristics, such as age, English skills, and educational attainment, will be reinforced among immigrants in Australia through the points test used in the Skill Stream of the Migration Program.

Consequently, immigrants will differ in terms of average levels of characteristics compared to the native born in the country of destination, and will even differ from those in the country of origin who did not immigrate. Family reunion and humanitarian immigrants migrate largely for non-economic considerations, and will tend not to share this selectivity in immigration, or where selectivity is present, it will not be as intense as for economic immigrants.

Second, immigrants' characteristics at the time of arrival and their post-arrival investments in human capital and other decisions (for example, fertility) are both important to consider when examining immigrants' labour market and social outcomes in the country of destination.

Third, there is a well-defined post-arrival adjustment pattern in the labour market, where immigrants are usually shown to incur economic disadvantage in the immediate post-arrival period, and the extent of this disadvantage reduces with time spent in the destination country. This initial disadvantage will vary with the degree to which immigrants' pre arrival skills are internationally transferable. Hence a small disadvantage is expected for economic immigrants from English speaking countries, and a large disadvantage for humanitarian immigrants. This disadvantage will also vary with labour market conditions at the time of arrival, being more pronounced in periods of weak labour markets, and less pronounced in periods of tight labour markets. The strength of the so called adjustment or acclimatisation path has generally being reported as varying inversely with the extent of the immigrant disadvantage in the immediate post-arrival period. However, despite this, the initial disadvantage may never be fully overcome for some immigrants (for example, family reunion immigrants), whereas for immigrant groups characterised by favourable selectivity, the immigrants may end up having labour market outcomes superior to the outcomes of the native-born counterparts. Estimated adjustment periods of 15 years or longer are typical.

Fourth, post-arrival patterns in other dimensions (for example, fertility) may differ from that in the country of origin. For example, fertility behaviour in the post-arrival period may be closer to that of Australian-born women than it is to that of women who remained in the origin country (see Birch (2005) for relevant analyses).

Fifth, when analysing the economic and social outcomes of immigrants in Australia, account needs to be taken of the fact that numbers in the various visa groups refer to both the Principal Applicant and members of the migrating unit family. Analyses of economic outcomes by visa categories need to be sensitive to this.

Modelling of the demographic and economic impacts of immigrants should, as far as possible, be sensitive to these stylised facts. The New Tracker Arrival and

Labour Supply Projection demographic models provide a detailed platform to enable the labour supply effects of a 50 per cent increase in the skilled migration program to be quantified. The modelling demonstrates an awareness of the points listed above.

The 'received wisdom' for assessment of the projections should be that as skilled immigrant flows constitute a small part of the overall workforce they should not have large effects, either positive or negative, on aggregate labour market outcomes in any given year. This follows from earlier reviews by Foster and Baker (1991) and Wooden, Holton, Hugo and Sloan (1994), and the more recent research by Addison and Worswick (2002). However, as skilled immigrants are favourably selected (both self and through the points system) for labour market success in Australia, a small, positive, cumulative impact might be expected in the longer term (assuming the absence of major impediments, such as significant changes in capital/labour ratios).

The basis of the modelling undertaken is a cohort model whereby a cohort of persons of a given age and sex are followed through time, year by year, with the composition being affected by mortality, emigration and immigration. Labour market outcomes are then projected. Projections for the native-born are based on trends over a short time horizon. Given the significant changes in the labour market in recent times, using a short window of recent information in forecasting is a sensible approach. The projections for immigrants are based around an adjustment path as has been reported in the economics of immigration literature. The adjustment paths adopted seem reasonable, though for the reasons outlined above, they possibly entail an underestimate in terms of end point, and an overstatement in terms of speed of adjustment. These two factors will tend to offset each other.

The models also assume that the increase in new arrivals does not displace existing Australian workers. As the academic literature has not found evidence that can be used to convincingly argue against this assumption it can be viewed as reasonable.

The data used in the analyses are not ideal, but appear to represent the best combination of pieces of evidence currently available. For example, evidence on the adjustment profiles has to be inferred from cross-sectional data, from longitudinal data covering relatively few years of immigrants' post-arrival experience in Australia, or from the international literature. The collection of superior data has the potential to change the specific numbers provided, but is highly unlikely to alter the overall conclusions.

In summary, the assumptions adopted in the demographic modelling are reasonable given the state of the empirical evidence, points of debate are clearly documented, and, given this, the results are defendable.

I.2 Report from Peter Robertson

The modelling work undertaken for this report so far has been highly technical and of a very high professional standard. The approaches have been well thought out and the methodologies applied are appropriate to the question at hand. In what follows I comment briefly on why the method is appropriate and the significance of the results.

What questions is the modelling designed to answer?

Skilled immigrants bring particular skills, as measured by different qualifications. The importance of these skills and occupations differs across industries. An increase in skilled immigration, therefore is likely to have industry and occupation specific effects. The Productivity Commission have been asked to assess the economic impacts of the changing mix of skills that would be implied by an increase in skilled immigrant quotas.

This is a complex issue. In general we would expect slower wage growth for occupations where supply increases the most. However there will also be complex general equilibrium effects. Industries facing decreasing costs and increasing demands will tend to expand and these industry effects will also effect wage outcomes. Moreover immigrants, skilled or otherwise, need houses to live in and machines and tools to work with, creating increased demand for some occupations and commodities. It is extremely difficult to know how all these factors interact, and how market forces might resolve the many supply and demand changes for commodities and wages of different occupational groups. Sorting this out requires general equilibrium modelling.

The choice of the MONASH Model is appropriate because of its high level of industry and occupation detail. Moreover, because the model itself is standard and fully documented, the results are transparent and easy to interpret. The MONASH Model tells us, at a detailed level, how markets will respond to changes in the skilled immigrant policy. It is a model that assumes that markets work. Hence increased supplies of particular occupations, or decreased demand are mediated through changes in wage rates, and not unemployment.[1]

[1] The evidence of near full employment over the last 10 years, suggests that labour market clearing is also an appropriate assumption. Nevertheless it need not be the final word. In particular, the MONASH Model results might be usefully compared with details of sectoral labour market regulations, in order to consider which sectors, if any, may have difficulty adjusting to the changes.

Results and interpretation

The results provide a rich description of industry and occupation outcomes, and are very interesting. As an example of why these results are interesting, consider the science and medical professional type occupations. We find that some of these occupational groups in particular are projected to have lower growth rates of salaries if skilled immigration intakes are raised. This is not only because these occupations are highly represented among skilled immigrants, but also because demands for this occupation are confined to a few sectors, such as Health, Public Administration and Education.

The case of some trade occupations is somewhat different. This emphasizes the usefulness of the modelling techniques. For example, because the increase in immigrants also stimulates demand for industries such as construction, the downward pressure on wages from the increased supplies of workers in construction industries, is mitigated by the increased industry demands for those occupational groups.

These detailed results by occupation and industry are a unique analytical contribution to our understanding of the impacts of immigration. If used carefully they could provide an extremely valuable resource for managing Australia's immigration policy in the future. In particular, the results indicate that immigration may indeed be a useful policy option in the light of increasing health care costs, and the costs of maintaining an ageing population.

Other issues

During the workshops organized by the Productivity Commission, a number of concerns were raised about aspects of the modelling, and model choice. Two important issues are the effects of immigration on total factor productivity and on the environment. Unfortunately, while it is easy to think about these issues, there is little hard evidence on which to draw, which could be usefully incorporated into an economy-wide economic model. As with any model, the MONASH Model results are conditional. They do not deny, for example, that environmental impacts may be important in some cases. They are simply silent on the issue, and must be interpreted accordingly.

Discussion also centered on the speed at which the economy would adjust to a change in the immigration quota, and hence the timeframe for realizing changes in aggregate output, see appendix J. It is possible, even likely, that the adjustment speed is very slow. Cross-country evidence suggests that it takes around 35 years for an economy to adjust to reach the halfway point of a transition, Barro and

Sala-i-Martin (2004). This evidence would broadly support the assumptions underlying the assumed adjustment path used in the position paper.

The waters are muddied further, however, since there are many possible assumptions we could make about the way the immigration program might actually be phased in, a point eloquently made by Professor Peter McDonald. In general the transition speed depends upon many demographic and economic factors, which we know little about. Fortunately, however, this issue — the speed of adjustment of the economy — is only of marginal importance to the aims of the modelling exercise. I hope it does not distract us from the wealth of industry and occupational results provided.

I.3 Report from Rod Tyers

Introduction

This report offers some brief comments on the position paper and on the comparison of its results with the Econtech simulations.[2] For completeness, it also includes some points made in earlier communications.

The '2004 natives' issue

The group one would want to benefit from additional skilled migrants is the base period Australian population and their descendents – the 'natives'. To see that this is true, consider the static effect of a migration shock. The migrants come because conditions in Australia are better than in their country of origin. So we know they are made better off. The outstanding issue is whether the original Australian population and their descendents are made better off by this migration. If so then there is at least a potential Pareto improvement. The likely losers are those who are in the same jobs as the immigrants. But net gains to all Australians are possible, via other wage increases and capital income increases, and these make it possible to compensate the losers. My original suggestion, therefore, was to focus on the net effects on the natives and, in the dynamic simulations, their descendents. The migrants beyond 2004 and their descendents are almost certainly better off in aggregate, since their base for comparison is their country of origin.

The potential information loss from not solving this problem is that, since the immigrants have higher skill than the average Australian worker, it is possible that

[2] See Econtech (2006a).

their presence might raise both skilled and collective income, but the latter by less. So that it would be possible for base period native Australians and their descendents to be made worse off. Given that the eventual gains in Australia's per capita income from the current skilled migration shock simulations are quite small, this possibility cannot be ruled out.

The recommended additional simulation

I suggest an additional New Tracker Arrival and MONASH Model simulation for the case in which there are no post-2004 migrants at all. New Tracker Arrival would then give the labour supply numbers by skill level for this case and this should enable the MONASH Model to be run. It should provide estimates of capital stocks by sector for each year. These, in turn, would provide estimates (likely underestimates, since migrants raise rates of return) of the future holdings of base period Australian natives and their descendents. Returning to the base line and the high-migration simulations, calculations can now be made as to the changes in capital income to native Australians and their descendents (by applying simulated rates of return to the native and non-native holdings of physical capital).

The choice of welfare measure

From the viewpoint of the Productivity Commission's presentation, however, I realise that the above point is quite subtle and could be made controversial by immigrant vested interests. I therefore understand the choice to focus on real per capita income as the welfare measure.[3]

The productivity gap

The tendency for immigrants to require a 'catch-up' period, due to language and occupational differences, is currently captured via a 10-year adjustment path that assumes that immigrants' participation and unemployment rates improve over time, becoming the same outcomes as that of the natives for the same age, gender and qualification group. The gaps are based on census data — for participation, most of these gaps are in the order of 10–30 per cent points below the native outcomes for the same age, gender and qualification group.

[3] A more minor point regarding the welfare measure is that much hinges in this study on participation rates. Yet, in a country with rich leisure opportunities, increased participation does not necessarily indicate increased welfare. The labour–leisure choice is rarely incorporated in our economy-wide models but should be.

There is, nonetheless, a literature that quantifies a wage catch-up for new immigrants, in addition to a lag in their participation and unemployment rates.[4] Award conditions would have ruled this out in Australia until the last decade but make it possible since. The extent to which this effect outweighs the apparently greater effort made by new migrants is an empirical matter and I do not know the literature.

The productivity story in the position paper is one of its fundamental parts, however. Figure 10 in the Overview makes this plain, while raising several questions. It is surprising that the growth in the negative productivity effect is continuous, even through 20 years, while immigration and labour force growth appear to have reached a steady state in that time. It is difficult to see how capital dilution could explain this. Indeed, the extent of capital dilution could be overstated by the simulations, due to the overstatement of terms of trade effects (see below), the assumption that immigrants do not self-finance investment, and the Econtech point that the capital accumulation rate in response to the work force change might be unrealistically slow in the MONASH Model. Moreover, the average reader will bear in mind that the additional immigrants are more skilled than the general population, earn larger wages (as noted on p. 83) and so should raise average labour productivity.

Terms of trade effects

These are the main source of negative impacts on the aggregate economic outcome, according to the simulations thus far. They arise from the assumption of less than infinite export demand elasticities (-4 or -5 for most exports).

I think the assumptions on this are sound. It is the 'almost small' economy case, where there is no power to influence import prices but foreigners substitute between our exports and their products with elasticities of substitution in the range you mention. An expansion brought about by an increase in the supply of labour and capital must therefore push exports down the rest of the world's excess demand curve. I prefer to think of this as a 'real depreciation' — average home prices fall relative to the average price of foreign goods, and this is in association with the relative expansion in output at home which makes home goods cheaper on average than foreign goods.

The key question, though, is how large are these price effects. If central banks target inflation, this means that (relative) expansions tend to accompany depreciations.

4 Personal communication with Professor Tim Hatton, specialist in migration studies, particularly to Europe.

This is borne out by Australia's economic behaviour over the past two decades. In the very long run we expect a tendency to return toward Purchasing Power Parity (PPP), though this can take a very long time indeed. The criticism of the idea is that the composition of Australia's exports changes through time (which the MONASH Model should capture) but this accompanies new goods and quality changes (which the MONASH Model does not capture). New goods and quality upgrades apparently explain why the East Asian economies greatly expanded their exports to North America over the past two decades without substantial terms of trade deterioration.

Since the early paper on this subject by Martin (1993), the literature has been divided on the terms of trade effects of the surge of developing country manufactured exports. The modelling studies predict declines in the terms of trade while empirical studies find them to be difficult to observe and patchy when distinguished. A recent review is by Mayer (2003) and a still more recent study by Razmi and Blecker (2005) conclude that export growth tends not to cause adverse shifts in the terms of trade for exporters of other than the most basic labour intensive manufactures (textiles, clothing and footwear). The sophistication of manufactures is associated with differentiation and hence market broadening as well as with quality shifts.[5] All this suggests that the simulated changes in the terms of trade from the immigration studies, generated as they are by models with no endogenous product differentiation and no quality ladders, tend to overstate the likely effects.

Comparison with Econtech simulations

1. Key points of difference are the treatment of labour productivity and the balance between the financial wealth of migrants and their remittances. Of these, the main issue is labour productivity — the implied criticism here does need to be addressed. The Productivity Commission's occupational approach does seem to lead to modest average labour productivity outcomes, I guess in part because the terms of trade shifts against industries expanding on skilled migrant labour. The Murphy skill premium approach appears to lack the occupational and, more importantly, the sectoral detail of the Productivity Commission approach. It does not appear to capture the relative effects across sectors, which damp the gains from the migration.[6]

5 Even Hans Singer (1998), the originator of the pessimistic view that developing countries could not develop through trade because they would turn the terms of trade against themselves has conceded this.

6 There is no doubt that some characterisation in both the core models of the markets for skills (rather than the after-model or pre-model add-ons used in both studies) would add considerably.

2. Another point of difference is the lack of fixed factors in the Murphy approach. These must have a negative effect on average labour productivity and need to be incorporated in the MONASH Model manner.

3. 'Participation rate' issues do contrast the approaches but do not seem very important in the wash-up.

4. It is not clear what the Murphy external (balance of payments) closure is and hence what is assumed about foreign direct investment. They get a larger terms of trade effect than the Productivity Commission, though I cannot tell if this is due to a closure assumption or the external elasticities used. The Econtech report reads as if there is no sectoral detail in the MM2 model used, though I have read elsewhere that this model now runs with 18 sectors. Even if it has these sectors, with a single 'effective labour' supply, the interactions between the occupational mix of the workforce and sectoral prices and outputs cannot be properly captured.

5. Both approaches are weak on the treatment of demographic effects on saving and their implications for the balance of payments. Skilled immigration should raise the average private saving rate because it raises the proportion of the population in the wage-earning and high-saving age groups. Relative to current simulations, the incorporation of this behaviour would tend to raise the ratio of income to consumption without making the population worse off on average. It would also depreciate the real exchange rate and raise net exports, thereby accommodating growth in the skilled immigrant employing industries, albeit with a decline in the terms of trade where product quality and product diversity is fixed. Home income must rise, however, because net outward factor income flows must decline.

6. Both approaches omit the effects of industry specific but otherwise generic skills. By hiring immigrants who have worked in the same industry in which they are employed on arrival, these skills are exploited. Without immigration, cross training, directed not only occupationally but industry specifically, is required to achieve the same employment gains. This is also a reason to suspect the two studies are pessimistic.

7. As discussed in section 4, above, I think the models overstate the negative terms of trade effects. This is not just for the reason related to saving, mentioned previously, but also because the models do not capture changes in the composition of goods produced and consumed. Historically, countries have expanded substantially without large terms of trade losses, because their production and exports shift laterally across the mix of goods and up quality ladders. This also makes both studies pessimistic.

8. Finally, I think the base line simulation is important in each case. I believe that the global terms of trade is shifting in favour of skill intensive goods. This is true notwithstanding the decline in the prices of computers and their components. Ever since the work of Lewis (1952), a measured trend toward rising prices of traded manufactures relative to raw materials has been prominent in the commodity trade

literature. Grilli and Yang (1988) confirmed and updated the trend identified by Lewis, indicating a rise in relative manufactures prices of half a per cent per year. If the base line projections were to have this trend in the terms of trade built in, then the gains to free trading countries from changing their factor endowment ratios (toward skill) must be larger, other things equal. This must be true even if the change offsets the terms of trade growth somewhat.

J Alternative modelling assumptions and results

The Commission's analysis of the effect of a 50 per cent increase in the Skilled Migration Program is separated into two parts. First, the Commission estimated the demographic and labour supply effects (appendix F). Second, the Commission contracted the Centre of Policy Studies (CoPS) to analyse the economy-wide effects of the demographic and labour supply changes (appendix G).

This appendix compares both parts of the modelling undertaken for this study with modelling in Econtech (2006b) presented to the Commission by the Department of Immigration and Multicultural Affairs. This comparison is based on the Commission's interpretation of Econtech (2006b) and related material (including Powell and Murphy 1997).

Although both approaches are similar, they differ in some key assumptions and methodologies. The different assumptions lead to some differences in results.

In the final year of the simulations:

- CoPS estimates a larger gain from the increased *quantity* of labour. The main reason for this difference is the assumptions made about the participation rates of Skilled visa immigrants (section J.1).
- Econtech (2006b) estimates a larger gain from the *quality* of labour. This difference arises from the Commission's disaggregated approach to labour supply, which reveals two secondary effects that reduce the skill composition effect over time (section J.2).
- Migrant transfers increase the consumption per capita in Econtech (2006b) by 0.3 per cent after 20 years. Migrant transfers increase income (GNP) per capita in the CoPS study by 0.1 per cent after 21 years (section J.3).
- Econtech (2006b) estimates a larger gain from the *productivity* of labour (separate to the skill composition effect). The disaggregated approach to labour supply in this study captures industry share and cost effects that reduce the capital–labour ratio, and therefore labour productivity (section J.4).
- Overall, CoPS estimates a gain in GNP per capita of 0.7 per cent. Econtech (2006b) estimates a gain in consumption per capita of 1.1 per cent (section J.5).

J.1 Demographic and labour supply differences

This section examines the different assumptions in the demographic modelling of CoPS and Econtech (2006b). These differences relate to the treatment of remigration, participation rates, unemployment rates and skills.

Remigration

The two studies make different assumptions about remigration. Econtech (2006b) assumes that immigrants do not leave Australia after arrival. The Commission's modelling allows for remigration, which is estimated based on Overseas Arrivals and Departures data. The Commission assumes that the increase in immigration does not change the arrivals and departures of the rest of the population.

Therefore, although the two studies simulate the same *policy* change — a 50 per cent increase in the Skilled migration intake — they simulate different *population* deviations. The Commission projects that the population increase is 3.2 per cent relative to the base case after 20 years.[1] With no remigration, Econtech (2006b) projects an increase of 3.7 per cent. In other words, the population increase in the Econtech (2006b) modelling is approximately 0.5 percentage points (15 per cent) larger than the Commission modelling.[2] This increases the labour supply shock in Econtech (2006b).

If the same assumption of zero remigration is made in the Commission's model, the New Arrivals Tracker (NAT) projects the deviation in population to be 3.64 per cent after 20 years. Consequently, the Commission's labour supply increase would be 14 per cent larger if remigration was excluded in NAT.

Participation rates

There are significant differences in the approach to participation rates in the two models.

Econtech (2006b) assumes that migration has no effect on the historical trends in labour participation rates of specific age–gender groups. This implies either that the additional immigrants have the same age–gender specific participation rates as

1 The population increase is 3.35 per cent after 21 years, in 2024-25.

2 Based on the information in Econtech (2006b), it is not possible to estimate directly what the effect of including remigration would be in Econtech's model. However, excluding remigration from NAT increases the population deviation by 14 per cent. This gives a similar percentage increase in population to the reported increase in Econtech (2006b).

existing residents, or, alternatively, that the higher (lower) age–gender specific participation rates of immigrants reduces (increases) the age–gender specific participation rates of existing residents.

The Commission estimates the participation rates of immigrants by visa category. It assumes a ten-year acclimatisation path during which Skilled visa immigrants' participation rates start slightly below, but end up significantly above existing residents of the same age and gender. The modelling assumes no effect on the labour market outcomes of existing residents (no displacement).

Skilled visa immigrants tend to have higher education levels than the existing residents. This is generally associated with higher participation rates. Therefore, 'well-established' Skilled visa immigrants have significantly higher age–gender specific participation rates compared to existing residents, although participation rates are lower for the first few years and for persons with poor English skills (chapter 4).

Despite the smaller increase in population in the Commission's modelling, the higher participation rates of Skilled visa immigrants result in a larger employment deviation after 20 years, compared with Econtech (2006b).

Unemployment

The two studies approach unemployment in different ways. However, both studies find that increasing Skilled visa migration has little effect on unemployment.

Econtech (2006b) assumes that in the long run, unemployment converges back to the non-accelerating inflation rate of unemployment. Econtech (2006b) models labour supply and demand separately, and wages adjust gradually to return the labour market to the non-accelerating inflation rate of unemployment.

The Commission uses projections of the number of hours worked, including unemployment parameters that represent structural and frictional unemployment (similar to a notion of an age–gender specific non-accelerating inflation rate of unemployment). The MONASH Model then adjusts wages (as part of a complex process) to employ all of the projected hours of labour supplied.

Similar to participation rates, Skilled visa immigrants have different unemployment rates to existing residents of the same age and gender. Immigrants experience high unemployment in their early years in Australia, but fully acclimatised Skilled visa immigrants have lower unemployment rates. Again, this reflects the higher education levels of immigrants under the Skilled migration program.

The Commission assumes that the additional immigration does not displace existing workers from employment. Econtech's unemployment effects suggest that this assumption is not critical to the results.

J.2 Skills

Before comparing the approach to skills in the two models, it is useful to define two terms: the skill premium and the skill composition effect.

Skill premium

The skill premium is the per cent difference in the average wage of the additional immigrants relative to the average wage of the base-case population.

It should be noted that average relative wages are different *solely* because of the different skill composition of the two groups. Persons in the same occupation are assumed to earn the same hourly wage, but a surgeon typically earns more than a labourer.

Skill composition effect

The skill composition effect is the *deviation* in effective hours per hour worked (where effective hours are wage-weighted hours). This can be explained by the following equation:

$$\frac{GDP}{Hours} = \frac{GDP}{Effhrs} \times \frac{Effhrs}{Hours}$$

where *Effhrs* are effective hours.

A change in the ratio of effective hours worked to hours worked is a skill composition effect. The ratio of GDP to effective hours worked is a measure of labour productivity using quality-adjusted labour inputs[3].

Labour supply modelling framework

There are important differences in the level of disaggregation in the models, which have a direct impact on the skill composition effect.

3 This methodology is consistent with the 'quality-adjusted labour index' approach of the ABS, described in Reilly, Milne and Zhao (2005).

In Econtech (2006b), there is one type of labour, called effective labour. The deviation in effective labour is equal to the deviation in employment in persons, multiplied by the relative wage of those persons. The relative wage of the additional immigrants is estimated outside the general equilibrium model, based on the occupation mix of immigrants from the *Longitudinal Survey of Immigrants to Australia* (cohort 2, wave 2, collected in 2002).

In other words, Econtech (2006b) estimates the skill premium of the additional immigrants based on fixed relative wages and a fixed occupational mix from 2002.

In this study, the labour supply inputs into the MONASH model are disaggregated by skill. There are 67 skill categories, a combination of (highest) level of educational attainment and field of study. For example, a person might have a bachelor degree in information technology, a postgraduate degree in health, or no post-school qualification.

Labour by skill is transformed in the model into labour by occupation, according to a Constant Elasticity of Transformation function. This function is designed so that only persons with certain skills can work in certain occupations. For example, someone with a medical degree can be a taxi driver, but a person without a medical degree cannot become a doctor. Furthermore, changing occupations is difficult, with the elasticity of transformation set at 0.35.

Therefore, the supply of labour by *occupation* is primarily influenced by the changes in the supply of labour by skill, determined outside the model.

The demand for labour by occupation is determined within the model. Industries demand labour by occupation in order to maximise profits, based on the price of labour and other inputs of production, as well as demand for each industry's output.

Different industries need different types of labour. Each industry has a unique Constant Elasticity of Substitution function that combines labour from a mix of occupations. For example, the health services industry mainly uses the labour of doctors, nurses and administrators. The construction industry mainly uses the labour of tradespersons, labourers, crane drivers and managers.

Therefore, as industries expand by different amounts, the demand for labour in some occupations will increase by more than the demand for other occupations.

In this simulation of the MONASH Model, wages adjust by occupation in order to clear the market, which means that all the labour supplied is employed in an

occupation.[4] If the demand for labour of a certain occupation increases by more than the supply of labour to that occupation, the relative wage of that occupation increases. Alternatively, if the supply of labour to an occupation increases by more than the demand for labour in that occupation, the relative wage of that occupation decreases.

The Commission's disaggregated approach to labour supply adds value to the existing research. In particular, the disaggregated projection of skills provides useful insights into compositional effects on industries and occupations, and reveals some important 'secondary' effects:

- Demographic effects reduce the skill premium of the additional immigrants over time, despite the fact that immigrants up-skill at the same rate as existing residents (appendix F, figure F.7).
- Relative wage effects reduce the skill premium over time. This is because the supply of labour in certain occupations increases by more than the demand for labour in those occupations.

A summary of these effects is shown in table J.1 and are explained in detail below.

Table J.1 **Impact on the skill premium and skill composition effect of changes in the age–gender structure and relative wages**
2024-25

	Skill premium[a]	*Skill composition effect*[b]
	(%)	(% deviation from base)
CoPS modelling, with both effects	8	0.27
No demographic effect, with changes in relative wages	10 [c]	0.32 [d]
No change in relative wages, with demographic effect	12	0.46
Neither cohort or relative wage effect	14	0.54 [d]
Econtech (2006b) estimate, scaled for remigration	21	0.52 [e]
Econtech (2006b) estimate	21	0.6 [e]

[a] The per cent difference in the average wage of the additional immigrants and the average wage of the total population. [b] The per cent deviation in effective hours per hour worked from the base-case simulation. [c] This estimate uses the projected relative wages from the increased-migration simulation. Modelling the different skill composition could result in different projections for relative wages, which could change the skill premium. [d] Based on 'back-of-the-envelope' calculations. [e] Contribution to deviation in living standards.

Source: Productivity Commission calculations based on projections from NAT and the MONASH Model.

4 This is not the same as full employment. Unemployment is projected outside the general equilibrium model, in the demographic models (appendix F), using the concept of a non-accelerating-inflation rate of unemployment. In other words, labour supply in this context refers to hours *worked*.

Demographic effects change the skill composition of the additional immigrants

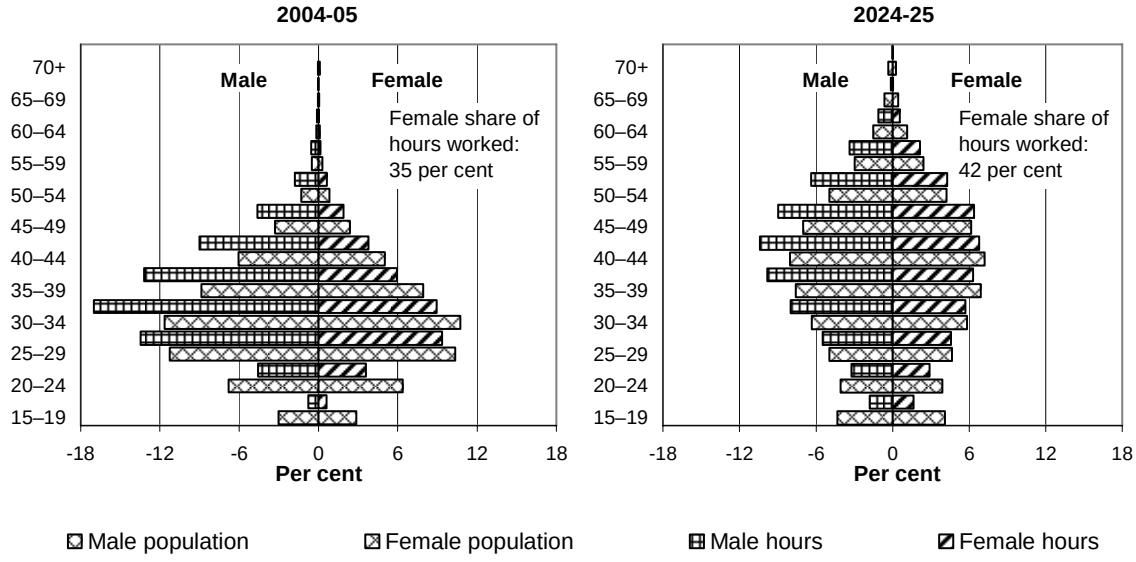
The 'demographic effect' refers to natural changes in the age and gender structure that reduce the skill premium of additional immigrants.

Like all populations, the additional immigrants age over time, which results in changes to the age–gender profile, as shown in figure J.1. The arrival of more immigrants each year slows the ageing of the population as a whole, but it cannot stop the ageing. For example, the share of the additional immigrants over the age of 55 increases from 1.3 per cent in 2004-05 to 9.7 per cent in 2024-25. The share of prime working-age persons, 25–54, falls from 90 per cent to 83 per cent over the same period.

The change in the age–gender profile of the additional *workers* is even more acute. The share of additional hours worked by persons aged over 55 increases from 0.9 per cent in 2004-05 to 7.4 per cent in 2024-25. Moreover, although the share of *persons* aged 15–24 decreases by 1.4 percentage points over the projection period, the share of additional *hours worked* by persons aged 15–24 increases slightly.

Furthermore, although the gender mix of the additional immigrants is relatively stable (the female share of the population increases by 0.2 percentage points), from

Figure J.1 **Demographic changes in the additional immigrants**
Population and hours worked[a], 2004-05 and 2024-25



[a] The share of hours worked by persons of that age and gender.

Source: Productivity Commission projections from NAT.

2004-05 to 2024-25 the share of hours worked by females increases by 6.4 percentage points. This is particularly noticeable for females over 55 years of age. The population share of females over 55 increases by 680 per cent (3.7 percentage points), whereas the share of hours worked by the same group increases by almost 1400 per cent (2.6 percentage points).

Therefore, the skill composition of the additional immigrants also changes over time. The cohorts that increase as a share of the hours worked also tend to have lower skills than the average additional immigrant, with the exception of prime aged females and older males. Young workers aged 15–25 and female workers over 55 years of age have a higher than average share of persons with no post-school qualification (table J.2).

Table J.2 **Share of hours worked by persons with no post-school qualification as a per cent of hours worked by that cohort**

Additional immigrants only

	2004-05	*2024-25*
	%	%
Female		
15–24 years	41.55	57.85 [a]
25–54 years	25.68	22.79
55+ years	24.16	35.13
15+ years	27.58	27.47
Male		
15–24 years	43.02	61.28 [a]
25–54 years	23.79	19.21
55+ years	23.41	14.42
15+ years	25.36	22.45
Persons		
15–24 years	42.37	59.66 [a]
25–54 years	24.43	20.68
55+ years	23.57	22.11
15+ years	26.14	24.52

[a] The shares for persons aged 15–24 years increase over time, which reflects an increase in post-school training.

Source: Productivity Commission projections from NAT.

Without this demographic effect, the share of additional hours worked by persons with no post-school qualification would be around 21 per cent in 2024-25, instead of the 24.5 per cent shown in table J.2. Therefore, by 2024-25, the *skill premium* of the additional immigrants would have been 10 per cent, instead of the projected skill premium of 8 per cent (table J.1).

Relative wage effects also reduce the skill composition effect

In this study, relative wage movements reduce the skill composition effect. If the additional immigrants had no effect on the relative wages of different occupations, the skill composition effect would be 0.46 per cent in 2024-25. However, the additional immigration reduces the wages of skilled occupations relative to less skilled occupations. Therefore, the skill composition effect is 0.27 per cent in 2024-25 (table J.3).

Table J.3 **Deviation in effective hours per hour**
Per cent deviation from base case

	2004-05	*2024-25*
	(%)	(%)
Deviation in hours worked	0.110	4.59
Deviation in effective hours (fixed wages)	0.120	5.07
Deviation in effective hours (projected wages [a])	0.120	4.87
Deviation in effective hours per hour (fixed wages)	0.013	0.46
Deviation in effective hours per hour (projected wages [a])	0.013	0.27

[a] 'Projected' refers to the wages from MONASH for the relevant year, allowing relative wages to change.

Source: Productivity Commission calculations based on CoPS simulations using the MONASH Model.

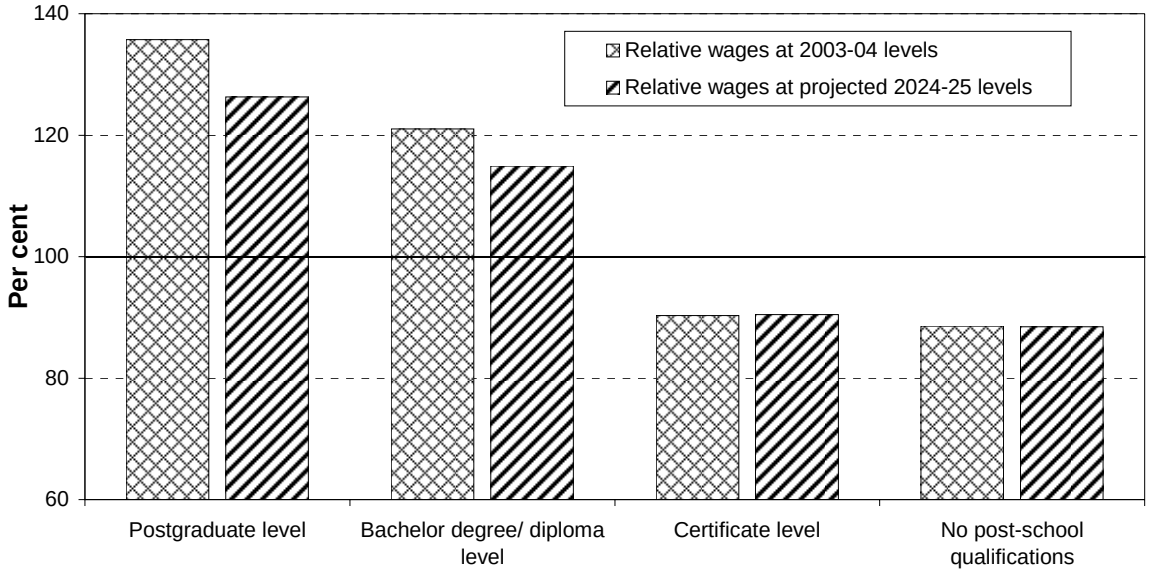
It is the change in relative wages, not the aggregate wage, which reduces the skill composition effect. For example, in 2024-25, the wages of persons with postgraduate degrees reduces from 137 per cent of the average wage in the base-case simulation, to 129 per cent of the average wage in the increased-migration simulation, as shown in figure J.2.

The additional immigrants are significantly over-represented among highly qualified workers that experience a reduction in their relative wage premium, as shown in figure J.3.

Therefore, the skill premium falls because of relative wage changes. The additional immigrants earn 13 per cent more per hour than the base-case population in 2004-05. In the final year, the additional immigrants earn 8 per cent more per hour (table J.1).

Figure J.2 **Hourly wages by qualification**

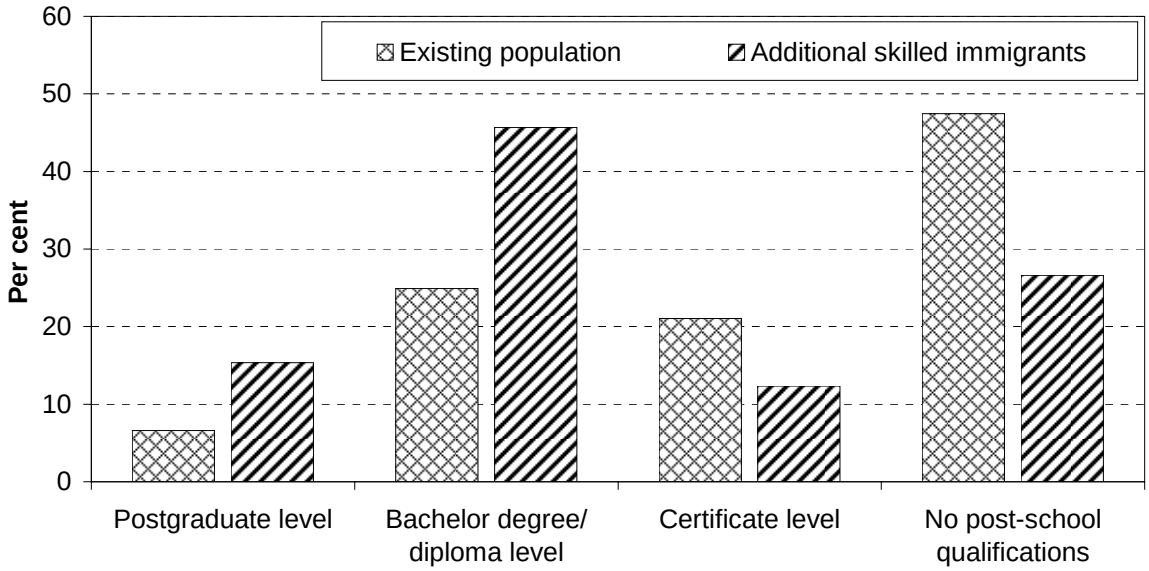
As a proportion of average Australian wages, 2003-04 and 2024-25



Source: Productivity Commission estimates based on CoPS simulations using the MONASH Model.

Figure J.3 **Proportion of hours worked by qualification level**

Skilled visa immigrants and existing resident population, 2004-05



Sources: Productivity Commission projections from NAT for the additional immigrants; CoPS estimates for the existing population based on ABS Survey of Education and Work (see ABS 2005b).

Calculation of the skill composition effect

Three indexes of labour are required to calculate the skill composition effect, allowing for a comparison of fixed or flexible relative wages.

Index 1 — simple index of labour supply based on the summation of hours worked

$$L_t^1 = L_{t-1}^1 \left(\frac{\sum_s H_t^s}{\sum_s H_{t-1}^s} \right) \tag{1}$$

where L_t is the value of the index at time t, H_t^s are the hours worked for each defined category of skill, s, in each time period, t.

Index 2 — index of labour based on skill composition with fixed relative wages

$$L_t^2 = L_{t-1}^2 \left(\frac{\sum_s \left(H_t^s \cdot \frac{W_0^s}{\overline{W_0}} \right)}{\sum_s \left(H_{t-1}^s \cdot \frac{W_0^s}{\overline{W_0}} \right)} \right) \tag{2}$$

where W_0^s are wages by skill and $\overline{W_0}$ is the average wage from the database. In other words, the current hours by skill are weighted using constant relative wages from the database.

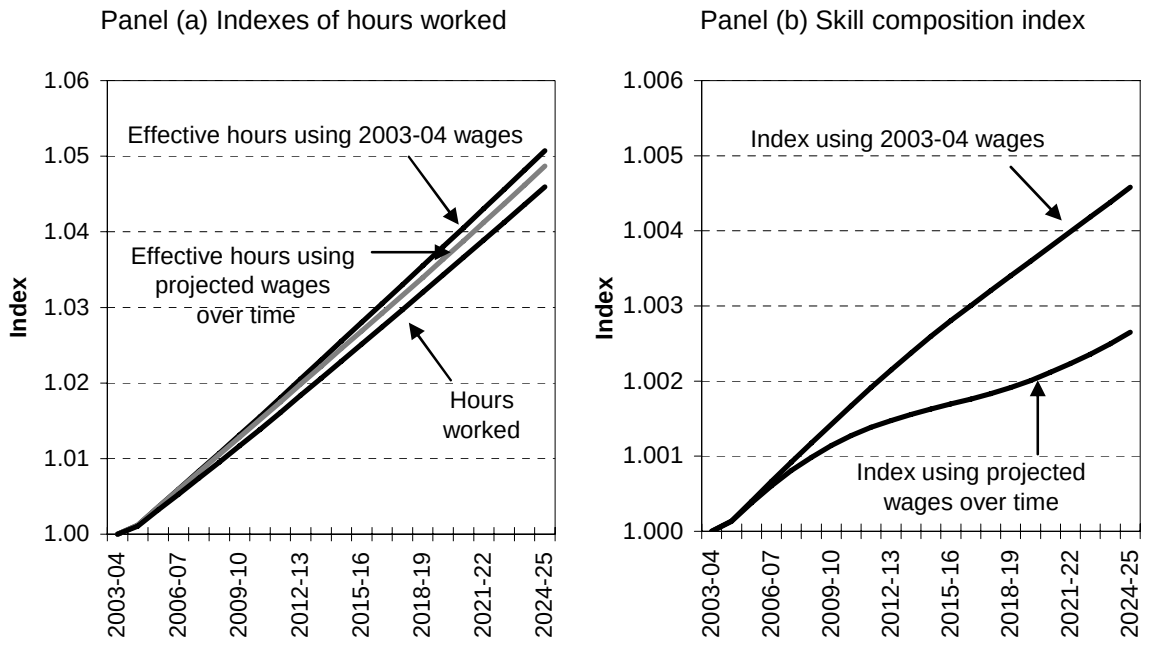
Index 3 — index of labour based on equilibrium skill composition and wages

$$L_t^3 = L_{t-1}^3 \left(\prod_s \left(\frac{H_t^s}{H_{t-1}^s} \right)^{\frac{1}{2}\left(\frac{W_t^{sGE} H_t^s}{\sum_s \left(W_t^{sGE} H_t^s \right)} + \frac{W_{t-1}^{sGE} H_{t-1}^s}{\sum_s \left(W_{t-1}^{sGE} H_{t-1}^s \right)} \right)} \right) \tag{3}$$

where W_t^{sGE} are wages by skill in time t, determined by the general equilibrium model. In other words, the hours worked in each skill category *and* relative wages by skill reflect the general equilibrium solution values and not the initial values.

The three indexes and the effect on the skill composition index are shown in figure J.4. The additional immigrants increase hours worked by 4.6 per cent in 2024-25 (index 1). If relative wages were fixed, effective hours would have increased by 5.1 per cent in 2024-25 (index 2). However, using equilibrium wages from the general equilibrium solution, effective hours increases by 4.9 per cent in 2024-25 (index 3).

Figure J.4 **Comparison of three labour indexes and the implication for the skill composition effect**
2003-04 to 2024-25



Source: Productivity Commission estimates based on CoPS simulations using the MONASH Model.

The skill composition effect is calculated as the per cent deviation (from the base case) in effective hours per hour worked:

$$\text{Skill composition effect} = 100 \times \left(\frac{\left(L_t^{3M} / L_t^{3B} \right) - \left(L_t^{1M} / L_t^{1B} \right)}{L_t^{1M} / L_t^{1B}} \right) \quad (4)$$

where L_t^{3M} is the increased-migration simulation index, and L_t^{3B} is the base-case simulation index (this is also calculated using index 2 in place of index 3).

It is worth noting that even a small change in relative wages can reduce the skill composition effect considerably. Although the difference in labour indexes 2 and 3

is only 0.2 per cent (table J.4), the deviation in effective hours per hour worked is 42 per cent smaller using index 3.

In other words, allowing for relative wage movements almost halves the skill composition effect of the 50 per cent increase in Skilled migration by 2024-25.

Table J.4 **Comparison of three indexes of labour**
Indexed to database year, 2003-04

	Base case	*Increased migration*	*Base case*	*Increased migration*
	2004-05	2004-05	2024-25	2024-25
Hours worked	102.2	102.3	119.1	124.6
Effective hours (fixed wages)	102.3	102.4	121.6 [b]	127.8
Effective hours (actual wages [a])	102.3	102.4	121.6 [b]	127.5

[a] 'Actual' refers to the equilibrium wages for the relevant year, allowing relative wages to change (index 3). [b] Relative wages are fixed over time in the base-case simulation

Source: Productivity Commission estimates based on CoPS simulations using the MONASH Model.

J.3 Migrant transfers and remittances

Any net wealth of the additional immigrants, accounting for net remittances, increases GNP per capita. The financial wealth of the additional immigrants is used to fund investment, and therefore reduces net foreign liabilities.

The CoPS modelling assumes that Skilled visa immigrants bring around $25 000 per immigrant,[5] based on Commission estimates from the *Longitudinal Survey of Immigrants to Australia* (cohort 2, wave 2). This contributes to an increase in GNP per capita of around 0.1 per cent (or $53 per capita) in 2024-25.

Econtech (2006b) estimates capital transfers to be around $30 000 to $40 000 per immigrant[6] (assuming no remittances). This increases consumption per capita by 0.3 per cent after 20 years.

The different effects on living standards in the two models can partly be explained by two factors. First, the two models assume different capital transfers per immigrant, as discussed above. Second, remigration reduces annual migrant

5 In 2004-05 dollars. This number grows with inflation, and in real terms by 1.5 per cent per year.

6 The amount depends on the share of immigrants in each sub-category of Skilled visa immigrants in Econtech (2006b) — in particular, the share of Business Skills migrants — which is not stated.

transfers in the Commission's study, because it is assumed that immigrants take their capital when they leave.

J.4 General equilibrium modelling methodology

This section examines the specific differences regarding the level of disaggregation in the general equilibrium modelling of CoPS and Econtech (2006b). It then discusses the impact of these differences on the projections of the terms of trade and the adjustment of capital.

Modelling framework for the cost of labour by industry

There are important differences in the level of disaggregation in the models, which have significant effects on the overall result.

In Econtech (2006b), there is only one type of labour (effective labour), and the increase in immigration simply increases the aggregate supply of labour. This labour appears to be perfectly substitutable between industries.[7] This implies that the *deviation* in the unit cost of labour is the same in each industry, despite the fact that wages differ by industry (Powell and Murphy, 1997, pp. 406–9).

In this study, labour supply inputs are disaggregated by skill, as described in section J.2. Within the MONASH Model, labour by skill is transformed into labour by occupation, according to a Constant Elasticity of Transformation function.

The transformation of skills into occupations is determined at the economy-wide level. Wages by occupation adjust in order to clear the market. Each year, there is an (equilibrium) economy-wide wage by occupation.

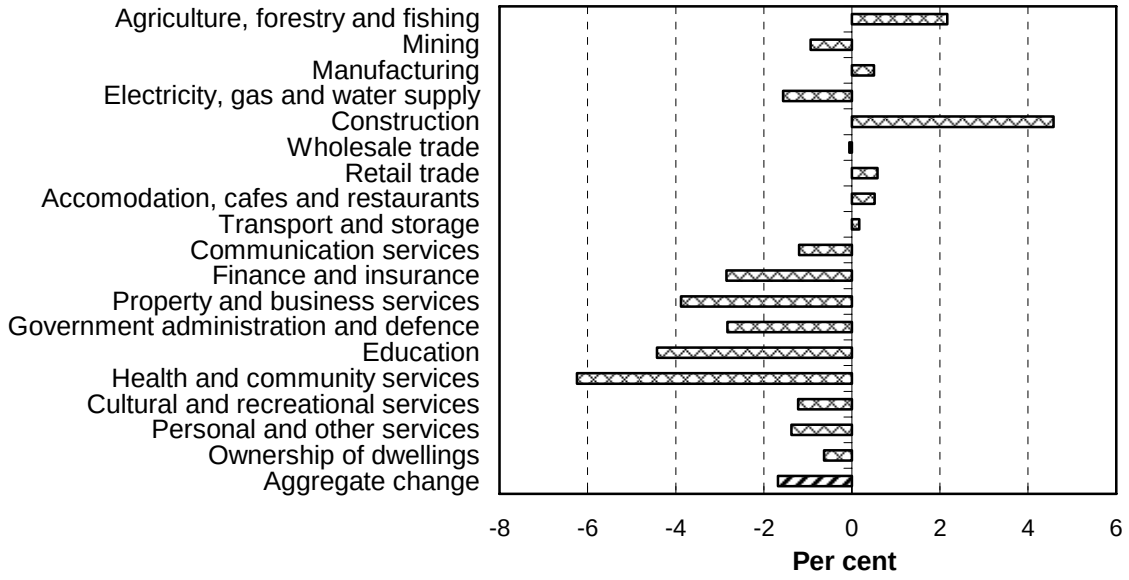
However, different industries need different types of labour. As described in section J.2, each industry has a unique Constant Elasticity of Substitution function that combines labour from a mix of occupations. For example, the Education industry mainly uses the labour of teachers and administrators. The Agriculture, Forestry and Fishing industry mainly uses the labour of farmers, farm managers and labourers.

Therefore, despite there being an economy-wide wage by occupation, the cost of one unit of labour is different in each industry. Equally, the deviation in the average unit cost of labour varies by industry in the increased-migration simulation, as shown in figure J.5.

7 Based on the Commission's interpretation of Econtech (2006b).

Figure J.5 **Projected change in average unit cost of labour**

Per cent deviation between the base-case and increased-migration simulations by 2024-25



Source: CoPS estimates based on simulations using the MONASH Model.

Since the change in average unit cost of labour varies across industries, the change in the cost of production also varies by industry. The production function in each industry is another Constant Elasticity of Substitution function that combines units of labour and capital. An increase in the unit cost of labour increases the cost of a unit of output. It also has a differential effect on the change in the mix of capital and labour chosen in each industry.

Therefore, there are industry composition effects in the CoPS modelling that do not appear to be modelled in Econtech (2006b).[8]

In this study, the Commission chose to model the labour supply effects of migration at a disaggregated level in order to capture the richness of effects that arise from disaggregation. This approach revealed the 'secondary effects' on skills (discussed in section J.2). Furthermore, the disaggregated labour supply approach has an impact on industry composition and industry costs, and these sectoral effects have an impact on the economy-wide results.

8 Econtech (2006b) might have industry composition effects, but these would be driven by changes in demand by industry, not different shifts in cost of labour by industry.

Terms of trade

Both models assume that Australia is an 'almost small' economy. This implies that Australia is too small (in international trade) to influence the price of imports, but not too small to affect the price of our exports. Australian exporters face downward-sloping demand curves, which means that in order to expand the volume of Australia's exports, exporters must accept a lower price. Therefore, an expansion in exports has the potential to worsen Australia's terms of trade (explained in appendix G, box G.3).

The terms of trade fall by 0.9 per cent in the CoPS modelling by 2024-25, and by 1.1 per cent in Econtech (2006b) after 20 years. When scaled to account for the different population shocks, Econtech's terms of trade fall by around 1 per cent.

The fall in the terms of trade reduces the consumption share of GDP. The CoPS modelling estimates that the 0.9 per cent fall in the terms of trade reduces GNP per capita directly by 0.5 per cent. Econtech (2006b) estimates that a 1.1 per cent fall in the terms of trade reduces living standards by 0.3 per cent.[9]

The adjustment of capital

In this study, the capital–labour ratio falls by 0.6 per cent in 2024-25. This reduces (quality-adjusted) labour productivity, which contributes to a 0.2 per cent fall in GNP per capita. In Econtech (2006b), the capital–labour ratio increases by around 0.1 per cent after 20 years. This also increases living standards by 0.1 per cent.

This difference between the deviations in the capital–labour ratio is not related to the speed of adjustment of capital. Although the rates of adjustment of capital do differ in the two models, capital has fully adjusted by the final year in both models.[10]

Rather, the different deviations in the capital–labour ratio result from different modelling methodologies. Specifically, the disaggregated nature of the Commission's approach, made possible by using the MONASH Model, captures different industry and cost effects. The Econtech (2006b) model, on the other hand, assumes a uniform labour shock.

9 This estimate is based on a comparison of the simulation in Econtech (2006b) with another Econtech simulation in which the terms of trade effects were almost eliminated by shifting the demand for Australian exports.

10 The final year in the MONASH simulation is after 21 years. The final year in Econtech (2006b) is the steady state solution, nominally after twenty years.

In this study, the capital–labour ratio falls by 0.6 per cent for two reasons.

First, the rental price of capital[11] increases by 0.5 per cent, which explains 40 per cent of the deviation in the aggregate capital–labour ratio. The terms of trade increases the rental price of capital, since the relative cost of imports increases and investment is typically import-intensive. In addition, compositional changes in the economy increase the *construction* cost of capital.[12] Specifically, the relative wage increases of labourers and tradespersons — persons used to build machines, factories and so on — cause the construction cost of capital to rise, relative to the base case.[13]

Second, industry composition effects significantly reduce the aggregate capital–labour ratio in the increased-migration simulation. This explains 60 per cent of the deviation in the aggregate capital–labour ratio. With the exception of construction, the industries that expand more than the average are industries that are labour intensive. For example, output in the health industry expands by 15 per cent more than the increase in aggregate output — the labour intensity in the health industry is around 90 per cent, compared with the economy-wide labour intensity of around 65 per cent.

J.5 The effect of migration on living standards

Despite differences in the assumptions and modelling approaches between the two models, the overall projected effect on living standards is similar.[14] Furthermore, most of difference between the deviations in living standards can be explained once allowance is made for differences between the studies in respect of remigration and the labour-supply modelling framework.

Overall, CoPS projects a 0.7 per cent increase in GNP per capita. Econtech (2006b), scaled for remigration, projects a 1 per cent increase in living standards.

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11 Otherwise known as the real producer price of capital, or the annual user charge of capital. It is an equivalent notion to the *rent* on a property, not the cost of buying or building a property.

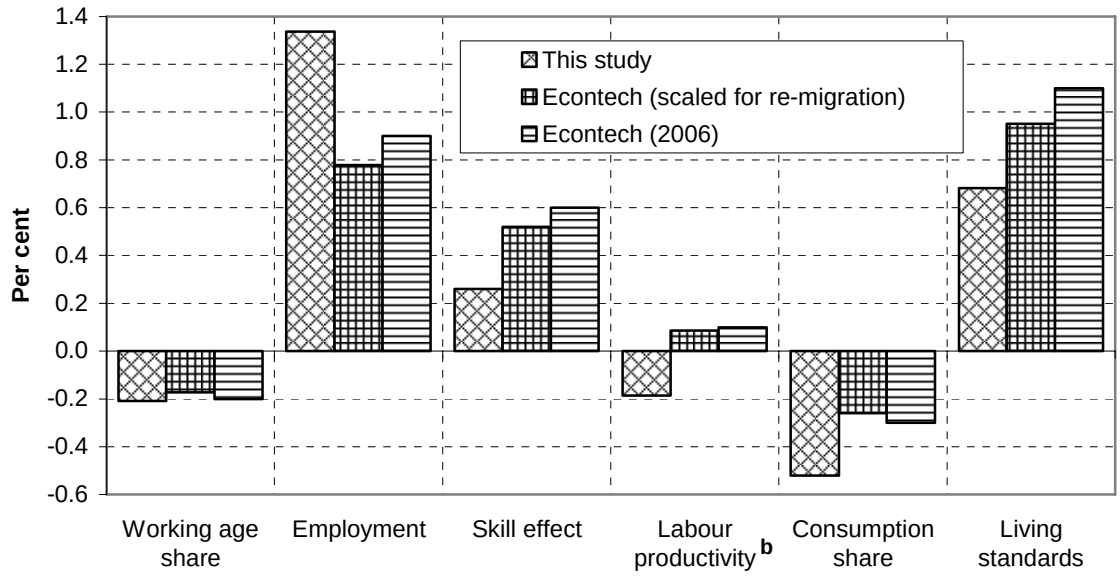
12 In MONASH, *financial* capital is available on world capital markets, but domestic construction of *physical* capital requires labour inputs. Therefore, as the price of these labour inputs increases, the *construction* cost of capital increases.

13 As the construction cost of capital increases, the rental price of capital must also increase, because the rate of return in the increased-migration simulation is the same as in the base-case simulation by 2024-25.

14 For comparability in this section, the reported results from this study are after 20 years (2023-24) and not the final year results from 2024-25.

A comparison of the projected contributions to living standards in the two models is presented in figure J.6. The various components of these changes in projected living standards are discussed below.

Figure J.6 **Comparison of the contributions to living standards[a]**
Deviation from base case after 20 years



a Living standards refer to GNP per capita in this study, and consumption per capita in Econtech (2006b). **b** Labour productivity measured using quality-adjusted labour, consistent with Reilly, Milne and Zhao (2005).

Sources: Productivity Commission estimates based on CoPS modelling and Econtech (2006b).

Working-age share

Both models project similar effects from changes in the working-age shares. This effect reduces living standards by around 0.2 per cent after 20 years. The additional immigrants have a higher share of females of child-bearing age, and can, therefore be expected to have a higher share of children in the future.

Employment

The CoPS modelling estimates a higher gain from an increase in the quantity of labour, 1.3 per cent compared with 0.8 per cent in the (scaled) Econtech (2006b) results. This reflects differences in estimating participation rates.

Specifically, the additional immigrants in this study have higher participation rates than existing residents of the same age and gender. This reflects the higher educational attainment of the additional immigrants (participation is positively

correlated with educational attainment). In Econtech (2006b), the aggregate participation rate increases only because of the different age–gender structure of the additional immigrants, and is not related to their educational attainment.

Skill effect

Econtech (2006b) estimates a higher gain in living standards from the skill effect, 0.5 per cent (scaled) versus 0.3 per cent in this study.

Two 'secondary' effects that arise from the disaggregated approach to labour supply explain the difference in the skill effects of the two models. First, changes in the age and gender structure of the additional immigrants, and particularly of the additional *workers*, reduce the skill composition effect over time (the demographic effect). Second, changes in relative wages, induced by the additional immigration, also reduce the relative skill level of the additional immigrants (the relative wage effect).

In the absence of these two effects, the skill composition effect would have been approximately 0.52 per cent. However, because of these two *endogenous* effects, the skill composition effect in this study is 0.25 per cent after 20 years.

Labour productivity

Econtech (2006b) estimates a higher gain in (quality-adjusted) labour productivity, 0.1 per cent (scaled) compared with a fall of 0.2 per cent in this study. This is because the aggregate capital–labour ratio increases by 0.1 per cent in Econtech (2006b), whereas it falls by 0.6 per cent in the MONASH Model.

The different changes in the capital–labour ratio are a result of the different modelling methodologies. In particular, the disaggregated approach to labour supply in this study captures industry share and cost effects that are not modelled in Econtech (2006b). For example, the impact of an additional immigrant with a medical degree has a different effect on the health industry, compared with the impact of an additional immigrant with an engineering degree (even if the two persons earn exactly the same wage).

Consumption share of GDP

Both models project a decline in living standards from a consumption-share effect. The increase in net foreign liabilities, as well as the decline in the terms of trade, means that living standards increase by less than the increase in GDP.

In other words, the increase in Australia's income is less than the increase in Australia's production, because part of the additional income is paid to overseas capital owners, and part of the production (exports) is sold at a lower price.

The CoPS modelling projects that the consumption-share effect reduces GNP per capita by 0.5 per cent. This includes migrant transfers of $25 000 per immigrant, which offset the consumption-share effect by 0.1 per cent. The consumption-share effect is a combination of the fall in the terms of trade and an increase in net foreign liabilities, partially offset by a fall in the relative price of consumption.[15]

Econtech (2006b) estimates that the consumption-share effect reduces consumption per capita by 0.3 per cent (scaled). This includes migrant transfers of around $30 000 to $40 000, which offset the consumption-share effect by 0.3 per cent.

15 The price of consumption increases by less than the price of GDP.

References

AATSE (Australian Academy of Technological Sciences and Engineering) 2001, *Population Futures*, Canberra.

ABARE 2005, 'Statistical tables', *Australian Commodities*, vol. 12, no. 2, pp. 406–40.

—— 2004, *Australian Commodity Statistics 2004*, Canberra.

Abella, M. 2004, 'The Role of recruiters in labor migration', in Massey, D. and Taylor, J. (eds), *International Migration: Prospects and Policies in a Global Market*, Oxford University Press.

ABS (Australian Bureau of Statistics) 2006, *Australian National Accounts: National Income, Expenditure and Product*, Cat. no. 5206.0, Canberra.

—— 2005a, *Balance of Payments and International Investment Position*, Cat. no. 5302.0, December Quarter, Canberra.

—— 2005b, *Education and Work Australia*, Cat. no. 6227.0, May, Canberra.

—— 2005c, *Migration Australia 2003-04*, Cat. no. 3412.0, Canberra.

—— 2004a, *Migration*, Cat. no. 3412.0.

—— 2004b, *Measuring Net Overseas Migration*, Technical Note, http://www.abs.gov.au/Ausstats/abs@.nsf/0/6a8f1b1a1f70ae1aca256e5a00756134?OpenDocument (accessed 1 August 2005).

—— 2004c, *Australian Historical Population Statistics*, Cat. no. 3105.065.001.

—— 2004d, *Overseas Arrivals and Departures*, Cat. no. 3401.0.

—— 2002a, *Australian Social Trends 2001 Population — Population Growth: Coming to Australia*, http://www.abs.gov.au/Ausstats/abs@.nsf/94713ad445ff1425ca25682000192af2/d650a8e2782a347aca256bcd00825564!OpenDocument (accessed 28 September 2005).

—— 2002b, *Measuring Australia's Progress: The Headline Indicators: Land Degradation*, Cat. no. 1370.0.

—— 2002c, *2001 Census of Population and Housing*, http://www.abs.gov.au/ausstats/abs@cpp.nsf/DetailsPage/02001?OpenDocument&tabname=Details&prodno=0&issue=2001&num=&view=&#Working%20Population%20Profile (accessed 21 April 2006)

—— 2000, *Australian Mining Industry, 2002: Mining Special Article — The Australian Mining Industry: From Settlement to 2000 (Oct, 2000)*, Cat. no. 8414.0.

—— 1997, *ASCO: Australian Standard Classification of Occupations*, 2nd edn, Canberra.

—— 1995, *Year Book Australia 1995 Special Article — Ethnic and Cultural Diversity in Australia*, http://www.abs.gov.au/Ausstats/abs@.nsf/Lookup/49F609C83CF34D69CA2569DE0025C182 (accessed 31 July 2005).

Abbott, T. (Minister for Employment and Workplace Relations) and Ruddock, P. (Minister for Immigration and Multicultural and Indigenous Affairs) 2002, *Working Holiday Makers Add Value — Report*, Joint Media Release, MPS 086/2002, http://www.minister.immi.gov.au/media_releases/ruddock_media02/r02086.htm (accessed 27 July 2005).

Access Economics 2005, *March 2005 Issue of Business Outlook: Five Year Forecasts for Business Planners*, Canberra.

—— 2004, *DIMIA Migrants' Fiscal Impact Model: Model Documentation and User Guide*, Prepared for the Department of Immigration and Multicultural and Indigenous Affairs, http://www.immi.gov.au/research/publications/migrants-fiscal-impact-july-2004.pdf (accessed 26 August 2005).

—— 2003, *The Importance of Age in Migrants' Fiscal Impact*, Prepared for the Department of Immigration and Multicultural and Indigenous Affairs.

—— 2002, *The Impact of Permanent Migrants on State and Territory Budgets*, Prepared for the Department of Immigration and Multicultural and Indigenous Affairs, on behalf of the Joint Commonwealth, State and Territory Research Advisory Committee, Canberra, May 2002, http://www.immi.gov.au/research/publications/perm_mig_statebudget.pdf (accessed 23 August 2005).

Ackland, R. and Williams, L. 1992, *Immigrants and the Australian Labour Market: The Experience of Three Recessions*, Bureau of Immigration Research, Canberra.

Addison, T. and Worswick, C. 2002, 'The impact of immigration on the earnings of natives: evidence from Australian micro-data', *Economic Record*, vol. 78, no. 240, pp. 68–78.

Alvarado, J. and Creedy J. 1998, *Population Ageing, Migration and Social Expenditure*, Edward Elgar, United Kingdom.

Antecol, H., Cobb-Clark, D.A. and Trejo, S.J. 2003, 'Immigration policy and the skills of immigrants to Australia, Canada and the United States', *Journal of Human Resources*, vol. 38, no. 1, pp. 192–221.

Appleyard, D.R. and Field, A.J. 1992, *International Economics*, Richard B. Irwin, Homewood, Illinois.

Arrow, K.J., Ng, Y-K. and Yang, X. 1998, *Increasing Returns and Economic Analysis*, Macmillan Press, London.

Auriol, L. and Sexton, J. 2002, 'Human resources in science and technology: measurement issues and international mobility', in OECD (Organisation for Economic Cooperation and Development), *International Mobility of the Highly Skilled*, OECD Proceedings, Paris.

Australian Government Treasury 2002, *Intergenerational Report 2002-03*, Budget Paper no. 5, 14 May, Commonwealth of Australia.

Baker, M. and Wooden, M. 1992, 'Immigration and its impact on the incidence of training in Australia', *Australian Economic Review*, vol. 25, no. 2, pp. 39–53.

—— and —— 1991, *Immigration and Training*, Bureau of Immigration Research, Canberra.

Baldwin J. and Caves R. 1997, '*International Competition and Industrial Performance: Allocative Efficiency, Productive Efficiency, and Turbulence'* in Cook, G. (ed) 1998, *The Economics and Politics of International Trade*, Routledge, London.

Barrett, A. and O'Connell, P. 2001, 'Is there a wage premium for returning Irish migrants?', *Economic and Social Review*, vol. 32, no. 1, pp. 1–21.

Barro, R.J. 1997, *Macroeconomics*, The MIT Press, 5th edn, Cambridge, Massachusetts.

—— and Sala-i-Martin, X. 2004, *Economic Growth*, 2nd edn, MIT Press, London.

BCA (Business Council of Australia) 2005, *Infrastructure: Action Plan for Future Prosperity*, Melbourne.

—— 2004, *Australia's Population Future: A Position Paper*, Prepared for the Business Council of Australia by Professor Glenn Withers, AO, ANU and Applied Economics, April 2004.

Becker, G. 1964, *Human Capital*, Columbia University Press for the National Bureau of Economic Research.

—— 1962, 'Investment in human capital: a theoretical analysis', *Journal of Political Economy*, vol. 70, pp. 9–49.

Bedford, R., Ho, E. and Lidgard, J. 2001, 'Immigration policy and New Zealand's development into the 21st century: review and speculation,' *Asian and Pacific Migration Journal*, vol. 10, no. 3, pp. 585–616.

Beltratti, A. 1996, *Models of Economic Growth with Environmental Assets*, Kluwer Academic Publishers, Dordrecht.

Benge, M. and Wells, G. 2002, 'Growth and the current account in a small open economy', *Journal of Economic Education*, vol. 33, no. 2, pp. 152–65.

Berry, A.R. and Soligo, R. 1969, 'Some welfare aspects of international migration', *Journal of Political Economy*, vol. 77, pp. 778–94.

Birch, E., 2005, The determinants of labour supply and rertility behaviour: a study of Australian women, PhD Thesis, The University of Western Australia, (unpublished).

Birrell, R. and Rapson, V. 2005, *Migration and the Accounting Profession in Australia*, Centre for Population and Urban Research, Monash University, Report prepared for CPA Australia, Melbourne.

——, —— and Smith, F.T. 2005a, *Brain Drain: Fact or Fiction*, Paper presented at the OECD Conference on Trends in the Management of Human Resources in Higher Education, Paris.

——, —— and —— 2005b, *Immigration in a Time of Domestic Skilled Shortages: Skilled Movements in 2003-04*, Report prepared for Department of Immigration and Multicultural and Indigenous Affairs, Canberra.

Birrell, R., Rapson, V., Dobson, I.R. and Smith, T. 2004, *Skilled Movements in the New Century: Outcomes for Australia*, Department of Immigration and Multicultural and Indigenous Affairs, Canberra.

——, ——, —— and —— 2001, *Skilled Labour: Gains and Losses*, Report for the Department of Immigration and Multicultural and Indigenous Affairs, Canberra.

Blinder, A. 1973, 'Wage discrimination: reduced form and structural estimates', *Journal of Human Resources*, vol. 8, no. 4, pp. 436–55.

Borjas, G.J. 2005, 'Globalisation and immigration', in Weinstein, M. (ed), *Globalisation: What's New?*, Columbia University Press, New York.

—— 2003, 'The labor demand curve is downward sloping: reexamining the impact of immigration on the labour market', *Quarterly Journal of Economics*, vol. 118, no. 4, pp. 1335–76.

—— 1999, 'The economic analysis of immigration', in Ashenfelter, O. and Card, D. (eds), *Handbook of Labour Economics*, vol. 3. pp. 1697–1760.

—— 1995, 'The economic benefits from immigration', *Journal of Economic Perspectives*, vol. 9, no. 2, pp. 3–22.

—— 1993, 'Immigration policy, national origin, and immigrant skills: a comparison of Canada and the United States', in Card, V. and Freeman, R. (eds), *Small*

Differences that Matter: Labour Markets and Income Maintenance in Canada and the United States, Chicago University Press.

—— 1987, 'Immigrants, minorities, and labor market competition', *Industrial and Labour Relations Review*, vol. 40, no. 3, pp. 382–92.

—— 1986a, 'The demographic determinants of the demand for black labour', in Freeman, R. and Holzer, H. (eds), *The Black Youth Employment Crisis*, University of Chicago Press, NBER, pp. 191–230.

—— 1986b, 'The sensitivity of labour demand functions to choice of dependent variable', *Review of Economics and Statistics*; vol. 68, no. 1, pp. 58–66.

—— 1983, 'The substitutability of black, hispanic, and white labour', *Economic Inquiry*, vol. 21, no. 1, pp. 93–106.

—— Freeman, R.B. and Katz, L.F. 1997, 'How much do immigration and trade affect labor market outcomes?', *Brookings Papers on Economic Activity*, no. 1, pp. 1–90.

Bourassa S. and Hendershott P. 1992, *Over-investment in Housing?*, Background Paper for National Housing Strategy, Commonwealth Department of Health Housing and Community Services.

Brown, R.P.C. 2005, *Interrelationships between Remittances and Human Capital; Lessons from Pacific Island Remittances Surveys*, G-20 Workshop on Demographic Challenges and Migration, 27–28 August, Sydney.

BTE (Bureau of Transport Economics) 1999, *Urban Transport Looking Ahead, Information Sheet 14*, Canberra.

Burley, I., Murphy, P. and Fagan, R. 1997, *Immigration and Australia's Cities*, The Federation Press, Sydney.

Canbäck, S. 2004, *Diseconomies of Scale in Large Corporations: Theory and Empirical Analysis*, Pyx Institute and Henley Management College Working Paper, http://www.canback/disec.pdf (accessed 7 March 2006).

Card, D. 2005, *Is the New Immigration Really so Bad?*, Working Paper 11547, National Bureau of Economic Research, Cambridge, Massachusetts. http://www.nber.org/papers/w11547 (accessed 21 April 2006).

CoAG (Council of Australian Governments) 2006, *Communiqué*, 10 February, http://www.coag.gov.au/meetings/100206/index.htm (accessed 23 February 2006).

CGC (Commonwealth Grants Commission) 2002, *Socio-Demographic Composition*, Discussion Paper, CGC 2002/21, July 2002.

—— 2001, *Administrative Scale*, Discussion Paper CGC 2001/16, November.

Chang, H.C. 2004, 'The impact of immigration on the wage differential in Australia', *Economic Record*, vol. 80, no. 248, pp. 49–57.

Chapman, B. and Cobb-Clark, D.A. 1999, 'A comparative static model of the relationship between immigration and the short-term employment prospects of unemployed residents', *Economic Record*, vol. 75, no. 231, pp. 358–68.

Chislolm, A.H. 1999, *Land Resource and the Idea of Carrying Capacity*, Business Council of Australia, Papers, vol. 1, no. 2, pp. 19–26.

—— and Kennedy, J.O.S. 1990, Urban environmental issues and recreation and tourism', in Clarke, H.R., Chisholm, A.H., Edwards, G.W. and Kennedy, J. (eds), *Immigration, Population Growth and the Environment*, AGPS, Canberra, pp. 137–50.

Chiswick, B. 1999, *Are Immigrants Favorably Self-Selected?*, AEA Papers and Proceedings, vol. 89, no. 2, pp. 181–85.

—— 1986, 'Human capital and the labour market adjustment of immigrants: testing alternative hypotheses', *Research in Human Capital and Development*, iss. 4, pp. 1–26.

—— 1979, 'The economic progress of immigrants: some apparently universal patterns', in Fellner, W., (ed), *Contemporary Economic Problems 1979*, American Enterprise Institute, Washington, pp. 357–99.

—— 1978, 'The effect of Americanisation on the earnings of foreign-born men', *Journal of Political Economy*, vol. 86, no. 5, pp. 897–922, October.

—— and Miller, P.W. 2006, 'Language skills and immigrant adjustment: the role of immigration policy, in *Public Policy and Immigrant Settlement*, (forthcoming).

—— and —— 1995, 'The endogeneity between language and earnings: international analyses', *Journal of Labor Economics*, vol. 13, no. 2, pp. 246–88.

—— and —— 1985, 'Immigration generation and income in Australia', *Economic Record*, vol. 61, pp. 540–53.

Chiswick, B., Lee, Y. and Miller, P. 2005, 'Immigrant earnings: a longitudinal analysis', *Review of Income and Wealth*, vol. 51, no. 4, pp. 485–503.

Chiswick, C.U. 1989, 'The impact of immigration on the human capital of natives', *Journal of Labour Economics*, vol. 7, no. 4, pp. 464–86.

Ciconne, A. and Hall, R. 1996, 'Productivity and the density of economic activity', *American Economic Review*, vol. 86, no. 1, pp. 54–70.

Citizenship and Immigration Canada 2005, *Facts and Figures 2004: Immigration Overview – Permanent and Temporary Residents*, Citizenship and Immigration Canada, Ottawa.

Clarke, H.R., Chisholm, A.H., Edwards, G.W. and Kennedy, J. 1990, *Immigration, Population Growth and the Environment*, AGPS, Canberra.

Clarke, H.R. and Ng, Y-K. 1993, 'Immigration and economic welfare: resource and environmental aspects', *Economic Record*, vol. 69, no. 206, pp. 259–73.

Co, C., Gang, I. and Yun, M. 2000, 'Returns to returning', *Journal of Population Economics*, vol. 15, pp. 57–79.

Cobb-Clark, D. 2006, 'Selection policy and labour market outcomes of new immigrants', in Cobb-Clark, D. and Khoo, S. (eds), *Public Policy and Immigrant Settlement*, Edward Elgar, Cheltenham, United Kingdom, (forthcoming).

—— 2003, 'Public policy and the labor market adjustment of new immigrants to Australia', *Journal of Population Economics*, vol. 16, pp. 655–81.

—— 2000, 'Do selection criteria make a difference? visa category and the labor market status of immigrants to Australia', *Economic Record*, vol. 76, no. 232, pp. 15–31.

—— 1999, *Do Selection Criteria Make a Difference? Visa Category and the Labour Force Status of Australian Immigrants*, Discussion Paper no. 397, Centre for Economic Policy Research, The Australian National University, Canberra.

—— and Connolly, M.D. 1997, 'The worldwide market for skilled migrants: can Australia compete?', *International Migration Review*, vol. 31, pp. 670–93.

—— and Khoo, S. 2006, *Public Policy and Immigration Settlement*, Edward Elgar, Cheltenham, United Kingdom, (forthcoming).

Cohen, K. and Cyert, R. 1975, *Theory of the Firm: Resource Allocation in a Market Economy*, Prentice-Hall, New Jersey, USA.

Coppel, J., Dumont, J. and Visco, I. 2001, *Trends in Immigration and Economic Consequences*, Economic Department, Working Paper no. 284, OECD.

Corden, W.M. 2003, *40 Million Aussies? The Immigration Debate Revisited*, Inaugural Richard Snape Lecture, Productivity Commission, Melbourne, 30 October 2003.

Costello, P. (Treasurer) 2005, *International Tax Reforms*, Press Release, http://www.treasurer.gov.au/tsr/content/pressreleases/2005/044.asp (accessed 25 October 2005).

—— 2003, *Review of International Tax Arrangements*, Press Release, http://www.treasurer.gov.au/tsr/content/pressreleases/2003/032.asp (accessed 25 October 2005).

CSIRO 2005, *Big Murrumbidgee Water Savings Possible*, Media Release reference 05/55, 12 April 2005.

Cully, M. and Skladzien, T. 2001, *Assessment of Overseas Qualifications and Skills: A Comparative Analysis*, Report to the Overseas Qualifications Board, National Institute of Labour Studies, Flinders University, Adelaide.

Davies, L., Banister, D. and Hall, P. 2004, *Transport and City Competitiveness — Literature Review*, Report prepared for the UK Department of Transport. http://www.dft.gov.uk/stellent/groups/dft_science/documents/page/dft_science_027353-14.hcsp (accessed November 2005).

De Laine, C., Laplagne, P. and Stone, S. 2000, *The Increasing Demand for Skilled Workers in Australia: The Role of Technical Change*, Productivity Commission, Staff Research Paper, AusInfo, Canberra, September.

DeVoretz, D. 2001, 'Canadian immigration: economic winners and losers', in Diajic, S. (ed), *International Migration: Trends, Policies and Economic Impacts*, Routledge, London.

Diewert, E. 2004, *Productivity Perspectives in Australia: Conclusions and Future Directions*, Paper presented at Productivity Perspectives 2004 Conference, Hyatt Hotel, Canberra, 9 December 2004.

—— and Fox K.J. 2005, 'On measuring the contribution of entering and exiting firms to aggregate productivity growth', Discussion Paper 05-02, Department of Economics, University of British Columbia, Vancouver, Canada, V6T 1Z1, http://www.econ.ubc.ca/diewert/disc.htm.

—— and Lawrence, D.A. 1995, 'The excess burden of taxation in New Zealand', *Agenda*, vol. 2, no. 1, pp. 27–34.

DEWR (Department of Employment and Workplace Relations) 2005, *Workforce Tomorrow — Adapting to a More Diverse Australian Labour Market*, Canberra.

DIMA (Department of Immigration and Multicultural Affairs) 2006, *Population Flows: Immigration Aspects 2004-05*, http://www.immi.gov.au/statistics/publications/popflows2004_5/index.htm.

DIMIA (Department of Immigration and Multicultural and Indigenous Affairs) 2005a, *Abolition of the 'White Australia' Policy*, Fact Sheet 8 – 16 September 2005, http://www.immi.gov.au/facts/08abolition.htm (accessed 27 September 2005).

—— 2005b, *Emigration from Australia*, Fact Sheet 5, October 2005, http://www.immi.gov.au/facts/05emigration.htm (accessed 21 October 2005).

—— 2005c, *Immigration Update 2003-2004*, Research and Statistics Section, http://www.dimia.gov.au/statistics/publications/immigration_update/Update_June04.pdf, Canberra.

—— 2005d, *Labour Agreements — Frequently asked Questions*, http://www.dimia.gov.au/faq/migrate/migrate_employer/employer04.htm#q1 (accessed 1 August 2005).

—— 2005e, *Overseas Arrivals and Departures Tables*, http://www.dimia.gov.au/statistics/stat_info/oad/index.htm#expl (accessed 2 August 2005).

—— 2005f, *Overview of Skilled Migration to Australia*, Fact Sheet 24, http://www.dimia.gov.au/facts/24overview_skilled.htm, (accessed 8 November 2005).

—— 2005g, *Population Flows: Immigration Aspects*, 2003–04 edn.

—— 2005h, *To Undertake a Study into the Social Costs and Benefits of Migration in Australia*, RFT 02130, Canberra.

—— 2005i, *Skilled Categories*, Fact Sheet 25, http://www.dimia.gov.au/facts/25skilled_categories.htm (accessed 25 July 2005).

—— 2005j, *Temporary Entry: An Overview*, Fact Sheet 46, http://www.immi.gov.au/facts/46temporary_entry.htm (accessed 19 July 2005).

—— 2005k, *Working Holiday Maker Program*, Fact Sheet 49, http://www.immi.gov.au/facts/49whm.htm (accessed 19 July 2005).

—— 2004a, *Immigration Update 2002-2003*, Research and Statistics Section, Canberra,.http://www.dimia.gov.au/statistics/publications/immigration_update/Update_June03.pdf (accessed 10 April 2006)

—— 2004b, *Settler Arrivals 1993-94 to 2003-04*, Department of Immigration and Multicultural and Indigenous Affairs, Canberra.

—— 2004c, *Temporary Protection Visas*, Fact Sheet 64, http://www.dimia.gov.au/facts/64protection.htm (accessed 27 July 2005).

—— 2003, *Report of the Review of Settlement Services for Migrants and Humanitarian Entrants*, Canberra.

—— 2002, *Longitudinal Survey of Immigrants to Australia*, Cohort 2, Canberra.

—— 2001, *Immigration: Federation to Century's End*, Statistics section, Canberra.

—— 1999a, *Population Flows: Immigration Aspects*, Canberra, December.

—— 1999b, *Review of the Independent and Skilled – Australian Linked Categories*, Canberra.

DIPNR (NSW Department of Infrastructure, Planning and Natural Resources) 2004, *New South Wales State and Regional Population Projections 2001–2051*, Sydney.

Dixon, P.B. and Rimmer M.T. 2002, *Dynamic, General Equilibrium Modelling for Forecasting and Policy: A Practical Guide and Documentation of Monash*, North-Holland, New York.

DPL (Department of the Parliamentary Library) 1996, Social Security Legislation Amendment (Newly Arrived Resident's Waiting Periods and Other Measures) Bill 1996, Bills Digest 102, http://www.aph.gov.au/library/pubs/bd/1995-96/96bd102.htm (accessed August 2005).

Docquier, F. and Marfouk, A. 2005, 'International migration by education attainment, 1990–2005', in Ozden, C. and Schiff, M. (eds), *Migration, Remittances and the Brain Drain*, The World Bank and Palgrave, McMillan, Washington DC.

Doove, S., Gabbitas, O., Nguyen-Hong, D. and Owen, J. 2001, *Price Effects of Regulation: Telecommunications, Air Passenger Transport and Electricity Supply*, Productivity Commission, Staff Research Paper, AusInfo, Canberra, October.

Dumont, J. and Lemaitre, G. 2005, 'Counting immigrants and expatriates in OECD countries: a new perspective' in OECD, *Trends in International Migration*, Paris.

Dustmann, C. and Fabbri, F. 2003, 'Language proficiency and labour market performance of immigrants in the UK', *Economic Journal*, iss. 113, pp. 695–717.

—— and Van Soest, A. 2002, 'Language and the earnings of immigrants', *Industrial and Labor Relations Review*, vol. 55, no. 3, pp. 474–92.

Econtech 2006a, *The Economic Impacts of Migration: A Comparison of Two Approaches*, Report to the Department of Immigration and Multicultural Affairs, Canberra, February.

—— 2006b, *The Economic Impacts of Migration: A Comparison of Two Approaches*, Report to the Department of Immigration and Multicultural Affairs, Canberra, April.

—— 2004a, *The Economic Impacts of the Current Migration and Humanitarian Programs 2004*, Report prepared for the Department of Immigration and Multicultural and Indigenous Affairs (unpublished).

—— 2004b, *The Impact of Migration and Humanitarian Programs on State and Territory Economies*, Report prepared for the Department of Immigration and Mullticultural and Indigenous Affairs, Canberra, 2 August 2004.

FitzGerald, S. 1988, *Immigration: A Commitment to Australia*, The Report of the Committee to Advise on Australia's Immigration Policies, AGPS, Canberra.

Fischer, S. 2003, *Globalization and its Challenges*, Ely, R.T. Lecture, American Economic Association, Washington DC.

Flatau, P., Petridis, R. and Wood, G. 1995, *Immigrants and Invisible Underemployment*, AGPS, Canberra.

Foran, B. and Poldy, F. 2002, *Future Dilemmas Options to 2050 for Australia's Population, Technology, Resources and Environment*, CSIRO Working Paper Series 02/01.

Foster, W. 1996, *Immigration and the Australian Economy*, Prepared for the Department of Immigration and Multicultural Affairs, AGPS, Canberra.

—— 1994, *The Macroeconomic Limits of Compositional Change in Australian Immigration*: *Results of the AEM-I Model*, Bureau of Immigration and Population Research, AGPS, Canberra, February.

—— 1992, *Macroeconomic Effects of Change in the Size and Composition of Australia's Migrant Intake*, Bureau of Immigration and Population Research, AGPS, Canberra, November.

—— and Baker, L. 1991, *Immigration and the Australian Economy*, AGPS, Canberra.

Freebairn, J. 2004, *Bureau of Transport and Regional Economics Regional Research Colloquium 19 February 2004*, Canberra Economic Policy and Regions, The University of Melbourne, http://www.btre.gov.au/docs/events/reg_colloquium/papers/j_freebairn.pdf (accessed 3 November 2005).

—— 1995, 'Reconsidering the marginal welfare cost of taxation', *Economic Record*, vol. 17, no. 213, pp. 121–31.

Fullilove, M. and Flutter, C. 2004, *Diaspora: The World Wide Web of Australians*, Institute Paper 04, Lowy Institute for International Policy, Sydney.

Galor, O. and Stark, O. 1991, 'The probability of return migration, migrants' work effort, and migrants' performance', *Journal of Development Economics*, vol. 35, no. 2, pp. 399–405.

Gang, I. and Rivera-Batiz, F. 1994, 'Labour market effects of immigration in the United States and Europe', *Journal of Population Economics*, vol. 7, no. 2, pp. 157–75.

Garnaut, R. 2002, *Immigration: Who Wins and Who Loses, Migration: Benefiting Australia*, Conference Proceedings, Sydney 7–8 May 2002, Department of Immigration and Multicultural and Indigenous Affairs, Sydney, pp. 131–64.

——, Ganguly, R. and Kang, J. 2003, *Migration to Australia and Comparisons with the United States: Who Benefits?*, Paper presented at Australian National University RSSS Conference, *Migration and Migration Policy in the Long Run*, Canberra, 4 December 2003.

Gaston, N. and Nelson, D. 2001, *The Employment and Wage Effects of Immigration: Trade and Labour Economics Perspectives*, Research Paper Series, Globalisation and Labour Markets Programme, Research Paper 2001/28, Leverhulme Centre for Research on Globalisation and Economic Theory, http://www.nottingham.ac.uk/economics/ (accessed 10 November 2005).

GCIM (Global Commission on International Migration) 2005, *Migration in an Interconnected World: New Directions for Action*, Report of the Global Commission on International Migration, Switzerland.

Gollop, F.M. 1985, 'Analysis of the productivity slowdown: evidence for a sector-biased or sector-neutral industrial strategy', in Baumol, W.J. and McLennan, K. (eds), *Productivity Growth and U.S. Competitiveness*, Oxford University Press, New York.

Gradus, R. and Smulders, S. 1993, 'The trade-off between environmental care and long-term growth — pollution in three prototype growth models', *Journal of Economics*, vol. 58, no. 1, pp. 25–51.

Graham, D.J. 2005, *Transport Investment, Agglomeration and Urban Productivity*, Paper presented at the World Bank Urban Research Symposium 2005, Blue Tree Park Hotel, Brasilia, 4–6 April 2005 http://www.worldbank.org/urban/symposium2005/index.html (accessed November 2005).

Green, A. and Green, D. 1999, The economic goals of Canada's immigration policy: past and present', *Canadian Public Policy*, vol. 25, no. 4, pp. 425–51.

Green, C., Kler, P. and Leeves, G. 2005, *Immigrant Overeducation: Evidence from Recent Arrivals to Australia*, Proceedings of the Australian Conference of Economists 2005, http://gemini.econ.umd.edu/cgi-bin/conference/download.cgi?db_name=ACE2005&paper_id=91 (accessed 21 April 2006).

Greene, W. 2003, *Econometric Analysis*, 5th edn, Prentice Hall, New Jersey.

Greenwood, M. and Hunt, G. 1995, 'Economic effects of immigrants on native and workers: complementarity, substitutability, and other channels of influence', *Southern Economic Journal*; vol. 61, no. 4, pp. 1076–97.

Grilli, E. and M.C. Yang 1988, 'Primary commodity prices, manufactured goods prices and the terms of trade of developing countries: what the long run shows', *World Bank Economic Review*, vol. 2, no. 1, January.

GGDC (Groningen Growth and Development Centre) 2006, *Total Economy Database*, http://www.ggdc.net, (accessed March 2006).

Grossman, J.B. 1982, 'The substitutability of natives and immigrants in production', *Review of Economics and Statistics*, vol. 64, no. 4, pp. 596–603.

Hamermesh, D.S. and Grant, S. 1979, 'Econometric studies of labor-substitution and their implications for policy', *Journal of Human Resources*, vol. 14, no. 4, pp. 518–42.

Hansen C. 2002, *A Literature Survey on Increasing Returns, Agglomeration Effects and Economic Growth*, Paper prepared for The Economic Transformation Team New Zealand Treasury, 20 March 2002.

Hanson, G.H. 2005, 'Challenges for US immigration policy', in Bergsten, C.F. (ed), *The United States and the World Economy: Foreign Economic Policy for the Next Decade*, Washington DC, Institute for International Economics, pp. 343–72.

Hatton, T. and Williamson, J. 2002, *What Fundamentals Drive World Migration?* United Nations University World Institute for Development Economics Research, Helsinki.

Henriksen, E.R., Knarvik, K.H.M. and Steen, F. 2001, *Economies of Scale in European Manufacturing Revisited*, CEPR Discussion Paper no. 2896.

Hisnanick, J.J. and Kymn, K.O. 1999, 'Modeling economies of scale: the case of US electric power companies', *Energy Economics*, vol. 21, iss. 3, pp. 225–37.

Hugo, G. 2004a, *A New Paradigm in International Migration: Implications for Migration Policy and Planning in Australia*, Research Paper no. 10 2003-04, Information and Research Services, Parliamentary Library, Canberra, March.

—— 2004b, *Australia's Most Recent Immigrants*, ABS Cat. no. 2053.0, Commonwealth of Australia, Canberra.

—— 2004c, *Temporary Migration: A New Paradigm of International Migration*, Australian Parliamentary Paper, Parliamentary Library, Canberra.

—— 2001, *Emigration from Australia, Economic Implications*, CEDA Information Paper no. 77, http://www.immi.gov.au/research/publications/econimpact_1.pdf (accessed September 2005).

—— 1995, *Understanding Where Immigrants Live*, Bureau of Immigration, Multicultural and Population Research, Canberra.

—— 1994, *The Economic Implications of Emigration from Australia*, AGPS, Canberra.

——, Rudd D. and Harris K. 2003, *Australia's Diaspora: Its Size, Nature and Policy Implications*, CEDA Information Paper no. 80, Victoria, December.

——, —— and —— 2001, *Emigration from Australia: Economic Implications*, CEDA Information Paper no. 77, http://www.immi.gov.au/research/publications/econimpact_1.pdf (accessed September 2005).

Hwang, A.R. 2003, 'Exports, returns to scale, and total factor productivity: the case of Taiwanese manufacturing industries', *Review of Development Economics*, vol. 7, iss. 2, pp. 204–16.

IC (Industry Commission) 1997, *Role of Economic Instruments in Managing the Environment*, Staff Research Paper, Industry Commission, Melbourne, July.

IOM (International Organization for Migration) 2005, *World Migration, Costs and Benefits of International Migration 2005*, vol. 3, World Migration Report Series, Geneva.

—— 2003, *World Migration 2003: Managing Migration*, vol. 2, World Migration Report Series, Geneva.

Jackson, J., McIver, R. and McConnell, C. 1994, *Economics*, 4th edn, McGraw-Hill, Sydney, Australia.

JSCM (Joint Standing Committee on Migration) 2005, Submissions to the inquiry into Skills Recognition, Upgrading and Licensing, Canberra, http://www.aph.gov.au/house/committee/MIG/recognition/subs.htm (accessed November 2005).

—— 2004, Report of the Joint Standing Committee on Migration, *To Make a Contribution: Review of Skilled Labour Migration Programs 2004*, March, Canberra.

Junakar, P.N. and Manuteau, S. 2005, 'Do migrants get good jobs? New migrant settlement in Australia', *Economic Record*, vol. 81, no. 255, pp. 534–46.

——, Pope, D. and Withers, G. 1998, 'Immigration and the Australian macro-economy: perspectives and prospectives', *Economic Record*, vol. 31, no. 4, pp. 435–44.

Kaskarelis, I.A. 1997, 'Aggregate returns to scale in Greek manufacturing', *Applied Economics*, vol. 29, iss. 12, pp. 1673–78.

Keller, W. 2002, 'Geographic localization of international technology diffusion', *American Economic Review*, vol. 92, no. 1, pp. 120–42.

Kennedy, J.O.S. 1990, 'Environmental policy and the impact of immigration', in Clarke, H.R., Chisholm, A.H., Edwards, G.W. and Kennedy, J. (eds),

Immigration, Population Growth and the Environment, AGPS, Canberra, pp. 75–90.

—— and Chisholm, A.H. 1990, 'Impact of immigration on renewable resources', in Clarke, H.R., Chisholm, A.H., Edwards, G.W. and Kennedy, J. (eds), *Immigration, Population Growth and the Environment*, AGPS, Canberra, pp. 124–136.

Khoo, S. 2002, 'Immigration issues in Australia,' in Carmichael, G. and Dharmalingam, A. (eds), *Populations of New Zealand and Australia at the Millennium: A Joint Special Issue of the Journal of Population Research and the New Zealand Population Review*, Australian Population Association and Population Association of New Zealand, Canberra and Wellington, pp. 67–78.

——, McDonald, P., Giorgas, D. and Birrell, B. 2002, *Second Generation Australians*, Department of Immigration and Multicultural and Indigenous Affairs, Canberra.

——, ——, P., Hugo, G. and Voigt-Graf, C. 2004, *Temporary Skilled Migration to Australia: Employers' Perspectives*, Presented at Population and Society: Issues, Research and Policy, 12th Biennial Conference of the Australian Population Association, Canberra, 15–17 September.

Kippen, R. and McDonald, P. 2000, 'Australia's population in 2000: the way we were and the way we might have been', *People and Place*, vol. 8, no. 3, pp. 10–17.

Kinnaird, B. 1999, 'Working holiday makers: more than tourists — implications of the report of the Joint Standing Committee on migration', *People and Place*, vol. 7, no. 1, pp. 39–52.

Kramer, R. 1997, *Developments in International Migration to the United States: 1997*, The United States Report for the Continuous Reporting System on Migration (SOPEMI) of the Organization for Economic Cooperation and Development (OECD), Paris.

Leigh, A. 2003, *What Affects Inequality? Evidence from Time Series Data*, Paper presented to the Australian Social Policy Conference, UNSW, Sydney.

Legal and Constitutional Reference Committee 2005 Report, *They Still Call Australia Home: Inquiry into Australian Expatriates*, March, Canberra.

Levine, P., Lotti, E. and Pearlman, J. 2003, *The Immigration Surplus Revisited in a General Equilibrium Model with Endogenous Growth'*, Hamburg Institute of International Economics, Discussion Paper no. 20.

Lewis, W.A. 1952 'World production, prices and trade, 1870-1960', *Manchester School of Economic and Social Sciences*, vol. 20, no. 2, pp. 105–38, May.

Lopez-Cordova, E. and Olmedo, A. 2005, *International Remittances and Development, Existing Evidence, Policies and Recommendations*, G-20 Workshop in Demographic Challenges and Migration, Sydney, Australia, 27–28 August.

Lowe, I. 1988, 'Australia's non-renewable resource base', in Day, L.H., and Rowland, D.T. (eds) 1988, *How Many More Australian?*, Longman Cheshire, Melbourne, pp. 38–52.

Madden, G. and Savage, S. 1998, Sources of Australian labour productivity change 1950–1994, *Economic Record*, vol. 74, no. 227, pp. 362–72.

Martin, A., Abella, M., Kuptsch, C. 2006, *Managing Labour Migration in the Twenty-First Century*, Global Management Series, Vail-Ballou Press, New York.

Martin, P. 2005, *Migrants in the Global Labour Market*, Paper prepared for the Policy Analysis and Research Programme of the Global Commission on International Migration, Global Commission on International Migration, Geneva.

Martin, W. 1993, 'The fallacy of composition and developing country exports of manufactures', *The World Economy,* vol. 23, pp. 979–1003.

Matthews, R. 1992, *Immigration and State Budgets*, Bureau of Immigration Research, Canberra.

Mayer, J. 2003, *The Fallacy of Composition: A Review of the Literature*, UNCTAD Discussion Paper no. 166, February.

McDonald, J.T. and Worswick, C. 1999, 'The earnings of immigrant men in Australia: assimilation, cohort effects, and macroeconomic conditions', *The Economic Record*, vol. 75, no. 228, pp. 4962, March.

McDonald, P. 2002, *Australia's Demographic Profile and Prospects*, http://www.manningclark.org.au/papers/profile.htm (accessed September 2005).

—— and Kippen, R. 2000, *Population Futures for Australia: The Policy Alternatives*, Parliamentary Library Research Paper no. 5, http://www.aph.gov.au/library/pubs/rp/1999-2000/2000rp05.htm (accessed 17 February 2005).

McDonald, P., Khoo, S.E. and Kippen, R. 2003, 'Alternative net migration estimates from Australia: exploding the myth of a rapid increase in numbers', *People and Place*, vol. 2, no. 3, pp. 23–36.

Meagher, G.A. 1997, 'Changes in the demand for labour in Australia', in Industry Commission (ed), *Changing Labour Markets, Prospects for Productivity Growth*, Melbourne.

Meikle, K. 1985, 'Immigration and economic development', in Norman, N. and Meikle K. (eds), *The Economic Effects of Immigration on Australia*, vol. 2, CEDA, pp. 16–46, Melbourne.

Meyer, J.B. 2001, 'Network approach versus the brain drain: lessons from the diaspora', *International Migration Review*, vol. 39, no. 5, pp. 91–110.

Miller, P. 1999, 'Immigration policy and immigrant quality: the Australian points system', *The American Economic Review*, vol. 89, no. 2, pp. 192–7.

Mincer, J. 1974, *Schooling, Experience and Earnings*, National Bureau of Economic Research, New York.

Morrison-Paul, C.J. and Siegel, D.S. 1999, 'Scale economies and industry agglomeration externalities: a dynamic cost function approach', *American Economic Review*, vol. 89, iss. 1, pp. 272–90.

Oczkowski, E. and Sharma, K. 2001, 'Imperfect competition, returns to scale and productivity growth in Australian manufacturing: a smooth transition approach to trade liberalisation', *International Economic Journal*, vol. 15, no. 2, pp. 99–113.

Nakajima, T., Nakamura, A., and Nakamura, M. 2002, "Japanese TFP Growth before and after the Financial Bubble: Japanese Manufacturing Industries", paper presented at the NBER, Cambridge MA, July 26, 2002.

——, —— and Yoshioka, K., 1998, 'An Index Number Method for Estimating Scale Economies and Technical Progress Using Time Series of Cross-Section Data: Sources of Total Factor Productivity Growth for Japanese Manufacturing, 1964-1988, *Japanese Economic Review*, vol. 49, pp. 310–334.

OECD (Organisation for Economic Cooperation and development) 2005a, *Measuring Globalisation: OECD Handbook on Economic Globalisation Indicators*, Paris.

—— 2005b, *Trends in International Migration: Annual Report 2004*, 29th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 2004a, *Country Study of Australia (part IV)*, Paris.

—— 2004b, *Internationalisation of Higher Education*, Policy Brief, http://www.oecd.org/dataoecd/33/60/33734276.pdf (accessed September 2005).

—— 2004c, *Trends in International Migration: Annual Report 2003*, 28th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 2003a, 'Immigration and labour shortages: evaluation of needs and limits of selection policies, in the Recruitment of Foreign Labour', by Doudeijns, M. and Dumont, J-C., Conference Paper, European Commission, Brussels, http://www.oecd.org/dataoecd/13/59/15474016.pdf (accessed 21 April 2006)

—— 2003b, *Migration and the Labour Market in Asia: Recent Trends and Policies*, Paris.

—— 2003c, *Trends in International Migration: Annual Report 2002*, 27th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 2002, *International Mobility of the Highly Skilled*, OECD Proceedings, Paris.

—— 2001a, *Measuring Productivity: Measurement of Aggregate and Industry-level Productivity Growth*, OECD Manual, Paris.

—— 2001b, *Trends in International Migration: Annual Report 2001*, 26th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 2001c, *Trends in International Migration: Annual Report 2000*, 25th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 2000, *Globalisation, Migration and Developmen*t, Paris.

—— 1999, *Trends in International Migration: Annual Report 1999*, 24th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 1998, *Trends in International Migration: Annual Report 1998*, 23rd Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 1997a, SOPEMI, *Trends in International Migration: Annual Report 1996*, Report of the OECD Continuous Reporting System on Migration, http://www.oecd.org/dataoecd/21/48/2717811.pdf (accessed 7 October 2005).

—— 1997b, *Trends in International Migration: Annual Report 1996*, 22nd Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 1995, *Trends in International Migration: Annual Report 1994*, 21st Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 1994, *Trends in International Migration: Annual Report 1993*, 20th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

—— 1992, *Trends in International Migration: Annual Report 1992*, 19th Annual Report of the OECD Continuous Reporting System on Migration, Paris.

Ottaviano, G.I.P. and Peri, G. 2005, *Rethinking the Gains from Immigration: Theory and Evidence from the U.S.*, National Bureau of Economic Research, Working Paper 11672.

Parasnis, J., Fausten, D. and Smyth, R. 2005, *The Impact of Immigration on Native Workers in Australia*, 34th Conference of Economists, Economic Society of Australia, Melbourne, 26–28 September.

Parry, T.G. 2005a, *A Framework for the Future*, Final Report of the inquiry into Sustainable Transport in New South Wales (Chair Professor Thomas G. Parry),

December, http://www.transport.nsw.gov.au/ministerial-inquiry/ (accessed August 2005).

—— 2005b, *Options for the Future*, Interim Report of the inquiry into Sustainable Transport in New South Wales (Chair Professor Thomas G. Parry), August, http://www.transport.nsw.gov.au/ministerial-inquiry/ (accessed August 2005).

Patterson, K. 2000, *Electronic Work Visas for Overseas Students at Australian Universities*, Media Release, http://www.minister.immi.gov.au/media_releases/ruddock_media00/p00013.htm (accessed 19 July 2005).

Pearce, D.W. and Turner, R.K. 1990, *Economics of Resources and the Environment*, Harvester Wheatsheaf, New York.

Perkins, J., Brain, P., Manning, I. and Klingender, T. 1990, *Immigration and Scale Economies*, AGPS, Canberra.

Peter, M. and Verikios, G. 1995, *The Effects of Immigration on Residents' Income in Australia: Some Issues Reconsidered*, General Paper no. G-115, Monash University, Australia, May.

Peterson, D., Dwyer, G., Appels, D. and Fry, J. 2004, *Modelling Water Trade in the Southern Murray-Darling Basin*, Productivity Commission, Staff Working Paper, Melbourne, November.

Pope, D. and Withers, G. 1993, 'Do migrants rob jobs? Lessons of Australian history, 1861–1991', *Journal of Economic History*, vol. 53, no. 4, pp. 719–42.

Powell, A. and Murphy, C. 1997, *Inside a modern macroeconometric model: a guide to the Murphy Model*, 2nd edn, Springer-Verlag, Berlin.

PC (Productivity Commission) 2005a, *Australian Pigmeat Industry*, Report no. 35, Melbourne.

—— 2005b, *Economic Implications of an Ageing Australia*, Research Report, Canberra.

—— 2005c, *Review of National Competition Policy Reforms*, Report no. 33, Canberra.

—— 2005d, *Trends in Australian Agriculture*, Research Paper, Canberra.

—— 2004a, *First Home Ownership*, Report no. 28, Melbourne.

—— 2004b, *Impacts of Native Vegetation and Biodiversity Regulations*, Report no. 29, Melbourne.

—— 2003, *Evaluation of the Mutual Recognition Schemes*, Research Report, October, Canberra.

—— 2001, *Telecommunications Competition Regulation*, Report no. 16, AusInfo, Canberra.

—— 2002, *Trends in Australian Infrastructure Prices 1990-91 to 2000-01*, Performance Monitoring, AusInfo, Canberra, May.

—— 1999a, *An Assessment of the Performance of Australian Railways, 1990 to 1998*, Supplement to Inquiry Report *Progress in Rail Reform*, AusInfo, Canberra, November.

—— 1999b, *International Benchmarking of Australian Telecommunications Services*, Research Report, AusInfo, Melbourne, December.

—— 1999c, *International Benchmarking of Telecommunications Prices and Price Changes*, Research Report, AusInfo, Melbourne, December.

Quigley, J.M. 1998, 'Urban diversity and economic growth', *Journal of Economic Perspectives*, vol. 12, no. 2, pp. 127–38.

Quispe-Agnoli, M. and Zavodny, M. 2002, 'The effect of immigration and output mix, capital, and productivity', Federal Reserve Bank of Atlanta, *Economic Review*, First Quarter, 1–11.

Rahman, J. 2005, *Comparing Australian and United States Productivity*, Mimeo, Australian Government Treasury, Canberra, http://www.treasury.gov.au/documents/987/PDF/04_comparing_productivity.pdf (accessed 21 April 2006).

Razmi, A. and Blecker, R. 2005, *Relative Prices and the Fallacy of Composition in Manufacturing-based Exported Growth: An Empirical Investigation*, University of Massachusetts, Working Paper no. 2005–18, Massachusetts.

Reilly, R., Milne, W. and Zhao, S. 2005, *Quality-adjusted Labour Inputs*, Australian Bureau of Statistics, Cat. no 1351.0.55.010, Analytical Services Branch, Canberra.

Report of the Senate Legal and Constitutional Reference Committee 2005, *They Still call Australia Home: Inquiry into Australian Expatriates*, May, Canberra.

Richardson, S. 2005a, *The Most Recent Migrant Experience*, Evaluation of general skilled migration, Parliament House 7 November 2005, http://www.ssn.flinders.edu.au/nils/Migration%20Points%20System.pdf (accessed December 2005).

—— 2005b, What is a skill shortage?, The National Institute of Labour Studies, Paper, (draft), April 2005.

—— and Lester, L. 2004, *A Comparison of Australian and Canadian Immigration Policies and Labour Market Outcomes*, Report to the Department of Immigration and Multicultural and Indigenous Affairs, Canberra.

——, Robertson, F. and Ilsley, D. 2001, *The Labour Force Experience of New Migrants*, Report prepared for Department of Immigration and Multicultural and Indigenous Affairs by the National Institute of Labour Studies, AGPS, Canberra.

Rivera-Batiz, F. and Sechzer, S. 1991, 'Substitution and complementarity between immigrant and native labour in the US', in Rivera-Batiz, F., Sechzer, S. and Gang, I. (eds), *US Immigration Policy Reform in the 1980s*, Westport, Praeger, pp. 89–116.

Roach, N. (Chairman) 1995, *Report by the Committee of Inquiry into the Temporary Entry of Business People and Highly Skilled Specialists*, AGPS, Canberra.

Roe, T.L. and Elbasha, E.H. 1996, 'On endogenous growth: the implications of environmental externalities', *Journal of Environmental Economics and Management*, vol. 31, pp. 240–268.

Rogers, M. 1998, *The Definition and Measurement of Productivity*, Melbourne Institute Working Paper no. 9/98, ISSN 1328-4991, ISBN 0 7325 0912 6, The University of Melbourne.

Romer, D. 2001, *Advanced Macroeconomics*, 2nd edn, McGraw-Hill, New York.

Rosenthal, S.S. and Strange, W.C. 2003, *Evidence on the Nature and Sources of Agglomeration Economies*, Paper prepared for the Handbook of Urban and Regional Economics, vol. 4, http://www.econ.brown.edu/faculty/henderson/WillAndStuart.pdf (accessed November 2005).

Ruddock, P. (Minister for Immigration and Multicultural and Indigenous Affairs) 2003a, *2003–04 Migration Program will increase Benefits to Australia*, Media Release MPS 18/2003, http://www.minister.immi.gov.au/media_releases/ruddock_media03/r03018.htm (accessed 18 July 2005).

—— 2003b, *State Specific and Regional Migration*, Media Release (attachment 3), http://www.minister.immi.gov.au/media_releases/ruddock_media03/r03018_c.htm (accessed 18 July 2005).

—— 2002a, *New Arrangements Boost Support for Regional Australia*, Media Release MPS 092/02, http://www.minister.immi.gov.au/media_releases/ruddockmedia02/r02092.htm (accessed 29 July 2005).

—— 2002b *Regional Australia Benefits from Skilled Migration*, Media Release MPS 069/02, http://www.minister.immi.gov.au/media_releases/ruddock_media02/r02069.htm (accessed 10 April 2006).

—— 1999, *Skilled Migration Changes Contribute $2.4 billion boost*, Media Release MPS 43/99, http://www.minister.immi.gov.au/media_releases/ruddock_media99/r99043.htm (accessed 18 July 2005).

—— and Alston, R. (Minister for Communications, Information Technology and the Arts) 2001, *Immigration Initiatives to Attract IT Experts*, Attachment, Joint Media Release MPS 009/01, http://www.minister.immi.gov.au/media_releases/ruddock_media01/r01009a.htm (accessed 27 July 2005).

Salt, J. 2002, 'Global competition for skills: an evaluation of policies', in Department of Immigration and Immigration and Multicultural Affairs, *Migration: Benefiting Australia*, Conference Proceedings, Canberra.

Samuelson, P. A., Hancock, K. and Wallace, R. 1975, *Economics*, 2nd edn, McGraw-Hill, Sydney.

Saunders, P. and King, A., 1994, *Immigration and the Distribution of Income*, AGPS, Canberra.

Sayers, C. and Shields, D. 2001, *Electricity Prices and Cost Factors*, Productivity Commission, Staff Research Paper, AusInfo, Canberra, August.

Schaafsma, J. and Sweetman, A. 2001, *Immigrant Earnings; Age at Immigration Matters*, Working Paper, Queens University School of Policy Studies, no. 20, May.

SGS (SGS Economics & Planning) 2002, *Regional Business Development Literature Review*, Report prepared for the Department of Transport and Regional Services http://www.rbda.gov.au/literature_review/index.aspx (accessed November 2005).

Shah, C. and Burke, G. 2005, 'Skills shortages: concepts, measurement and policy responses', *Australian Bulletin of Labour*, vol. 31, no. 1, pp. 44–71.

Shan, H., Morris, A. and Sun, F. 1999, 'Immigration and unemployment: new evidence from Australian and New Zealand', *International Review of Applied Economics*, vol. 12, no. 2. pp. 253–60.

Shields, M. and Wheatley Price, S. 2002 'The English language fluency and occupational success of ethnic minority immigrant men living in English metropolitan areas', *Journal of Population Economics*, vol. 15 no. 1, pp. 137–60.

Singer, H.W. 1998, 'Beyond terms of trade: convergence/divergence and creative destruction', *Zagreb International Review of Economics and Business*, vol. 1, no. 1, pp. 13–25, May.

Smith, J.P. and Edmonston, B. (eds) 1998, *The New Americans: Economic, Demographic and Fiscal Effects of Immigration*, National Research Council, Washington, DC.

Statistics New Zealand 2005, *Tourism and Migration 2004*, http://www.stats.govt.nz/tables/tables-tourism-2004 (accessed September 2005).

Stromback, T. 1994, *Immigration and Skill Transfer*, Working Paper Series no. 9408, School of Economics and Finance, Curtin University of Technology, Perth, Australia.

—— 1983, *The Earnings of Migrants' in Australia*, Bureau of Labour Market Research, Canberra.

Sun, J-M. and Pelkmans, J. 1998, 'Regulatory competition in the single market', in Baldwin, R., Scott, C. and Hood, C. (eds), *A Reader on Regulation*, Oxford University Press.

The Global Commission on International Migration 2005, *Migration in an Interconnected World: New Directions for Action*, Report of the Global Commission on International Migration, Switzerland.

Tian, G. and Shan, J. 1999, 'Do migrants rob jobs? New evidence from Australia', *Australian Economic History Review*, vol. 39, iss. 2, pp. 133–42.

Tran-Nam, B. and Nevile, J.W. 1988, 'The effects of birthplace on male earnings in Australia', *Australian Economic Papers*, June, pp. 83–101.

Treasury 2004, Treasury submission to the Senate Economics References Committee Inquiry into the Structure and Distributive Effects of the Australian Taxation System, http://www.treasury.gov.au/documents/710/PDF/Senate_Economics_References_Committee.pdf#search='incentives%20transfer%20payments%20efficiency' (accessed 16 November 2005).

Trinh, L., Gibson, J. and Oxley, L. 2004, 'Cost and income-based measures of human capital', in George, D.A.R., Oxley, L. and Carlaw, K.I. (eds), *Surveys in Economic Growth: Theory and Empirics*, Blackwell Publishing, United Kingdom, pp. 44–75.

Turner, D. and Norman, N. 1985, 'Managers' perceptions of the migrant worker', in Norman, N. and Meikle K. (eds), *The Economic Effects of Immigration on Australia*, vol. 2, CEDA, Melbourne, pp. 347–69.

UN (United Nations) 2002, *International Migration Report 2002*, Department of Economic and Social Affairs: Population Division, New York.

—— 1998, *Recommendations on Statistics of International Migration*, Revision 1, New York.

US Department of Homeland Security 2005, *2004 Yearbook of Immigration Statistics*, US Government Printing Office, Washington, DC.

Vanstone, A. (Minister for Immigration and Multicultural and Indigenous Affairs) 2005a, *2005–06 Migration (non-humanitarian) Program*, Media Release VPA 052/2005, http://www.minister.immi.gov.au/media_releases/media05/v05052.htm (accessed 12 July 2005).

—— 2005b, *Working Holiday Makers Boost Australian Economy*, Media Release VPA 018/2005 http://www.minister.immi.gov.au/media_releases/media05/v05018.htm(accessed 27 July 2005).

—— 2005c, *Overseas Skills Recognition – Establishment and Maintenance of a Web Portal for Information and Registration Processes*, Budget 2005 Fact Sheet no. 16, Media Release, 10 May.

—— and Andrews, K. (Minister for Employment and Workplace Relations) 2005, *Government targets migration to skills needs of Australian industry*, Joint Media Release no. KA 325/05, 1 November.

Walker, G. 1998, 'Economies of scale in Australian banks 1978–1990', *Australian Economic Papers*, vol. 37, iss. 1, pp. 71–87.

Washer, M. 2005, *Sustainable Cities*, House of Representatives Standing Committee on Environment and Heritage (Dr Mal Washer, Chairman), AGPS, Canberra.

Weil, D.N. 2005, *Economic Growth*, Pearson Education Inc, publishing as Addison-Wesley, Boston, USA.

Williams, L. 1995, *Understanding the Economics of Immigration', Bureau of Immigration and Population Research*, Department of Immigration and Ethnic Affairs, Canberra.

——, Murphy, J. and Brooks, C. 1997, *Initial Labour Market Experiences of Immigrants*, Department of Immigration and Multicultural and Indigenous Affairs, Canberra.

Winters, L. 2002, 'Economic implications of mode 4 trade', *Movement of Natural Persons (Mode 4) Under the GATS*, Joint WTO–World Bank Symposium, Geneva.

Winters, A., Walmsley, T., Zhen, K. and Grynberg, R. 2003, *Liberalising Temporary Movement of Natural Persons: An Agenda for the Development Round*, Blackwell Publishing, Oxford.

Withers, G. 2004, *Australia's Population Future: A Position Paper*, Prepared for the Business Council of Australia, Melbourne.

—— 2003a, 'Core issues in immigration economics and policy', *Economic Papers*, vol. 22, no. 1, pp. 13–23.

—— 2003b, *Immigration Economics: Concord and Contestation*, National Europe Centre Paper no. 65, Paper presented to conference entitled, 'The Challenges of immigration and integration in the European Union and Australia', 18–20 February 2003, University of Sydney, Australia.

Woessmann, L. 2004, 'Specifying human capital', in George, D.A.R., Oxley, L. and Carlaw, K.I. (eds), *Surveys in Economic Growth: Theory and Empirics*, Blackwell Publishing, United Kingdom.

Wooden, M., Holton, R., Hugo, G. and Sloan J. 1994, *Australian Immigration, A Survey of the Issues*, 2nd edn, AGPS, Canberra.

Zagler, M. and Durnecker, G. 2004, 'Fiscal policy and economic growth', in George, D.A.R., Oxley, L. and Carlaw, K.I. (eds), *Surveys in Economic Growth: Theory and Empirics*, Blackwell Publishing, United Kingdom.