PRODUCTIVITY COMMISSION

Distribution of the Economic Gains of the 1990s

Staff Research Paper

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November 2000

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ISBN 1 74037 022 8

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An appropriate citation for this paper is:

Parham, D., Barnes, P., Roberts, P. and Kennett, S. 2000, *Distribution of the Economic Gains of the 1990s*, Productivity Commission Staff Research Paper, AusInfo, Canberra.

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Preface

This paper was developed and written by Dean Parham, Paula Barnes, Paul Roberts and Sharon Kennett. Tracey Horsfall provided administrative and production support. John Salerian and Ralph Lattimore provided valuable technical assistance.

The paper was refereed by Garth Pitkethly and Lynne Williams of the Productivity Commission and Professor Steve Dowrick of the Australian National University (chapter 4). The paper has also benefited from comments received at presentations at the Commission, at the Australian National University and to Professor Robert Gordon of Northwestern University. The views expressed in this paper remain those of the authors.

Abbreviations and explanations

Abbreviations

AASE	Australian Associated Stock Exchanges
ABS	Australian Bureau of Statistics
ACIRRT	Australian Centre for Industrial Relations Research and Training
AIHW	Australian Institute of Health and Welfare
ASX	Australian Stock Exchange
ATM	Automatic teller machine
BIE	Bureau of Industry Economics
CBA	Commonwealth Bank of Australia
CPI	Consumer price index
DETYA	Department of Employment, Training and Youth Affairs
DISR	Department of Industry, Science and Resources
DIST	Department of Industry, Science and Tourism
EFTPOS	Electronic funds transfer at point of sale
GDI	Gross domestic income
GDP	Gross domestic product
GOS	Gross operating surplus
GPI	Genuine Progress Indicator
HIA	Housing Industry Association
IC	Industry Commission
EPAC	Economic Planning Advisory Commission
HSBC	High-skilled blue collar
HSWC	High-skilled white collar

KIS	Capital income share
LIS	Labour income share
LP	Labour productivity
MFP	Multifactor productivity
NATSEM	National Centre for Social and Economic Modelling
OECD	Organisation for Economic Co-operation and Development
OK	Output-capital ratio
PC	Productivity Commission
RBA	Reserve Bank of Australia
RP	Real profitability
RPW	Real product wage

Explanations

Billion	The convention used for a billion is a thousand million (10^9).

Key messages

- Australia's surge in productivity growth in the 1990s fuelled an acceleration in growth in total income and average income (income per person in Australia).
  - Annual average income growth accelerated from 1.4 per cent in the 1970s and 1980s to 2.5 per cent in the 1990s.
  - Faster productivity growth accounted for over 90 per cent of the acceleration.
- The income growth of the 1990s was distributed evenly between labour (wages and salaries) and capital (profits). The labour and capital shares in economywide income were stable throughout the 1990s. Concerns that productivity-enhancing factors have adversely affected the income-earning potential of labour appear to be unfounded at the aggregate level.
- Strong productivity growth enabled strong growth in both real wages and profits. The growth in real wages was accompanied by employment growth and falls in unemployment. Thus, those already in employment and those looking for work have both benefited.
- A change in the distribution of income toward capital in some industries — Electricity, gas and water and Communication services — was counteracted by a change in the distribution toward labour in other industries.
- Productivity gains at the industry level have predominantly been passed on in the form of lower prices. This is particularly true of the 1990s, suggesting that stronger competitive pressures have been at work.

Overview

Australia's economic performance improved impressively over the 1990s. The annual rate of growth averaged more than 4 per cent over the nine years from the trough of the recession in 1990-91 — the longest period of annual average growth above 4 per cent since the early 1970s. The unemployment rate declined steadily from the recession-affected levels of the early 1990s. Inflation fell to rates not seen since the early 1970s. And, in the midst of these good results, the economy also showed much greater resilience to shocks, most notably in the form of the Asian financial crisis.

A surge in productivity growth in the 1990s has been a major influence on Australia's strong economic performance. In fact, the importance of productivity growth as a source of output growth was higher in the 1990s than ever before (at least since the start of productivity estimates in the 1960s).

This study principally addresses two questions. What has the productivity surge meant for growth in average incomes in Australia? What has stronger productivity growth meant for the *distribution* of income?

But the study also sets the trends in average income and the distribution of income in the broader context of trends in living standards (box 1). The review of available indicators suggests that, while the economic trends have been positive and strong in the 1990s, other 'quality of life' issues also concern a large section of the community.

Contributions to growth in average income

Productivity growth was the main source of growth in income per person in Australia over the 1990s.

In this study, average income was measured as gross domestic income (GDI) per person. GDI involves an adjustment to GDP for changes in the terms of trade (the ratio of export to import prices). However, growth in GDI and GDP were very similar over the periods examined — to the point that one can virtually be read for the other.

Box 1 **Trends in living standards**

This paper focuses on growth in average income and the distribution of income. These are conventionally considered to be important indicators of trends in living standards. But they are not the only relevant considerations. Trends in a number of indicators are as follows (see chapter 2 for more discussion).

Average income: Australia was one of only a few OECD countries to experience a faster rate of growth in GDP per person in the 1990s than in the 1980s.

Income distribution: The available evidence suggests that there has not been a major change in the distribution of the disposable incomes of Australians over the 1980s and 1990s. A major reason is that government taxes and transfers have largely counteracted a widening dispersion in market incomes (from employment, investment and superannuation).

Consumption expenditure: Real average consumption expenditure per person increased at a slightly faster rate in the 1990s, compared with the 1980s. And the affordability of major items — housing and motor vehicles — also improved over the 1990s. Thus, not only were households spending more, but they were also getting more of the 'big ticket' items for their money.

Genuine progress indicator: A composite indicator which adjusts GDP growth for a range of other factors — for example, non-market income, income inequality, social costs and environmental degradation — has shown an improvement from the mid-1990s.

Health, housing and education: A number of indicators in areas of health, housing and education showed improvements in the 1990s — although not necessarily at faster rates than in the 1980s.

Hours of work: Average hours worked by full-time workers (including overtime and unpaid hours) rose over the 1980s and 1990s, but by more over the 1990s. There are two sides to any change in working hours — increased hours may mean more income, but they also mean less leisure and, for some, this may detract from their desired lifestyle.

Quality of life: Several surveys of subjective opinion on whether Australians consider that their quality of life is getting better or worse have shown that around a third or more of respondents consider that the quality of life is deteriorating.

A clear message is that, while the economic trends in the 1990s have been positive and strong, other issues also concern many in the community.

There have been three phases of growth in average income:

- rapid growth at an annual average rate of 2.9 per cent in the 1960s and up to 1973-74;
- slower growth (1.4 per cent a year) from 1973-74 to the end of the 1980s; and
- a return to more rapid growth (2.5 per cent a year) in the 1990s.

Growth in average income can be decomposed into contributions from demographic change (the proportion of the population of working age), labour market factors (participation rates, unemployment, average hours of work) and labour productivity growth (output per hour worked).

It turns out that, over the periods examined, growth in labour productivity has accounted for nearly all of the growth in average income. Growth in labour productivity can, in turn, be decomposed into two components — capital deepening (raising the ratio of capital to labour) and growth in multifactor productivity (an increase in the ratio of output to input of both labour and capital). See box 2.

Box 2 **Components of growth in labour productivity**

Labour productivity captures much more than the efficiency with which workers operate. It is affected by capital investment, management practices, technology, reallocation of resources between firms and industries, and more.

With a few technical assumptions, growth in labour productivity can be decomposed into two measurable components — capital deepening and multifactor productivity growth. Capital deepening refers to growth in the ratio of capital to labour. It is measured as the growth in the capital-labour ratio, multiplied by capital's share in total income. Multifactor productivity growth reflects increases in the amount of output produced from labour and capital inputs.

Capital deepening raises labour productivity because it means that each unit of labour (an hour of an employee's work time) has more capital to work with and can thereby produce more output. For example, a scientist or design engineer can achieve more in an hour of work when given access to a more powerful computer. When there is an increase in output, even though it may be due to additional capital, the ratio of output to labour — labour productivity — increases.

Multifactor productivity growth raises labour productivity because it means that, through new technologies or new management or work practices, labour and capital inputs can combine in ways that generate more output. When this happens, there is also an increase in the ratio of output produced to labour used.

Consequently, capital deepening and multifactor productivity (MFP) have accounted for nearly all of the long-term growth in income per person.

Capital deepening has been the more important contributor — accounting for about two-thirds of the growth in average incomes since the mid-1960s. But it has been a constant contributor across the three phases of growth (figure 1).

Growth in multifactor productivity has been less important overall, accounting for about a half of the growth in average income since the mid-1960s. But it has been the more important contributor to *variations* in growth in average income (figure 1). In the 1970s and 1980s period, productivity growth was slow and contributed 0.6 of a percentage point to the relatively slow 1.4 per cent a year growth in average income. But, in the 1990s, productivity growth contributed 1.4 percentage points (or nearly two-thirds) to the 2.5 per cent a year growth in average income. Productivity growth contributed more than capital deepening in the 1990s (figure 1).

The surge in productivity growth was by far the major factor behind the average income acceleration in the 1990s. Indeed, the above numbers imply that productivity growth contributed 0.9 of a percentage point (or over 90 per cent) to the acceleration in average income of 1.1 per cent a year between the two periods.

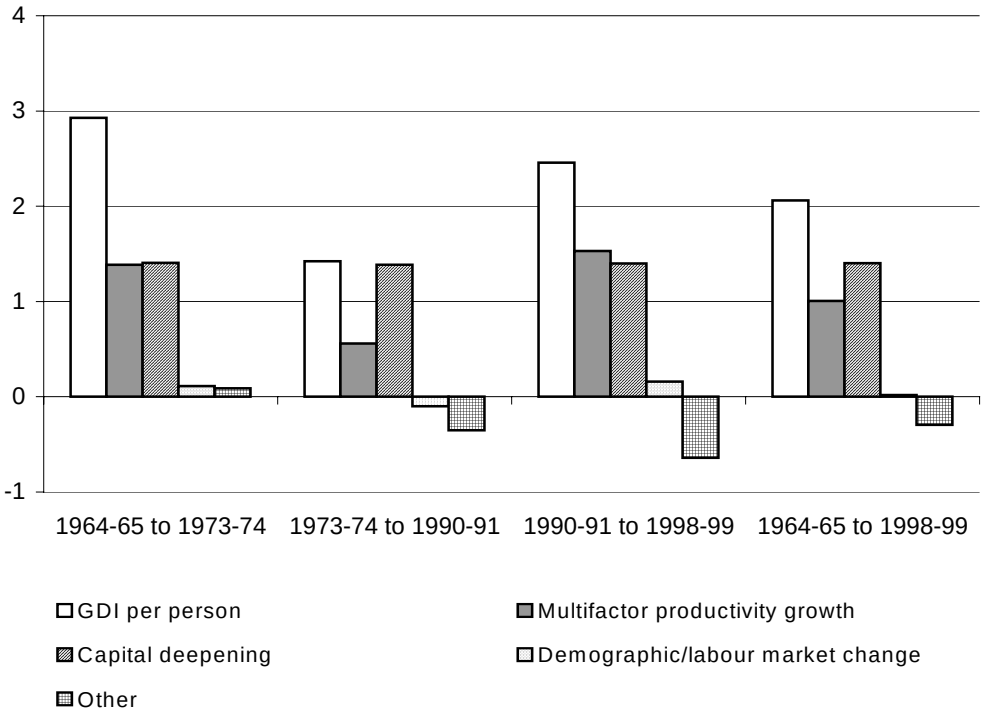
Changes in demographic and labour market factors, although individually important at different times, tended to offset each other within each of the three phases of growth.

Nevertheless, labour market factors made sizeable contributions to improvements in average income in particular periods. Specifically, the growth in employment in the late 1980s contributed about 1.7 percentage points to the 2.7 per cent a year growth in average incomes. Capital deepening and productivity growth were both particularly low during this period. The labour market contributions in this period emphasise the importance of sustained employment growth and reductions in unemployment to improvements in average incomes.

The period from 1993-94 brought together the range of contributing factors. Capital deepening was at its long-term rate of growth of 1.4 per cent a year. Productivity growth was at a record high of 1.7 per cent a year and favourable labour market trends contributed 0.8 per cent a year. Average income grew at a very strong rate of 3.3 per cent a year.

Figure 1 **Contributions to growth in real gross domestic income per person, various periods, 1964-65 to 1998-99**

Per cent per year



Productivity growth and the distribution of income gains to labour and capital

There has been worldwide interest in the income distribution effects of factors, such as lower trade barriers and technological change, that enhance productivity growth. A common focus is on whether the productivity-enhancing factors are biased against labour, in general, or against a certain type of labour — particularly, unskilled workers. A bias would show up as lower rates of employment or the payment of lower wages, at least in relative terms. Either way, a bias would lead to a relative (if not absolute) decline in total payments to labour or to the labour type.

A number of factors could have enhanced productivity growth in Australia in the 1990s and, at the same time, altered the distribution of income between labour and capital. The possibilities include:

- technological change — some technologies are considered to be labour saving and some are considered to favour skilled labour;
- reductions in trade barriers — some claim that competition from low-wage countries reduces the wage and employment prospects of low-skilled workers;

- a shift towards enterprise bargaining — there are claims that decentralisation of wage determination and associated changes have reduced the relative bargaining strengths of workers;
- the introduction of a stronger commercial focus and competition for government business enterprises — this gives enterprises incentives to reduce excess manning levels that may have built up under an 'employer of last resort' philosophy; and
- contracting out — there are claims that contracting out reduces costs, frequently at the expense of lower wages, if not reductions in employment.

The general tenor of these claims implies that the productivity gains of the 1990s have been biased against labour — and perhaps especially against unskilled labour.

Trends in the labour income share

As mentioned at the outset, growth in Australia's output — and therefore income — was consistently strong in the 1990s, averaging over 4 per cent a year since 1990-91.

The labour income share — wage and salary payments to labour as a proportion of total income — provides a convenient measure to track the distribution of income to both labour and capital. While it obviously indicates the extent to which labour shares in the flow of income generated, movements in the capital share can be taken to be equal (but opposite) to movements in the labour share. (Capital income is the gross operating surplus before depreciation, interest and tax.)

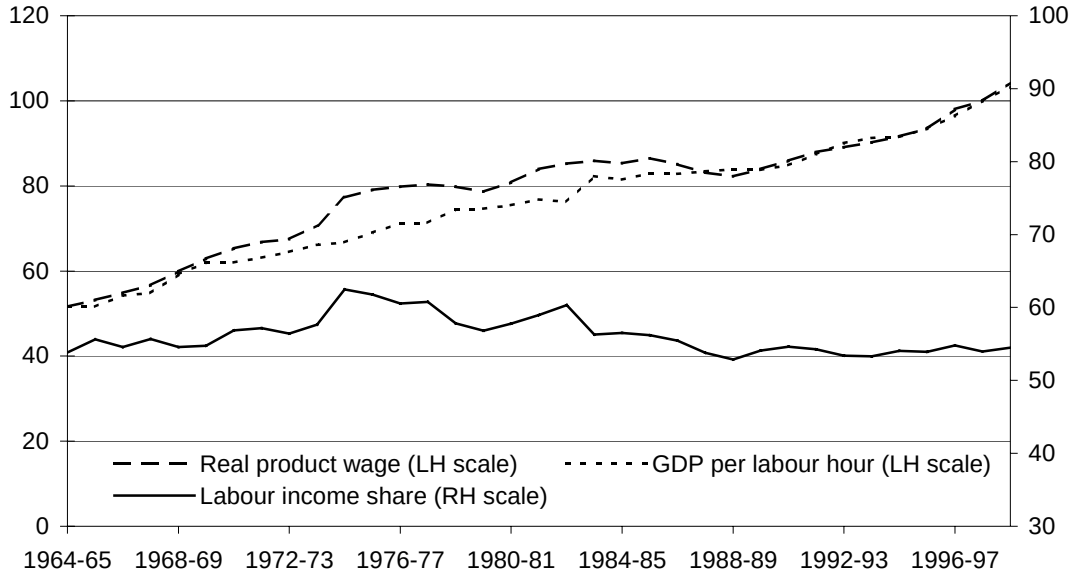
The economywide labour income share was stable from the late 1980s and right through the 1990s (figure 2). This means that labour and capital shared proportionately in the strong income growth of the 1990s. It implies there was no bias against labour at the aggregate level.

There is a similar pattern in the market sector of the economy. This covers 60 per cent of the economy, but excludes service activities (such as public administration, defence, health and education) that do not have output measures determined by the valuations of market transactions.

However, there was a reduction in the labour income share of 0.3 per cent a year, suggesting a slight bias against labour in the market sector over the 1990s. In other words, production in the market sector became slightly more capital-intensive. As outlined below, two industry sectors — Electricity, gas and water and Communication services — became noticeably more capital-intensive in the 1990s.

Figure 2 **Economywide labour income share, real product wage and GDP per labour hour, 1964-65 to 1998-99**

Index 1997-98 = 100 (LHS) and per cent (RHS)



But, with a stable share for the economy as a whole, it would appear that the slight bias against labour in the market sector has been offset by a slight bias in favour of labour in the non-market sector. For example, the strong employment growth in business services could be an offsetting factor from the non-market sector. (Lack of data prevented confirmation of this possibility.)

Wage and profit rates

Changes in wage, salary and profit rates indicate the extent to which those already employed and engaged in market activities share in income gains.

The labour income share can be transformed mathematically in a way that identifies the rate of payment to labour and introduces an explicit link to productivity. The essential feature of the transformation is that:

growth in the labour income share	=	growth in the real product wage	−	growth in labour productivity

The real product wage is a measure of the real rate of payment to labour from a producer cost point of view. It is derived by using an index of producer prices to deflate the nominal average hourly rate of payment to labour.

The above relationship shows that an increase in the real product wage will raise the labour income share, if it is not accompanied by an equal increase in labour

productivity. (As will be seen, this is what happened in the 1970s.) Or, to put it another way, an increase in labour productivity enables the real product wage to increase without raising the labour income share. (This was the 1990s experience.)

Underlying the stable labour income share of the 1990s, there was strong growth in the real product wage, which was matched by growth in labour productivity (figure 2 and table 1). Both grew at around 2.5 per cent a year. The increased real cost of employing an hour of labour was matched by increased real product (and income) generated per hour of labour.

As noted before, a surge in multifactor productivity growth was the major contributor (over 90 per cent) to the added strength in labour productivity growth in the 1990s.

Strong real wage gains are also evident when wages are viewed as a source of income to those employed (box 3). The real consumption wage (as shown in table 1) uses the consumer price index to deflate the nominal average hourly wage.

On the capital side, there was an improvement in profitability underlying the stable capital share in the 1990s. The rate of profit grew at over 1 per cent a year in the 1990s (table 1), compared with declines in previous decades. The average rate of profit increased over the 1990s from 14.3 to 15.8 per cent in the economy at large and from 16.0 to 18.4 per cent in the market sector.

Table 1 **Accounting for growth in the labour income share, 1990-91 to 1998-99**

Per cent per year

	Economywide	*Market sector*
Growth in labour income share	0.0	-0.3
equals		
Growth in real product wage	2.5	2.6
less		
Growth in labour productivity	2.5	2.9
Information items:		
Growth in real consumption wage	1.9	2.1
Growth in rate of profit	1.2	1.7

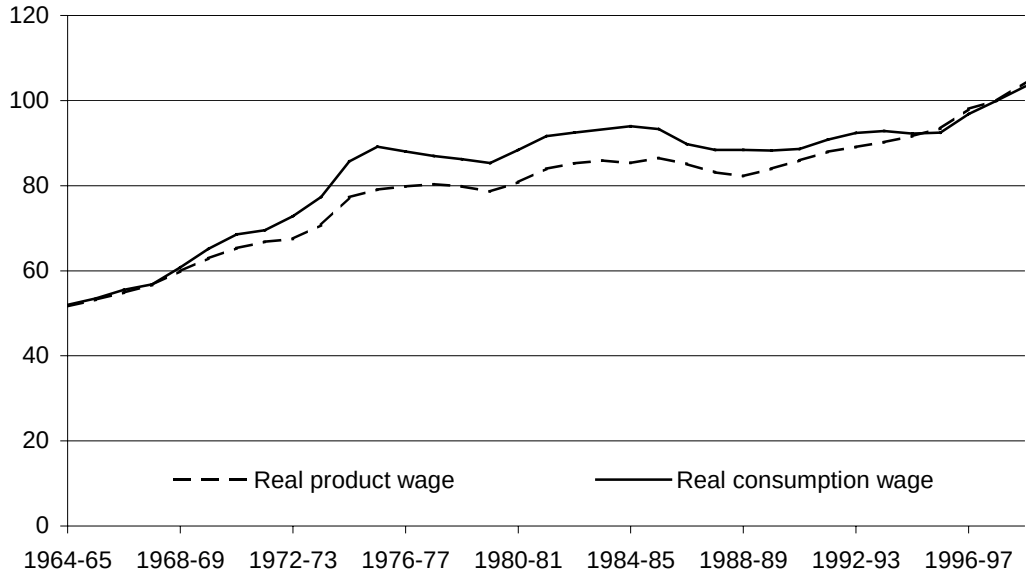
Box 3 **Payments to labour as a source of earned income**

In thinking of the real value of payments to labour as a source of income for those employed, consumption prices, rather than producer prices, are more relevant. Using a consumption price deflator to form a 'real consumption wage' gives a better indication of the command over consumption of goods and services that payments to labour provide.

Like the real product wage, the real consumption wage grew strongly in the 1990s. Its growth was not as high as the growth in the real product wage over the whole period (table 1), because of greater moderation in the growth of producer prices than in consumer prices. However, there was very little difference in their rate of growth from the mid-1990s (both were around 3.8 per cent a year from 1995-96).

Real product wage and real consumption wage, 1964-65 to 1998-99

Index 1997-98 = 100



Employment rates

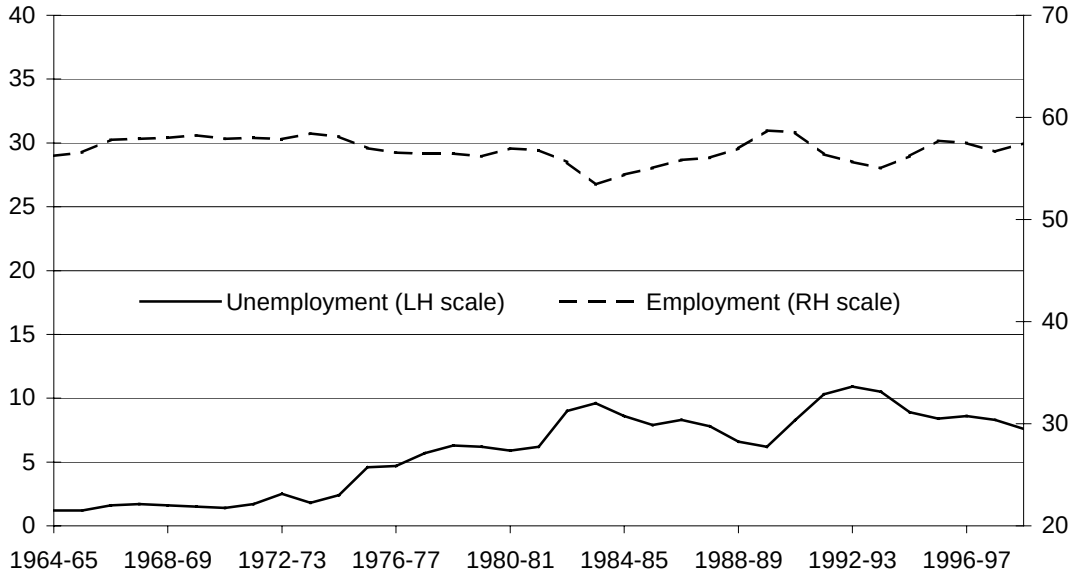
Increases in employment raise total labour income payments. They mean that more people are able to share in income gains by participating in employment.

The 1990s brought favourable labour market trends — after the major disruption of the early 1990s recession. The rate of employment in the working-age population (15 years of age and over) returned to near-record levels and the rate of unemployment in the workforce steadily declined (figure 3).

Thus, the growth in labour income over the 1990s came through a combination of growth in average wage rates and growth in employment.

Figure 3 **Workforce unemployment rate and working-age employment rate, 1964-65 to 1998-99**

Per cent



The 1970s and 1980s experience

The period from the mid-1970s and through the 1980s stands in contrast to the 1990s (and 1960s). Multifactor productivity growth was low. Income growth was generally lower and more volatile. The distribution of income to labour and capital was not even. And unemployment grew steadily and persisted for much of the period.

The contrasts between this period and the 1990s reinforce the importance of productivity growth, not only in promoting income growth, but also in sustaining growth in both labour and capital income.

Like many other economies, the Australian economy was hit by a number of shocks in the mid-1970s. There was a sharp decline in the terms of trade and a reduction in export volumes. On the supply side, real wages climbed sharply.

The labour income share rose sharply from 1972-73 to 1974-75 as the increase in the real product wage outstripped the growth in labour productivity (figure 2). The divergence between wage growth and productivity growth became known as ‘the real wage overhang’.

Table 2 **Accounting for growth in the labour income share**

	1964-65 to 1972-73	*1972-73 to 1974-75*	*1974-75 to 1983-84*	*1983-84 to 1988-89*	*1988-89 to 1993-94*	*1993-94 to 1998-99*
Economywide						
Growth in labour income share	0.6	5.2	-1.1	-1.3	0.2	0.4
equals						
Growth in real product wage	3.4	7.0	1.2	-0.9	1.9	3.0
less						
Growth in GDP per labour hour	2.8	1.7	2.4	0.4	1.7	2.5
which equals						
Growth in GDP	5.1	2.6	2.6	3.9	2.3	4.6
less						
Growth in average hours	-0.6	-1.2	-0.5	0.2	-0.1	-0.3
less						
Growth in the workforce	3.2	2.3	1.7	2.8	1.3	1.6
less						
Growth in the employment rate	-0.3	-0.1	-1.0	0.5	-0.6	0.7
Information items:						
Growth in real consumption wage	4.3	8.5	0.9	-1.0	1.0	2.2
Growth in rate of profit	-2.2	-11.4	1.0	1.5	0.5	0.8
Market sector						
Growth in labour productivity	2.4	4.0	2.2	1.5	2.0	3.1
equals						
Capital deepening	1.4	1.6	1.5	0.6	1.5	1.4
plus						
Multifactor productivity growth[a]	1.0	2.5	0.6	0.9	0.5	1.7

[a] Except for the period 1993-94 to 1998-99, the displayed rates of MFP growth should not be interpreted as underlying or trend rates of growth.

The labour income share rose by over 5 per cent a year over this period, with increases in the real product wage of 7 per cent a year (table 2). The higher real cost of employing labour, without a commensurate increase in output and income, squeezed profits. Producers were induced to substitute capital for labour.

The higher labour income share was not sustained. It gradually declined from the mid-1970s as further growth in the real wage moderated and growth in labour productivity picked up.

However, the source of additional labour productivity growth through this period was quite different from the source of the 1990s growth in labour productivity (namely, stronger MFP growth). Higher unemployment, due to both demand and supply side influences, had the effect of raising labour productivity growth.

Table 2 shows that the employment rate declined by 1 per cent a year from the mid-1970s to the mid-1980s, even with slower growth in workforce numbers. (Growth in the workforce, combined with a decline in the employment rate, means that unemployment increased.) The faster rate of decline in the employment rate, compared with the previous period (from -0.1 to -1.0 per cent a year), more than accounts for the 0.7 of a percentage point acceleration in labour productivity (GDP per labour hour) between 1972-73 to 1974-75 and 1974-75 to 1983-84.

The labour income share fell through another mechanism from the mid-1980s, when reductions in real wages were implemented through the prices and incomes Accords. The real product wage declined by 0.9 per cent a year from 1983-84 to 1988-89. This contributed more than substantially to the reduction in the labour income share of 1.3 per cent a year.

The labour income share returned to around 1960s levels by the late 1980s (figure 2).

Strong multifactor productivity growth is a key feature that distinguishes the 1990s — and the 1960s — period from the mid-1970s to the end of the 1980s (see 'Market sector' section of table 2). Strong MFP growth in the 1990s sustained the increases in real wages through strong labour productivity growth. As a result, the increased real cost of labour did not squeeze profits. Real wages and rates of profit both increased. And, with strong growth in output, employment grew and unemployment fell. The distribution of income between labour and capital remained even.

Industry perspective

Productivity gains can be distributed as higher wages or higher profits or, with lower costs, they can be passed on to industrial and household purchasers through lower prices charged for goods and services produced.

Productivity gains at the industry level were mostly passed on in the form of lower prices in the 1990s. There was little variation across industries in wage growth or profit growth. But high productivity growth industries had lower price increases and, in some cases, had price decreases.

These results are summarised in the correlation coefficients in table 3. There is some correlation across industries between productivity growth and profitability, but the link between industry differences in wages growth and industry differences in productivity performance is relatively weak. The negative correlation between productivity growth and prices is much stronger in the 1990s.

Table 3 **Correlation coefficients between sectoral multifactor productivity growth and growth in wages, profits and prices**

	1974-75 to 1988-89	*1988-89 to 1998-99*	*1974-75 to 1998-99*
Real consumption wage	0.48	-0.57	0.31
Rate of profit	0.77	0.41	0.77
Prices	-0.59	-0.90	-0.82

This indicates that, while productivity growth is important for growth in the general levels of real wages and profitability, industry variations in productivity growth have not translated nearly as readily into wage growth differentials. Industries with high productivity growth have not tended to raise wages by more than other industries. Industries with high productivity growth have paid the going wage increases, taken a little extra in profits in some cases (after weathering declines through the 1970s and early 1980s) but, mostly, have lowered their prices relative to other industries.

Moreover, the trend toward passing productivity gains on through lower prices has been stronger in the 1990s than in the past. This is consistent with producers facing stronger competitive pressure in the 1990s.

Competitive pressures thus appear to be important not only in contributing to the generation of productivity gains (PC 1999b), but also in influencing the distribution of the gains. Competitive pressures are likely to have put some brake on nominal wage increases and profit growth, and to have encouraged productivity gains to be passed on through lower prices.

This tendency to pass the gains on in the form of lower prices is likely to have contributed to lower inflationary pressures in the economy generally. As the OECD (2000b, p. 86) noted in its survey of Australia:

> This in turn meant continued growth in real wages, household income and consumption, and was achieved with little diminution in the growth of profits or the incentive to invest.

Passing on productivity gains through lower prices is likely to have its own distributional effects (not analysed in this paper). For example, lower relative prices for goods and services that form a prominent part of expenditure in low-income households would be of greater benefit to low-income households.

The industry perspective also shows that, whilst productivity growth has been neutral with respect to labour at the aggregate level, the same is not true of all industry sectors. Electricity, gas and water and Communication services have shown strong productivity growth. At the same time, they have switched to more

capital-intensive production. Electricity, gas and water reduced its labour input, whereas the major factor in Communication services was very strong growth in capital inputs.

Other dimensions of income distribution

It is freely acknowledged that the distribution of productivity and income gains between labour and capital is only part of the complete distributional picture. However, tracing the distribution of income between labour and capital through to the distribution of personal and household income was beyond the scope of this study. Rather, the results of other studies have been used to fill in some of the gaps in the personal and household distribution picture. The treatment of income distribution, however, remains incomplete. And the specific influences of productivity-enhancing factors on personal and household income have not been analysed.

The available evidence suggests that, while the distribution of income between labour and capital has been even, the distribution of earnings among individuals has become more unequal in the 1990s. The increase, however, is a continuation of the growth in earnings inequality during the 1980s, rather than a step up in the 1990s.

The sources of this skew in the distribution of earnings have not been fully explored in this study. Other studies provide evidence of a bias in the growth in labour payments in favour of skilled workers. Their share of the total wage bill has risen from around 37 per cent in the mid-1980s to around 42.5 per cent in the late 1990s. Most of this increase took place in the 1990s. The evidence from Australian and overseas studies finds that technological change (especially computer related) is a source of bias in favour of skilled workers, but trade liberalisation appears to have little effect.

The change in the distribution of payments to labour does not appear to be the result of a change in the wage premium for skill. The growth in payments to skilled labour appears to be due more to faster growth in employment (relative to unskilled workers) than to faster growth in wages.

There is evidence of faster wage growth for one group — chief executive officers. But, since the benefiting group only represents a small proportion of the working population, the effect on overall wage dispersion is likely to be small.

The growing inequality in earnings has undoubtedly had a major influence on the distribution of market income (income from work, investment and superannuation). The distribution of market income has also become more unequal (box 4).

Importantly though, the distribution of disposable income amongst individuals and households has remained relatively stable between the early 1980s and the mid-1990s, despite the increased inequality in market incomes (box 4). This implies that the tax and transfer system has been largely effective in counteracting the increased inequality in market incomes.

However, middle-income earners have not shared equally in the income gains. Income earners at the top and bottom have both received more income, while middle income earners have missed out.

Other dimensions of distribution are also examined in chapter 5. The examination shows that governments have shared proportionately in the income gains of the 1990s, whilst there is a mixed picture in terms of the distribution of gains between urban and rural and regional communities. The data also suggest that foreigners did not receive a greater share of the 1990s income gains.

Box 4 **Measures of income inequality**

Professor Ann Harding and colleagues at NATSEM have measured income inequality at two points — 1982 and 1996-97. Their results show that while the distribution of income from wages, salaries and other market sources has become more unequal, this growing inequality has been largely offset by the tax and transfer system.

Income inequality is measured by Gini coefficients, which are at zero with equal income distribution and at unity if one income unit has all of the income.

Gini coefficient measures of inequality in the distribution of income

	1982	*1996-97*
Earned income	0.477	0.538
Market income	0.457	0.511
Gross income	0.386	0.398
Disposable income	0.337	0.346

Source: NATSEM (2000).

The NATSEM results show that both earned income (wages, salaries and self-employment income) and market income (earned income plus investment and superannuation income) have both become more unequal. However, government transfers (pensions, allowances and other welfare payments) have reduced both the level of and growth in inequality in market income. Gini coefficients for gross income (market income plus transfers) show the effect of transfers and for disposable income (gross income less income tax) show the effect of income tax.

The main conclusion from the available evidence is that an increased dispersion in earnings — which may have been due to productivity-enhancing or other factors — has been largely counteracted by government policies operating through the tax and transfer system.

Concluding remarks

This study has shown that productivity growth became the major source of growth in average incomes over the 1990s and has played a major role in sustaining growth in wages, profits and employment.

The study also found that there has been no bias against labour at the aggregate level. This is despite a number of developments that are sometimes perceived to have an anti-labour bias.

This does not mean that there have not been biases against labour in specific areas. Indeed, some areas have been identified in this study — at the industry level and in terms of skill level.

But specific areas of bias against labour cannot be extrapolated. The economy is operating in such a way that a bias against labour in one area is counteracted by a bias in favour of labour in another area.

The study has also shown that sustained increases in wages and employment are important for promoting growth in average income and for influencing the way in which income gains are shared between those in and out of work.

An important question — and one that has been exercising some academic economists — is whether wage and income measures can be introduced to promote additional employment growth, in order to make further inroads into unemployment, without compromising the prospects for productivity growth or the desire for equitable outcomes in the distribution of income.

Finally, there are a several areas of further research that could add to the picture presented here:

- Further analysis of the specific (productivity-related and other) sources of change in the distribution of earnings.
- Investigation of possible explanations for the seeming lack of movement in wage relativities — including rigidities in wage setting or the successful matching of supply shifts with demand shifts.
- Further analysis of the distributional effects at the personal and household level of changes in relative consumer prices.

1 The context for this study

The 1990s saw the return of strong economic growth in the Australian economy. Annual growth averaged over 4 per cent for the nine years since 1990-91. This is the longest period of expansion since the early 1970s.

Improved productivity growth has been a major contributor to Australia's stronger economic growth (PC 1999b). In fact, the Australian economy now relies more heavily on productivity growth as a source of growth than in the past (table 1.1).

Stronger economic growth means more income for Australians, thus laying the foundation for improvements in living standards. As good economic results continue to be posted, there seems to be growing realisation in the community that improvements in economic prosperity are being sustained. Yet, some apprehension remains.

- The economy may be performing better, but am I better off?
  - Do lifestyle and other sacrifices outweigh the economic gains?
  - Is the quality of life improving?
- How evenly are the gains being distributed in the community?
  - Is the community becoming more starkly divided between those who are able to benefit from today's opportunities and those who are not?
  - Is rural and regional Australia missing out?

Table 1.1 **Annual rates of growth in output, inputs and multifactor productivity, market sector, 1964-65 to 1998-99**

	Inputs		*Productivity*		*Output*	
	%pa	%	%pa	%	%pa	%
1964-65 to 1973-74	3.4	(71)	1.4	(29)	4.8	(100)
1973-74 to 1990-91	1.9	(76)	0.6	(23)	2.4	(100)
1990-91 to 1998-99	2.0	(57)	1.5	(43)	3.6	(100)

Source: PC estimates based on ABS data.

1.1 Objectives and scope of the paper

This paper aims to shed some light on the relationships between productivity growth, income growth and its distribution and improvements in living standards. The specific objectives are to examine trends, particularly over the 1990s, in:

- a range of indicators of Australian living standards (chapter 2);
- factors accounting for growth in average incomes (chapter 3);
- the distribution of productivity and income gains between labour and capital (chapter 4); and
- other dimensions of the distribution of economic gains such as the distribution of earnings from work, payments to foreigners and the distribution of gains across people in rural and urban regions (chapter 5).

The main analytical task of the paper is to examine the links between productivity growth, income growth and the distribution of income between labour and capital — the 'functional distribution of income' (see figure 5.1 in chapter 5). Other dimensions of income and living standards are examined (for example, trends in the distribution of personal income), but in brief and with reliance on material assembled from other sources.

The paper does not attempt to provide complete and definitive answers to distributional questions. Its scope and limitations can be summarised with the aid of figure 1.1. The figure outlines influences on a range of distributional dimensions.

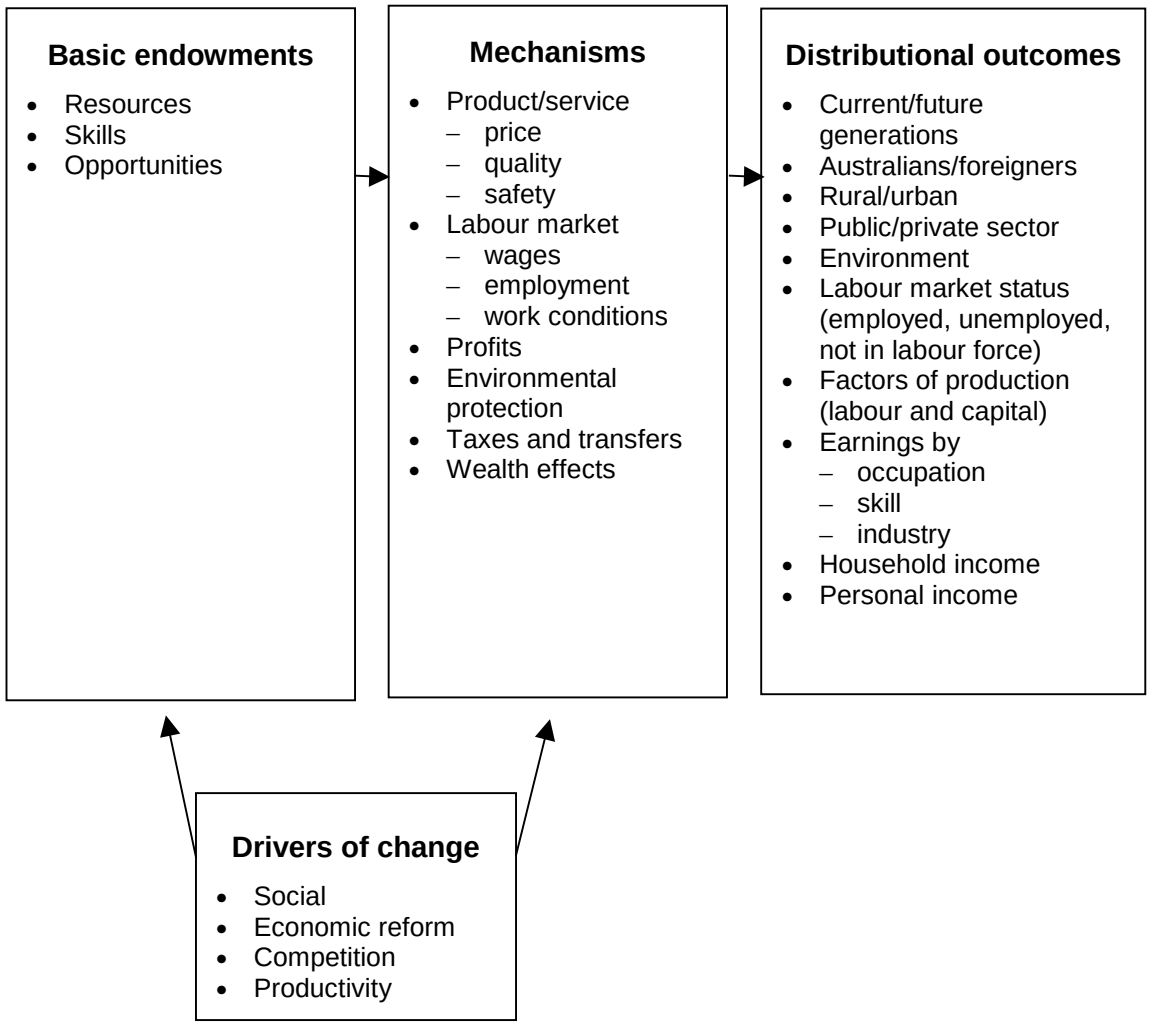
- The figure lists a number of distributional outcomes — some, but not all, of which are examined in this paper.
- The figure also shows several basic endowments of resources, skills, talents and opportunities. These are the factors that fundamentally determine distributional outcomes. Many studies have pointed to the ultimate importance of social factors in determining distributional outcomes.
- A range of mechanisms, including those listed in the figure, link the endowments to the distributional outcomes.
- Finally, there are drivers of change, which can influence distributional outcomes by affecting endowments or mechanisms.

The figure is intended to convey the notion that productivity growth is only one of many factors that can influence distributional outcomes. As will be shown in this paper, productivity growth can have an important influence on the growth and distribution of factor incomes. But, at the level of personal and household income, other social factors and policy levers have more immediate and powerful influence.

For example, Atkinson (1999) concluded that differences in government policies and social norms explain a large part of the different trends in income distribution across the major high-income countries since the 1970s.

The paper looks at the influence of productivity growth, as a driver of change, on some of the mechanisms listed in figure 1.1 — wages, employment and profits — and how these affect the functional distribution of income (chapter 4).

Figure 1.1 **Framework for analysis of the distribution of gains**



But the paper does not attempt to extend the analysis of the influence of productivity growth beyond the functional distribution of income. Thus, while it links productivity growth to the distribution of income between labour and capital, it does not link productivity growth to the distribution of income across labour groups — for example, to changes in the dispersion of earnings between different skill or managerial/non-managerial groups. This is a major gap in the analysis and remains as an area for further work.

The paper does examine some of the other distributional outcomes witnessed in recent years (chapter 5). But it is beyond the scope of this paper to link any changes in the distributional outcomes noted in chapter 5 to the range of possible determining factors — productivity included — in anything more than a cursory way. For example, some of the distributional changes presented in chapter 5 could, in principle, be due as much to changes in social policy as they could be to changes in productivity performance.

1.2 A brief review of the nature of other studies

Before moving on to the examination of trends in living standards, it may be helpful to place this study in the context of other studies. The following is not intended as a comprehensive review, but rather to highlight the distinguishing characteristics of a range of approaches.

Selected examples of studies conducted by the Productivity Commission and its predecessors, as well as others published in the economics literature, are briefly described in box 1.1. The examples are drawn from the empirical literature and do not include the multitude of studies that focus solely on distributional outcomes, without links to endowments, mechanisms or drivers of change.

A number of studies have concentrated on the distribution of productivity gains between higher wages, higher profits and lower prices for purchasers — BIE (1986, 1990, 1996), Fluet and Lefebvre (1987), IC (1997a), Waters and Tretheway (1998).

Other studies have examined the impacts of economic reforms on costs and prices (Winston 1998), factor income distribution (Easton 1996) or personal/household distribution of income (Easton 1996, IC 1996a, IC 1996b, Harding et al. 2000).

Trade liberalisation has also been a focus of empirical research, particularly on its links to growth. The distributional effects of trade liberalisation have tended to focus on the distribution of earnings — Burtless (1995), Murtough, Pearson and Wreford (1998), de Laine, Laplagne and Stone (2000).

Box 1.1 **Selected studies on the distribution of gains**

'*Micro' studies of the distribution of productivity gains to prices, profits and wages*

- The Bureau of Industry Economics (BIE) produced a stream of case studies examining the impact of microeconomic reform on individual industries, including agri-food, automotive, manufacturing and aluminium. The case studies examined aspects of distribution to various extents.
  - BIE (1986) reported that, over the period 1954-55 to 1981-82, more than half of the gains from manufacturing productivity growth were passed on as cost and ultimately price decreases. However, the BIE (1990) found that, for the period 1969-70 to 1987-88, only 30 per cent of productivity gains were distributed as price reductions, with over 60 per cent distributed to labour and 8 per cent to capital. The distribution of gains varied during this period and between manufacturing industries. For example, over the period 1984-85 to 1987-88, there was much wage restraint — largely as a result of the wages Accord — and the real return to labour fell by 0.3 per cent a year.
  - The BIE automotive case study (BIE 1996) reported responses from a survey of manufacturers about the perceptions of the distribution of productivity gains, together with more objective measures. Manufacturers perceived that most gains flowed to customers as price decreases and quality increases. BIE analysis supported the view that productivity increases flowed through to customers. Most manufacturers also contended that gains flowed through to some wage and profit increases. The more objective data supported this to some extent.
- Fluet and Lefebvre (1987) used a price accounting framework to describe how productivity improvements in Canadian manufacturing were apportioned among labour, capital, materials and government through an increase in the price of these factors or through an increase in taxes levied on factor inputs, and consumers through a decrease in industry selling prices. He found that over the period 1965 to 1980 roughly half of the increase in real income generated by productivity advances within manufacturing was redistributed to the rest of the economy through changes in relative prices.
- The Industry Commission (IC 1997a) focused on the distribution of gains from productivity growth between firms (wages and profits) and purchasers (prices). The paper examined distribution at the sectoral level in some detail, together with a brief examination of the aggregate and case study perspectives. Although not conclusive, it suggested that from these three perspectives there was some shift in the pattern of distribution of productivity gains away from wage increases towards lower prices. This coincided with government reforms that led to greater competitive pressures in the economy. The distribution of gains through lower prices magnified the flow-on effects to the rest of the economy.

(Continued on next page)

Box 1.1 **(continued)**

- Waters and Tretheway (1998) examined the links between productivity and price performance for Canadian railways between 1956 and 1995. Under perfect competition, total price performance — the growth of input prices compared with the growth of output prices — is equal to total factor productivity and all productivity gains are passed on to consumers. In non-competitive industries, comparisons of total factor productivity and total price performance trends might serve as an indicator of whether such firms/industries are becoming more or less competitive. It was found that competitive forces had constrained the railways from raising prices in most of their markets and the productivity gains had not been sufficient to offset the rising prices of major inputs.

Impacts of policy reforms on distribution

- Easton (1996) looked at trends in factor and personal income distribution in New Zealand in pre- and post-reform periods. He examined factor distribution from the late 1970s to the mid-1990s, including real wages, factor shares between capital and labour, and return on capital. He found that it was not possible to attribute significant changes in factor distribution to the reforms. He also stated that it is difficult to argue that there was a major change in personal (market) income distribution in the period from the reforms, but there was probably a shift towards greater inequality after adjusting for tax paid and benefits received. However, he could not directly attribute this to market reforms.
- IC (1996a) examined the direct and indirect effects of price reforms for electricity, water, sewerage and drainage on income distribution. It concentrated solely on price effects and assumed that households did not adjust their consumption of goods and services in response to changing prices. It included effects on household expenditure, not only through direct effects on the price of goods subject to reform, but through indirect effects of the reforms on the cost of other goods and services consumed by households. This paper suggests that considering only direct effects of GBE price reform is likely to overstate the negative impact on household expenditure.
- IC (1996b) used an economywide framework to model the effect of a group of four reforms — tariff changes, reforms in electricity and telecommunications, and increasing competitive tendering and contracting of government services — on household incomes. Changes in income through changes in the distribution of employment between industries and occupations and changes in wage and profit levels were examined. Results showed these reforms increased income, on average, for households in all income groups. These income gains were fairly evenly distributed, although households in the middle and higher end of the income distribution gained relatively more than households in the two lowest income groups.

(Continued on next page)

Box 1.1 **(continued)**

- Winston (1998) evaluated changes in real costs and prices over time, comparing pre- and post-reform periods, for a number of industries deregulated in the US (airlines, trucking, railroad, banking and natural gas). While acknowledging that the entire change could not be attributed to deregulation, he found that the evidence to date suggested that since deregulation each of the industries examined had substantially improved its productivity, reduced its real operating costs (by between 25 and 35 per cent) and not significantly increased its profitability, but instead had passed on gains to consumers as lower real average prices (by between 30 and 75 per cent). He noted that consumers had not shared equally in the gains from deregulation since regulation had often been aimed at equalising prices across consumer groups and geographical areas where market forces would not produce this outcome.
- Harding et al. (2000) examined the distributional impact of year 2000 tax reforms in Australia. Their analysis suggested that particular groups, for example families with children and those in particular income brackets, for example between $38 000 and $50 000, would receive larger gains than other groups in the community.

Effects of trade liberalisation and technological change on the distribution of earnings

- Burtless (1995) surveyed the literature examining the impact of trade liberalisation on earnings inequality, mainly for the US. He noted the lack of consensus on whether lower trade barriers can explain the decline in the relative wages earned by less-skilled workers in the US and other industrialised countries. He suggested that most authors argue that rising earnings inequality is mainly the result of technological change rather than pressure on unskilled workers' wages from foreign competition, although some of the more recent literature had suggested that trade played a leading role in rising inequality.
- Murtough, Pearson and Wreford (1998) investigated whether trade liberalisation by Australia had reduced the wages and/or employment of low-skill workers relative to other employees. It was found that there was no strong support for the claim that trade liberalisation has increased earnings inequality or unemployment in Australia. Other factors appeared to be more significant.
- de Laine, Laplagne and Stone (2000) found that technological change has increased the demand for skilled workers in Australia. The relationship appears to have strengthened in the 1990s. Any trade influences on the demand for skill are weak.

2 Recent trends in living standards

This chapter examines trends in Australian living standards, with particular focus on recent changes in the 1990s.

The 'standard of living' is a multidimensional concept that defies precise definition. It is interpreted differently by different people. Various approaches to monitoring living standards are examined in the next section, before reviewing a range of indicators.

2.1 Approaches to monitoring living standards

The terms 'standard of living' and 'wellbeing' are often used interchangeably, but are sometimes used to encompass different aspects of life. 'Wellbeing' and 'quality of life' are often used to refer to both material and non-material aspects of life. The 'standard of living' is sometimes, but not always, used to refer to only the material aspects of life, which are more amenable to quantitative measurement.

There is no single, fully-defensible measure of living standards. A variety of approaches can be taken to measure living standards. These include average income, composite indicators and sets of indicators. Surveys of perceptions of living standards are often used to indicate non-material aspects as well as material aspects.

Average income

A nation's average income, usually measured as GDP per person, is a very common indicator of general living standards, particularly in international comparisons. It is a single indicator that is relatively easy to compile. Average income is used to provide a general indication of the economic aspects of living standards, particularly command over goods and services.

But it has some fairly well-known limitations.[1] It does not capture broader aspects of living standards, such as income distribution, and many aspects of health and

[1] For a discussion of these limitations see, for example, Commonwealth Treasury (1973) and Dowrick and Quiggin (1998).

environmental quality. For example, income measures do not capture the benefits of environmental amenity, such as scenic beauty and climate.

The effectiveness of average income as an indicator of living standards depends on the context. For broad comparisons between countries, average income may be a reasonable indicator of standards on the necessities and material comforts of life. In high-income countries, other considerations besides income become more important, once basic necessities are generally available among the population. More income can provide more options and choices related to quality of life or lifestyle. Typically, these other considerations then become more important in terms of what communities give priority to and value.

Composite indicators

Composite indexes go beyond average income measures by incorporating a range of complementary indicators, along with GDP per person, into a single index. The Genuine Progress Indicator (GPI) is an Australian example, developed in recent years.[2] The GPI is based on the idea of sustainable income. It builds on GDP, addressing some of the problems identified with GDP as a measure of progress. Hamilton and Saddler (1997a, p. 2) state that the GPI:

- includes the contribution of household and voluntary work;
- distinguishes more carefully between costs and benefits of economic activity (for example, expenditures that are defences against declining social and environmental conditions are deducted);
- adjusts for income inequality;
- takes account of some social costs, such as the costs of unemployment and of crime; and
- includes a range of measures of environmental degradation and resource depletion.

The GPI is subject to some controversy. While composite indexes are more comprehensive than GDP, it has been argued that they are difficult to interpret, involve a weighting of different elements of living standards (about which there may not be universal agreement), and imply there is a single answer to the question of whether life is getting better or worse (see, for example, Castles 1998; Dowrick and Quiggin 1998; Trewin 1998).

[2] See Sharpe (1999) for a survey of composite indexes.

Sets of indicators

A further alternative is to review a range of indicators without combining them explicitly into a composite index. Numerous aspects of living standards can be included. And it is possible to include non-material aspects, such as social and political participation and family relationships. Data availability generally imposes bounds on the number of aspects included.

Comprehensive studies including objective and subjective measures are not undertaken regularly in Australia. However, the ABS does collect and report on a range of measures of living standards; and since 1994 has produced an annual report, *Australian Social Trends*, which brings together a number of indicators on a broad range of social policy issues.[3]

Recent major Australian studies of a comprehensive type include the Australian Standard of Living Study conducted in 1987 (Travers and Richardson 1993) and the Australian Living Standards Study conducted by the Australian Institute of Family Studies in 1991. Both studies were based on indicators of a range of areas or 'spheres of life' and included both material and non-material aspects, for example family relationships and personal wellbeing. The 1991 study included more 'spheres of life' than the 1987 study, but focused mainly on families with dependent children (Terrill and Brodie-Reed 1998).

Most recently, the Centre for Independent Studies published *State of the Nation*, a collection of a large number of economic and social indicators from the early 1900s to 1999 (Sullivan et al. 1999). This study was not a survey-based study, like those mentioned above, but instead drew together existing statistics from a number of sources.

Surveys of perceptions of the quality of life

While some of the studies based on sets of indicators include subjective measures, a complementary approach is to simply ask people how they view their quality of life. Quality of life is a broader concept than just material wellbeing. There can therefore be a difference between subjective and objective measures of living standards.

Recent broad surveys include Pusey (1998), which examined the views of 400 'middle Australians', and Eckersley (1999), which involved a national survey of 1200 Australians. Hugh Mackay regularly takes 'soundings' of particular aspects of

[3] The ABS has examined various indicators of wellbeing and has indicated that over the next couple of years it may produce an alternative composite indicator to GDP (Macken 2000).

life (see, for example, Mackay 1999). Newspoll also periodically conducts surveys asking Australians whether life is getting better (see, for example, Kelly 2000).

2.2 A review of available indicators

This section provides an overview of trends in average income, composite and other readily available indicators. Where possible, overseas evidence is also provided to indicate whether the trends are particular to Australia or more widespread. The overview also highlights any changes that have become evident in the 1990s. Appendix A provides a more detailed examination of Australian and international data on living standards.

Income, wealth and consumption

Average income

Average incomes of Australians grew strongly in the 1990s (figure 2.1 and table 2.1). Real GDP per person grew at a rate of 2.1 per cent a year in the 1990s compared with 1.9 per cent a year in the 1980s.[4] On a real average income basis, Australians were 2.4 times as well off in 1998-99 than in 1959-60, with real GDP per person of around $31 000 compared with around $13 000 (1997-98 dollars).

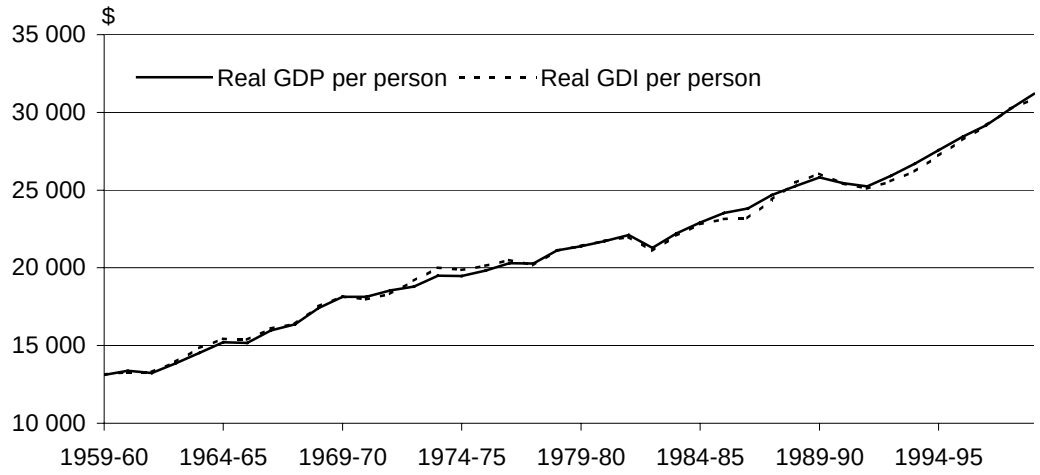
Figure 2.1 also presents another measure of average income, gross domestic income (GDI) per person, which is derived by adjusting the GDP series for changes in Australia's terms of trade (the price of exports relative to the price of imports). The terms of trade affect the purchasing power of the income derived from production of goods and services in Australia. A decline in the terms of trade reduces real GDI, all other things equal. GDI per person tracks GDP per person very closely.

Australia has been one of only a few OECD countries to show stronger growth in GDP per person in the 1990s than the 1980s. On a trend basis, Australia was one of only 8 out of 26 OECD countries to experience higher growth between 1990 and 1998 than between 1980 and 1990, and ranked seventh amongst these countries in terms of growth rate in the 1990s (Scarpetta et al. 2000).

[4] The 1980s are calculated from 1979-80 to 1989-90 and the 1990s from 1989-90 to 1998-99. Use of 1989-90 lessens the impact of the 1990s recession and its recovery on the calculations.

Figure 2.1 **Real GDP per person and real GDI per person, 1959-60 to 1998-99**

1997-98 dollars



Data sources: ABS National Accounts (1998/99) database, RBA Australian Economic Statistics database and ABS Time Series Statistics Plus database on EconData (accessed 26 July 2000).

Table 2.1 **GDP per person in Australia, 1959-60 to 1998-99**

			Average annual growth rate between periods	
Year	*GDP per person*	*Multiple of 1959-60 level*	*Actual*	*Trend*
	$ 1997-98		% per year	% per year
1959-60	13 100	1.0	..	..
1969-70	18 100	1.4	3.3	3.3
1979-80	21 400	1.6	1.7	1.9
1989-90	25 800	2.0	1.9	1.7
1998-99	31 200	2.4	2.1	2.2

.. Not applicable.

Sources: ABS National Accounts (1998/99) database, RBA Australian Economic Statistics database and ABS Time Series Statistics Plus database on EconData (accessed 26 July 2000). Trend rates are PC estimates based on these data sources.

Income distribution

The average income measure can mask changes occurring in the distribution of income that can affect community wellbeing. The distribution of income is important to many people's attitudes toward fairness and, at some point, can affect social cohesion.

The measurement of income distribution is a complex area and different measures provide different results. It is important to be clear about the definition of income being used — earnings (from employment in labour markets); market income (earnings plus mainly self-employment and investment income); gross income (market income plus government cash transfers); disposable income (gross income minus income tax); or final income (disposable income plus indirect benefits minus indirect taxes). The relationship between these definitions of income is depicted in figure 5.1 in chapter 5. In addition, there is equivalent income, where an adjustment is made for the size and composition of the income unit (for example, the household) reflecting the relative income levels needed to maintain a similar standard of living. Equivalent income can apply to any of the income definitions mentioned.

Over the longer term in Australia, inequality in income (by any of these definitions) has fallen, with most of the reduction occurring before the 1980s. The picture over the 1980s and 1990s is less clear. In market income terms, there has been some increase in income inequality in the 1980s and early 1990s, but redistribution through the welfare system has had an offsetting effect, so that gross income inequality has been fairly stable (Harding 1997; Johnson, Manning and Hellwig 1995). The ABS (1999) found that gross income distribution had remained almost unchanged between 1994-95 and 1997-98, with gross income inequality increasing more in the 1980s than in the 1990s.

However, a lack of change in overall summary measures of inequality can still mask movements in the distribution of income between certain groups. Recent analysis by the National Centre for Social and Economic Modelling (NATSEM 2000) examined disposable income over the period 1982 to 1996-97 and found that, in terms of income increases, the bottom and top of the income distribution had fared better than the middle. As a result of these offsetting effects, the summary measure of income inequality had remained virtually unchanged.

In an international context, there is considerable debate over the presence of clear trends in income inequality. Among high-income countries, differences in features, such as labour market institutions, affect inequality outcomes.

Trends in income inequality are also affected by the definition of income examined. Visco (1998) suggests that some analyses are too narrowly focused on the distribution of earnings across those who have jobs. Countries differ in the equality of earnings amongst those employed. However, they also differ in unemployment rates — some of those with higher earnings inequality have lower unemployment rates. When earnings dispersion is recalculated including the unemployed, earnings dispersion is more similar across countries.

On the basis of equivalent disposable income data from the Luxembourg Income Study,[5] the trend over the 1980s and 1990s was towards increased inequality in most major OECD countries.[6] Australia has had a similar experience to a number of OECD countries.

Wealth

Distribution of wealth is another relevant aspect of living standards. Assets can provide income, through dividends, interest or rental income. They also have the potential to increase in value, providing the owner with capital gains. And increases in wealth can affect household spending behaviour.

Looking at the household[7] balance sheet as a whole, real household net worth increased by 47 per cent between 1988-89 and 1998-99, from $1312 billion to $1926 billion (1997-98 dollars). The household sector has traditionally been a net provider of funds, and while this remains the case, both lending and borrowing activities have increased.

The balance sheet for the government sector of the economy is examined in appendix A.

The proportion of the Australian community owning shares has increased considerably over the period 1986 to 1999, from 9 to 54 per cent of the adult population, with significant growth in the late 1990s in particular (appendix A). The share of households either owning or purchasing a home has remained relatively steady since the 1960s.

Consumption

It is sometimes argued that consumption is a more direct measure of household wellbeing than income. Income is more variable and subject to transitory fluctuations, which households may be able to smooth out through borrowing and saving (Barrett, Crossley and Worswick 2000).

Real private consumption expenditure per person in 1998-99 was $18 273 (1997-98 dollars), around 2.2 times the 1959-60 level of $8168. Growth in the 1990s was 1.9 per cent a year, compared with 1.8 per cent a year in the 1980s (appendix A).

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5 This study emphasises comparability of data across countries.

6 The Luxembourg Income Study data also suggest increased inequality in Australia, which appears at odds with the ABS and other studies mentioned above.

7 Including unincorporated enterprises.

Of 29 OECD countries, 10 including Australia had higher growth in real private final consumption expenditure per person in the period 1989 to 1997 than in the period 1979 to 1989 (OECD 1999b).

In addition to average purchasing power, it is possible to examine changes in the affordability of major items. In 1998, both cars and housing were more affordable than in 1984, by around 9 and 1 per cent, respectively. However, in 1999, housing affordability fell significantly with increases in interest rates. But in both cases there was a downward trend in affordability from the mid-1980s to 1990, and an upward trend in the 1990s (appendix A).

Relative consumer prices changed in favour of clothing, household equipment, recreation and education and housing over the 1980s and 1990s. For each of the major expenditure groups included in the Consumer Price Index (food, clothing, housing, household equipment and operation, transportation, alcohol and tobacco, health and personal care, and recreation and education), the average annual rate of growth in the 1990s was lower than in the 1980s.

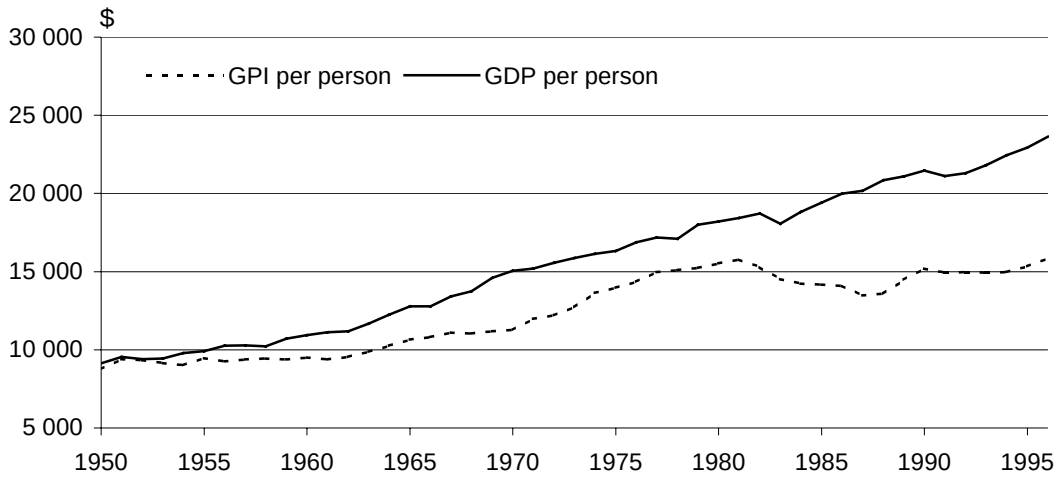
Composite indicators

GDP per person is compared with the GPI per person in figure 2.2. GPI per person diverges from GDP per person over time. GPI per person declined from the late 1970s to the mid-1980s, before rising again to the late 1970s level by 1996.[8] A slight improvement is evident from the mid-1990s. Hamilton and Saddler (1997b) argue that the divergence, and decline in the GPI since the late 1970s, is explained by the benefits of economic growth being offset by the costs. The principal factors they cite are: unsustainable foreign debt levels; the growing costs of unemployment and overwork; the combined impact of a number of environmental problems; the escalating costs of energy resource depletion and greenhouse gas emissions; and a failure to maintain investments in the national capital stock. They also note that the decline in the GPI would have been evident earlier except for the improvement in income distribution in the 1970s.

There is also a divergence internationally — the divergence of the Australian GPI from GDP in the 1970s is mirrored in indexes for Britain, US and some European countries (Hamilton and Saddler 1997b).

8 The latest data currently available are for 1996. An update is due later in 2000.

Figure 2.2 **Real GPI per person[a] and real GDP per person[b], 1950 to 1996**
1990 dollars



a GPI per person is weighted for changes in income distribution, using changes in the share of total income received by the bottom quintile of taxpayers. The divergence between GDP per person and GPI per person is more pronounced when the GPI is not weighted for changes in income distribution. **b** GDP in this figure is a different base year to figure 2.1.

Data source: Hamilton and Saddler (1997b, p. 52).

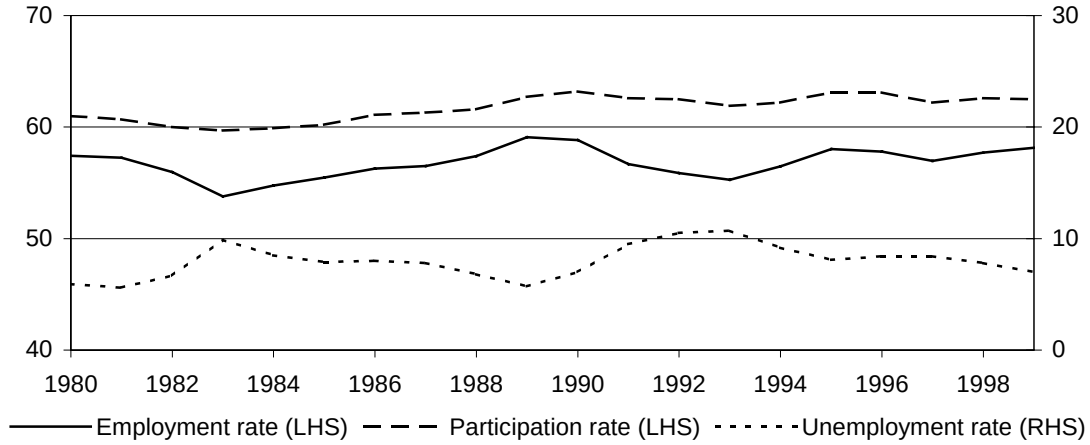
Other indicators

A number of other indicators of living standards, including working hours, health, housing and education, were examined for Australia and major OECD countries for which data were readily available (appendix A). Overall, these indicators mainly showed an improvement over the 1990s. However, in some cases, improvements in the 1990s were at a slower rate than in the 1980s.

The rates of employment and unemployment are important elements of the living standards of the community and, as noted above, should be included alongside any examination of the distribution of earnings. Figure 2.3 presents the rates of employment, unemployment and participation in the workforce over the 1980s and 1990s. Employment grew in both the 1980s and the 1990s, but at a faster rate in the 1980s. At the end of the 1990s, the ratio of employment to the population aged 15 years and over was just below that at the end of the 1980s. The unemployment rate trended downwards for most of the 1980s before rising in the early 1990s recession and then declining from the mid-1990s. The participation rate showed an upward trend within a relatively narrow range over most of the 1980s and 1990s.

Figure 2.3 **Employment, unemployment and participation rates[a], 1980 to 1999[b]**

Per cent



a The employment rate is the ratio of the number employed to the population aged 15 years and over. The unemployment rate is the ratio of the number unemployed to the number in the labour force (employed plus unemployed). The participation rate is the ratio of the labour force to the population aged 15 years and over. **b** August data.

Data source: ABS Labour Force Statistics database on EconData (accessed 12 July 2000).

Working hours has received recent attention. There are two sides to any change in working hours — increased hours may mean more income, but they also mean less leisure. Individual's preferences for additional income and additional leisure time are obviously important in weighing these two sides. But there is concern that, at least for some, increased hours of work may be coming at the cost of decreased quality of life. For an individual, the number of hours worked depends on the desired hours of work, opportunities to work those hours and lifestyle choices. But there is also a claim (see, for example, ACIRRT 1999) that people are directly or indirectly 'coerced' to work longer hours than they desire. However, Wooden (2000b) states that, based on 1995 data, the majority (about two-thirds) of those working 45 hours or more per week were happy with the hours they usually worked. There are further rounds of counter-claims and counter-arguments.

In Australia, average *standard* working hours for full-time workers were around 4 per cent less in 1996 than in 1980, with virtually all of this decline taking place in the 1980s. Average *actual* hours worked by full-time workers (including overtime and unpaid hours) rose by 1.9 per cent over the 1980s, but by 3.4 per cent over the

1990s.[9] Cross-country comparisons of hours worked by full-time workers are not readily available.[10]

Health is a relevant indicator of living standards but, because of the complexity of attendant issues, useful summary indicators are difficult to compile. For some aspects of health services, an increase in services cannot be judged in isolation as an improvement or a deterioration in living standards. One broad indicator of the health of the community is life expectancy — an increase in this measure is generally considered to represent an improvement in living standards. In Australia and major OECD countries, life expectancy has risen in both the 1980s and 1990s. Some other health indicators are presented in appendix A.

Participation in education affects the skill levels and career opportunities of the population. Increased participation is generally considered an indicator of improvements in living standards. In Australia, participation in school and higher education institutions increased considerably over the 1980s and 1990s. The percentage of the 15-19 year old population attending a school increased at a much faster rate in the 1980s than in the 1990s, reaching 50.8 per cent in 1999. Higher education students as a ratio to the 20-24 age group has almost doubled since 1981, reaching 50.4 per cent in 1999, with a slightly higher rate of increase in the 1990s than in the 1980s. Again, this reflects similar changes in major OECD countries.

Environmental quality is another important aspect of living standards, but it is multi-faceted and difficult to measure comprehensively. Data comparisons over time are not always readily available and the interpretation of changes in such indicators is not always clear. No attempt has been made to make an overall assessment of environmental change in this paper.

Intergenerational aspects

Changes in some of the indicators examined above have implications for future living standards as well as current living standards. Aspects of living standards, such as environmental quality, education and debt levels, can be said to have

[9] Results for working hours are sensitive to the choice of period, for example, the month chosen. These results are based on simple averages of the monthly observations for each financial year from the ABS Labour Force Statistics (database). The 1980s are calculated as 1979-80 to 1989-90 and the 1990s are 1989-90 to 1998-99.

[10] Total hours worked averaged across all workers has shown a declining trend in most major OECD countries over the period 1979 to 1998, except Sweden and the US. A slowing in the decline in average hours has also been evident in most major OECD countries, including Australia. The OECD (1998, p. 156) suggests that the contribution of an increase in the share of part-time workers to the decrease in average hours varies across countries.

intergenerational effects. Current impacts on environmental quality can potentially have an impact on future environmental quality. Participation in education can affect the skills of the workforce and the productiveness of the economy, as well as enhancing other aspects of community life. Debt incurred in the current period has to be serviced in the future but, if productively used, for example, for infrastructure, it can also improve the future operation of the economy.

Subjective measures

A range of other studies of living standards in Australia have concentrated on subjective measures or views and perceptions of living standards. For example, in 1999, the Australia Institute commissioned a survey of public opinion on whether the quality of life of people in Australia is getting better, worse or staying the same. This national survey of 1200 people found that only about a quarter of Australians thought life was getting better, over a third said it was getting worse and slightly more than a third thought it was staying the same (Eckersley 1999, p. ix). In 1996, the Middle Australia Project surveyed 400 'middle Australians' and found that 51 per cent of them thought that their quality of life was declining, 39 per cent thought it was improving and 10 per cent did not know (Pusey 1998, p. 185).

Hugh Mackay regularly takes 'soundings' of the perceptions of Australians about various aspects of life. Mackay (1999, p. 10) highlighted the sentiment that 'the economy might be in great shape, but my life isn't' and noted the contradictory sense that, for many Australians, life is getting better and worse.

Most recently, a Newspoll survey commissioned by *The Australian* newspaper asked respondents to think about the overall quality of life, taking account of social, economic and environmental conditions and trends, and found that 34 per cent of respondents thought life in Australia was getting worse, 34 per cent thought it was about the same and 31 per cent thought it was getting better (with 1 per cent uncommitted) (Steketee 2000). The survey also found there was a 70 per cent preference for reducing inequality instead of maximising economic growth (Kelly 2000).

2.3 Assessment

There has generally been an improvement in economic indicators in the 1980s and 1990s. On the basis of average income, the improvement has been more marked in the 1990s than the 1980s. Private consumption expenditure has also followed this pattern, together with house and car affordability. The Genuine Progress Indicator, an alternative composite indicator of living standards, also shows relatively better

performance in the 1990s than the 1980s, with a deterioration in the 1980s, but some improvement in the 1990s.

Income distribution became more unequal in the 1980s, on some measures, although it was relatively stable in the 1990s if redistribution through the welfare system is taken into account (see also chapter 5).

Other indicators, such as participation in education, also show an improvement in living standards. Participation in school and higher education rose in both the 1980s and 1990s, although only growth in participation in higher education continued at a higher rate in the 1990s than the 1980s.

However, not all indicators show an improvement in living standards. Average working hours of full-time workers increased in both the 1980s and 1990s, with a higher rate of increase in the 1990s. And some surveys of perceptions of quality of life in the 1990s have suggested that around a third of Australians thought the quality of life was getting worse.

It is difficult to definitively interpret the differences between general trends in economic indicators and some quality of life survey results. Generally, it is not known whether the source of the deterioration in the quality of life is related to economic factors, social trends or personal factors. However, it does mean that quality of life factors, outside of material wellbeing, are important to a sizeable proportion of the community.

The remainder of this paper focuses on average income and its distribution. While these are important indicators of trends in living standards, they are not the only relevant considerations.

3 Contributions to improvements in average income

This chapter examines the contributions of a number of factors to growth in income per person in Australia. The contributing factors include several of the indicators reviewed in the last chapter — employment, unemployment and hours of work. But a message from the last chapter — that average income has limitations as an indicator of living standards — should be borne in mind.

The previous chapter also pointed out that Australia was one of only a few OECD countries to experience faster growth in average incomes in the 1990s than in the 1980s. Stronger productivity growth has been an important contributor to the performance of the faster growing economies (OECD 2000a). The framework used in this chapter identifies the contribution of productivity growth, among other factors, to past growth in average income in Australia.

3.1 Phases of growth

Average income is measured in this chapter as gross domestic income (GDI) per person. GDI is derived by adjusting GDP for changes in the terms of trade. GDI therefore better reflects the purchasing power (over goods and services, including imports) of income generated from production in Australia. (GDI and GDP per person are compared in chapter 2.)

Figure 3.1 shows an actual and trend series for Australia's GDI per person. The trend series was formed with a Hodrick-Prescott filter and is used to help identify shifts in trends.

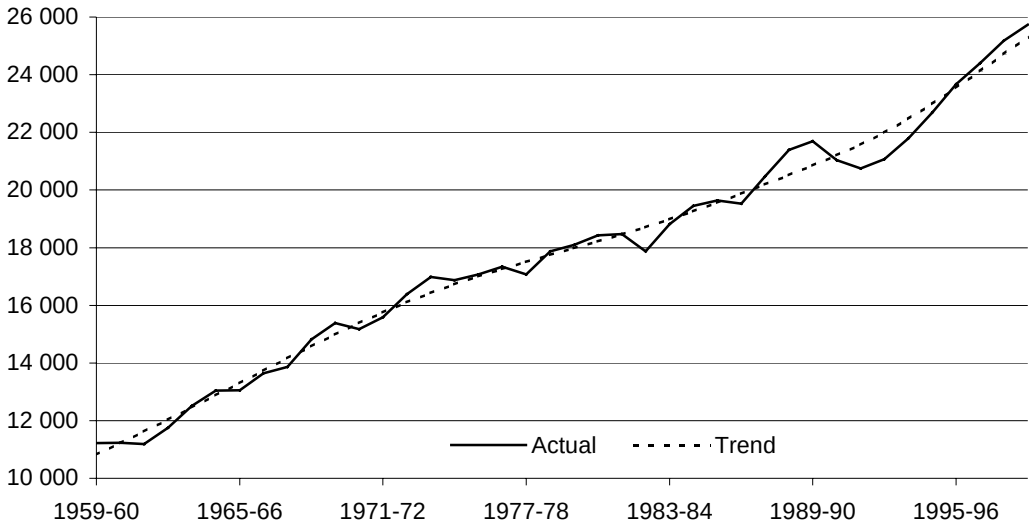
Three phases of growth in average income in Australia are identified for separate analysis:

- relatively rapid growth in the 1960s and up to 1973-74;
- a slowdown in growth between 1973-74 and 1990-91; and
- a return to more rapid and sustained growth between 1990-91 and 1998-99.

The selection of breakpoints between these phases is discussed in appendix B. The breakpoint at 1973-74 is clear cut. The breakpoint at 1990-91 is not as clear cut, but provides the best compromise, given the need to use actual data points for the decomposition. The use of 1990-91 slightly understates the underlying rate of growth in the 1973-74 to 1990-91 period and slightly overstates the underlying rate of growth in the 1990s (table 3.1).[1] It should be noted that, while 1990-91 was the trough of the recession, it was not a trough in the GDI per person series (figure 3.1).

A number of sub-periods are also examined separately in the next section.

Figure 3.1 **Real gross domestic income per person[a], 1959-60 to 1998-99**
1989-90 dollars



a The trend line is based on the Hodrick-Prescott filter.

Data source: PC estimates based on ABS data.

Table 3.1 **Average annual growth in real domestic income per person, selected periods**
Per cent per year

	Actual	*Trend*[a]
1959-60 to 1973-74	3.1	3.0
1964-65 to 1973-74	2.9	2.7
1973-74 to 1990-91	1.4	1.6
1990-91 to 1998-99	2.5	2.3

a The trend rate of growth is based on the Hodrick-Prescott filter (λ = 100).

Source: PC estimates based on ABS data.

[1] The weaknesses of the Hodrick-Prescott filter in identifying underlying trends should also be acknowledged. These weaknesses are stronger at the end points of series.

3.2 Contributions to growth in average incomes

Growth in real GDI per person can be decomposed into contributions from a range of demographic, labour market and production factors. The details of the decomposition are presented in appendix B. A non-technical guide is provided in box 3.1. The components of the decomposition and the results are presented in table 3.2 and the major contributors are displayed in figure 3.2.

Box 3.1 **The decomposition of growth in average income**

The growth in gross domestic income (GDI) per person can be decomposed into contributions from a range of demographic, labour market and production factors. The derivation of the framework used is set out in appendix B.

A non-technical explanation is as follows.

- Growth in GDI per person is equal to growth in GDP per person, adjusted for changes in the terms of trade.
- Growth in GDP per hour can be derived from growth in GDP per person, adjusted for changes in:
  - the proportion of the population of working age ('demographic profile');
  - the rate of participation in the labour force;
  - the unemployment rate; and
  - the average hours worked per person employed.
- Growth in output per hour (or labour productivity) for the market sector can be derived from growth in GDP per hour for the economy as a whole, if adjustments are made for changes in:
  - the ratio of output in the whole economy to output in the market sector; and
  - the ratio of hours worked in the whole economy to hours worked in the market sector.
- The hours worked ratio enters with the opposite (negative) sign to the output ratio because it is the denominator of output per hour.
- Labour productivity in the market sector can be further decomposed into:
  - a capital deepening component, reflecting changes in the ratio of capital to labour (or the additional capacity for an hour of labour to produce more output because there is more capital on average to work with); and
  - growth in multifactor productivity (reflecting the additional output produced per unit of combined labour and capital).

Table 3.2 **Decomposition of growth in real gross domestic income per person, 1964-65 to 1998-99**

	1964-65 to 1973-74		*1973-74 to 1990-91*		*1990-91 to 1998-99*		*1964-65 to 1998-99*	
	%pa	%	%pa	%	%pa	%	%pa	%
Sum of:								
Capital deepening[a]	1.4	(47)	1.4	(93)	1.4	(57)	1.4	(66)
Multifactor productivity	1.4	(46)	0.6	(37)	1.5	(63)	1.0	(47)
equals:								
Market sector labour productivity growth	**2.8**	**(94)**	**1.8**	**(129)**	**2.9**	**(120)**	**2.3**	**(114)**
plus:								
Economywide/market sector output	0.2	(5)	0.5	(35)	0.2	(7)	0.3	(16)
Economywide/market sector hours worked (*negative of*)	-0.2	(-7)	-0.7	(-45)	-0.7	(-28)	-0.6	(-26)
equals:								
Growth in GDP per hour	**2.7**	**(92)**	**1.7**	**(118)**	**2.4**	**(98)**	**2.1**	**(103)**
plus:								
Demographic profile	0.3	(10)	0.3	(20)	-0.1	(-4)	0.2	(10)
Participation rate	0.7	(22)	0.4	(24)	0.3	(14)	0.4	(20)
Unemployment[b]	-0.3	(-9)	-0.2	(-17)	-0.3	(-11)	-0.3	(-12)
Average hours	-0.6	(-20)	-0.5	(-34)	0.2	(8)	-0.4	(-17)
equals:								
Growth in GDP per person	**2.8**	**(96)**	**1.6**	**(111)**	**2.6**	**(105)**	**2.1**	**(104)**
plus:								
Terms of trade[c]	0.2	(5)	-0.2	(-13)	-0.1	(-5)	-0.1	(-4)
equals:								
Growth in GDI per person	**2.9**	**(100)**	**1.4**	**(100)**	**2.5**	**(100)**	**2.1**	**(100)**

[a] Capital deepening is the growth in the capital-labour ratio multiplied by capital's share of income. [b] This is not the unemployment rate. It is actually (1 – the unemployment rate). Therefore a negative number implies an increase in unemployment. [c] The growth in the terms of trade is multiplied by the import share of domestic consumption.

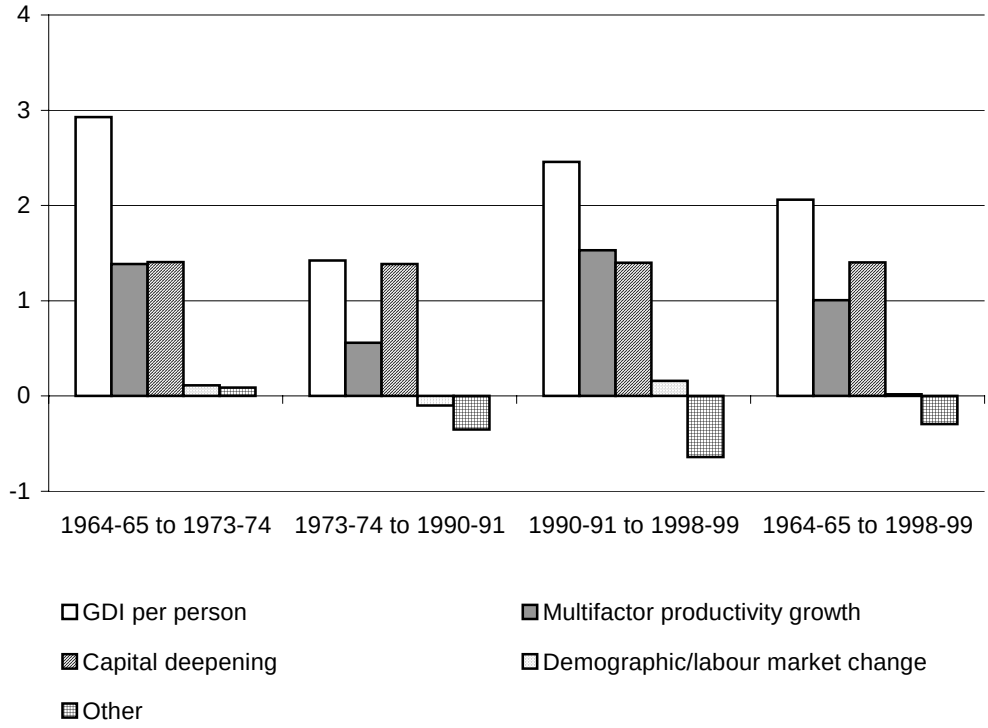
Source: PC estimates based on ABS data.

A feature of the results is that there is, generally, little difference in growth rates between the main steps in the decomposition, which are displayed in bold. The terms of trade adjustment is relatively small, so that growth in GDI per person closely follows GDP per person. The demographic and labour market changes, though individually important in different periods, collectively have tended to offset each other within the same period, resulting in a relatively small net effect. Growth in GDP per person therefore closely follows growth in GDP per hour. Finally, the adjustment to get from economywide GDP per hour to market sector output per hour (by adjusting for changes in the relative size of outputs and relative

magnitudes of hours worked) is again minor, except for the 1990s period. Apart from the 1990s, growth in economywide GDP per hour closely follows market sector labour productivity.

Figure 3.2 **Contributions to growth in real gross domestic income per person, various periods**

Per cent per year



Data source: Table 3.2.

Overall, therefore, growth in market sector labour productivity is a reasonably close approximation to growth in GDI per person and GDP per person, particularly over the long run (for example, 1964-65 to 1998-99). But it does not hold as closely in the sub-periods.[2]

The results in table 3.2 show that the main contributors to growth in GDI per person have been capital deepening and growth in multifactor productivity (MFP) (see also figure 3.2). Capital deepening raises labour productivity because it means that each

[2] As noted, the economywide to market sector adjustment is more prominent in the 1990s. Both hours worked and output grew faster in the economy as a whole than in the market sector, but the hours worked relativity increased more than the output relativity. As shown in appendix B, virtually all activity outside of the market sector made some contribution to the divergence. But the rapid growth in Property and business services makes a particularly strong contribution. The ABS does not consider the output of this and other non-market industries to be sufficiently well measured to include these industries in productivity calculations.

unit of labour (an hour of work) has more capital to work with and thereby produces more output. For example, a scientist or design engineer can achieve more in an hour of work when given access to a more powerful computer. Increasing the capital-to-labour ratio raises labour productivity. MFP growth raises labour productivity because it means that, especially through new technologies, labour and capital inputs can combine in ways that generate more output. When this happens, there is also an increase in the ratio of output produced to labour used.

The trends in capital deepening and MFP are displayed in figure 3.3.

Of the two major factors, capital deepening has been the more important overall, accounting for two-thirds of the growth in average income since the mid-1960s.[3] However, capital deepening was a constant growth factor across the periods. There was little variation in its average rate of growth and contribution to average GDI growth over the three periods.

Multifactor productivity growth accounted for about half the growth in average income over the entire period. But it is the major change factor that has varied in concert with both GDP per person and GDI per person. The correlation between growth in GDI per person and MFP growth is not perfect over the three periods. But the correlation with MFP growth is stronger than with the other factors. When MFP growth was lower in the 1970s and 1980s, so was growth in GDP and GDI per person. In the other two periods, growth in MFP, GDP per person and GDI per person were all higher (figure 3.2).

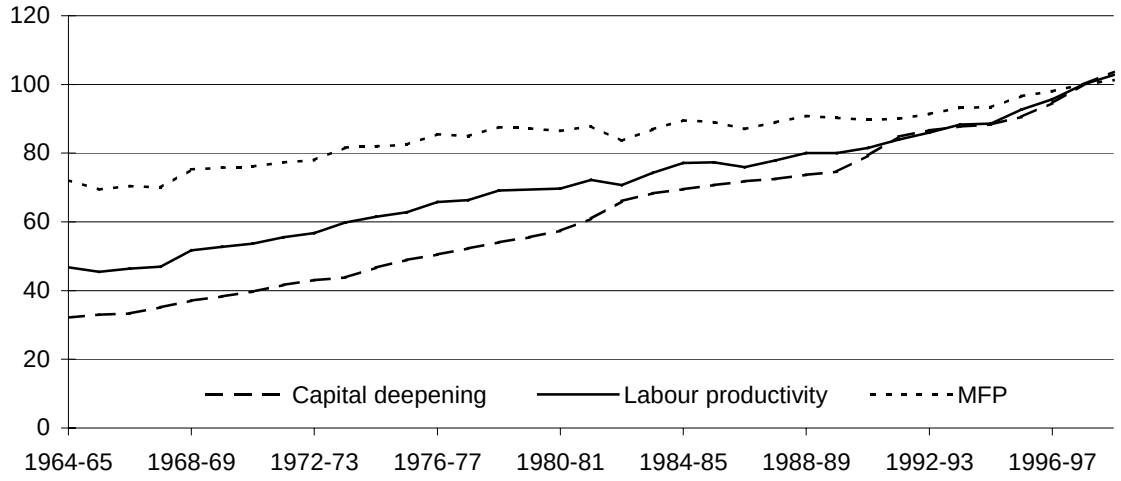
Multifactor productivity growth was the main factor underlying the return to rapid growth in the 1990s (even despite the greater dichotomy in output and hours between the market sector and the whole economy). MFP growth accounted for roughly two-thirds of the growth in average income in the 1990s, slightly ahead of the contribution attributable to capital deepening (table 3.2).

The contributions to the acceleration in average incomes can be gauged by subtracting the 1990s growth rates from the growth rates in the earlier period. Thus, the acceleration in average income in the 1990s was 1.1 per cent a year (2.5 less 1.4). There was no difference in capital deepening between the periods, but MFP growth contributed 0.9 of a percentage point — over 90 per cent of the average income acceleration.

[3] Capital deepening accounts for a larger part of the variation in GDI per person in this study than in IC (1997a). This is due to the introduction of a new ABS measure for capital input (capital services), which increases the rate of capital growth and therefore capital deepening over time.

Figure 3.3 **Labour productivity, capital deepening[a] and MFP in the market sector, 1964-65 to 1998-99**

Indexes 1997-98 = 100



a Capital deepening is the growth in the capital-labour ratio multiplied by the capital share of income.

Data source: ABS (*Australian System of National Accounts*, Cat. no. 5204.0; unpublished data).

Sub-periods through the 1970s, 1980s and 1990s

Shorter periods over the 1970s, 1980s and 1990s are examined in table 3.3 and figure 3.4. The purpose of examining these periods is to more clearly distinguish the influence of different contributing factors at different times to growth in GDI per person, rather than to suggest that these periods represent trend or underlying growth rates in average income.

Table 3.3 **Contributions to growth in real domestic income per person, various periods**

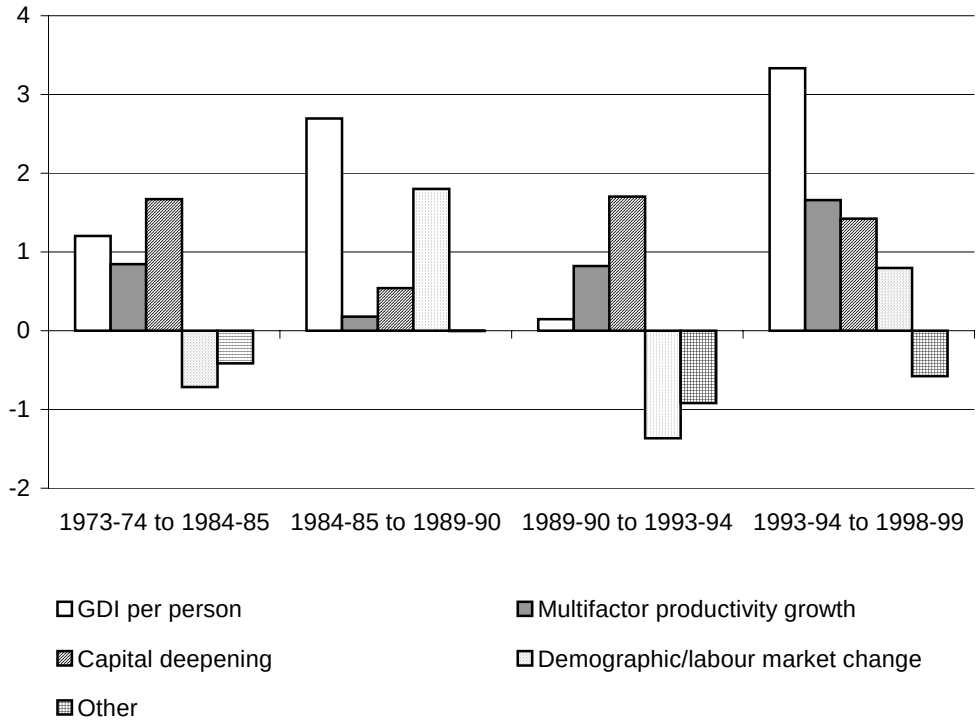
	1973-74 to 1984-85		*1984-85 to 1989-90*		*1989-90 to 1993-94*[d]	*1993-94 to 1998-99*	
	%pa	%	%pa	%	%pa	%pa	%
Sum of:							
Capital deepening[a]	1.7	(121)	0.5	(22)	1.7	1.4	(43)
Multifactor productivity	0.8	(61)	0.2	(7)	0.8	1.7	(50)
equals:							
Market sector labour productivity growth	**2.3**	**(195)**	**0.7**	**(27)**	**2.5**	**3.1**	**(93)**
plus:							
Economywide/market sector output	0.7	(53)	0.0	(0)	0.6	0.0	(0)
Economywide/market sector hours worked (*negative of*)	-0.9	(-62)	-0.1	(-5)	-0.9	-0.7	(-20)
equals:							
Growth in GDP per hour	**2.2**	**(184)**	**0.6**	**(22)**	**2.2**	**2.3**	**(70)**
plus:							
Demographic profile	0.4	(27)	0.2	(9)	-0.1	-0.1	(-2)
Participation rate	0.1	(8)	1.2	(48)	-0.2	0.4	(13)
Unemployment[b]	-0.7	(-53)	0.5	(21)	-1.2	0.7	(22)
Average hours	-0.5	(-33)	-0.2	(-7)	0.1	-0.3	(-9)
equals:							
Growth in GDP per person	**1.5**	**(123)**	**2.4**	**(89)**	**0.8**	**3.2**	**(95)**
plus:							
Terms of trade[c]	-0.3	(-21)	0.1	(6)	-0.6	0.1	(3)
Growth in GDI per person	**1.2**	**(100)**	**2.7**	**(100)**	**0.1**	**3.3**	**(100)**

a Capital deepening is the growth in the capital-labour ratio multiplied by capital's share of income. **b** This is not the unemployment rate. It is actually (1 – the unemployment rate). Therefore a negative number implies an increase in unemployment. **c** The growth in the terms of trade is multiplied by the import share of domestic consumption. **d** Percentage contributions are not included for this period. Because growth in GDI per person is so low, percentage contributions do not give meaningful indications.

Source: PC estimates based on ABS data.

Figure 3.4 **Contributions of major factors to average income growth, various periods**

Per cent per year



Data source: Table 3.3.

The shorter periods selected are:

- 1973-74 to 1984-85 (the slower output growth years);
- 1984-85 to 1989-90[4] (a growth acceleration accompanied by expansion in employment);
- 1989-90 to 1993-94 (a period primarily of recession and recovery); and
- 1993-94 to 1998-99 (a period of record productivity growth).

Figure 3.1 shows that while the underlying trend for the period 1973-74 to 1984-85 is similar to actual GDI per person, the underlying trend is not the same for the other three periods. For the periods 1984-85 to 1989-90 and 1993-94 to 1998-99, the actual rate of growth slightly overstates the trend rate of growth in GDI per head. For the period 1989-90 to 1993-94, the actual rate of growth understates the underlying rate of growth in average income.

4 1989-90 was used as an end point, rather than 1990-91, because 1989-90 was the end point of the employment expansion.

Accordingly, the decomposition in table 3.3 shows much greater short-term variation in growth in GDI per person and in contributions from the listed factors. The contributions of demographic and labour market factors are more prominent.

In the two periods of weak growth in GDI per person — 1973-74 to 1984-85 and 1989-90 to 1993-94 — growth in unemployment was a major detractor. Capital deepening was slightly above historical trends, but largely due to loss of employment of labour, rather than above average growth in capital. MFP growth was only moderate.

The two high-growth periods — 1984-85 to 1989-90 and 1993-94 to 1998-99 — had very different contributing factors.

In the latter part of the 1980s, the contribution of labour market factors was strong and positive. Strong employment expansion absorbed increases in labour market participation and some unemployment. As will be discussed further in the next chapter, this was a period when real wage moderation under the prices and incomes Accords assisted employment growth. Capital deepening and MFP growth were both very low through this period and made relatively small contributions.

The period after 1993-94 showed very high growth in GDI per person at 3.3 per cent a year.[5] This high growth after 1993-94 came from an unusual combination of strong contributions from all major factors — labour market (increased participation and lower unemployment), capital deepening at its long-term rate, and MFP growth at a record rate. MFP growth was the major contributor.

3.3 Assessment

There are two important qualifications. First, the framework provides an 'accounting' decomposition of contributions to growth in average income. It does not capture causal links between variables. For example, the framework does not attribute to multifactor productivity growth any influence that it has on the rate of investment and therefore the rate of capital deepening. Similarly, it does not take account of the influence that changes in employment have on the rate of capital deepening.

Second, the decomposition of average income has not allowed for one important factor — the proportion of income generated in Australia that goes to foreigners

[5] The high rate of growth of 3.3 per cent a year also adds to confidence that using the recession year of 1990-91 as a breakpoint for the 1990s analysis does not exaggerate the impression of average income growth in the 1990s. Average annual growth from 1990-91 was 2.5 per cent.

(and, equally, the income derived by Australians from abroad). Substantial shifts in overseas income flows would obviously affect the growth in average income available to Australians. This issue is examined in chapter 5.

With these qualifications in mind, the decomposition shows the importance of capital deepening and MFP growth to average income growth over the long term. Capital deepening has tended to be a constant contributor, whereas MFP growth has been more variable, along with average income.

The long-term perspective tends to mask the importance of labour market factors in a number of shorter periods. Increases in employment and unemployment also have had a strong influence on average income growth at various times.

MFP growth has been particularly important in contributing to average income growth in the 1990s. MFP also accounted for about 90 per cent of the acceleration in average income growth in the 1990s, compared with its contribution in the 1970s and 1980s.

The period since 1993-94 shows very high growth in average income, with a combination of contributions from record productivity growth, capital deepening at its long-term rate and strong, positive labour market contributions, particularly through lower unemployment.

4 Productivity and the distribution of labour and capital income

Chapter 3 showed that productivity growth has been a major factor underpinning growth in average income in Australia over the long term; and that a productivity surge has been a particularly important source of income growth in the 1990s. But what about the distribution of income? What do variations in productivity growth mean for the distribution of income? How have the gains from the 1990s productivity surge been distributed?

This chapter addresses these questions, but only in partial fashion. The focus is on income distribution at a very broad level — namely, between labour and capital income. Effects on wage dispersion, for example, are not considered here (see chapter 5 for further discussion).

The analysis of income distribution in this chapter concentrates on three features.

1. The shares of total income distributed to labour and to capital.
   - Changes in factor income shares over the 1990s would indicate an uneven distribution of income gains.
2. The rate of wage and salary payments to labour and the rate of profit earned by capital.
   - Increases in rates of pay and profit would indicate the extent to which those engaged in market activities share in income growth.
3. Rates of employment and unemployment.
   - These factors indicate the extent to which the working-age population receives income through earnings from work (as well as enjoys non-economic dimensions of living standards, such as a sense of inclusion and economic participation in community life).

These three features are related. The magnitude of labour income, for example, depends on the rate at which labour is paid and the rate at which labour is employed.

The next three sections deal with each of the three features in turn. A fourth section presents a sectoral perspective on the distribution of productivity gains.

4.1 Factor income shares

This section focuses on labour and capital shares of total income. The ABS measures labour income as total payments to labour (total wages, salaries and supplements[1]). Capital income is measured as gross operating surplus[2] (income before depreciation, interest and taxes). Total factor income is the sum of labour income and capital income. Aside from statistical discrepancies, total factor income equals GDP, less indirect taxes and subsidies on Australian production and imports.

Concepts of income and cost are used interchangeably in this chapter. Payments to labour and capital are a cost of production, but also a source of income to wage and salary earners and owners of capital.

The labour income share — payments to labour as a proportion of total factor income — provides a convenient measure to track the factor distribution of income. While it indicates the extent to which labour shares in income growth, movements in the capital share can be taken to be equal (but opposite) to movements in the labour share.

Values of the labour income share since the mid-1960s are presented in figure 4.1. More attention should be paid to movements in the labour income share, than to its levels. The general level may seem too low to many readers. The low level is explained by the inclusion of the 'mixed income' of unincorporated enterprises in capital income.[3] Some mixed income is more appropriately considered as labour income — compensation for the labour input of owners/partners. But the degree of understatement of the labour income share is likely to be stable, and to have little bearing on *trends* in the labour income share. (A correcting adjustment is made below, when the field of view shifts from the whole economy to the market sector.[4])

1 More precisely, payments to labour are measured as the total compensation to labour in the form of wages, salaries and supplements, plus employers' social contributions, for example, workers' compensation premiums.

2 Published data on gross operating surplus also includes gross mixed income of unincorporated enterprises (owner-operator businesses). Gross mixed income includes both a labour compensation element (returns on labour input) and capital element (operating surplus on capital inputs). Mixed income is apportioned to labour and capital components in the market sector analysis reported below, but not for the total economy.

3 See footnote 2.

4 A comparison of labour income shares in the market sector with and without the allocation of mixed income supports the view that allocation makes little difference to the estimation of trends in the labour income share. There are some differences relating to the mid-1970s to the early 1980s, but little difference for the 1990s.

Figure 4.1 shows that the labour income share was stable from the late 1980s and through the 1990s. It also shows that the annual rate of growth in total income was consistently strong, once through the early 1990s recession.

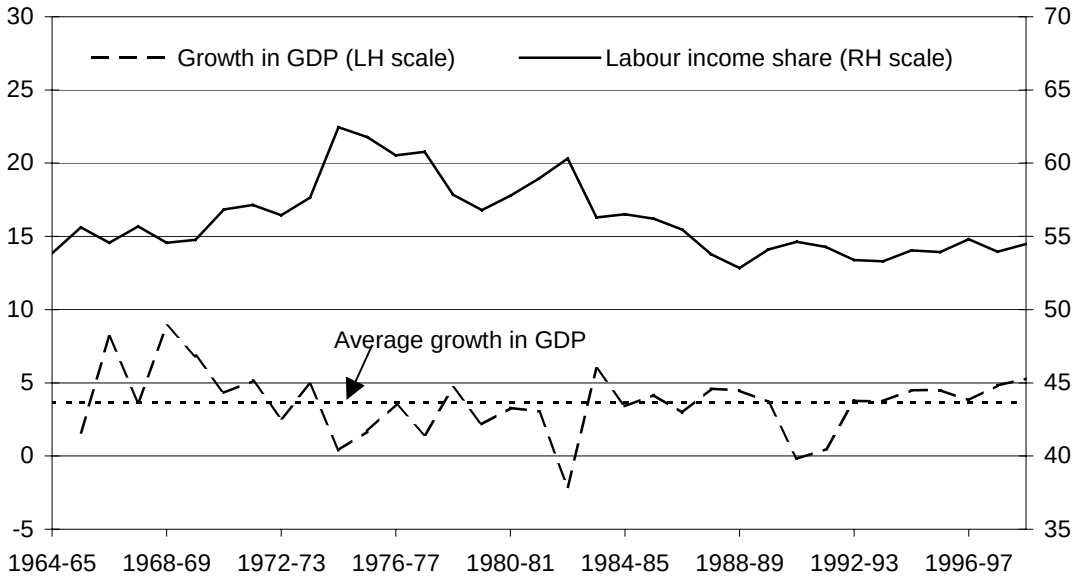
The stability in the labour income share through the 1990s means that labour and capital shared proportionately in the strong income growth of the 1990s.

The earlier history shows that stable income shares are not a constant feature. Figure 4.1 shows that the labour income share rose sharply in the mid-1970s and then declined gradually — albeit with some volatility — before stabilising in the late 1980s. The elevated labour income share was associated with generally lower and more volatile income growth. (The movements in the labour income share in the 1970s and 1980s are examined and explained in the next two sections.)

On the other hand, the 1960s experience was similar to the 1990s experience. The labour income share was relatively stable and income growth was high. The level of the labour income share is slightly lower in the 1990s than in the 1960s. At first glance, this would indicate that production has become more capital intensive. On the other hand, if unincorporated businesses have become more prominent in the economy — which is likely, for example, with the growth in services over a 30 year horizon — it could merely reflect an increase in the proportion of labour income 'mixed' in with capital income.

Figure 4.1 **Labour income share and annual growth in GDP[a] in the total economy, 1964-65 to 1998-99**

Per cent



a GDP is measured at factor cost. The average growth rate is a simple average for the period 1964-65 to 1998-99.

Data source: PC estimates based on ABS data.

4.2 Productivity and rates of pay and profit[5]

Changes in the rates of payment to labour and capital are one source of change in total payments to factors. They are also of interest in indicating whether, for example, those already in employment share in income gains through the payment of higher wages and salaries.

The labour income share (LIS) can be transformed mathematically in a way that explicitly identifies the rate of payment to labour. It also introduces an explicit link to productivity. The transformation shows that the labour income share comprises a real hourly average rate of pay component and a labour productivity component (box 4.1).

The average rate of pay is measured in real terms as the average hourly rate of payment to labour, deflated by an index of producer prices.[6] It is the real cost of payments to labour, from a producer cost point of view, and is referred to as the 'real product wage' (RPW). The real product wage differs from the commonly-used real average wage, based on a consumption price deflator (the CPI). The latter form of real wage — termed the real consumption wage in this paper — is examined later in this section.

Labour productivity (LP) is the ratio of real value added (computed with the same index of producer prices) to hours worked.

The essential feature of the transformation is that it shows that growth in the labour income share is equal to growth in the real product wage, less growth in labour productivity. That is,

$$(1) \qquad \dot{LIS} = \dot{RPW} - \dot{LP}$$

where a dot over the variable signifies a proportional rate of growth in that variable.

The equation shows that an increase in the real product wage will raise the labour income share, if it is not accompanied by an equal increase in labour productivity.[7]

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5 Whilst there are some differences, the inspiration for the decomposition of the labour income share comes from Bosworth and Perry (1994).

6 More fully, the real product wage is the total compensation to employees (wages, salaries and supplements, plus employer social contributions), divided by total hours worked, and deflated by an output price deflator. The GDP deflator is used for the whole economy and, as stated later in the text, a price deflator was constructed for use with market sector data.

7 The decomposition of the labour income share bears similarities to 'unit labour cost' assessments. Unit labour cost calculations typically compare *nominal* wage movements with labour productivity movements. However, the decomposition of the labour income share presented here compares *real* wage movements with labour productivity movements.

Or, to put it another way, an increase in labour productivity enables the real product wage to increase without raising the labour income share.

It is possible to perform the same transformation of the capital income share to identify a 'real profitability' component and a 'capital productivity' or output-capital component (box 4.1). The 'real profitability' measure is the ratio of real capital income to net capital stock, where a product price deflator is used to calculate the real value of payments to capital. This is consistent with viewing payments to capital as a production cost to producers.[8] In this sense, it can be interpreted as the real cost of a unit of capital.

Real profitability differs conceptually from a conventional 'rate of profit', which is measured in current prices as the ratio of gross operating surplus to net capital stock — the dollars received from the dollars invested.[9] It is the rate of profit as viewed by the owners of capital. Because this latter profit measure is more conventional and readily understood, it is also reported.

As with the labour side, there is a relationship between the capital income share (KIS), real profitability (RP) and the output-capital ratio (OK). In proportional rate of growth terms:

$$(2) \qquad \dot{KIS} = \dot{RP} - \dot{OK}$$

Implementation of the decomposition of factor income shares

The decomposition of the factor income shares is implemented at two levels — economywide and market sector. Implementation at the market sector level takes advantage of better defined productivity measures at that level. The market sector represents about 60 per cent of the total economy and excludes areas such as public administration and defence, which lack the well-defined output measures needed for productivity calculations.

However, the market sector implementation is made difficult by the absence of a market sector output price deflator needed to calculate a market sector real product wage and real profitability. The ABS constructs a real output measure for the market sector from real output estimates of constituent industries. It does not deflate a current price estimate of market sector output.

---

8 Another way of expressing the decomposition of both the labour and capital shares is that, from the producer's cost point of view, the factor cost shares are a function of the real rate of payment to factors (measured in terms of prices received for output) and the factor intensity of production.

9 Strictly, the rate of profit would be the dollars received this period from the dollars invested at the start of the period.

Box 4.1 **Decomposition of factor income shares**

The labour income share is the ratio of labour compensation to total factor income. A series of modifications to this ratio separately identifies a real wage component and a productivity component.

$$\text{Labour income share} = \frac{\text{Labour compensation}}{\text{Total income (= total output)}}$$

$$= \frac{\text{Labour compensation}}{\text{Hours worked}} \times \frac{\text{Output price index}}{\text{Output price index}} \times \frac{\text{Hours worked}}{\text{Total output}}$$

$$= \frac{\text{Average hourly labour compensation}}{\text{Output price index}} \div \text{Labour productivity}$$

$$= \text{Real product wage} \div \text{Labour productivity}$$

Similarly, the capital income share can be decomposed in order to separately identify a profit component and a productivity component.

$$\text{Capital income share} = \frac{\text{Gross operating surplus (GOS)}}{\text{Total income (= total output)}}$$

$$= \frac{\text{GOS}}{\text{Capital stock}} \times \frac{\text{Output price index}}{\text{Output price index}} \times \frac{\text{Capital stock}}{\text{Total output}}$$

$$= \text{Real profitability} \div \text{Output-capital ratio}$$

A price deflator was constructed for this paper by taking a weighted average of the implicit price deflators for individual industry sectors (for example, manufacturing and mining) within the market sector (appendix C). It is acknowledged that the constructed price deflator is a potential source of approximation error in the decomposition.

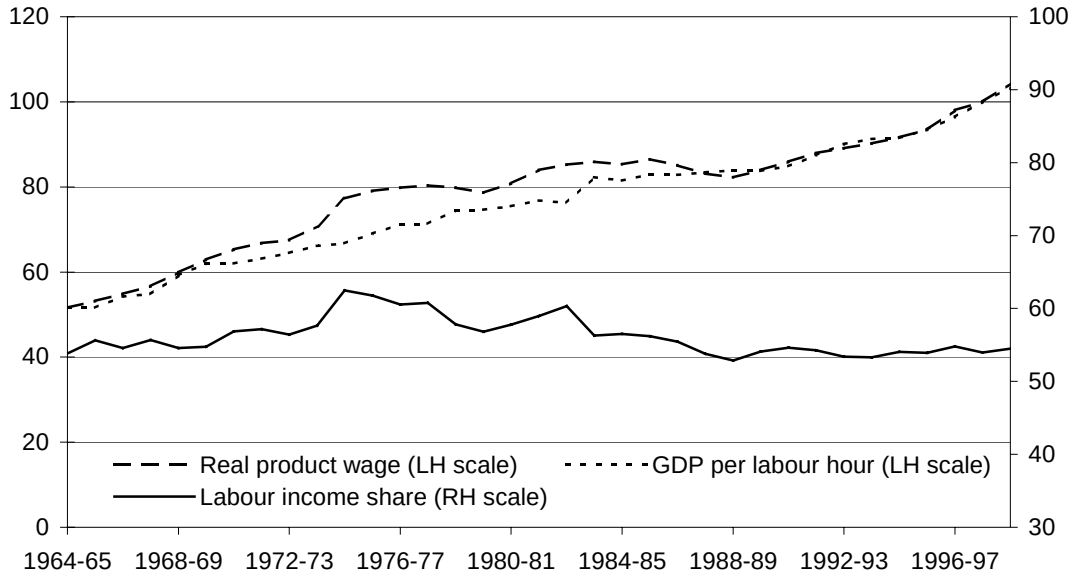
The market sector decomposition was implemented on the basis of market prices (that is, with indirect taxes and subsidies allocated to labour and capital) rather than at factor cost. This was designed to replicate published ABS productivity measures, which use market prices.

Figure 4.2 shows the labour income share, the real product wage and GDP per labour hour (a broadly defined measure of labour productivity[10]) for the whole economy. Figure 4.3 shows the equivalent variables for the market sector.

10 Strictly, labour productivity is only well-defined for the market sector. Consequently, labour productivity for the whole economy is referred to as GDP per labour hour.

Figure 4.2 **Economywide labour income share, real product wage and GDP per labour hour, 1964-65 to 1998-99**

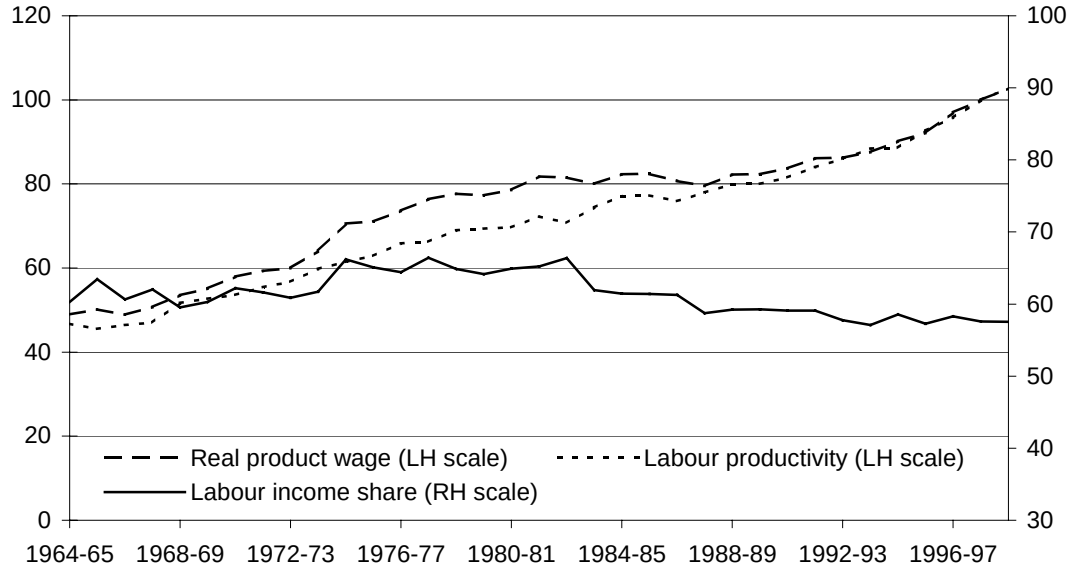
Index 1997-98 = 100 (LHS) and per cent (RHS)



Data source: PC estimates based on ABS data.

Figure 4.3 **Market sector labour income share, real product wage and labour productivity, 1964-65 to 1998-99**

Index 1997-98 = 100 (LHS) and per cent (RHS)



Data source: PC estimates based on ABS data.

The labour income share for the market sector follows a broadly similar pattern to the labour income share for the whole economy over the entire period.[11] However, there was a slight decline in the market sector labour income share over the 1990s of 0.3 per cent a year (table 4.1).

This indicates that market sector production became slightly more capital intensive over the 1990s. But the absence of change in the labour share for the economy as a whole over the 1990s implies that there was an offsetting expansion, favouring labour, in the non-market sector. This has not been investigated because data on factor income shares in industries outside of the market sector were not obtained for this study. However, the growth in employment in Property and business services (appendix B) is a possible candidate.

Growth rates in the decomposition variables over three major periods since the 1960s are shown in table 4.1. On the labour side and following equation (1), line 1 is equal to line 2 minus line 3 (aside from rounding errors) and, on the capital side and following equation (2), line 4 is equal to line 5 minus line 6.

Table 4.1 **Annual average growth in factor income shares and their decomposition, major periods, 1964-65 to 1998-99**

Per cent per year

	1964-65 to 1973-74		*1973-74 to 1990-91*		*1990-91 to 1998-99*	
	Economy	*Market sector*	*Economy*	*Market sector*	*Economy*	*Market sector*
Payments to labour						
1. Labour income share	0.8	0.3	-0.3	-0.3	0.0	-0.3
2. Real product wage	3.6	3.0	1.2	1.6	2.5	2.6
3. Output per labour hour[a]	2.8	2.8	1.5	1.8	2.5	2.9
Payments to capital						
4. Capital income share	-1.0	-0.4	0.4	0.4	0.0	0.5
5. Real profitability	-1.9	-1.4	-0.5	-0.5	1.2	1.7
6. Output per unit of capital	-0.9	-1.0	-0.9	-0.8	1.2	1.3
7. Rate of profit	-2.8	-2.6	-0.2	-0.8	1.2	1.7

[a] Output per labour hour is equal to GDP per labour hour for the economy as a whole and 'true' labour productivity for the market sector.

Source: PC estimates.

11 There is a difference in levels of the labour income share between figure 4.2 (total economy) and figure 4.3 (market sector). For example, the labour share in the 1990s is in the range 53.3 to 54.6 per cent in figure 4.2 and in the range 57.1 to 59.1 per cent in figure 4.3. A large part of the difference is due to adjustments made for mixed-income in unincorporated businesses (see footnote 2). Mixed income has been allocated to labour and capital for the market sector analysis, but not for the total economy analysis.

The decomposition shows that, while the labour income share was comparatively stable in the 1990s, the real hourly rate of payment to labour (the real product wage) showed strong growth. Figures 4.2 and 4.3 indicate that this was especially so, from the mid-1990s.

The key feature of the 1990s was that labour productivity growth was high and matched the growth in the real product wage. Table 4.1 shows that labour productivity and the real product wage in the economy both rose at around 2.5 per cent a year. Because their growth rates matched, the labour income share did not rise. However, labour productivity grew faster than the real product wage in the market sector, consistent with the modest decline in the labour income share.

Similarly, while the capital income share was stable in the 1990s, profitability showed historically strong positive growth (figures 4.4 and 4.5 and table 4.1). In analogous fashion to the labour side, an increase in the ratio of output to capital matched the increase in profitability so that there was no change in the capital income share. Real profitability (and the rate of profit) grew at over 1 per cent a year in the 1990s, compared with declines in previous periods.[12] In terms of levels, the rate of profit increased over the 1990s from 14.3 to 15.8 per cent in the economy and from 16.0 to 18.4 per cent in the market sector.

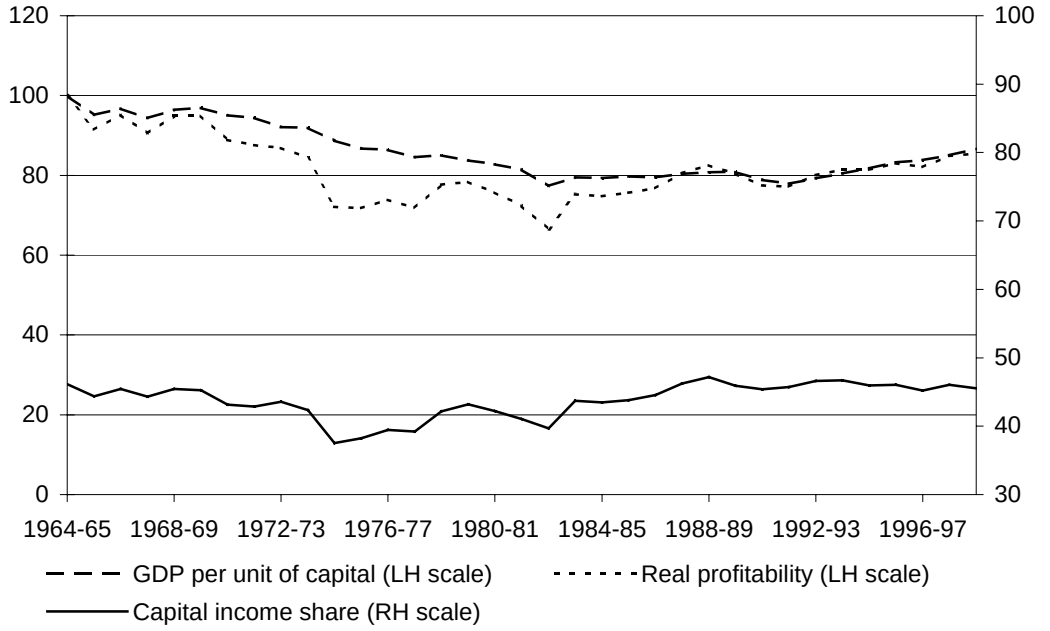
Figures 4.2 and 4.3 also reveal the sources of the increase in the labour income share in the mid-1970s — faster growth in the real product wage than in labour productivity. The gap between real wage and productivity growth was referred to at the time as the 'real wage overhang'.

The labour income share gradually declined thereafter as further growth in the real wage moderated (although there was a further rise in the early 1980s), and growth in labour productivity picked up. (The factors underlying the labour productivity growth and the decline in the labour income share over this period are examined more closely in the next section.)

[12] Growth in real profitability and growth in the rate of profit diverge when growth in capital prices and producer prices diverge. The divergence between the two measures shown in table 4.1 implies that, in earlier periods, capital prices increased faster than producer prices.

Figure 4.4 **Economywide capital income share, real profitability and GDP per unit of capital, 1964-65 to 1998-99**

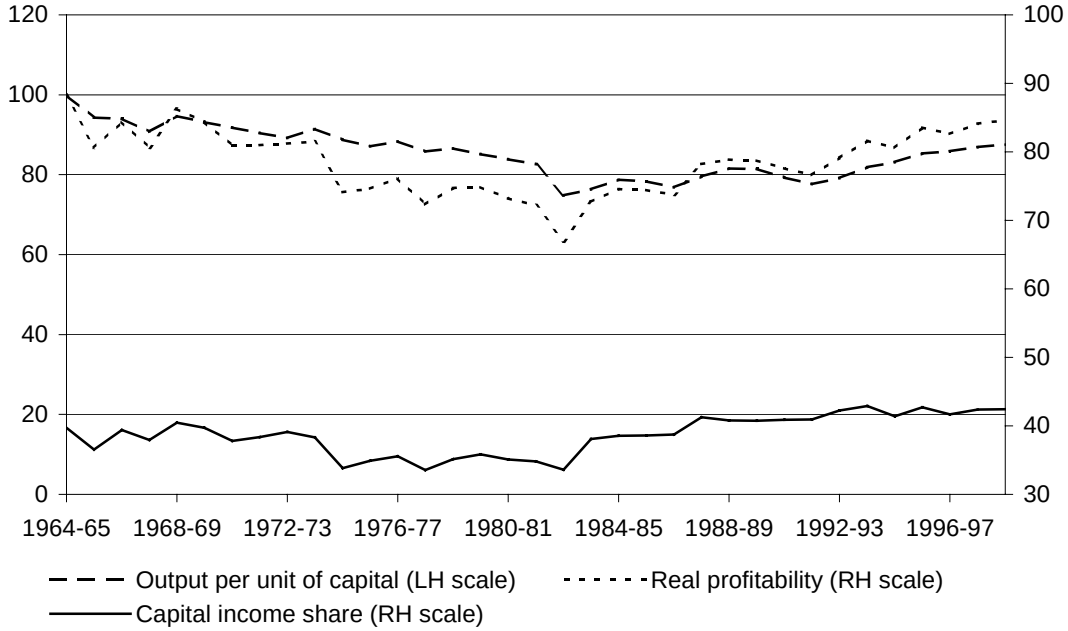
Index 1964-65 = 100 (LHS) and per cent (RHS)



Data source: PC estimates based on ABS data.

Figure 4.5 **Market sector capital income share, real profitability and output per unit of capital, 1964-65 to 1998-99**

Index 1964-65 = 100 (LHS) and per cent (RHS)



Data source: PC estimates based on ABS data.

Again, the 1960s experience was similar to the 1990s experience. Underlying the stable labour income share, there was strong real wage growth, accompanied by strong labour productivity growth.

Payments to labour as income

The above decomposition of the labour income share reflects a treatment of payments to labour as a production cost. The critical feature is the use of producer prices to deflate the nominal average hourly rate of payment to labour in constructing the real product wage.

However, in thinking of the real value of payments to labour as a source of earned income for those employed, consumption prices, rather than producer prices, are more relevant. As box 4.2 explains, the real product wage can be decomposed into the more familiar form of average real wage (hourly compensation deflated by an index of consumer prices — termed 'the real consumption wage'), multiplied by the ratio of consumer to producer prices (termed 'the labour terms of trade'). The real consumption wage gives a better indication of the command over consumption of goods and services that payments to labour provide.

Box 4.2 The real consumption wage

A consumption price deflator, such as the CPI, is very often used to calculate a real wage measure. This reflects a view of wages and salaries as a source of income to those employed.

The real 'consumption' wage can be derived from the real product wage (see box 4.1) as follows:

$$\text{Real product wage} = \frac{\text{Average hourly labour compensation}}{\text{Output price index}}$$

$$= \frac{\text{Average hourly labour compensation}}{\text{Consumption price index}} \times \frac{\text{Consumption price index}}{\text{Output price index}}$$

$$= \text{Real consumption wage} \times \text{Labour terms of trade}$$

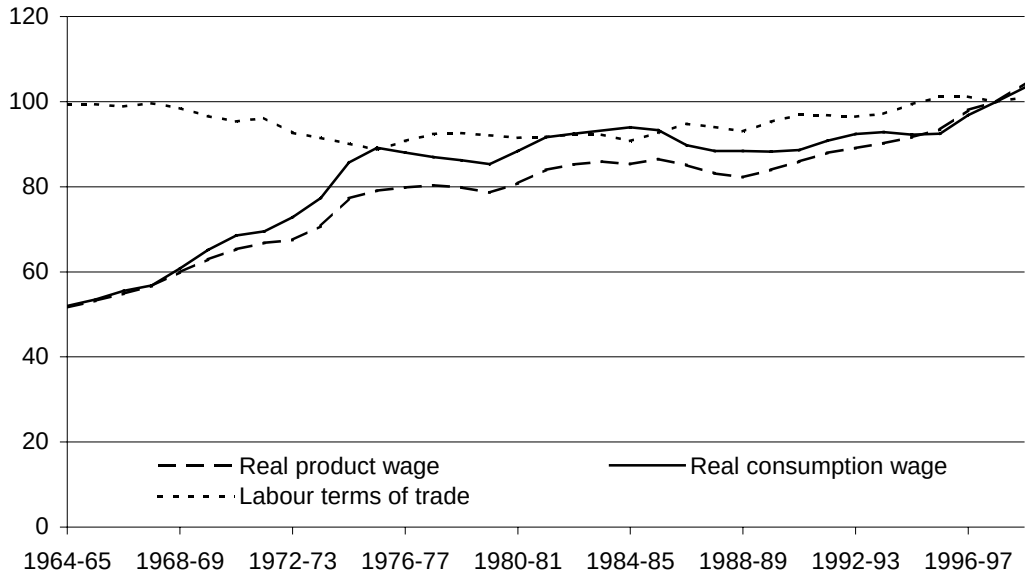
Figure 4.6 confirms that, like the real product wage, the real consumption wage increased in the 1990s and, in particular, from the mid-1990s. In fact, figure 4.6 shows little difference between the product and consumption wages from the mid-1990s (both growing at about 3.8 per cent a year from 1995-96). Growth in the real

consumption wage over the 1990s was 1.9 and 2.1 per cent a year respectively in the economy and market sector.

A gap opened up in the late 1960s and early 1970s when producer prices increased faster than consumer prices (the labour terms of trade declined). This suggests that supply-side cost pressures were more important than demand-side price pressures at the time. Indeed, the demand side was relatively weak.

The gap remained virtually unchanged until the mid-1980s, after which the labour terms of trade increased, with greater moderation in increases in producer prices than in consumer prices. This could be consistent with, for example, producers facing greater competitive pressures in the 1980s and 1990s. Or, there may have been adverse terms of trade effects, lifting the relative prices of imported goods.[13]

Figure 4.6 **Real product wage, real consumption wage and labour terms of trade for the total economy, 1964-65 to 1998-99**
Index 1997-98 = 100



Data source: PC estimates based on ABS data.

13 Bosworth and Perry (1994) state that a rising labour terms of trade in the US was due to the focus of production on investment goods (especially computers) and services that had falling relative prices, and the focus of consumption on goods and services with rising relative prices. Changes in indirect taxes on production and consumption could also affect the labour terms of trade.

4.3 The links between wages, productivity and employment

As stated at the start of this chapter, a third major area of interest concerns rates of employment and unemployment. These also influence the magnitude of payments to labour.

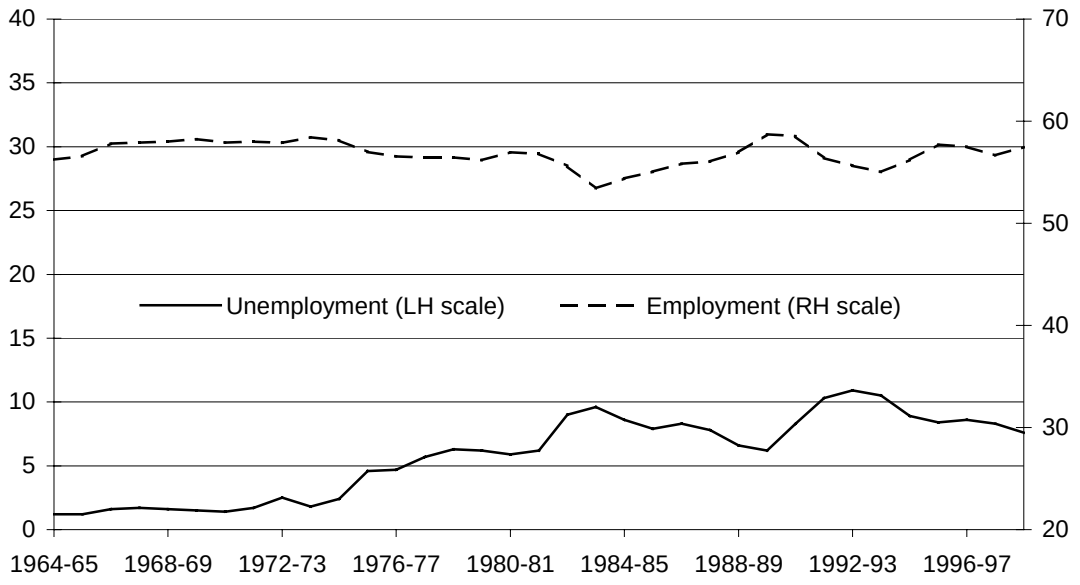
Figure 4.7 shows employment and unemployment rates since the mid-1960s.

- Employment trends over the 1990s were favourable after the major disruption of the early 1990s recession. The employment rate returned to historical highs and the unemployment rate declined.
- Employment conditions deteriorated from the mid-1970s. Unemployment climbed steadily and the employment rate declined marginally. There was, however, marked improvement in both in the mid- to late 1980s.
- Employment conditions were favourable in the 1960s and early 1970s, with high employment and low unemployment.

The links between wages growth, productivity growth and unemployment can be explored by examining the factors underlying changes in the labour income share.

Figure 4.7 **Workforce unemployment rate and working-age employment rate[a], 1964-65 to 1998-99**

Per cent



a The rate of unemployment is the ratio of the number unemployed to the number in the workforce. The employment rate is the ratio of the number employed to the size of the working age population (15 and over).

Data source: PC estimates based on ABS data.

1972-73 to 1974-75: Increase in labour income share

Like many other economies, the Australian economy was hit by a number of shocks in the mid-1970s. There was a sharp decline in the terms of trade and a reduction in export volumes. On the supply side, real wages climbed markedly.

The labour income share rose sharply from 1972-73 to 1974-75 as the increase in the real product wage outstripped the increase in labour productivity (figures 4.2 and 4.3). Table 4.2 shows that the labour income share rose by over 5 per cent a year over this period, with increases in the real product wage of 7 per cent a year.

The real wage rise squeezed profits. A reduction of about 9 per cent a year in real profitability was the major factor behind the reduction in the capital income share over this period.

However, the increase in the labour income share was not sustained. As pointed out previously, it gradually declined from the mid-1970s, before restabilising at the end of the 1980s.

With the increase in the labour income share resulting from the real product wage growing in excess of labour productivity growth, there are three possible paths toward a 'correction' in an elevated labour income share:

- a reversal in the excess rise in real wage growth;
- a lift in labour productivity growth through stronger multifactor productivity growth; or
- a fall in employment growth and an unemployment rise, which by default will raise labour productivity growth.

All three possibilities were evident in Australia at different times. These are now examined.

Table 4.2 **Accounting for annual average growth in economywide factor income shares, various periods[a], 1964-65 to 1998-99**

Per cent per year

	1964-65 to 1972-73	*1972-73 to 1974-75*	*1974-75 to 1983-84*	*1983-84 to 1988-89*	*1988-89 to 1993-94*	*1993-94 to 1998-99*
Payments to labour						
1. Labour income share	0.6	5.2	-1.1	-1.3	0.2	0.4
2. Real product wage	3.4	7.0	1.2	-0.9	1.9	3.0
3. GDP per labour hour	2.8	1.7	2.4	0.4	1.7	2.5
4. GDP	**5.1**	**2.6**	**2.6**	**3.9**	**2.3**	**4.6**
5. Labour hours	2.3	0.9	0.2	3.5	0.6	2.0
6. Average hours	**-0.6**	**-1.2**	**-0.5**	**0.2**	**-0.1**	**-0.3**
7. Employment	2.8	2.2	0.7	3.3	0.7	2.3
8. Workforce	**3.2**	**2.3**	**1.7**	**2.8**	**1.3**	**1.6**
9. Employment rate	**-0.3**	**-0.1**	**-1.0**	**0.5**	**-0.6**	**0.7**
10. Unemployment	12.9	0.0	18.5	-4.8	11.5	-4.7
11. Participation rate	0.7	0.4	0.1	1.0	0.2	0.4
Payments to capital						
12. Capital income share	-0.7	-7.2	1.7	1.5	-0.2	-0.5
13. Real profitability	-1.7	-8.9	0.5	1.9	-0.3	1.0
14. GDP per unit of capital	-1.0	-1.8	-1.2	0.3	-0.1	1.5
15. GDP	5.1	2.6	2.6	3.9	2.3	4.6
16. Net capital stock	6.2	4.5	3.9	3.6	2.4	3.0
17. Rate of profit	-2.2	-11.4	1.0	1.5	0.5	0.8

a The time periods were selected to best illustrate the role of different factors real wage growth in excess of labour productivity growth from 1972-73 to 1974-75; narrowing of the real wage gap through unemployment growth between 1974-75 and 1983-84; a decline in real wages from 1983-84 to 1988-89; and record productivity growth from 1993-94 to 1998-99.

Source: PC estimates.

1974-75 to 1983-84: The unemployment response

A real wage increase that is not matched by labour productivity growth means that an increase in the hourly cost of employing labour is not offset by an increase in output (or total income) generated per hour of labour. Profits are squeezed. Labour becomes more expensive relative to capital, inducing producers to substitute capital for labour.

In the absence of strong output growth driven by other factors (and as noted above, demand and output growth were both weak from the mid-1970s), employment growth slows and unemployment rises. Figure 4.7 shows that unemployment

increased from the mid-1970s. Part of this unemployment growth can be attributed to the unsustainable rise in real wages — an increase in 'classical' unemployment due to an increase in the relative cost of labour.[14] However, not all unemployment growth was due to the higher cost of labour. As noted, demand conditions were weak at this time. The collapse in the terms of trade and export volumes would also have contributed to unemployment growth.

Box 4.3 presents a simplified theoretical case for links between real wages, labour productivity and unemployment (for a given level of unemployment due to other causes). However, it is emphasised that this model presents the case for 'classical' unemployment. It is not suggested that this was the only factor contributing to growth in Australian unemployment in the 1970s. Indeed, the level of unemployment remains unexplained by the factors considered in this study.

However, irrespective of its sources, higher unemployment had the effect of raising labour productivity growth. This can be seen in two ways. First, lower or negative labour input growth in the presence of weak output growth means that the ratio of output to labour — labour productivity — rises. The second way is to see labour productivity growth as the sum of capital deepening and multifactor productivity growth (see chapter 3). Reducing the rate of labour input growth can raise the capital-labour ratio and so labour productivity can rise through capital deepening.[15]

The rise in labour productivity helped to reduce the real wage excess and lower the labour income share from the mid-1970s.

The data in table 4.2 can be used to demonstrate the links between employment trends, labour productivity and the labour income share. All variables are measured in terms of growth rates. Aside from approximation errors, GDP per labour hour is equal to growth in GDP less growth in hours worked (line 3 is equal to line 4 minus line 5); growth in hours worked is equal to growth in average hours plus growth in employment (line 5 is equal to line 6 plus line 7); growth in employment is equal to growth in the workforce plus growth in the workforce employment rate (line 7 is equal to line 8 plus line 9). Overall, line 3 is therefore equal to line 4 minus line 6 minus line 8 minus line 9. Growth in numbers unemployed (line 10) and the participation rate (line 11) are included for information.[16]

[14] Empirical studies have confirmed the negative relationship between real wages and aggregate employment. For a recent survey, see Webster (2000).

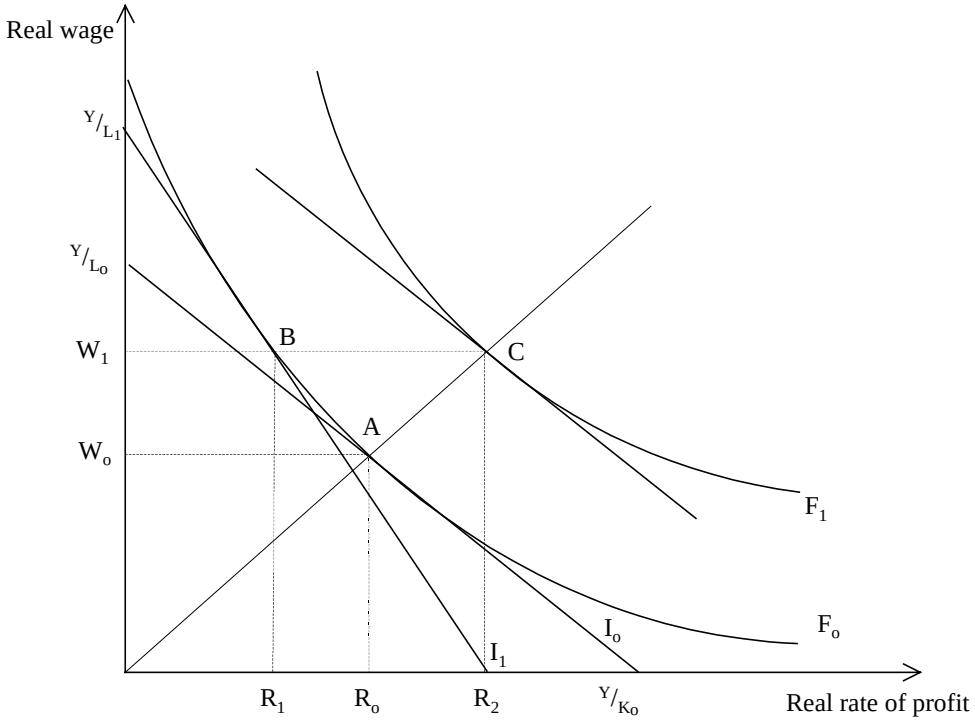
[15] Yet another way of putting it is that, because of the decreasing marginal productivity of labour, the average product of labour rises when employment is reduced.

[16] Growth in the unemployment rate can be computed as line 10 minus line 8. The annual percentage point increase in the unemployment rate is approximately equal to the negative of the growth in the employment rate (minus line 9).

Box 4.3 **Real wages, productivity and unemployment**

The relationships between real wages, productivity and unemployment can be illustrated with a simplified version of a model set out by Bruno and Sachs (1985).

The curve F_o is what Bruno and Sachs call a factor price frontier. It describes feasible and efficient combinations of factor rewards for the currently available production technology. (The factor price frontier is the 'dual' of a production isoquant in factor quantity space. It is assumed that there are constant returns to scale and factors are paid according to their marginal products.)



The line I_o represents the income produced from a given endowment of L_o units of labour and K_o units of capital. The slope of the line is the capital-labour ratio and the intercepts represent capital and labour productivity (or the inverse of factor intensity). The optimal profit maximising point of production is A, with real wage W_o, and real rate of profit R_o.

Suppose now that there is an increase in the real wage to W_1. This induces a shift around the factor price frontier to the point B, via a shift to more capital-intensive production (represented by the steeper slope — higher capital to labour ratio — in the line I_1.). With given capital K_o, this can only be achieved by reducing labour input. The rate of profit declines to R_1. Thus, with fixed technology and capital inputs, the wage increase leads to unemployment and a lower rate of profit. With unemployment, labour productivity rises.

Suppose instead that, from the initial position at A, there is a (factor-neutral) productivity increase, represented by a shift in the factor price frontier from F_o to F_1. The new optimum point is C, at which the real wage rises to W_1 and the real rate of profit rises to R_2. With a productivity increase, therefore, both wages and the real rate of profit can increase, while both factors remain fully employed. In this case, the productivity improvement sustains employment and the wage rise to W_1.

The table shows that the employment rate declined at 1 per cent a year. With the workforce still growing at 1.7 per cent a year, this implies strong growth in unemployment — which is confirmed in the table by the 18.5 per cent a year growth in numbers unemployed. The decline in the employment rate of 1.0 per cent a year contributed about two-fifths of the 2.4 per cent a year labour productivity growth over 1974-75 to 1983-84.

The decline in workforce growth and the decline in the employment rate meant that labour productivity grew faster than the real product wage. This was despite slower output growth and despite a further wage hike in the early 1980s (figure 4.2). (The spike in the labour income share in 1982-83 was due to a stronger reduction in capital income during the recession at that time.)

The Australian experience of a sharp rise in the labour income share in the mid-1970s and a gradual decline, associated with rising unemployment, corresponds to the experience of a number of European countries (box 4.4).

1983-84 to 1988-89: The real wage response

From around 1984, real wages declined under the prices and incomes Accords, leading to a further correction in the labour income share. Table 4.2 shows the real product wage declined by 0.9 per cent a year, which contributed to the reduction in the labour income share of 1.3 per cent a year — even though growth in labour productivity slowed markedly. The decline in the real product wage accounts for about two-thirds of the decline in the labour income share.

The wage moderation brought improvement in employment conditions. Employment growth increased (with increased participation) and unemployment declined (table 4.2). The growth in employment, whilst obviously a positive feature in its own right, held down growth in labour productivity. Even though output growth was strong (3.9 per cent a year), its influence on labour productivity growth was largely offset by strong growth in the workforce (2.8 per cent a year) and the employment rate (0.5 per cent a year).

The labour income share returned to around 1960s levels by the late 1980s (figure 4.3). The gap between growth in the real product wage and labour productivity growth that had opened in the 1970s closed again at that time. This source of ‘classical’ unemployment, due to the high cost of labour, was removed.

Nevertheless, unemployment (due to other factors) remained high. At 6.6 per cent in 1988-89, the unemployment rate was much higher than it had been in the 1960s.

Box 4.4 **An international perspective on labour income shares**

Blanchard (1997) examined capital income shares in a number of countries and identified two groups — Continental European countries (France, Italy, Spain and Germany) and 'Anglo-Saxon' countries (United States, Canada and the United Kingdom).

These two groups showed quite different movements and trends in capital shares. For the sake of compatibility with the focus in this chapter, these differences are outlined in terms of the labour income share.

Like Australia, the Continental countries experienced a sharp increase in their labour income shares in the mid-1970s, driven by increases in real wages at a given level of unemployment and productivity. Labour income shares gradually fell during the 1980s and 1990s, as firms substituted capital for more expensive labour. Blanchard also conjectures that there may have been some technological bias toward capital. Unemployment has increased steadily in these countries, as the labour income shares have fallen.

Significantly, labour income shares in Continental countries continued to fall in the 1990s, below the levels that existed in the early 1970s.

In contrast, labour income shares in the Anglo-Saxon countries have remained comparatively constant throughout the decades. Unemployment has also remained relatively low.

It seems that Australia behaved more like the Continental countries in the 1970s and 1980s, but more like 'Anglo-Saxon' countries in the 1990s.

The different behaviour of the Continental countries has been put down to differences in labour market and wage setting institutions (Blanchard 1997; Bruno and Sachs 1985; Nickell and Layard 1998). Factors such as the degree of centralisation and co-ordination in bargaining and the flexibility to adjust nominal wages quickly to changing market conditions (for example, absence of automatic indexing and presence of wage recontracting), as well as generosity of unemployment benefits and degree of unionisation, are seen as important.

1993-94 to 1998-99: The productivity surge

It was after the correction to the labour income share was completed — namely, in the 1990s — that increases in multifactor productivity growth emerged as a source of higher labour productivity growth. If increased MFP growth had come earlier, it could have sustained the real wage increase, and induced a correction in the elevated labour income share.

As previously demonstrated, the productivity growth sustained both growth in real wages and growth in real rates of profit (see also table 4.2). (A simplified

theoretical case for an increase in productivity growth to generate an increase in both real wages and rates of profit is presented in box 4.3.) Because increased MFP growth accompanied it, the real wage rise did not raise the real cost of employing labour relative to capital and therefore did not create 'classical' unemployment pressure.

Favourable employment trends were achieved in the presence of record MFP growth. Growth in output (underpinned in part by productivity growth and increased spending from the real income growth it produced) was sufficiently strong to raise employment and make inroads into unemployment, which had grown again during the early 1990s recession.

Table 4.3 presents a similar growth accounting exercise for the market sector. However, it identifies the contribution of multifactor productivity growth to labour productivity growth rather than employment and unemployment.[17] On the labour side, line 3 is equal to line 4 minus line 5 (by definition) and line 3 is also approximately equal to line 6 plus line 7 (see chapter 3). On the capital side, line 10 is equal to line 11 minus line 12, and line 14 is equal to line 15 plus line 16. Growth in output per unit of capital (line 10) does not equal the growth in the output to capital services ratio (line 14). The capital services measure is based on the 'economic' rather than 'financial' measure of capital input.[18]

As noted before, the income shares and real rates of payments to factors for the market sector are measured in market prices, rather than at factor cost, in order to be consistent with published productivity estimates. This does not affect estimates of growth in factor income shares.

Trend estimates of MFP growth are displayed in table 4.3 to indicate underlying rates of productivity growth over the selected periods. Since these periods do not correspond to productivity cycles (except 1993-94 to 1998-99), actual estimates do not necessarily give a sound indication of underlying productivity growth.

[17] The factor income shares are as provided by the ABS for the market sector. The rates of payment to factors were derived by applying the factor income shares to the published output series.

[18] The financial measure is used at line 10 to preserve the decomposition of the capital income share.

Table 4.3 **Accounting for annual average growth in market sector factor income shares, various periods, 1964-65 to 1998-99**

	1964-65 to 1972-73	*1972-73 to 1974-75*	*1974-75 to 1983-84*	*1983-84 to 1988-89*	*1988-89 to 1993-94*	*1993-94 to 1998-99*
Payments to labour						
1. Labour income share	0.1	4.3	-0.7	-0.9	-0.7	0.2
2. Real product wage	2.6	8.5	1.4	0.5	1.3	3.2
3. Labour productivity	2.4	4.0	2.2	1.5	2.0	3.1
4. Output	4.6	3.3	1.8	4.7	1.8	4.4
5. Hours worked	2.1	-0.7	-0.4	3.2	-0.2	1.3
6. Capital deepening	1.4	1.6	1.5	0.6	1.5	1.4
7. MFP						
- actual	1.0	2.5	0.6	0.9	0.5	1.7
- trend[a]	1.5	1.9	0.7	0.6	0.7	1.8
Payments to capital						
8. Capital income share	-0.2	-7.0	1.3	1.4	1.0	-0.2
9. Real profitability	-1.6	-7.2	-0.4	2.7	1.1	1.1
10. Output per unit of capital	-1.4	-0.2	-1.7	1.3	0.1	1.4
11. Output	4.6	3.3	1.8	4.7	1.8	4.4
12. Net capital stock	6.1	3.6	3.5	3.3	1.7	3.0
13. Rate of profit	-2.2	-10.9	-0.3	1.7	1.5	0.9
14. Output per unit of capital services	-1.3	-0.1	-2.1	0.0	-1.5	-0.3
15. Capital deepening	-2.3	-2.7	-2.8	-0.9	-2.1	-2.0
16. MFP	1.0	2.5	0.6	0.9	0.5	1.7

a Based on unpublished ABS estimates of trend MFP.

Source: PC estimates.

The market sector results are broadly consistent with the economywide results, although they differ in terms of magnitudes in some periods. For example, the much slower growth in output per labour hour in the economy as a whole, compared with the market sector, in 1972-73 to 1974-75 is likely due to the rapid expansion in public sector services. The importance of employment influences on labour productivity growth from the mid-1970s to the late 1980s can be seen in the variations in growth in hours worked.

Labour productivity growth also comprises contributions from capital deepening and MFP growth. Capital deepening was relatively constant throughout, except in the late 1980s, when the employment expansion reduced the capital-labour ratio.

MFP growth made a relatively weak contribution to labour productivity growth from the mid-1970s to the mid-1990s. However, it accounted for over a half (1.7 percentage points) of the 3.1 per cent a year labour productivity growth over 1993-94 to 1998-99.

The increase in the output-capital ratio is also linked to improved multifactor productivity.[19] Like labour productivity, there is a capital deepening component and an MFP component. The acceleration in MFP was the major factor behind the increase in the output-capital ratio in the 1990s.

In short, the labour productivity gains of the 1990s were based on efficiency (MFP) gains, rather than adverse employment trends (as happened in the late 1970s and early 1980s). The MFP gains of the 1990s had a neutral effect on the relative flows of income and rates of payment to the factors of production. It also appears to have had a positive, rather than a negative, influence on the employment of labour.

4.4 An industry perspective

Examination of trends in industry sectors can provide further insight into the distribution of factor income. Details of sectoral trends are presented in appendix C, while the main features are presented here.

Labour income shares

Figure 4.8 shows the growth in labour income shares in industry sectors over the period 1974-75 to 1998-99. (Sectoral productivity estimates for years prior to 1974-75 are not available.) Sectoral growth in the labour income share is also decomposed into growth in sectoral real product wages[20] and growth in sectoral labour productivity. Industry sectors are displayed in descending order of labour productivity growth over the period.

Two sectors — Communication services and Electricity, gas and water — show comparatively large reductions in labour income shares. This suggests that these sectors have moved to more capital-intensive production since the mid-1970s. In the case of Communication services, this is predominantly due to strong capital growth (5 per cent a year average growth in net capital stock). In the case of Electricity, gas

[19] The relationship between capital deepening, MFP and growth in the output-capital ratio holds strictly for the capital services measure shown in table 4.3.

[20] Sector-specific price deflators are used to calculate sector real product wages.

and water, a reduction in labour input (1.7 per cent a year average reduction in employment) was the main factor behind the rise in capital intensity.

Changes in labour income shares in other sectors fall in a relatively narrow band around zero, with both positive and negative readings. There is no particular association between the strength of labour productivity growth and the change in labour income share. It is the relativity between real product wage growth and labour productivity growth that determines the change in the labour income share.

At the aggregate level, the labour income share declined from 1974-75 through to the late 1980s and remained stable in the 1990s. The same general pattern is evident in the sectoral results.

Figure 4.9 shows sectoral changes for two periods — before 1988-89 and after 1988-89. The year 1988-89 corresponds to the time of the restoration of the labour income share at the aggregate level and the boundary between periods used in the aggregate analysis in the previous section.

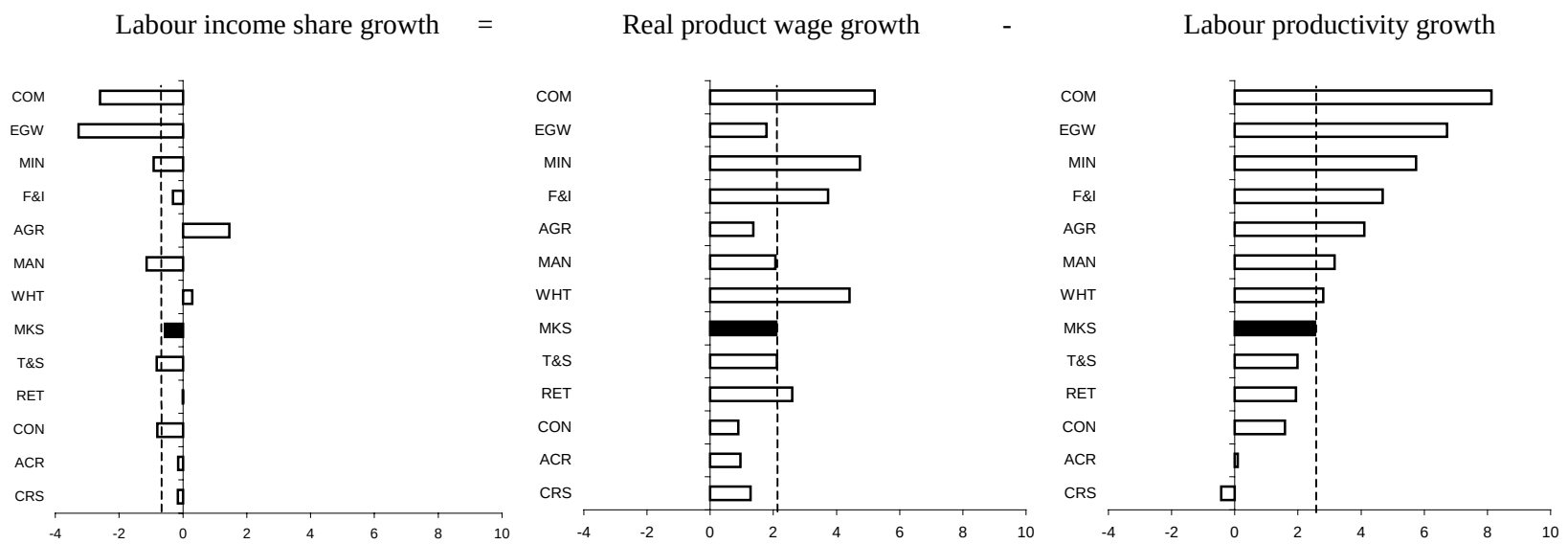
The figure shows observations of sectoral rates of productivity and wage growth. If these rates of growth were equal, there would be no change in the labour income share, and the observation would fall on the 45-degree line. Observations above the 45-degree line show increases in the labour income share, since wage growth is in excess of productivity growth. Conversely, observations below the line involve productivity growth in excess of wage growth and, therefore, decreases in labour income shares.

Over the period 1974-75 to 1988-89, Agriculture was the only sector showing an increase in labour income share. Over the 1990s, there was more of a spread of industry sectors around the 45-degree line, which is consistent with the stability in the labour share at the aggregate level.

Moreover, there was generally stronger growth in labour productivity in the second period. But, generally, higher labour productivity growth was also associated with higher real product wages. There were only small changes in the labour income share. The correlation between labour productivity growth and growth in real product wages is examined further below.

Figure 4.8 **Average annual rate of growth in labour income share, real product wage and labour productivity, industry sectors, 1974-75 to 1998-99**

Per cent per year

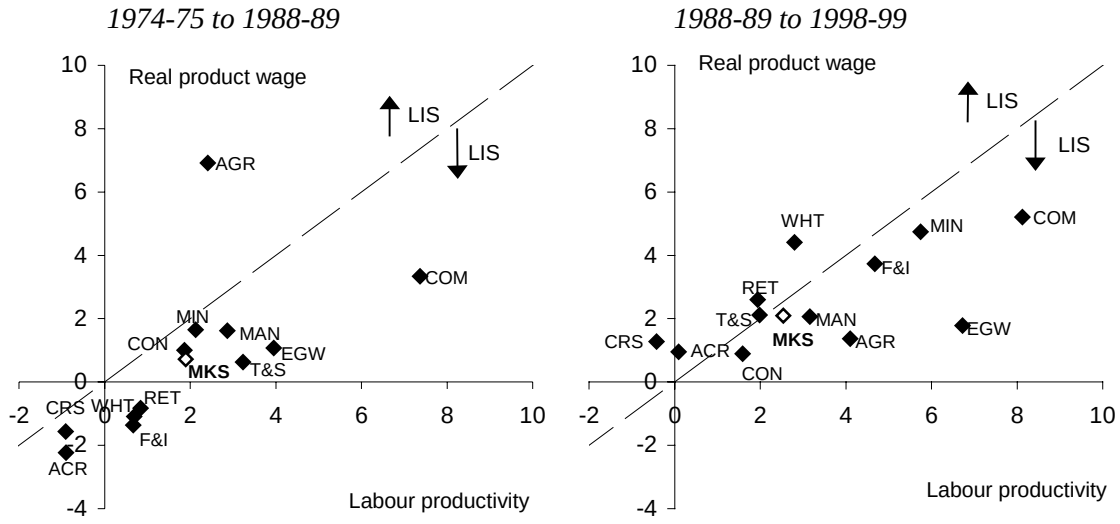


COM	Communication services	MAN	Manufacturing	RET	Retail trade
EGW	Electricity, gas and water	WHT	Wholesale trade	CON	Construction
MIN	Mining	MKS	Market sector	ACR	Accommodation, cafes and restaurants
F&I	Finance and insurance	T&S	Transport and storage	CRS	Cultural and recreational services
AGR	Agriculture				

Data source: PC estimates based on ABS data.

Figure 4.9 **Annual average growth in the real product wage and labour productivity**

Per cent per year



ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

Sources of labour productivity growth

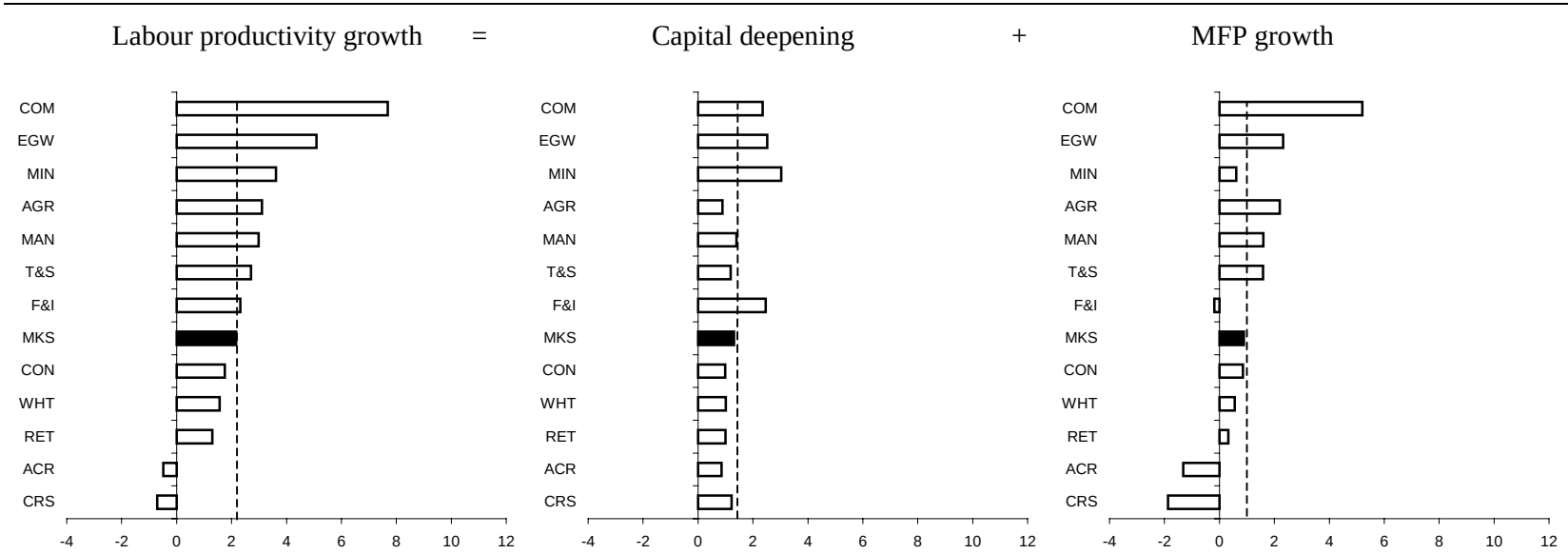
It has been pointed out in chapter 3 and earlier in this chapter that labour productivity growth has a capital deepening component and an MFP growth component.

Figure 4.10 shows that, in general, there is comparatively little variation across industries in the contribution to labour productivity growth from capital deepening (see appendix C for detail on sub-periods). Variation in labour productivity growth tends to be correlated with variation in MFP growth.

In the 1990s, however, capital deepening made a stronger contribution in a number of industries — particularly in Mining and Electricity, gas and water (appendix C).

Figure 4.10 **Average annual rate of growth in labour productivity, capital deepening and MFP, 1974-75 to 1998-99**

Per cent per year



COM	Communication services	T&S	Transport and storage	RET	Retail trade
EGW	Electricity, gas and water	F&I	Finance and insurance	ACR	Accommodation, cafes and restaurants
MIN	Mining	MKS	Market sector	CRS	Cultural and recreational services
AGR	Agriculture	CON	Construction		
MAN	Manufacturing	WHT	Wholesale trade		

Data source: PC estimates based on unpublished ABS data.

Distribution of productivity gains

The industry perspective can also be used to examine how sectoral productivity growth has translated into higher wages, higher profits or lower prices. For this purpose, the prime interest is in how MFP gains have been distributed.

The distribution is examined in terms of the real consumption wage, the rate of profit — the ratio of gross operating surplus to net capital stock at current prices — and industry-specific prices. Distribution is therefore examined from the viewpoint of beneficiaries — those employed, the owners of capital and purchasers.

Figures 4.11 and 4.12 display growth in sectoral MFP, the real consumption wage, the rate of profit and industry-specific prices over two periods — 1974-75 to 1988-89 and 1988-89 to 1998-99.

There are several noteworthy features in these figures, which are also supported by correlation coefficients displayed in table 4.4.

- There is comparatively low variation in the real consumption wage growth across industries (except for Agriculture) and the correlation between real consumption wage growth and MFP growth is relatively weak.
- There is stronger correlation between MFP growth and growth in the rate of profit, especially in the earlier period. (Profitability increased at the aggregate level, particularly in the latter part of the 1980s — see figure 4.5.)
- There is strong negative correlation between MFP growth and sectoral growth in prices — particularly in the 1990s.

Table 4.4 **Correlation coefficients between sectoral MFP growth and growth in wages, profits and prices**

	1974-75 to 1988-89	*1988-89 to 1998-99*	*1974-75 to 1998-99*
Real consumption wage	0.48	-0.57	.0.31
Rate of profit	0.77	0.41	0.77
Prices	-0.59	-0.90	-0.82

Source: PC estimates.

The real consumption wage uses a common price deflator across industries — the CPI. Therefore, the variation in growth in sectoral real consumption wages also represents the variation in growth in nominal wage rates across industries. The low variation in sectoral real consumption wages suggests that there is little variation in

nominal wage increases across industries — even in the presence of marked differences in MFP growth.

On the basis of the correlations, it appears that relative strength in productivity growth went into restoring industry profit growth in the earlier period. Profit growth was relatively large in Communication services and Electricity, gas and water — two industries dominated by government business enterprises. Stronger profit growth could be consistent with increased commercialisation and dividend requirements in these industries. The correlation with profit growth was not so evident in the 1990s.

The high negative correlation with prices suggests that a good deal of sectoral MFP growth has gone into holding down price growth, relative to other industries. The much stronger correlation in the 1990s could be consistent with greater competitive pressure to pass on productivity increases in the form of lower relative prices (IC 1997a).

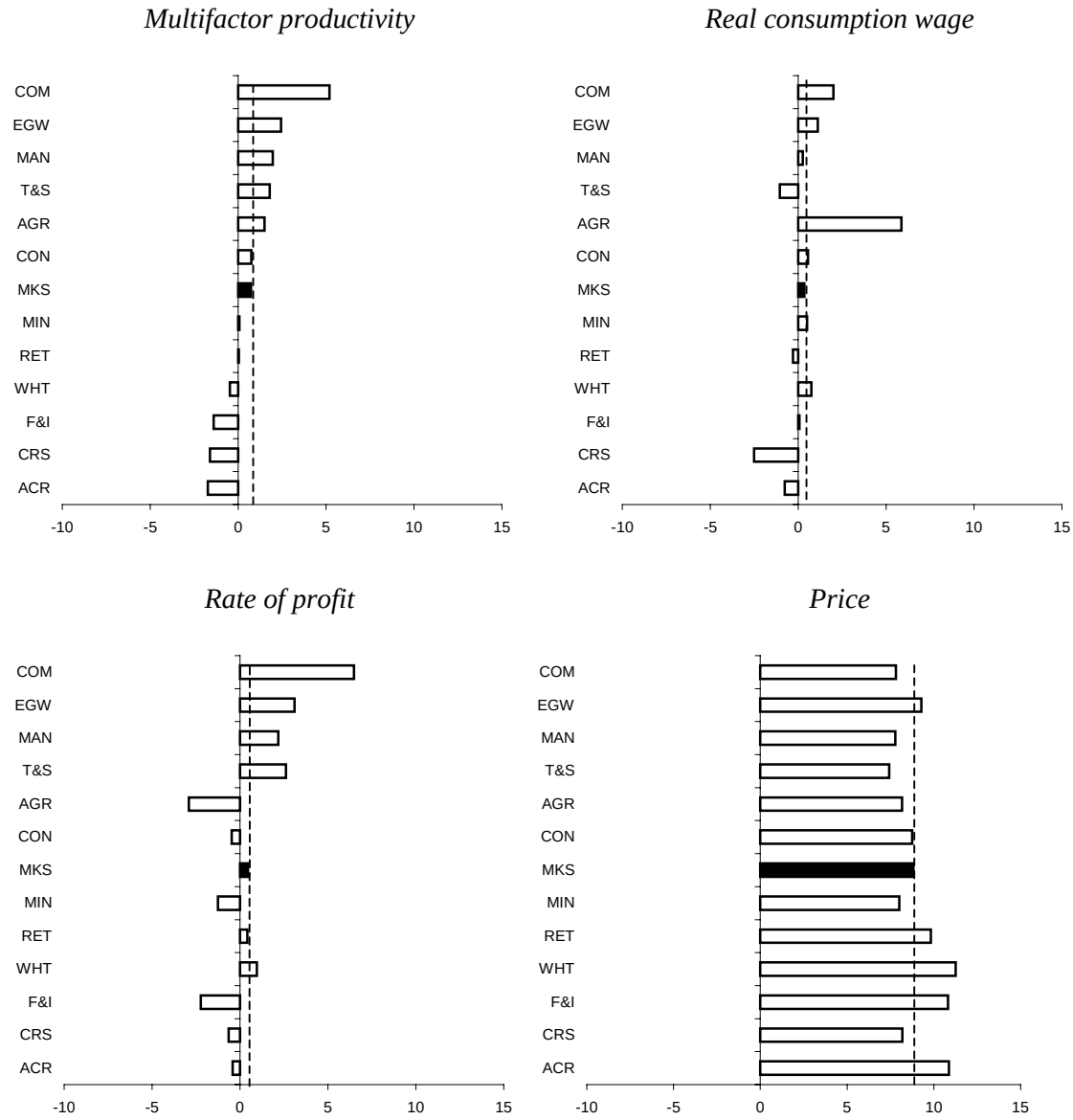
The impact of MFP growth on prices explains the divergence observed earlier between the relatively strong correlations between labour productivity growth and real product wages, on the one hand, and the weak correlations between productivity growth and real consumption wage growth, on the other hand. The variations in real product wages come more from variations in industry-specific prices growth, rather than variations in nominal wage growth.

Thus, while productivity growth has been important for general growth in real wages and profitability, industry variations in productivity growth have not translated as readily into wage growth differentials. In short, industries with higher productivity growth have not tended to increase wages by more. Rather, industry variations have tended to translate into price differentials. Industries with the highest productivity growth have been able to pay the going wage increases, take a little in profits, but mostly lower their relative prices — and more so in the 1990s, than in the past.

There are several possible explanations for the lack of variation in wage growth. Wage determination processes could be maintaining wage relativities, or changes in industry demands for labour could have been met by changes in supply. Further research is needed to provide an explanation.

Figure 4.11 **Average annual growth in multifactor productivity, real consumption wage, rate of profit and price[a], industry sectors, 1974-75 to 1988-89**

Per cent per year



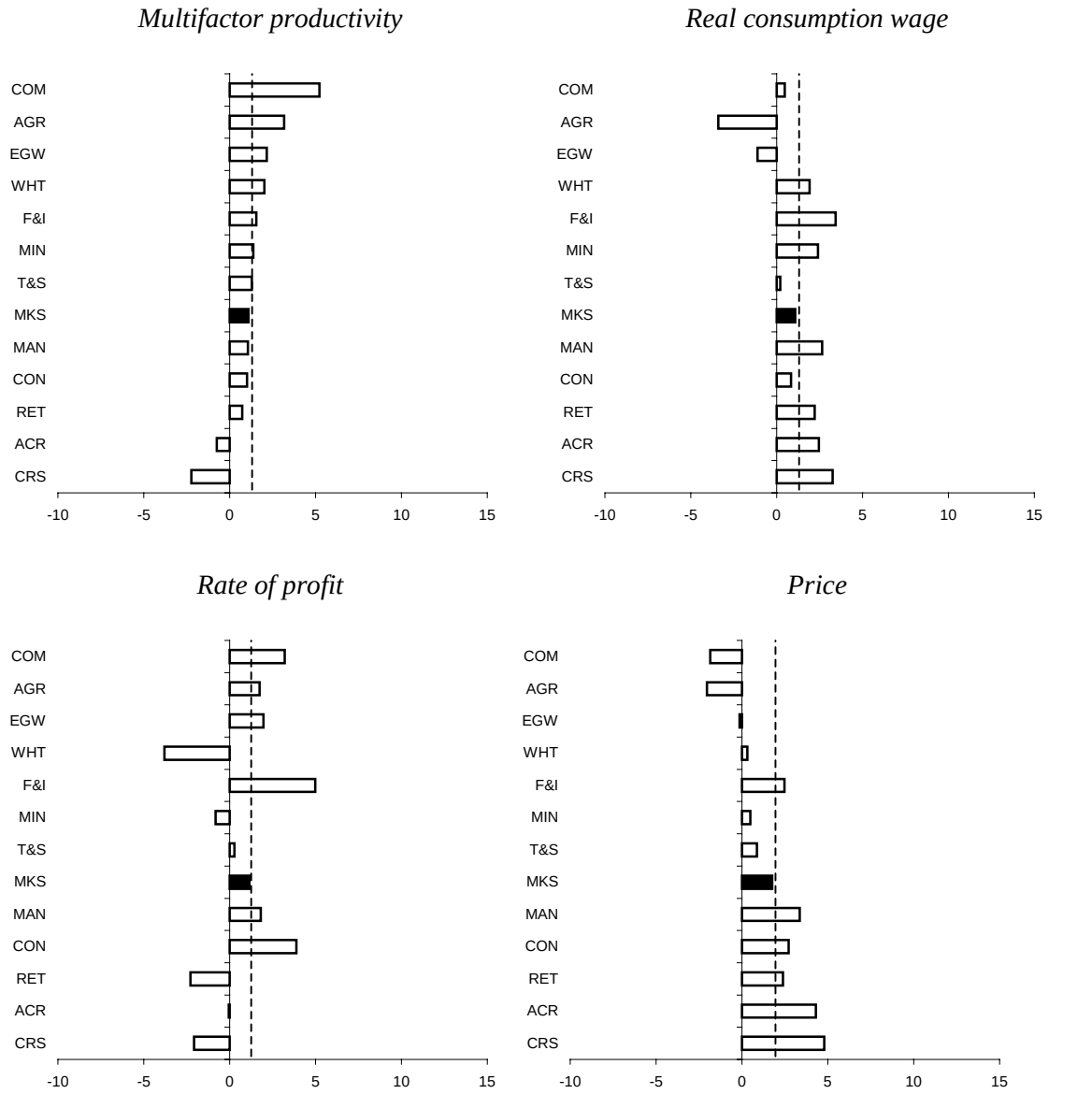
COM	Communication services	MIN	Mining
EGW	Electricity, gas and water	RET	Retail trade
MAN	Manufacturing	WHT	Wholesale trade
T&S	Transport and storage	F&I	Finance and insurance
AGR	Agriculture	CRS	Cultural and recreational services
CON	Construction	ACR	Accommodation, cafes and restaurants
MKS	Market sector		

a Industry price growth is measured by changes in industry-specific price deflators for value added.

Data source: PC estimates based on ABS data.

Figure 4.12 **Average annual growth in multifactor productivity, real consumption wage, rate of profit and price[a], industry sectors, 1988-89 to 1998-99**

Per cent per year



COM	Communication services	MKS	Market sector
AGR	Agriculture	MAN	Manufacturing
EGW	Electricity, gas and water	CON	Construction
WHT	Wholesale trade	RET	Retail trade
F&I	Finance and insurance	ACR	Accommodation, cafes and restaurants
MIN	Mining	CRS	Cultural and recreational services
T&S	Transport and storage		

a Industry price growth is measured by changes in industry-specific price deflators for value added.

Data source: PC estimates based on ABS data.

4.5 Assessment

The key findings in this chapter are these:

- There was consistently strong growth in total income in the 1990s, once through the early 1990s recession.
- Income and productivity gains of the 1990s were distributed evenly between labour and capital.
  - The labour (and therefore capital) share in total income remained broadly constant over the 1990s at the economywide level.
  - There was, however, a slight reduction in the income share (at 0.3 per cent a year) in the market sector.
- The real wages and profit rates both increased over the 1990s.
- The 1990s did bring recession but, after the recovery, there was ongoing employment growth and reduction in unemployment.
  - These favourable employment trends were achieved in the presence of record productivity growth and strong growth in real wages.

The 1990s combination of achievements — growth in real rates of pay and profits and expansion in employment and reduction in unemployment — contrasts with the experience of much of the 1970s and 1980s, when there was slower growth in real wage rates (after a hike in the mid-1970s), reductions in profitability and growth and persistence in unemployment.

Strong productivity growth is the key factor distinguishing the 1990s experience from that of the 1970s and 1980s. Growth in labour productivity is needed to sustain growth in real wages. History shows that this can be achieved in two ways — through weak employment growth and higher unemployment — as in the 1970s and early 1980s — or through higher efficiency (MFP) gains — as in the 1990s. The higher efficiency path not only avoids the adverse total employment consequences, but also generates more income to distribute.

There has been some bias in the distribution of income against labour in Communication services and Electricity, gas and water. This would have contributed to the slight bias against labour for the market sector in the 1990s. However, the lack of bias for the economy as a whole implies that there has been some bias in favour of labour in the non-market sector. Although it cannot be analysed because of lack of data, the Property and business services sector is a possible candidate, in view of its strong employment growth (appendix B).

Productivity growth can be distributed in three non-exclusive ways: higher wages, higher profits or, with lower unit costs, through lower output prices. Sectoral differences in productivity growth have translated predominantly into relative price declines, particularly in the 1990s. There was some link to relative profits, but industry differences in wages were only very weakly linked to industry differences in productivity performance. The strong price effects in the 1990s are consistent with there being stronger competition in product markets in the 1990s.

5 Some remaining issues

This chapter examines some remaining distributional issues. It touches on these issues for completeness rather than to provide a thorough examination.

Chapter 2 reported analysis which suggests that:

- there has been an increase in inequality in market incomes in the 1990s;
- the tax and welfare system has had an effect in largely offsetting the increase in market income inequality; and
- taking account of all sources of income, tax and welfare payments, there has been little change in overall income distribution — although middle income earners have not fared as well as those at the bottom and the top of the income distribution.

Figure 5.1 outlines different aspects of income distribution. It provides a framework for the issues examined in this chapter.

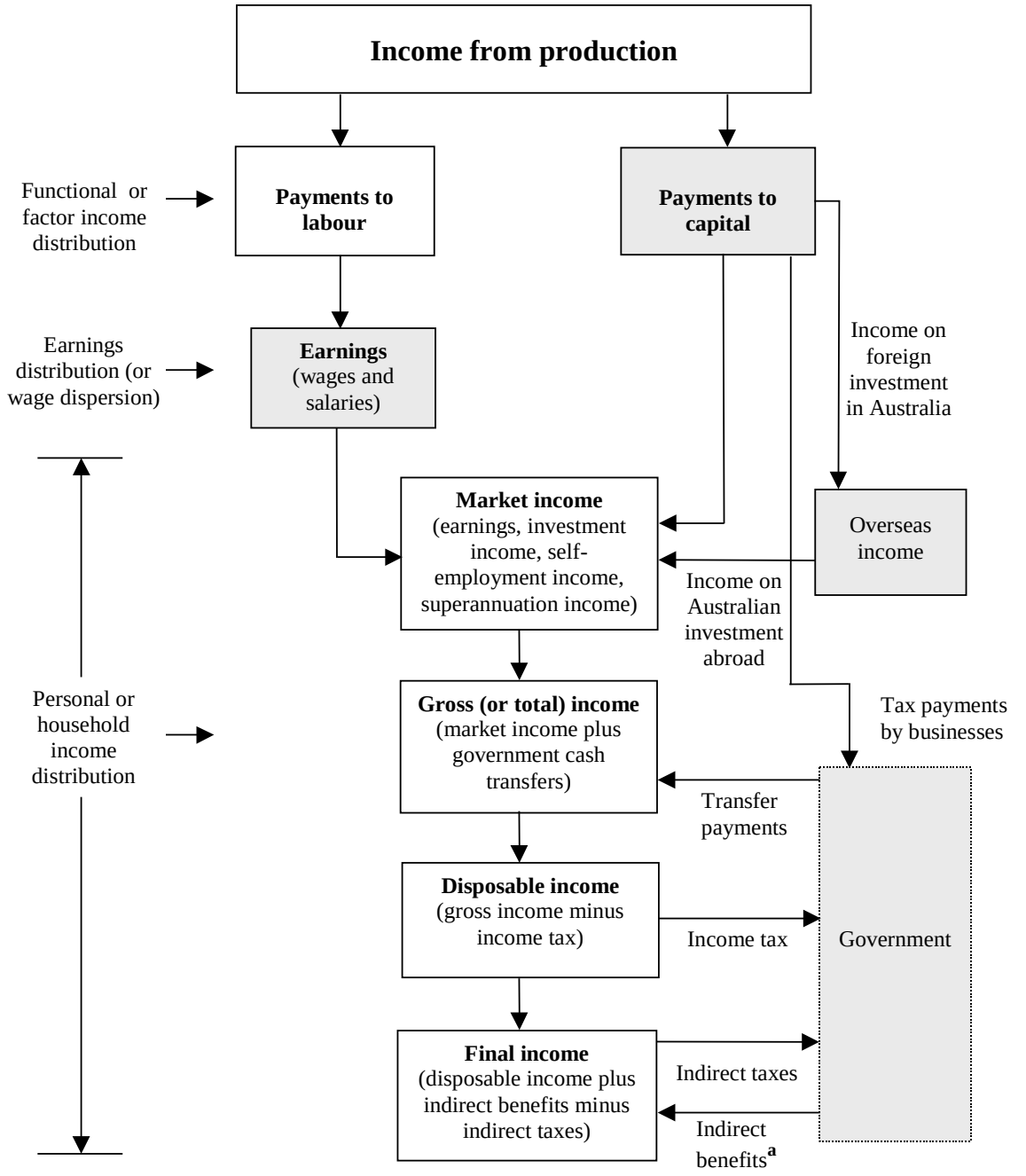
Chapter 4 examined the distribution of income at a broad level (the first level of figure 5.1) and found the income gains of the 1990s were shared evenly between labour and capital.

An even distribution of income between labour and capital, on the one hand, and an increase in market income inequality, on the other hand, means that the distribution of labour and capital income to individuals and households must have been uneven. For example, there may have been increased divergence in earnings and the distribution of dividends.

This chapter briefly examines the aspects of distribution that are shaded in figure 5.1. It looks at readily available information on the distribution of labour earnings and the distribution of capital income. The chapter also reports the distribution of income to two other major groups — governments and foreigners. It also touches on an additional element of distribution not shown in figure 5.1 — the observed differences in the experience of rural and urban areas. Following on from the previous chapter, some passing consideration is given to any influences that productivity growth may have had.

Details supporting the review presented in this chapter are reported in appendix D.

Figure 5.1 **Concepts of income commonly used in the analysis of income distribution**



[a] Indirect benefits are received from the use of government-provided or subsidised services, such as health care and education.

5.1 Trends in earnings distribution

The dispersion of earnings can be influenced by the dispersion of the wages paid to different jobs or a change in the distribution of jobs, for example growth in jobs with higher wages, causing the movement of people into the higher income groups (Norris and Mclean 1999). Recent research into possible causes of increased earnings dispersion have focused on mechanisms such as skill biased technological change, which can shift the employment opportunities towards members of the workforce with particular skills, and trade-related structural change, which can result in shifts in employment opportunities across industries. Also, there have been recent changes in the method of wage determination, which has evolved from a centralised system toward an enterprise-based system. These changes could have brought greater flexibility in wage determination, that could widen wage dispersion, depending on demand conditions and/or productivity performance, without the flow-on effects to other firms.

Table 5.1 **Distribution of earnings for full-time adult non-managerial workers, 1980 to 1998**

Earnings as a percentage of median earnings

	Lowest decile	*Highest decile*
Males		
1980	73.8	150.4
1990	69.5	156.3
1998	65.5	162.6
Females		
1980	81.8	142.8
1990	74.9	147.6
1998	71.8	150.4

Source: Norris and Mclean (1999).

The available evidence does suggest that there has been increasing earnings inequality across individuals in the 1990s, similar to that experienced in the 1980s. Research by Norris and Mclean (1999) found evidence of increasing earnings inequality in Australia during the 1990s, for both male and female full-time (non-managerial) workers (table 5.1). This increase appeared to be a continuation of increases in earnings inequality during the 1980s, and was at a similar rate.

The increased inequality in earnings may be the result of change in the structure of employment, more than changes in relative wages. As identified by de Laine, Laplagne and Stone (2000), high-skilled white collar employment grew by around

12 per cent between 1986 and 1998, and the wage bill share of high-skilled white collar workers by 14 per cent in the same period.[1]

In terms of family earnings, research by the National Centre of Social and Economic Modelling (NATSEM 2000) reports that, for the period 1982 to 1996-97, families in the top four income deciles experienced increased real wage income. In the same period, there was a decline in wage income in the middle income groups. The lowest income decile actually experienced growth in real wage income over the period, though not as significant in dollar terms, as the wages growth in the highest deciles.

There is some evidence to suggest that, in Australia, chief executive officer salaries are increasing at a higher rate than average earnings. Kryger (1999) reports that between 1988 and 1998 salaries of chief executive officers increased by 112 per cent, compared with an increase of 51 per cent for average earnings. However, this affects a relatively small group.

At a broad level, changes in relative wages between skill groups have not been significant (appendix D). Nevertheless, there may have been increased earnings inequality *within* skill and occupational groups. Wooden (2000b) suggests that the introduction of enterprise bargaining may have contributed to increased wage dispersion within occupations.

In terms of the distribution of wages between industries, as indicated in chapter 4, there has been little industry variation in wage growth, even with marked industry productivity differentials.

5.2 Trends in distribution of capital income

The capital share of total income remained steady during the 1980s and 1990s, as identified in the previous chapter. Looking at this result in more detail, what can be said about the distribution of this capital share? In this section, trends in the distribution of capital income over the 1980s and 1990s are examined.

[1] Amongst the less skilled occupations, employment growth has been variable. Some low-skilled white collar occupations have had relatively high employment growth while other occupations, such as tradespersons, have had relatively low growth. In aggregate, employment growth for less skilled occupations has been lower than that of high-skilled white collar occupations (see, for example, Cully 1999). However, even in those low-skilled occupations with relatively high growth, the recent increase in part-time employment lowers the relative growth in employment in terms of hours worked (Wooden 2000a).

Share ownership

As noted in chapter 2, there has been an increase in the proportion of Australian adults owning shares, from 9.2 per cent of the adult population in 1986 to 53.7 per cent in 1999. The fact that over half of adult Australians now either directly or indirectly own shares indicates a wider distribution of capital income through dividend payments in the late 1980s and 1990s.

However, although the proportion of Australian adults owning shares has increased, share ownership is still highly concentrated. According to Access Economics (1998), the top 10 per cent of income units still held 90 per cent of total shares held directly by private investors in 1998. Further, of this 90 per cent, the top 1 per cent of income units held almost two-thirds.

Foreign capital

The 1980s and 1990s saw the easing of restrictions on the flow of capital into and out of the country. The move to an open economy encouraged domestic producers to specialise, to export and to take advantage of possible economies of scale. A more open economy is also considered to have facilitated the productivity improvements experienced in the 1990s (PC 1999b).

The easing of restrictions on capital movements facilitated an increased inflow of foreign capital. Foreigners now earn a significant proportion of capital income generated in Australia. Australia relies heavily on foreign capital for development, and the inflow of capital from overseas does have significant benefits. Foreign capital often brings with it technology and expertise and plays an important role in the development of infrastructure that may help to boost the productive capacity of the economy (PC 1999b).

Foreign capital needs to be serviced through dividend and interest payments. The outflow of capital income grew by an average of 2.1 per cent a year in real terms in the 1990s. This compares with average annual growth of 14.0 per cent in the 1980s.

These results indicate that foreigners did not repatriate a greater share of the 1990s income gains.

5.3 The government sector

Governments influence the distribution of income in the economy through the tax and transfer system. Redistribution activities take the form of transfer payments, such as pensions, allowances and benefits. Health, education and other social programs also influence income distribution over the long term. Government health and education expenditure are examined in appendix A.

Revenue

Productivity improvements in the 1990s have resulted in increased incomes. All other things equal, this generates more tax revenue for governments which can be channelled in various ways, including better social infrastructure and income support.

During the 1990s, revenue as a percentage of GDP did not vary greatly, with the highest level of 33.2 per cent in 1996-97 and the lowest level of 29.7 per cent in 1992-93 (appendix D). The lack of variation in government revenue as a percentage of GDP over the 1990s indicates that governments have shared in the income gains of the 1990s.

Tax and transfer payments

Government transfers typically take the form of income support payments. Income support payments as a percentage of GDP fell consistently during the 1980s — from 6.8 per cent in 1984 to a low of 5.4 per cent in 1989. Payments rose to 7.7 per cent of GDP in the mid-1990s before falling to 7.1 per cent by 1998. An increase or decrease in income support payments can be influenced by a number of factors, such as the prevailing economic conditions (for example, changes to the number of unemployed persons), changes to eligibility requirements for payments and the demographic make-up of the population (such as the number of elderly and families with dependent children).

Data on government cash transfers received at the family level give an indication of the distribution of payments (NATSEM 2000). As detailed in appendix D, at the family level, government cash transfers increased in real terms for all but the top two income deciles between 1982 and 1996-97. This, coupled with the progressive nature of the income tax system, offset the real decline in private income experienced by most of the middle and lower income deciles.

5.4 Trends in rural and urban distribution

The relative wellbeing of Australia's rural and urban communities is an aspect of distribution which does not fit neatly into the flowchart in figure 5.1. However, it is an aspect of distribution which is attracting an increasing amount of attention in the community. There are several issues that influence the wellbeing of regions, including access to services, the viability of townships and the prevailing economic conditions. However, this section focuses on the economic indicators, income and employment, with an emphasis on changes in the relativities between rural and urban areas in the 1990s compared with the 1980s. Discussion of some other factors, including provision of services and prices, is provided in appendix D.

Diversity across non-metropolitan regions in the 1990s[2] is illustrated by income and unemployment data. Those regions dominated by the mining industry, and regions in the States experiencing relatively high economic growth, Western Australia and Queensland, tended to experience income growth relative to the national average and faster declines in unemployment rates. In contrast, other non-metropolitan regions, such as some of those in New South Wales and Victoria, experienced relative declines in income and slower declines in unemployment rates. The majority of non-metropolitan regions — 32 of 50 statistical divisions — experienced higher income growth relative to the national average. The unemployment rate fell in a majority of regions. Over the same period, 6 of 8 capital cities experienced falls in average income relative to the national average, but relatively faster declines in unemployment rates than the average for non-metropolitan regions.

In contrast, during the 1980s, the trend was towards increasing unemployment rates in all regions, and a relative income decline in a majority of regions. The average rise in unemployment rates in metropolitan regions was slightly higher than the average rise in the non-metropolitan regions, but from a lower initial rate. The average income of 6 of the 8 capital cities rose relative to the national average, but in virtually all non-metropolitan regions relative income declined.

Analysis of the readily available data does not give a clear indication that there has been an increasing divergence between metropolitan and non-metropolitan regions. Rather, the data indicate that there is significant variation in the economic experience across non-metropolitan regions. Factors such as the performance of industry in the region, and differences across States, appear to have significantly influenced the economic experience of regions in the 1990s. Also, there has been a

[2] Census data are used in this section. The examination of the 1990s is therefore a comparison of 1991 and 1996. For the 1980s, 1981 and 1991 are examined. These periods will obviously be affected by the business cycle.

significant change in the distribution of wellbeing within regions, with the growth of large regional centres at the expense of smaller towns.

5.5 Assessment

From the brief review undertaken in this chapter, it appears that there has been a widening in the earnings distribution during the 1990s, though at a similar rate to that experienced in the 1980s. In terms of capital income, there has been a more even distribution of share ownership. However, whilst foreign income from capital increased marginally, this was at a much slower rate than that of the 1980s. Distributional changes between urban and rural regions remain mixed, with no clear universal trend evident.

A Trends in selected indicators of living standards

This appendix provides more details about the selected measures of living standards discussed in chapter 2. It is not intended to be a comprehensive treatment of indicators of living standards. The areas covered are income, wealth, consumption, working hours, housing, health, education and environment. Where possible, comparisons are provided with major OECD countries for which data are readily available.[1]

The appendix concentrates on the main economic indicators for which data are readily available. Other indicators are treated in less detail, not because they are less significant, but because unambiguous indicators are not readily available. Some indicators of housing, health and education are examined using readily-available data, but these aspects of living standards are not comprehensively covered. Environmental trends are not examined at all (except to the extent they are covered by composite indicators), because unambiguous indicators are not readily available and an overall assessment of environmental change is complex and beyond the scope of this paper.

A.1 Income

Average income

GDP per person is an approximate measure of the income generated and available, on average, to the community. On an average income basis, Australians were 2.4 times as well off in 1998-99 in real terms than in 1959-60 (table A.1). Average income grew at an average annual rate of 2.1 per cent a year in the 1990s, compared with 1.9 per cent a year in the 1980s.

[1] Where possible, the average of 24 high-income countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Republic of Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States) is provided.

International comparisons are provided in table A.2. Of the major OECD countries shown, only three including Australia had higher average growth in the 1990s than in the 1980s. However, these three countries had relatively low average growth in the 1980s. On a trend basis, 8 out of 26 OECD countries had higher growth in the 1990s than the 1980s (table A.3).

Table A.1 **Real GDP per person, 1959-60 to 1998-99**

1997-98 dollars; index 1959-60 = 100

Year	*Real GDP per person*	
	$	Index
1959-60	13 101	100
1964-65	15 201	116
1969-70	18 136	138
1974-75	19 476	149
1979-80	21 381	163
1984-85	22 918	175
1989-90	25 818	197
1994-95	27 563	210
1998-99	31 188	238

Sources: ABS National Accounts (1998/99) database, RBA Australian Economic Statistics database and ABS Time Series Statistics Plus database on EconData (accessed 26 July 2000).

Table A.2 **International comparisons of real GDP per person, 1960 to 1998**

1995 $US

						Growth	
Country	*1960*	*1970*	*1980*	*1990*	*1998*	*1980-90*	*1990-98*
	$	$	$	$	$	% per year	% per year
Australia	9 559	13 311	15 721	18 023	21 881	1.4	2.5
Canada	9 063	12 479	16 423	19 160	20 458	1.6	0.8
France	10 595	16 387	21 374	25 624	27 975	1.8	1.1
Italy	6 628	10 771	14 621	18 141	19 574	2.2	1.0
Japan	8 213	20 015	27 672	38 713	42 081	3.4	1.0
Netherlands	11 525	16 636	20 443	24 009	28 154	1.6	2.0
Sweden	12 960	18 969	22 283	26 397	27 705	1.7	0.6
United Kingdom	9 499	11 831	14 205	18 032	20 237	2.4	1.5
United States	14 078	18 079	21 529	25 363	29 683	1.7	2.0
High income OECD average	10 379	15 889	20 366	25 546	28 688	2.3	1.5

Source: World Bank World Tables database on EconData (accessed on 20 July 2000).

Table A.3 **Trend growth in GDP per person in OECD countries, 1980–90 and 1990–98**

Average annual rate of growth, per cent

Country	*1980–90*	*1990–98*
Australia	1.6	2.4
Austria	2.1	1.7
Belgium	1.9	1.7
Canada	1.5	1.2
Denmark	2.0	2.1
Finland	2.2	1.3
France	1.6	1.2
Germany	1.9	0.9
Greece	1.3	1.3
Iceland	1.7	0.8
Ireland	3.0	5.6
Italy	2.3	1.3
Japan	3.3	1.6
Korea	7.2	5.3
Luxembourg	4.0	4.0
Mexico	0.3	1.2
Netherlands	1.6	2.1
New Zealand	1.2	0.8
Norway[a]	1.4	2.2
Portugal	2.9	2.5
Spain	2.3	2.2
Sweden	1.5	0.9
Switzerland	1.6	0.1
Turkey	2.0	2.3
United Kingdom	2.2	1.8
United States	2.0	2.2

a Mainland only.

Source: Scarpetta et al. (2000, p. 11).

Distribution of income

The community standard of living is affected by the distribution of income, not just changes in average income. The evenness of the distribution of income is one indicator of equality and the Gini coefficient is one summary measure of this distribution. The Gini coefficient can have a value between 0 (indicating that income is distributed equally) and 1 (indicating that one income unit has all of the income). However, Gini coefficients can be based on a range of income definitions and choices of income-sharing units.

Whiteford (1997) notes there is no unanimity on the trend or level of inequality in Australia, with the literature providing a bewildering array of contradictory results

and trends. Harding (1998) attributes these divergent conclusions about trends in income inequality to different methods and data. These aspects include the:

- definition of income (for example, earned, market, gross, disposable or final);
- size of the income unit (for example, individual, family or household);
- time period over which the receipt of income is measured (for example, weekly or annual);
- weighting of income units of different size and composition in the construction of summary measures of inequality; and
- summary measure used (for example, Gini coefficient, coefficient of variation or 90^{th} to 10^{th} percentile).

Harding (1998) provides a detailed explanation of the effect of these methodological decisions, but summarises the effect as follows.

> Generally speaking, broadening the definition of income, expanding the definition of the income unit, and lengthening the time period over which the receipt of income is measured, all produce a reduction in measured income inequality. (p. 250)

Changes in the dynamics of the workforce over time can also affect the interpretation of data on the distribution of earnings. For example, the number of students working in relatively low-paid and part-time jobs in service industries has increased. This will have an adverse impact on the distribution of earnings today, compared with periods when this was not so common. However, since most of these workers graduate to better-paid work, information on the distribution of lifetime earnings may give a different impression.[2]

Table A.4 presents a few measures for Australia based on *gross income*, which is measured as market income plus direct government cash benefits. These measures show that inequality in Australia declined over the twentieth century, but not steadily, with most of the reduction coming after the 1930s and before the 1980s. There was some increase in inequality between 1982 and 1994-95. The ABS found that the distribution of gross income remained almost unchanged between 1994-95 and 1997-98, but the National Centre for Social and Economic Modelling (NATSEM) found some decrease in inequality over the same period.

There was some increase in *earnings* and *market income* inequality in the 1980s and early 1990s, but this was largely offset by effective redistribution through the welfare system (Harding 1997; Johnson, Manning and Hellwig 1995; NATSEM 2000). Table A.5 illustrates this point, presenting a range of Gini

[2] The ABS is undertaking a development project to produce experimental estimates of human capital that will entail estimating lifetime earnings.

coefficients based on different definitions of income for the periods 1982 and 1996-97.

The issue of distribution of income to foreigners is discussed in appendix D.

Table A.4 **Income[a] distribution, 1915 to 1998[b]**

	Gini coefficient[c]				
Year	*Males*[d]	*Females*[d]	*Persons*[d]	*Income units*[e]	*NATSEM income units*[f]
1915	0.4550	0.6482	0.5473	na	na
1933	0.5551	0.4396	0.5514	na	na
1981	0.3705	0.5351	0.4735	0.40[g]	0.386[h]
1986	0.38	0.48	0.45	0.41	na
1990	na	na	na	0.43	na
1994	na	na	na	na	0.404
1995	na	na	na	0.443[d]	na
1996	na	na	na	0.437[d]	na
1997	na	na	na	0.444[d]	0.398
1998	na	na	na	0.446[d]	na

a Gross income, which is market income plus direct government cash benefits. **b** Year ending 30 June. **c** Measure of inequality of income distribution, which can have a value between 0 (indicating that income is distributed equally) and 1 (indicating that one income unit has all of the income). Presented for gross income in this table. **d** Calculation of Gini coefficients includes zero income. **e** Income unit is that group of persons within a household whose command over income is assumed to be shared. Calculation of Gini coefficients excludes zero income. **f** Uses the same income unit definition as the ABS, but data adjusted to improve comparability over time (see NATSEM 2000, p. 10). **g** For 1982. **h** For year ending December 1982. **na** Not available.

Sources: Data for individuals from McLean and Richardson (1986) up to 1981 and ABS (*Census 86 Australia in Profile*, Cat. no. 2502.0) for 1986; income units from ABS (*Social Indicators*, Cat. no. 4101.0) up to 1990 and ABS (*Income Distribution*, Cat. no. 6523.0) from 1995; NATSEM income units from NATSEM (2000, p. 2).

Table A.5 **Gini coefficients for various income measures for Australian income units, 1982 and 1996-97**

	Gini coefficient			
Income measure	*1982*	*1996-97*	*Change*	*Verdict*
Earned income[a]	0.477	0.538	+0.061	Sharp inequality increase
Market income[b]	0.457	0.511	+0.054	Sharp inequality increase
Gross (total) income[c]	0.386	0.398	+0.012	Inequality increase
Disposable income[d]	0.337	0.346	+0.009	No real change
Henderson equivalent income[e]	0.29	0.287	-0.003	No real change

a Earned income is defined here as wage income plus self-employment income. **b** Market income is defined here as private or 'pre-government action' income, with earnings, self-employment and investment income being the major sources of market income. **c** Gross income is market income plus government cash transfers. **d** Disposable income is gross income minus income tax. **e** Henderson equivalent income is disposable income adjusted for how much more (or less) income families require to achieve the same standard of living as a 'benchmark' family (see Harding 1997 for details).

Source: NATSEM (2000, p. 2).

International perspective

There does not appear to be a particular international trend in income inequality. A review of studies of a number of industrialised economies, all at similar levels of development and experiencing similar rates of growth, showed different trends in income inequality. The authors noted that this was to be expected, given that the determinants of income inequality in a country include social and political forces as well as economic ones (Aghion, Caroli and García-Peñalosa 1999).

It has also been suggested that when employment opportunities are considered as well as the distribution of earnings there is a more common pattern of rising economic inequality (Katz 1998; Visco 1998). A number of European countries (such as France and Italy) have shown relatively little increase in earnings inequality, but rising unemployment. The US has had increases in earnings inequality, but relatively low unemployment. Visco (1998) noted that if the distribution of earnings is calculated across the entire working age population, not just individuals who have jobs, earnings distribution is more similar across countries.

Concerns are often raised about the quality of Australian data used in international comparisons and the comparability of data across countries in general. One of the objectives of the Luxembourg Income Study project is to address the issue of cross-country data comparability. Table A.6 highlights the trend in equality of income distribution internationally, from 1969 to 1997, using data from that project. On the basis of this measure, the trend has been toward increased disposable income inequality in most major OECD countries including Australia — the exceptions being Canada and France. The trend for Germany is unclear. However, as noted above, the Gini coefficient is just one measure of income inequality. Oxley et al. (1999) used different data and a variety of measures to also conclude that inequality in the distribution of disposable income has increased over the two decades to the mid-1990s in some, but not all, of 13 OECD countries.

Table A.6 **International comparisons of household disposable income distribution, 1969 to 1997**

Gini coefficients[a]

Year	*Australia*	*Canada*	*France*	*Germany*	*Italy*	*Nether-lands*	*Sweden*	*United King-dom*	*United States*
1969								26.8	
1971		32.3							
1973				27.7					
1974								26.8	32.3
1975		29.3					21.7		
1978				27.1					
1979			29.7					27.0	30.9
1981	28.7	28.6	29.0	24.5			19.8		
1983				26.1		28.2			
1984			29.6	25.0					
1985	29.5								
1986					31.0			30.4	34.1
1987		28.9				26.8	22.0		
1989	31.0								
1991		28.6			29.0	27.2		34.0	34.2
1992							22.9		
1994	31.7	28.6	29.0	30.0[b]		31.0			36.9
1995					34.6		22.2	34.6	
1997									37.5

[a] Measure of inequality of income distribution, which can have a value between 0 (indicating that income is distributed equally) and 100 (indicating that one income unit has all of the income). Based on equivalent disposable income, person weighted in this table. Data for Australia will therefore differ from table A.4. [b] This result in under review.

Source: Luxembourg Income Study (1998).

A.2 Wealth

Assets and liabilities

Table A.7 presents the balance sheets for Australian households and government. The household balance sheet (which includes unincorporated enterprises) shows an increase in net worth of 47 per cent over the ten years to 1998-99. The net worth of general government has increased by 81 per cent.

Stevens (2000) notes that a major part of the increase in household wealth is due to rises in the value of dwellings and the value of financial assets (indirectly through superannuation and in direct holdings).

Table A.7 **Real[a] assets and liabilities of households and government, 1988-89 to 1998-99[b]**

1997-98 dollars

Year	*Dwellings*	*Shares and other equity*	*Total assets*	*Total liabilities*	*Net worth*
Households[c]	$b	$b	$b	$b	$b
1988-89	364.7	76.3	1 504.2	192.1	1 312.1
1989-90	383.5	69.8	1 513.9	204.8	1 309.0
1990-91	386.8	63.2	1 536.1	207.4	1 328.7
1991-92	389.3	76.5	1 542.0	212.7	1 329.3
1992-93	399.5	93.6	1 630.5	220.0	1 410.5
1993-94	417.9	117.6	1 749.7	246.7	1 503.0
1994-95	438.5	106.9	1 834.4	270.7	1 563.7
1995-96	445.2	99.5	1 883.7	302.3	1 581.5
1996-97	455.2	124.6	2 048.6	328.9	1 719.6
1997-98	472.8	150.3	2 182.1	367.8	1 814.3
1998-99	496.3	181.7	2 335.5	409.9	1 925.6

	Total non-financial assets	*Total financial assets*	*Total assets*	*Total liabilities*	*Net worth*
General government	$b	$b	$b	$b	$b
1988-89	278.4	116.2	394.6	223.4	171.1
1989-90	264.6	122.2	386.8	222.9	163.8
1990-91	266.7	130.1	396.8	236.9	159.9
1991-92	262.8	128.9	391.6	266.3	125.3
1992-93	277.1	239.6	516.7	306.1	210.6
1993-94	288.8	240.0	528.8	209.4	319.4
1994-95	314.9	218.0	532.9	312.0	221.0
1995-96	309.2	199.2	508.4	332.0	176.4
1996-97	326.7	197.1	523.8	335.0	188.8
1997-98	336.8	238.7	575.5	321.6	253.9
1998-99	352.8	265.3	618.1	308.8	309.4

a Deflated using GDP implicit price deflator. **b** Owing to the introduction of new international standards from 30 June 1995, estimates of financial assets and liabilities are not fully consistent with the estimates shown prior to this period. See ABS Cat. no. 5254.0. **c** Includes unincorporated enterprises.

Source: ABS National Accounts (1998/99) database on EconData (accessed 29 August 2000).

Asset ownership

Looking more closely at household asset ownership, the proportion of the Australian community owning assets, particularly shares, has increased considerably.

Table A.8 **Asset ownership, 1947 to 1999**

	Share ownership		*Home ownership*[a]		
Year	*Direct*	*Total*[b]	*Owner*	*Purchaser*	*Owner or purchaser*[c]
	% population[d]	% population[d]	% total households	% total households	% total households
1947	na	na	na	na	53.4
1954	na	na	na	na	63.3
1961	na	na	na	na	70.3
1966	na	na	na	na	71.4
1971	na	na	na	na	68.8
1976	na	na	32.3	35.6	68.4
1981	na	na	34.2	34.0	70.1
1986	na	9.2	38.9	31.5	70.4
1991	10.2	14.7	41.1	27.7	68.8
1994	16.0	19.9	41.8	28.3	70.1
1996	na	na	42.5	26.5	69.0
1997	20.4	34.0	na	na	na
1998	31.9	40.3	na	na	na
1999	40.6	53.7	na	na	na

a Private dwellings. **b** Total ownership includes investment in a managed fund (which invests wholly or partly in shares) or personal superannuation (which invests wholly or partly in shares where only individuals contribute and not their company, or individuals manage their own personal superannuation fund). **c** Includes a small number of 'owner/purchaser undefined', so components do not add to total. **d** Population of adults aged 18 years and over. **na** Not available.

Sources: Share ownership from AASE (1986) and ASX (1997; 2000); housing from ABS (*Housing Australia: A Statistical Overview*, Cat. no. 1320.0) to 1994 and ABS (*Australia in Profile: A Regional Analysis,* Cat. no. 2032.0) for 1996.

Share ownership in Australia increased dramatically between 1986 and 1999, particularly in the late 1990s (table A.8). There have been increased opportunities for people to become share owners through public floats, such as Telstra and the Commonwealth Bank. Many Australians also became shareholders under the demutualisation of AMP. Compulsory superannuation has contributed to the increase in indirect share ownership numbers. However, share ownership remains heavily concentrated among the very wealthy, with the top 10 per cent of income units holding 90 per cent of shares directly held by private investors (Access Economics 1998).

The share of households either owning or purchasing a home has remained relatively steady since the 1960s (table A.8). In the period 1976 to 1996, there was an increase in the share of households owning homes and a fall in the share of households purchasing homes, perhaps indicating that many households have made the transition from purchasing to owning their homes outright. Access Economics (1998) found that the dispersion of housing wealth is more even than

shares but, even so, 90 per cent of housing wealth is held by the top 50 per cent of wealth holders.

Overall, Access Economics (1998) noted that total wealth dispersion is more unequal than income and became even more unequally distributed during the late 1990s. Over the period 1993 to 1998, this is said to reflect the concentration of assets of the wealthiest in shares and expensive housing — the types of assets that have generated high returns in recent times.

A.3 Consumption

It has been argued that consumption is a more appropriate measure of household wellbeing than income (see for example, Barrett, Crossley and Worswick 2000, Blundell and Preston 1998, and Cutler and Katz 1992). This argument is based on the idea that income streams can fluctuate temporarily, but households are able to smooth these fluctuations by borrowing and saving. Income will therefore be more variable than expenditure, and this will affect the measurement of inequality at a point in time.

Average consumption

Private consumption expenditure per person is a measure of average purchasing power (table A.9). According to this economic indicator, the broad experience in the twentieth century for Australia was: marked fluctuations around a very slowly rising trend to the late 1930s; a sustained boom over the next three decades; and a marked slowdown in the 1970s (McLean 1987). In the 1980s, there was a further slowdown in growth, followed by stronger growth in the 1990s.

Australia's trend in real private consumption expenditure is compared with trends in major OECD countries in table A.10. Only Australia and the Netherlands had faster growth in the 1990s than the 1980s, with both countries having relatively low growth in the 1980s.

Distribution of consumption

Barrett, Crossley and Worswick (2000) found that for Australia, between 1975 and 1993, consumption was much more equal than income (table A.11). However, consumption inequality had also risen, although at a slower rate than income inequality. They also noted that in other developed countries it was a common finding that consumption is considerably more equal than income (table A.12).

Table A.9 Real private consumption expenditure per person, 1959-60 to 1998-99

1997-98 dollars; index 1959-60 = 100

Year	*Real private consumption expenditure per person*	
	$	Index
1959-60	8 168	100
1964-65	9 192	113
1969-70	10 600	130
1974-75	11 962	146
1979-80	12 828	157
1984-85	13 766	169
1989-90	15 359	188
1994-95	16 429	201
1998-99	18 273	224

Sources: RBA Australian Economic Statistics database and ABS Time Series Statistics Plus database on EconData (accessed 17 July 2000).

Table A.10 International comparisons of private final consumption expenditure per person, 1960 to 1997

1995 $US

						Growth	
Country	*1960*	*1970*	*1980*	*1990*	*1997*	*1980-90*	*1990-97*
	$	$	$	$	$	% per year	% per year
Australia	6 124	7 968	9 699	11 263	13 239	1.5	2.3
Canada	5 641	6 892	9 404	11 076	11 629	1.6	0.7
France	6 074	9 463	12 538	15 340	16 195	2.0	0.8
Italy	3 344	6 061	8 751	11 465	12 040	2.7	0.7
Japan	5 448	11 790	16 669	22 703	25 465	3.1	1.7
Netherlands	6 418	9 880	12 906	14 323	16 090	1.0	1.7
Sweden	8 002	10 960	12 493	14 290	14 142	1.4	-0.1
United Kingdom	5 782	6 832	8 456	11 607	12 876	3.2	1.5
United States	8 555	11 339	13 881	17 144	19 364	2.1	1.8
High income OECD average	6 250	9 447	12 409	15 825	17 487	2.5	1.4

Source: World Bank World Tables on EconData database (accessed on 20 July 2000).

Table A.11 **Inequality of equivalent gross income and equivalent nondurable consumption in Australia[a], 1975 to 1993**

Gini coefficients

Year	*Income*	*Consumption*
1975	0.259	0.202
1984	0.280	0.221
1988	0.275	0.214
1993	0.302	0.221
% change 1975 to 1993	17	9

a Based on ABS Household Expenditure Surveys.

Source: Barrett, Crossley and Worswick (2000, pp. 121, 127).

Table A.12 **International comparisons of inequality**

Percentage change in Gini coefficients[a]

Country/year	*Income*[b]	*Consumption*[c]
Australia 1975–93	17 (0.259)	9 (0.202)
Canada 1978–92	16 (0.272)	13 (0.228)
USA 1972–88	7 (0.371)	17 (0.253)

a Bracketed numbers are initial Gini coefficients. **b** Equivalent gross income. **c** Equivalent consumption for Australia and Canada. Equivalent total consumption for USA.

Source: Barrett, Crossley and Worswick (2000, p. 130).

Affordability of major items

While private consumption expenditure per person shows *average* purchasing power, there have also been changes in the affordability of major items. Table A.13 highlights changes in affordability in housing (ownership) and motor vehicles during the 1980s and 1990s. The higher the indexes, the more affordable the items.[3]

Housing affordability is usually not thought of as an absolute concept. Neutze (1987) suggested that few Australians cannot afford the housing standards and conditions in which their grandparents lived. Housing affordability is generally measured as a function of housing costs and income. This measure fell in the mid- to late 1980s before rising from the early to mid-1990s. In the later 1990s it fluctuated, reaching higher levels than 1984, before falling significantly in 1999 with interest rate rises (table A.13). More generally, housing costs (including rent as well as mortgage interest) as a percentage of average weekly household income rose slightly between 1974-75 and 1993-94 (table A.14).

3 These indexes are not adjusted for improvements in quality.

Car affordability is a function of income and car prices. It followed a fairly similar pattern to that for housing. The increased price of cars in the mid-1980s led to a sharp decline in car affordability (IC 1997b). DISR (1998) notes that, after 1995, with the combined effect of a stronger exchange rate, the sales tax changes and the annual reductions in tariffs, vehicles prices fell. This, combined with real growth in incomes through the 1990s, has improved affordability since 1995.

Table A.13 **Affordability of major items, 1984 to 1999[a]**

Year	*Housing*[b]	*Car*[c]
	Index (1989 = 100)	Index (1984:4 = 100)
1984	165.6	100.0
1985	145.0	95.2
1986	140.7	84.8
1987	140.4	80.8
1988	115.9	80.7
1989	106.6	81.8
1990	113.7	87.0
1991	128.4	85.7
1992	150.5	86.1
1993	160.8	84.4
1994	135.7	84.3
1995	141.6	85.2
1996	169.0	91.0
1997	168.0	100.7
1998	167.4	109.4
1999	144.1	na

a December quarter. **b** Housing affordability is measured by the ratio of average household disposable income to the qualifying income required to meet payments on a typical dwelling (expressed as an index). In calculating qualifying income, a deposit of 20 per cent with repayments of 30 per cent of income is assumed using a conventional 25 year loan. An increase in the index represents an improvement in affordability. **c** Car affordability equals average weekly full-time adult total earnings divided by the CPI motor vehicles price index. The higher the index, the more affordable. **na** Not available.

Sources: Car affordability from DIST (1995) and DISR (1998; 1999); housing from CBA-HIA (2000) and CBA-HIA unpublished data.

Table A.14 **Housing costs as a percentage of household income, 1974-75 to 1993-94**

Year	*Current housing costs*[a] *as a percentage of average weekly household income*
1974-75	11.0
1975-76	11.3
1984	10.9
1988-89	12.0
1993-94	12.2

a Rent payments, mortgage interest payments, water and sewerage rates, general rates, house and contents insurance, repairs and maintenance payments, interest on loans for alterations and additions, and body corporate payments. Mortgage principal payments excluded.

Source: ABS (*Housing: A Statistical Overview*, Cat. no. 1320.0).

Relative prices of consumer items

Price increases of other major consumer items provide a broader indication of changes in relative prices (but not affordability). Table A.15 provides the consumer price indexes for eight major expenditure groups. For each group, the average annual rate of growth in prices was lower in the 1990s than the 1980s. Over the 1990s, relative prices moved in favour of clothing, housing and household equipment and moved against alcohol and tobacco and health and personal care.

Table A.15 **Consumer price index for expenditure groups, March quarter 1980 to 2000**

Index 1989-90 = 100

Expenditure group	*1980*	*1985*	*1990*	*1995*	*2000*
Food	47.9	70.0	99.5	113.2	129.1
Clothing	50.4	69.4	100.0	106.2	104.8
Housing	40.2	62.3	101.4	102.8	100.7
Household equipment and operation	47.4	72.7	100.7	109.3	112.8
Transportation	43.6	68.5	101.7	117.3	130.1
Alcohol and tobacco	41.7	67.3	101.1	141.1	177.1
Health and personal care	47.2	61.6	101.7	136.5	153.1
Recreational and education	na	69.4	101.5	115.3	128.5

na Not available.

Source: ABS Time Series Statistics Plus database on EconData (accessed 24 May 2000).

A.4 Working hours

Leisure can be taken over a lifetime, the year of work or from week to week. And depending on the measure of hours used, trends can vary.

Table A.16 provides three measures of working hours — standard full-time working hours, and average actual hours worked by full-time workers and all workers. Average standard full-time hours per week in paid employment (taking into account holidays over the year) declined over the twentieth century. However, the rate of reduction in the first half of the century was greater than that experienced since, with no significant declines between the 1980s and 1990s in particular. Standard full-time working hours is also becoming a less relevant concept with the increase in part-time employment.

The second measure, average weekly hours worked by full-time workers, covers all hours worked (including overtime and unpaid hours). This measure rose by 1.9 per cent in the 1980s and by 3.4 per cent in the 1990s.

The third measure, average weekly hours worked by all workers, covers full-time, part-time and casual workers and also all hours worked (not necessarily paid for). This measure fell by 2 per cent between 1980 and 1990, but was virtually unchanged between 1990 and 1999.

The ABS (1995) noted that, despite the trend toward part-time work, there has been little change in overall average hours worked in recent years. Increases in average hours actually worked by full-time workers have offset the increased proportion of part-time workers. The trend to longer hours and unpaid overtime has been stronger in particular occupation groups, especially managers, professionals and associate professionals (Reith 2000).

International comparisons of annual hours actually worked per person between 1979 and the 1990s show that in most of the major OECD countries hours worked have decreased (table A.17). The exceptions are Sweden and the US. The OECD (1998) noted that the long-term decline in average annual hours worked per person in employment has slowed significantly in recent decades (since the beginning of the 1980s) in almost all OECD countries. In some countries, the decline appears to have stopped, in some it continues mainly because of an expansion of part-time work and, in a few, there has recently been an increase in hours. Within the overall averages there have been complex changes in the distribution of hours worked between individuals, reflecting an increased diversity of working arrangements.

Table A.16 **Working hours, 1901 to 1999**

	Adjusted standard working hours per week[a]			*Average weekly hours worked*[b]	
Year	*Males*[c]	*Females*[c]	*Persons*[d]	*Full-time workers*	*All workers*
1901	47.0	47.2	na	na	na
1915	47.0	47.2	na	na	na
1933	43.7	43.2	na	na	na
1947	40.8	41.2	na	na	na
1961	37.4	37.1	na	na	na
1966	37.4	37.1	na	na	na
1971	37.4	37.1	na	na	na
1976[e]	36.3	36.1	na	na	na
1980[e]	36.2	36.1	35.8	39.0	35.2
1986	na	na	35.1	39.1	34.7
1990	na	na	34.5	39.8	34.5
1991	na	na	34.4	39.9	34.5
1992	na	na	34.4	40.6	34.7
1993	na	na	34.4	40.3	34.4
1994	na	na	34.4	40.7	34.6
1995	na	na	34.4	40.9	34.7
1996	na	na	34.4	40.5	34.2
1997	na	na	na	41.0	34.5
1998	na	na	na	41.2	34.6
1999	na	na	na	41.1	34.5

a Standard minimum working hours for full-time adult employees adjusted for public holidays and annual leave. Adjusted using method outlined in Carter and Maddock (1984). **b** Simple average of monthly averages for financial years. **c** For December. **d** For June. **e** For 1976 and 1980, estimates for males exclude rural industry and shipping and stevedoring and estimates for females exclude rural industry, mining and quarrying, and building and construction. Estimates for persons exclude employees in the defence forces, agriculture, services to agriculture and employees in private households employing staff. **na** Not available.

Sources: Adjusted series for male and female estimates up to 1971 from Butlin (1977) and from ABS (*Labour Statistics*, Cat. no. 6101.0) for 1976 to 1980; persons based on ABS (*Award Rates of Pay Indexes, Australia,* Cat. no. 6312.0; unpublished data). Average weekly hours worked from ABS Labour Force Statistics database on EconData (accessed 27 July 2000).

Table A.17 **International comparisons of average annual hours actually worked per person in employment[a], 1979 to 1998**

Country	*1979*	*1983*	*1990*	*1994*	*1995*	*1996*	*1997*	*1998*
Australia	1 904	1 852	1 869	1 879	1 876	1 867	1 866	1 861
Canada	1 836	1 783	1 790	1 783	1 780	1 787	1 777	na
France	1 813	1 711	1 668	1 635	1 638	1 644	1 634	na
West Germany	1 764	1 724	1 611	1 581	1 561	1 557	1 553	1 562
Japan	2 126	2 095	2 031	1 898	1 889	na	na	na
Sweden	1 451	1 453	1 480	1 537	1 544	1 554	1 552	1 551
United Kingdom	1 815	1 713	1 767	1 737	1 740	1 738	1 736	1 737
United States[b]	1 905	1 882	1 943	1 945	1 952	1 951	1 966	1 957

a Total number of hours worked over the year divided by the average number of people in employment. Part-time workers are covered as well as full-time. The data are intended for comparisons of trends over time; they are unsuitable for comparisons of the level of average hours of work for a given year because of difference in their sources. **b** Break in series after 1990. **na** Not available.

Source: OECD (1999a).

A.5 Housing

The quality of housing is reflected in the average number of rooms per dwelling (table A.18). Slightly larger houses combined with a fall in the number of occupants led to an increase in the number of rooms per occupant. The rate of improvement in this measure was greater after 1947 than between 1911 and 1947. Occupants per dwelling has continued to decline very slightly in the 1990s compared with the 1980s, reflecting a rise in the proportion of lone person households (ABS 1996).

Table A.18 **Measures of housing size and crowding, 1911 to 1996**

Year	*Rooms per dwelling*	*Occupants per dwelling*	*Rooms per occupant*
1911	4.9	4.5	1.1
1921	4.9	4.4	1.1
1933	5.0	4.1	1.2
1947	5.0	3.8	1.3
1961	5.1	3.6	1.4
1971	5.0	3.3	1.5
1981	5.4	3.0	1.8
1986	na	2.9	na
1991	na	2.8	na
1996	na	2.7	na

na Not available.

Sources: McLean (1987) for data up to 1981; ABS (*Census 86 Australia in Profile*, Cat. no. 2502.0) for 1986; ABS (*Census 1996 Family and Labour Force Characteristics*, Cat. no. 2017.0) from 1991.

A.6 Health

Life expectancy

Life expectancy provides a general indication of improvements in the standard of health (table A.19). Factors that affect life expectancy, and health in general, include improved nutrition and advances in medical treatment. During the twentieth century, life expectancy in Australia increased by 20.7 years for males and 22.7 years for females. The bulk of this improvement occurred before the 1980s. The rate of improvement was slightly higher in the 1980s than the 1990s. This trend of increased life expectancy has occurred in most countries, though at different rates. Major OECD countries are shown in table A.20.

Table A.19 **Life expectancy, 1901 to 1998**
Years at birth

Period	*Males*	*Females*
1901–11	55.2	58.8
1920–22	59.2	63.3
1932–34	63.5	67.1
1946–48	66.1	70.6
1953–55	67.1	72.8
1965–67	67.6	74.2
1970–72	67.8	74.5
1981	71.4	78.4
1986	72.9	79.2
1991	74.4	80.4
1993–95	75.0	80.8
1994–96	75.2	81.1
1995–97	75.6	81.3
1996–98	75.9	81.5

Sources: ABS (*Social Indicators 1978*, Cat. no. 4101.0) up to 1970–72; ABS (*Yearbook Australia*, Cat. no. 1301.0) from 1981 to 1991; ABS (*Deaths*, Cat. no. 3302.0) from 1993–95.

Table A.20 **International comparisons of life expectancy, 1970 to 1997**
Years at birth

Country	*1970*	*1980*	*1990*	*1997*
Australia	71.4	74.4	77.0	78.2
Canada	72.5	74.7	77.2	78.9
France	72.0	74.3	76.8	78.4
Germany	70.5	72.6	75.1	76.7
Italy	71.9	73.9	77.1	78.2
Japan	71.9	76.0	78.8	80.4
Netherlands	73.5	75.7	76.9	77.5
Sweden	74.5	75.9	77.5	79.1
UK	71.7	73.8	75.6	77.1
USA	70.8	73.7	75.2	76.1
High income OECD average	70.9	73.8	76.0	78.0

Sources: World Bank World Tables database on EconData (accessed 20 July 2000); World Bank (1999).

Access to health services

In focusing on the improvements in living standards in the 1990s, compared with the previous few decades, issues related to access to health are perhaps more relevant than life expectancy. This is a complex area and useful summary indicators are difficult to compile. A few individual measures are presented in this section, but they do not convey the complete picture. Doctors and hospital beds per population are two commonly used measures. Expenditure on health services is also a broad indicator of potential access to health services.

Table A.21 shows that the number of doctors per 100 000 population has been increasing since 1986, and at a similar rate over the late 1980s and the 1990s.

Acute care hospital beds per 1000 population have fallen between 1980 and 1998 after rising in the 1970s (table A.21). After a rapid reduction in the length of hospital stays in the early 1980s, health authorities planned to reduce their acute hospital bed ratios (Australian Institute of Health and Welfare (AIHW) 1996). More recent trends also reflect the shift towards day surgery procedures. Treatments that have previously required admission are frequently being provided in outpatient clinics, day care facilities or by community health services. The role of the acute hospital has changed — increasingly its role is to provide services to patients needing a high level of care and technology that can be provided only within hospitals (AIHW 1998a). Changes in acute bed numbers are therefore only part of the picture.

Sullivan et al. (1999) notes that there are five phases in the supply of hospital beds since 1900 — a steady expansion up to the 1940s; stability to the early 1950s; another expansion to the early 1970s; a sharp decline to the early 1990s; and a levelling since. The data in table A.21 confirm that there is a slight slowing in the rate of decline between the 1980s and 1990s.

Major OECD countries show similar trends to Australia (table A.22). Physicians per population increased in most countries between 1960 and the 1990s. Acute care hospital beds per population rose between 1970 and 1980 in some countries, but fell in all countries between 1980 and the 1990s.

As physicians and hospital beds tend to be concentrated in urban areas, these indicators give only a partial view of health services available to the entire Australian population. The AIHW (1998b) noted that in rural and remote zones there is a wider role for acute care hospitals compared with hospitals in metropolitan zones. This wider role may include hospitalisation of people with chronic conditions more frequently if they are required to travel long distances for followup treatment, and care of nursing-home-type patients in the absence of nursing homes. The AIHW found that this was probably reflected in the provisions of a higher number of beds in non-metropolitan zones (AIHW 1998b).

Inaccessibility of GPs, however, is considered by the AIHW to be the greatest sources of health access disadvantage for most rural residents (AIHW 1998b). In 1996, there was almost double the number of GPs providing services to capital cities per head of population compared with 'other remote areas', the areas with the lowest per head ratio.

Table A.21 **Access to health services, 1970 to 1998**

Year	*Doctors*[a]	*Acute care hospital beds*[b]
	Doctor per 100 000 population	Number per 1000 population
1970	na	6.0
1975	na	6.2
1980	na	6.4
1985	na	5.8
1986	210	5.4
1988	na	5.2
1990	na	5.0
1991	225	na
1992	na	4.5
1993	na	4.3
1994	na	4.4
1995	na	4.2
1996	241	4.3
1997	na	4.2
1998	na	4.2

a Doctors are defined as practising general and specialist medical practitioners. **b** Financial year ending 30 June. **na** Not available.

Sources: Doctors from ABS (*Australian Social Trends*, Cat. no. 4102.0); hospital beds from Mathers and Harvey (1988) up to 1985 and AIHW (1996; 1998a; 1998c; 1999) from 1986.

Table A.22 **International comparisons of access to health services, 1960 to 1990s**

Per 1000 population

	Physicians[a]				*Acute care hospital beds*[b]		
Country	*1960*	*1970*	*1980*	*1990s*[c]	*1970*	*1980*	*1990s*[c]
Australia	1.3	1.2	1.8	2.2	6.0	6.4	4.2
Canada	1.1	1.5	1.8[d]	2.2	na	4.6	3.6
France	1.1	1.3	2.2[d]	2.8	na	6.2	4.5
Germany[e]	1.5	1.7	2.2	3.4	7.5	7.7	6.7
Italy	1.4	1.8	na	1.7	na	7.6	5.1
Japan	1.1	1.1	na	1.8	na	na	na
Netherlands	1.1	1.2	2.1[d]	2.5	5.5	5.2	3.8
Sweden	1.0	1.4	2.2	3.1	5.9	5.1	2.8
United Kingdom	1.1	1.2	1.6[d]	1.5	na	2.9	2.0
United States	1.4	1.6	1.8	2.5	3.9	4.2	3.4
High income OECD average	1.2	1.4	1.9[d]	2.6	na	na	na

a Physicians are defined as graduates of any faculty or school of medicine who are working in the country in any medical field (practice, teaching, research). **b** Includes public acute and private hospitals but excludes psychiatric hospitals. **c** Latest available year between 1990 and 1996. **d** 1981. **e** West Germany for hospital beds. **na** Not available.

Sources: Physicians from World Bank (1999); hospital beds from AIHW (1998c).

Health expenditure

Total annual health expenditure, as a proportion of GDP and per person, was higher in 1998 than in the early 1980s, but movement was within a fairly narrow band (table A.23). Total health expenditure as a proportion of GDP rose at a fairly steady rate in both the 1980s and 1990s. However, total annual health expenditure per person rose at a higher rate of 5.7 per cent a year between 1989 and 1998, compared with 2.1 per cent a year between 1984 and 1989. AIHW (2000) suggested that the growth of 3.6 per cent a year in real expenditure per person between 1960-61 and 1997-98 reflected the combined effects of change in the intensity of use of health service resources by individuals and an increase in the quality of the services provided. Health expenditure may also be affected by the ageing of the population.

Table A.24 provides comparisons with selected OECD countries. Health expenditure as a proportion of GDP rose in each of these OECD countries. Australia's GDP proportion was just below the weighted average of seven OECD countries throughout the period. The US had the highest proportion, while the UK had the lowest. Appropriate cross-country comparisons of levels are difficult because different countries face different health problems.

Table A.23 **Health expenditure, 1980 to 1998[a]**

Year	*Total annual health expenditure per person*	*Total health expenditure as a proportion of GDP*
	$ (1997-98 prices)	%
1980	na	7.0
1981	na	7.0
1982	na	7.0
1983	na	7.3
1984	1 723	7.3
1985	1 749	7.3
1986	na	7.4
1987	na	7.7
1988	na	7.4
1989	1 914	7.4
1990	na	7.5
1991	na	7.9
1992	na	8.1
1993	2 102	8.2
1994	na	8.2
1995	na	8.2
1996	na	8.2
1997	na	8.3
1998	2 523	8.3

a Year ended 30 June. **na** Not available.

Source: AIHW (2000, p. 234, 241).

Table A.24 **Total health expenditure as a proportion of GDP, Australia and selected OECD countries, 1961 to 1997**

Per cent

Year	*Australia*	*Canada*	*France*	*Germany*	*Japan*	*NZ*	*UK*	*USA*	*Seven-country mean*[a]	*Eight-country mean*[b]
1961	4.3	5.8	4.5	4.8	3.4	na	4.0	5.4	4.3	4.9
1964	4.5	5.9	5.0	4.9	3.5	na	4.1	5.8	4.5	5.2
1967	4.6	6.3	5.6	5.7	4.7	na	4.4	6.3	5.2	5.8
1970	4.8	7.0	5.8	6.3	4.6	5.2	4.5	7.3	5.4	6.3
1975	6.3	7.2	7.0	8.8	5.6	6.7	5.5	8.2	6.7	7.5
1976	7.2	7.1	7.0	8.7	5.6	6.3	5.5	8.5	6.7	7.6
1984	7.3	8.3	8.5	9.1	6.6	5.7	5.9	10.3	7.5	8.9
1985	7.3	8.3	8.5	9.3	6.7	5.3	5.9	10.6	7.5	9.0
1989	7.4	8.7	8.7	8.8	6.2	6.6	5.8	11.9	7.3	9.5
1993	8.2	10.1	9.8	9.9	6.6	7.2	6.9	14.2	8.2	11.0
1994	8.2	9.8	9.7	10.0	6.9	7.3	6.9	14.1	8.3	11.0
1995	8.2	9.4	9.8	10.4	7.2	7.3	6.9	14.1	8.5	11.1
1996	8.2	9.3	9.8	10.8	7.1	7.3	6.9	14.1	8.5	11.1
1997	8.3	9.2	9.6	10.7	7.2	7.6	6.8	13.9	8.4	11.0

a Weighted mean excludes United States. **b** Weighted mean. **na** Not available.

Source: AIHW (2000, p. 408).

A.7 Education

Retention in education beyond minimum leaving age provides an indication of the level of educational attainment and, at least in broad terms, career and income-earning opportunity. Participation in education, both at school and higher education institutions, increased considerably over the twentieth century (table A.25). There were significant increases in participation rates by the end of the 1990s compared with the beginning of the 1980s. EPAC (1996) attributed increasing school retention rates to a variety of factors including government incentives, declining youth employment opportunities and the perception that improved qualifications lead to better job opportunities.

Australia's trend is similar to that of major OECD countries (tables A.26 and A.27), which showed increased participation in secondary and tertiary education.

Table A.25 **Participation in education, 1901 to 1999**

Year	*Percentage of population 15–19 attending a school*	*Higher education students as a ratio to 20–24 age group*[a]
1901	7.6[b]	na (0.5)
1947	11.3	na (4.9)
1981	34.7	25.9 (12.8)
1986	42.2	29.2 (13.5)
1990	43.4	35.6
1991	47.5	38.3
1996	49.4	45.4
1997	51.3	48.0
1998	50.8	49.5
1999	50.8	50.4

[a] Bracketed numbers are for universities only, before the removal of the distinction between universities and colleges of advanced education. [b] For 1911. **na** Not available.

Sources: All data to 1981 from McLean (1987). After 1981, school attendance from ABS (*Transition from Education to Work*, Cat. no. 6227.0); university estimates estimated from ABS (*Social Indicators*, Cat. no. 4101.0; *Australian Demographic Statistics*, Cat. no. 3101.0); higher education estimates based on DETYA (1998; 1999) and ABS (*Australian Demographic Statistics*, Cat. no. 3101.0).

Table A.26 **International comparisons of access to secondary education, 1960 to 1995**

Per cent of relevant age group[a]

	Gross enrolment ratio[b]				
Country	*1960*	*1970*	*1980*	*1990*	*1995*
Australia[c]	51.0	82.1	71.2	81.7	142.5
Canada	46.0	65.2	87.6	100.7	104.9
France	46.0	73.4	84.6	98.5	111.3
Germany	na	na	na	98.3	104.0
Italy	34.0	60.8	71.8	82.8	93.9
Japan	74.0	86.6	93.2	97.1	103.0
Netherlands[c]	58.0	75.0	92.5	119.5	137.4
Sweden[c]	55.0	86.0	87.9	90.2	136.5
United Kingdom[c]	66.0	73.1	83.5	85.5	133.1
United States	86.0	83.7	91.2	93.1	97.4
High income OECD average	63	na	86.6	94.4	106.4

[a] The relevant age group is that which officially corresponds to the level of secondary education in the individual country, rather than necessarily the 15-19 age group as in table A.25. [b] Ratio of total enrolment, regardless of age, to the population of the relevant age group. This allows the ratio to be greater than 100 and is a different measure to table A.25. [c] Break in series. Includes training for the unemployed for 1995, and also for 1990 for the Netherlands. **na** Not available.

Sources: World Bank World Tables database on EconData (accessed 20 July 2000); World Bank (1999).

Table A.27 **International comparisons of access to tertiary education[a], 1980 to 1996**

Per cent of relevant age group[b]

	Gross enrolment ratio[c]		
Country	*1980*	*1990*	*1996*
Australia	25	36	76
Canada	57	95	90
France	25	40	52
Germany	27	34	45
Italy	27	31	43
Japan	31	30	43
Netherlands	29	40	50
Sweden	31	32	49
United Kingdom	19	30	50
United States	56	75	81
High income OECD average	35	48	60

a Includes universities, teachers colleges and higher-level professional schools. **b** The relevant age group is that which officially corresponds to the level of tertiary education in the individual country, rather than necessarily the 20-24 age group as used in table A.25. **c** Ratio of total enrolment, regardless of age, to the population of relevant age group.

Source: World Bank (1999).

Education expenditure

Government expenditure and total expenditure on education as a proportion of GDP was lower in 1998 than 1980, but moved within an extremely narrow band (table A.28). These proportions reached their lows in 1989 and 1990, before regaining some ground in the 1990s. The falls in expenditure as a proportion of GDP were the result of more rapid increases in GDP than in education expenditure.

Table A.29 presents public spending on education as a percentage of GDP for major OECD countries. In most countries, this percentage fell between 1980 and 1990, before increasing again between 1990 and the mid-1990s.

Table A.28 **Education expenditure, 1980 to 1998[a]**

Year	*Government expenditure on education as a proportion of GDP*	*Total expenditure on education as a proportion of GDP*
	%	%
1980	5.2	5.9
1981	5.2	6.0
1982	5.2	6.0
1983	5.4	6.3
1984	5.3	6.2
1985	5.2	6.1
1986	5.2	6.1
1987	5.1	6.1
1988	4.6	5.6
1989	4.4	5.4
1990	4.3	5.5
1991	4.6	5.8
1992	4.9	6.2
1993	4.9	6.2
1994	4.7	6.0
1995	4.6	5.9
1996	4.5	5.8
1997	4.5	5.9
1998	4.4	5.9

a Year ending June.

Source: Unpublished ABS data.

Table A.29 **International comparisons of public spending on education, 1960 to 1996**

Per cent of GDP

Country	*1960*	*1970*	*1980*	*1990*	*1996*[a]
Australia	2.8	4.0	5.5	5.4	5.6
Canada	na	8.7	6.9	6.8	7.0
France	2.4	4.8	5.0	5.4	6.1
Germany	na	na	na	na	4.8
Italy	2.9	3.7	na	3.2	4.7
Japan	4.0	3.9	5.8	na	3.6
Netherlands	4.5	7.2	7.6	5.9	5.2
Sweden	4.2	7.6	9.0	7.7	8.3
United Kingdom	na	5.3	5.6	4.9	5.4
United States	4.6	7.4	6.7	5.3	5.4
High income OECD average	3.0	4.8	5.8	5.4	5.4

a 1996 or not more than two years earlier. **na** Not available.

Source: World Bank (1999).

A.8 Environment

Protecting the environment is a strong priority and value in a large section of the community. However, unambiguous indicators of environmental change are not readily available and the interpretation of the few available indicators is not always clear. It is beyond the scope of this paper to attempt such an assessment of environmental change.

B Statistical decomposition of growth in average income

This appendix provides details of the methodology used to decompose gross domestic income (GDI) per person into its various components. The decomposition provides a formal framework to examine the links between productivity, labour market and demographic changes, on the one hand, and growth in average living standards, on the other.

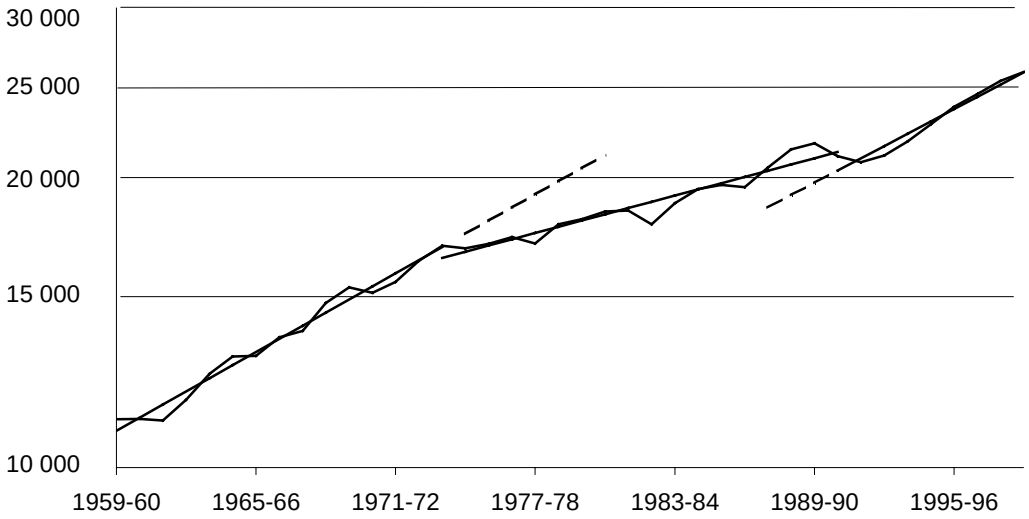
B.1 Phases of growth

Figure B.1 shows trends in Australia's gross domestic income per person. The series is drawn on a log scale to help identify shifts in trends. (A straight line on a log scale depicts a constant rate of growth.) There is clearly a change in trend in 1973-74, after which GDI per person slowed.

Whilst growth in GDI per person clearly accelerates in the 1990s, identifying a breakpoint from the slower growth of the 1970s and 1980s is not straightforward. There was an acceleration in the latter part of the 1980s. But it was not sustained. Many of the additional gains from faster growth in the latter part of the 1980s were reversed in the early 1990s recession. Taking a breakpoint at the end of the 1980s expansion (1989-90) would exaggerate the extent of sustained growth in the 1970s and 1980s and understate the extent of growth in the 1990s. Taking the breakpoint to be 1990-91, could result in an unduly favourable impression of the strength of underlying growth in the 1990s, given that 1990-91 was at the trough of a recession.

Figure B.2 shows an actual and trend series for Australia's GDI per person. The trend series was formed with a Hodrick-Prescott filter and is used to help identify a breakpoint between the 1980s and 1990s. First, the turning point in the trend series is 1990-91. Second, the actual data point at 1990-91 is very close to the trend series, and a growth rate based on actual data in the 1990s is close to the growth rate based on trends (table 3.1 in chapter 3). (Growth rates based on actual data are needed to undertake the decomposition.)

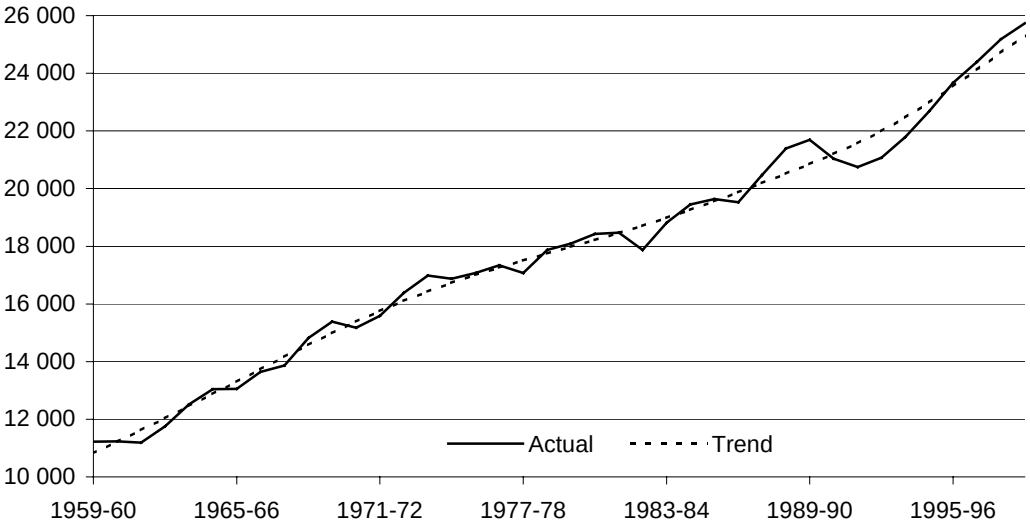
Figure B.1 **Real gross domestic income per person[a], 1959-60 to 1998-99**
1989-90 dollars (log scale)



a Trend lines are fitted for the periods 1959-60 to 1973-74, 1973-74 to 1990-91 and 1990-91 to 1998-99.

Data source: PC estimates based on ABS data.

Figure B.2 **Real gross domestic income per person[a], 1959-60 to 1998-99**
1989-90 dollars



a The trend line is based on the Hodrick-Prescott filter (λ = 100).

Data source: PC estimates based on ABS data.

Figure B.2 makes it even clearer that 1991-92, rather than 1990-91, is the trough in GDI per person and choosing this year as a breakpoint would exaggerate the upswing in the 1990s. Selecting 1989-90 as the breakpoint would have the difficulties outlined before. Out of the three possibilities (1989-90, 1990-91 and

1991-92), 1990-91 is a compromise, but provides the closest estimates to underlying trends.

B.2 The decomposition methodology

A mathematical framework for decomposing changes in average incomes was presented in *Assessing Australia's Productivity Performance* (IC 1997a, appendix B). It is a framework prepared by Professor Steve Dowrick for that report.

The framework involves three steps. The first step involves production relationships between inputs and output. An aggregate production function is expressed in the form Y = Mf(K,H), where Y is real output (GDP), K and H are capital input and labour hours, and M is a measure of multifactor productivity (MFP). Assuming a Cobb-Douglas production function with constant returns to scale and factors of production paid according to their marginal products, the production function can be written as:

$$Y = K^{\alpha}.L^{1-\alpha}.M$$

which in terms of proportional growth rates, becomes:

$$\dot{y}l = \alpha.\dot{k}l + \dot{m}$$

This says that the growth in labour productivity ($\dot{y}l$) is equal to the growth in the capital-labour ratio ($\dot{k}l$) multiplied by capital's share of income (α) plus MFP growth ($\dot{m}$).

The second step is to link output per person to labour productivity, labour force and demographic change. Output per person, (Y/P) can be written as:

$$Y/P = (Y/H).(H/P)$$

where, as before, (Y/H) is labour productivity, and (H/P) represents hours per person. Denoting the working age population as P^w, the number in the labour force as W, and the number of people employed as L, the identity becomes:

$$Y/P = (Y/H).(P^w/P).(W/P^w).(H/L).(L/W)$$

By denoting the unemployment rate as u = (W-L)/W, this identity can be written in proportional growth terms:

$$\dot{y}p = \dot{y}l + (\dot{p^w}/p) + (\dot{w}/\dot{p^w}) + (\dot{h}/\dot{l}) - \dot{u}$$

That is, the growth rate of output per person ($\dot{y}p$) is equal to the sum of the growth rates of labour productivity ($\dot{y}l$), the working-age share of the population ($\dot{p^w}/p$), labour force participation ($\dot{w}/p^w$) and average hours of work ($\dot{h}/l$), less the change in the unemployment rate ($\dot{u}$).

The third step is to link output per person to real income per person through a welfare specification. Real income per person can be defined in terms of the utility function of a representative consumer, which is defined in terms of consumption of both domestically produced and imported goods and services. Imports are exchanged for exports and the relative price of imports to exports is defined as the terms of trade (T). Maximising the consumer's utility, subject to budget constraints (assuming a Cobb-Douglas utility function), and substituting the optimal values into the utility function of the representative consumer, gives a measure of real average income. The resulting equation can be differentiated to give the growth rate of real income per person ($\dot{i}$) which is equal to the growth of real output per head ($\dot{y}p$) plus the growth in the terms of trade ($\dot{t}$) weighted by the import share (μ).

$$\dot{i} = \dot{y}p + \mu.\dot{t}$$

Finally, combining equations (1), (2) and (3) gives the full decomposition of income per head:

$$\dot{i} = \dot{m} + \alpha.\dot{k}l + (\dot{p^w}/p) + (\dot{w}/p^w) + \dot{h}/l + \mu\dot{t} - \dot{u}$$

To summarise[1], growth in real income per person ($\dot{i}$) is equal to: (1)

- growth in multifactor productivity ($\dot{m}$); (13)
- plus the growth in the capital-labour ratio multiplied by the capital share of income ($\alpha.\dot{k}l$); (12)
- plus the rate of demographic change (growth in the proportion of population of working age, $\dot{p^w}/p$); (4)
- plus the growth in labour force participation ($\dot{w}/p^w$); (5)
- plus the rate of growth of average hours of work ($\dot{h}/l$); (7)
- plus the import share multiplied by the growth in the terms of trade ($\mu.\dot{t}$); (2)
- less the change in the unemployment rate ($\dot{u}$). (6)

[1] The bracketed numbers correspond to the components in table B.1.

B.3 Implementation of the decomposition

The decomposition of GDI per person is intended to be implemented .at the economywide level. However, not all data can be measured at the economywide level. Productivity data are only available for the market sector. To preserve the integrity of the decomposition, an adjustment is included to allow for any divergence in growth of output and hours worked between the market sector and the total economy. The relationship between growth in labour productivity and growth in MFP and capital deepening then holds for the market sector. There are also relatively minor approximation errors involved in the implementation of this framework.

Reconciliation

The decomposition introduces data for all variables rather than summing them to get aggregate variables. This means that small approximation errors may occur. Table B.1 shows the differences between the summation of individual variables and their actual measurement for each stage of the decomposition. The results confirm that for each stage (bold variables) there are only minor approximation errors.

Table B.1 **Decomposition of changes in growth in real domestic income per person, 1990-91 to 1998-99**

Per cent per year

	Actual	*Components*	*Summation*	*Difference*
Sum of:				
1. Capital deepening[a]	1.40			
2. Multifactor productivity	1.53			
equals:				
3. Market sector labour productivity growth	**2.94**	**1+2**	**2.93**	**0.01**
plus:				
4. Economywide/market sector output	0.18			
5. Economywide/market sector hours worked *(negative of)*	-0.68			
equals:				
6. Growth in GDP per hour	**2.42**	**3+4+5**	**2.44**	**-0.02**
plus:				
7. Demographic profile	-0.09			
8. Participation rate	0.34			
9. Unemployment[b]	-0.28			
10. Average hours	-0.19			
equals:				
11. Growth in GDP per person	**2.58**	**6+7+8+9+10**	**2.57**	**0.00**
plus:				
12. Terms of trade[c]	-0.13			
equals:				
13. Growth in GDI per person	**2.46**	**11+12**	**2.44**	**0.02**

a Capital deepening is the growth in the capital labour ratio multiplied by capital's share of income. **b** This is not the unemployment rate. It is actually (1 – u). Therefore a negative number actually implies an increase in unemployment. **c** The terms of trade is multiplied by the import share of domestic consumption.

Source: PC estimates.

Non-market sector

The non-market sector includes Property and business services, Government administration and defence, Education, Health and community services, and Personal and other services. Tables B.2 and B.3 provide information on gross value added and total hours worked, for selected years. Growth in hours worked in the non-market sector (2.9 per cent per year compared with 0.6 per cent per year for the market sector) explains the discrepancies between the economywide growth in GDP

per hour and growth in market sector labour productivity. The majority of this growth in hours worked in the non-market sector occurred in the Property and business services sector.

Table B.2 **Gross value added and hours worked for the non-market sector industries and the market sector**

1997-98 dollars

	Gross value added		*Hours worked*	
Industry	*1990-91*	*1998-99*	*1990-91*	*1998-99*
	$b	$b	million hours/year	million hours/year
Property and business services	39	60	1 148	1 808
Government admin. and defence	19	23	651	618
Education	22	27	929	1 070
Health and community services	27	33	1 103	1 319
Personal and other services	11	13	470	594
Total non-market sector	118	155	4 300	5 409
Market sector	255	338	10 129	10 654

Sources: ABS (*Australian System of National Accounts*, Cat. no. 5204.0; ABS Labour Force Statistics database on EconData.

Table B.3 **Growth in gross value added and hours worked, by industry, 1990-91 to 1998-99**

Per cent per year

Industry	*Gross value added*	*Hours worked*
Property and business services	5.3	5.8
Government administration and defence	2.2	-0.7
Education	2.6	1.8
Health and community services	2.7	2.3
Personal and other services	2.5	3.0
Total non-market sector	3.5	2.9
Market sector	3.6	0.6

Source: PC estimates.

C Sectoral productivity growth and its distribution

This appendix provides a sectoral analysis of the distribution of income and productivity gains. Updated estimates of sectoral multifactor productivity (MFP) are presented first. The appendix then examines the distribution of factor income, according to the framework set out in chapter 4, and finally examines the distribution of productivity gains between wages, profits and prices.

C.1 Sectoral productivity estimates

Multifactor productivity

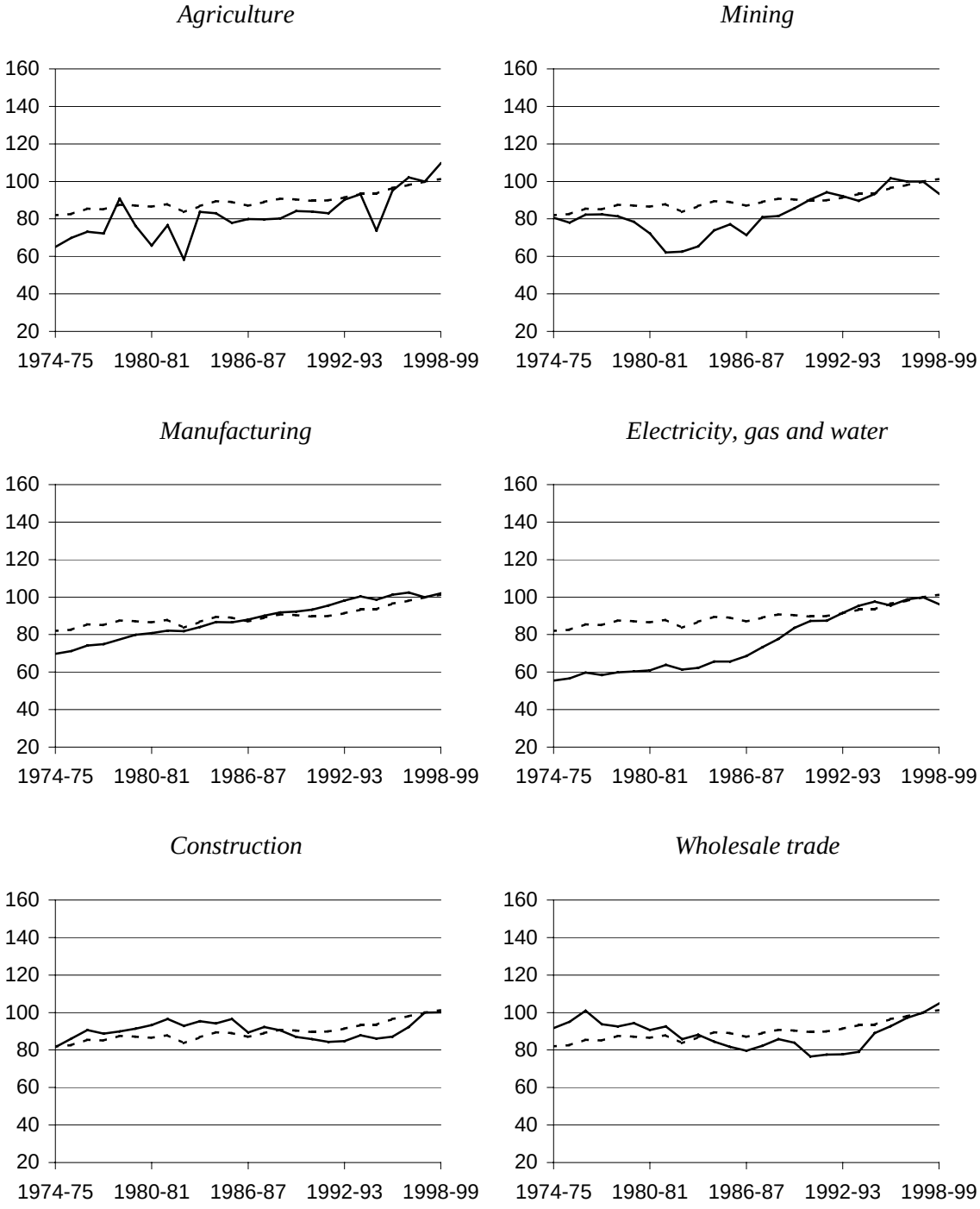
The Australian Bureau of Statistics (ABS) does not publish MFP estimates at the industry sector level. The Commission has previously published sectoral estimates in PC (1999b). Updated estimates are presented in figure C.1 and table C.1. These estimates were derived from sectoral data:

- output — chain volume indexes of gross value added, supplied by the ABS;
- capital input — capital services indexes supplied by the ABS; and
- hours worked — indexes supplied by the ABS for the years 1985-86 to 1998-99, while indexes for the years 1974-75 to 1984-85 were drawn from Gretton and Fisher (1997).

Figure C.1 presents MFP levels for each individual sector and the market sector average. Table C.1 presents growth in MFP by sector for periods that represent productivity cycles (peak-to-peak) for the market sector. Growth rates are calculated using the compound annual average method. Because sector productivity cycles do not necessarily correspond to aggregate productivity cycles, trend estimates are also included. These trend estimates are calculated using the Hodrick-Prescott filter.

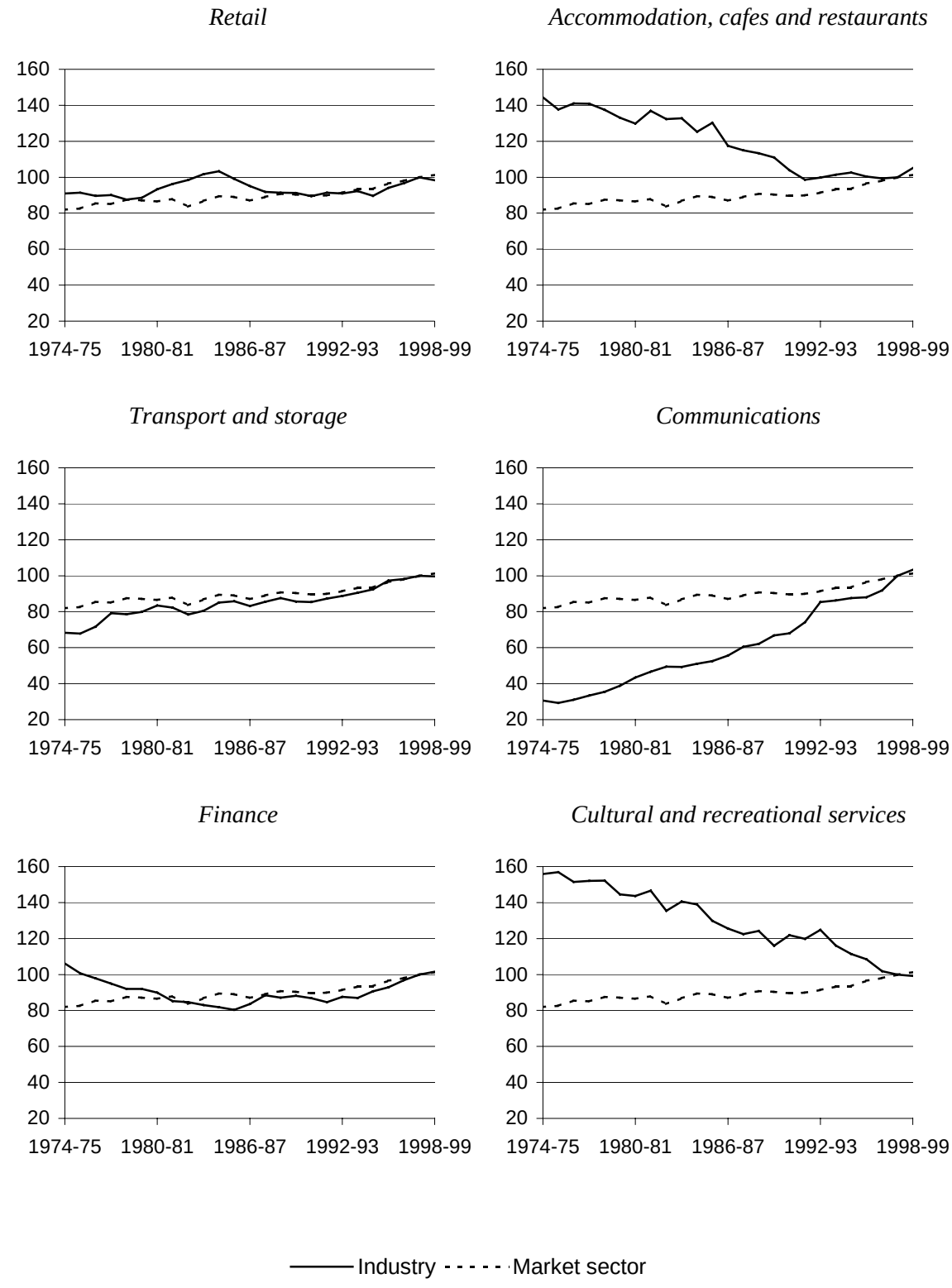
The charts show that there have been some increases in MFP in sectors such as Communications and Electricity, gas and water, as well as some decreases in sectors such as Accommodation, cafes and restaurants.

Figure C.1 **Multifactor productivity, by industry sector, 1974-75 to 1998-99**
Index 1997-98 = 100



(Continued on next page)

Figure C.1 **(continued)**



Data source: PC estimates based on ABS data.

Table C.1 **Growth in multifactor productivity, by industry sector[a]**

Per cent per year

Industry sector	*1974-75 to 1981-82*		*1981-82 to 1984-85*		*1984-85 to 1988-89*		*1988-89 to 1993-94*		*1993-94 to 1998-99*		*1974-75 to 1998-99*
	Actual	*Trend*	*Actual*	*Trend*	*Actual*	*Trend*	*Actual*	*Trend*	*Actual*	*Trend*	*Actual*
Agriculture	2.3	1.0	2.7	1.0	-0.9	1.3	3.0	2.0	3.3	2.9	2.2
Mining	-3.7	-1.6	6.0	0.6	2.5	2.6	1.9	2.6	0.8	1.6	0.6
Manufacturing	2.3	2.1	1.9	1.7	1.4	1.6	1.8	1.4	0.3	1.0	1.6
Electricity, gas and water	2.0	1.7	0.9	2.6	4.3	3.7	4.2	3.4	0.2	2.0	2.3
Construction	2.5	1.1	-0.8	-0.1	-1.0	-0.8	-0.6	-0.2	2.6	1.5	0.9
Wholesale trade	0.1	-1.2	-3.0	-1.6	0.4	-1.0	-1.6	1.1	5.8	3.2	0.6
Retail trade	0.8	0.8	2.4	0.3	-3.0	-0.5	0.2	-0.1	1.3	0.8	0.3
Accom., cafes and restaurants	-0.8	-1.2	-2.9	-1.8	-2.5	-2.4	-2.2	-2.0	0.7	-0.7	-1.3
Transport and storage	2.7	2.1	1.1	1.1	0.7	0.9	0.6	1.3	1.9	1.7	1.6
Communication services	6.2	6.9	3.1	5.5	5.0	5.4	6.8	5.3	3.7	4.3	5.2
Finance and insurance	-3.1	-2.3	-1.3	-1.2	1.6	0.1	0.0	1.2	3.1	2.0	-0.2
Cultural and rec. services	-0.9	-1.5	-1.8	-1.8	-2.8	-1.9	-1.3	-1.9	-3.1	-2.6	-1.9
Market sector	1.0		0.6		0.4		0.5		1.7		0.9

a Sectoral trend estimates are presented to allow for the possibility that sectoral productivity cycles do not correspond to aggregate productivity cycles. Trend growth rates are based on the Hodrick-Prescott filter.

Source: PC estimates based on unpublished ABS data, except for market sector from ABS (*Australian System of National Accounts*, Cat no. 5204.0).

Labour productivity

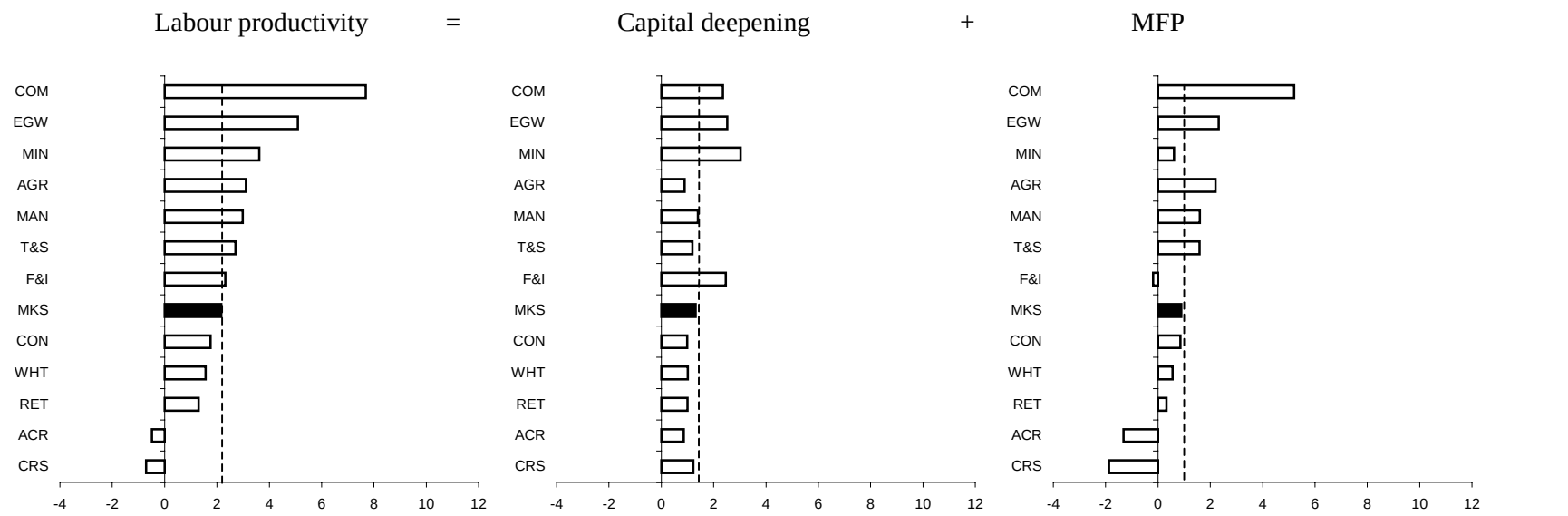
The framework developed in chapter 4 points to the importance of labour productivity growth in relation to growth in the real product wage. Thus, trends in labour productivity and its sources have importance in this appendix.

Figure C.2 provides information on the average annual rates of growth in labour productivity, MFP and capital deepening (the capital/labour ratio multiplied by the capital share of income) over the period 1974-75 to 1998-99. Growth in labour productivity is affected by growth in capital deepening and growth in MFP. For a further discussion on these sources of growth in labour productivity see chapter 3.

The figure shows that the variability in labour productivity across industries is more closely associated with variability in MFP, rather than capital deepening. Growth in capital deepening is relatively constant across the sectors compared with labour productivity and MFP growth.

Figure C.2 **Average annual rate of growth in labour productivity, capital deepening and MFP, 1974-75 to 1998-99**

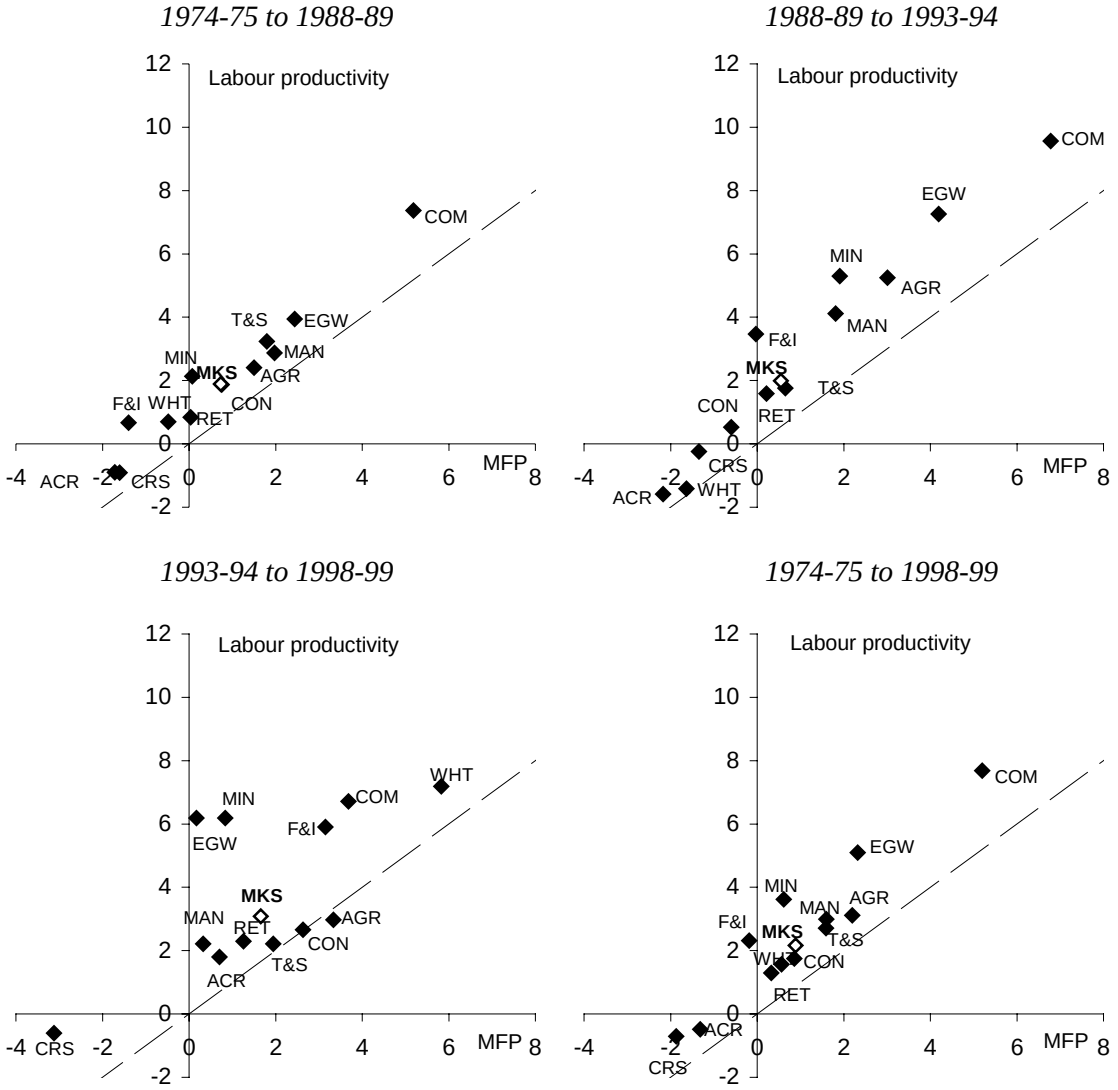
Per cent per year



COM	Communication services	MAN	Manufacturing	RET	Retail trade
EGW	Electricity, gas and water	WHT	Wholesale trade	CON	Construction
MIN	Mining	MKS	Market sector	ACR	Accommodation, cafes and restaurants
F&I	Finance and insurance	T&S	Transport and storage	CRS	Cultural and recreational services
AGR	Agriculture				

Data source: PC estimates based on unpublished ABS data.

Figure C.3 **Average annual growth in labour productivity and MFP**
Per cent per year



ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on unpublished ABS data.

Figure C.3 shows that there is a strong positive correlation between growth in labour productivity and growth in MFP in various periods. This correlation is strong in all periods, but less so in 1993-94 to 1998-99, due to the outliers, Mining and Electricity, gas and water. The vertical distance above the 45-degree line shows the extent of capital deepening in each industry. As figure C.2 showed, there is relatively little variation in capital deepening across industries. This also shows up

in figure C.3 as little variation in the distance from the 45-degree line (except for Mining and Electricity, gas and water). The charts also show labour and MFP growth is greater after 1988-89.

Table C.2 presents estimates of the correlation coefficients between labour productivity and capital deepening and labour productivity and MFP. The table shows that growth in labour productivity is highly correlated to growth in MFP. For the years 1993-94 to 1998-99, the lower correlation coefficient is due to the Mining and Electricity, gas and water sectors. The correlation coefficient is 0.88 if these two sectors are excluded from the estimates. There is some correlation between labour productivity and capital deepening, but it is not as strong.

Table C.2 **Correlation coefficients between labour productivity and MFP and capital deepening**

	Labour productivity and capital deepening	*Labour productivity and MFP*
1974-75 to 1988-89	0.53	0.98
1988-89 to 1998-99	0.69	0.84
1988-89 to 1993-94	0.79	0.97
1993-94 to 1998-99	0.46	0.65
1974-75 to 1998-99	0.63	0.94

Source: PC estimates.

C.2 Distribution of factor income

This section looks at the distribution of factor income to labour and capital at the industry sector level. Labour and capital income shares are decomposed according to the framework set out in chapter 4.

There are significant data requirements to examine the distribution of factor income by sector. Data on factor income flows are provided by the ABS. Producer prices are problematic, in that the output prices obtained from the ABS were not available for all industries or periods. To overcome this, implicit prices have been used in the analysis (see box C.1).

Box C.1 **Output price indexes**

Price indexes for final goods and services are not available for all sectors or for the full period under examination (1974-75 to 1998-99) and come from a variety of sources.

An alternative to observable output price indexes is implicit price deflators of value added. An implicit price deflator is the index derived from the ratio of current to constant prices of value added. Implicit price deflators are available at the sector level and can be used as proxies for output prices. However, there are doubts, both conceptually and practically, about their usage because the implicit price of value added is not observable. The data for the implicit price deflators is sourced from the Modellers' database section of ABS' Ausstats.

Labour income shares

Labour income shares can be decomposed into the real product wage and labour productivity. The real product wage can then be decomposed into the real consumption wage and the labour terms of trade. The real product wage is the average hourly labour compensation deflated by the industry-specific producer price. The real consumption wage is the average hourly labour compensation deflated by the consumer price index.

Figure C.4 presents labour income shares, labour productivity and the real product wage for each sector over the period 1974-75 to 1998-99. The charts show that there have been some declines in the labour income share over this period, especially for the Manufacturing, Electricity, gas and water, Construction, Transport and storage and Communications sectors. In all cases, this decline in labour income share is due to growth in labour productivity being greater than growth in the real product wage.

Figure C.4 **Labour productivity, real product wage and labour income share, by sector, 1974-75 to 1998-99**

Index 1997-98 = 100 (LHS) and per cent (RHS)

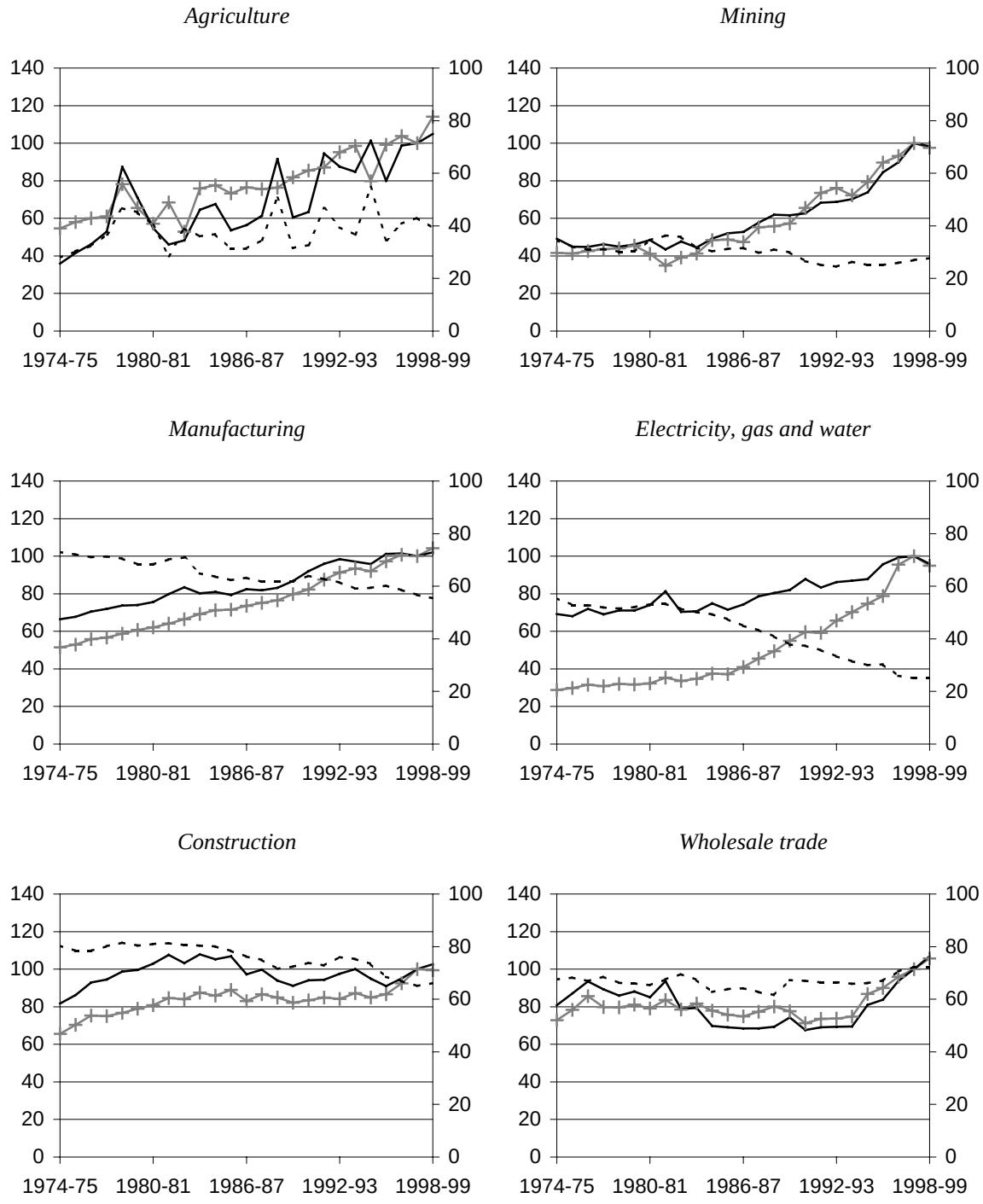


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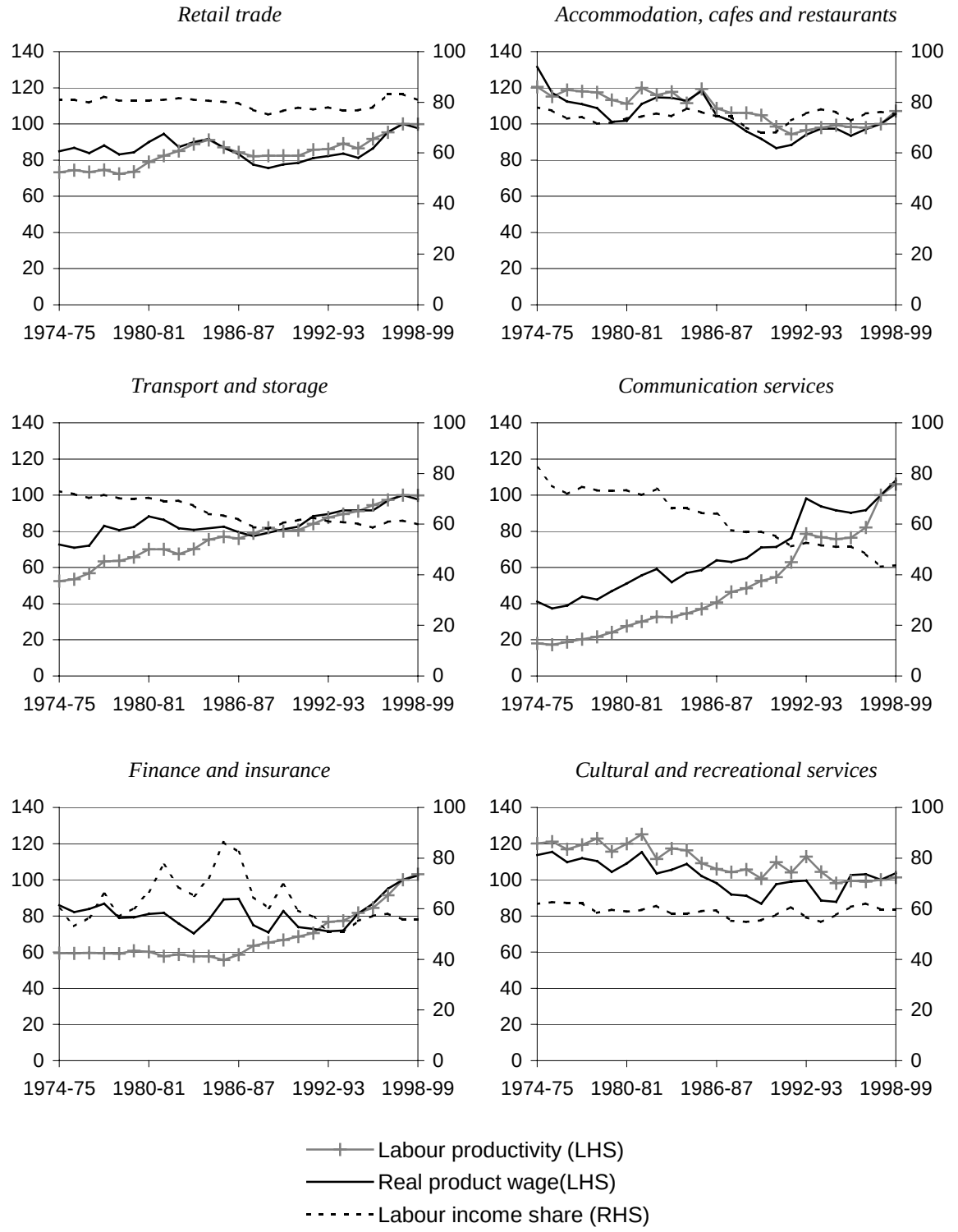
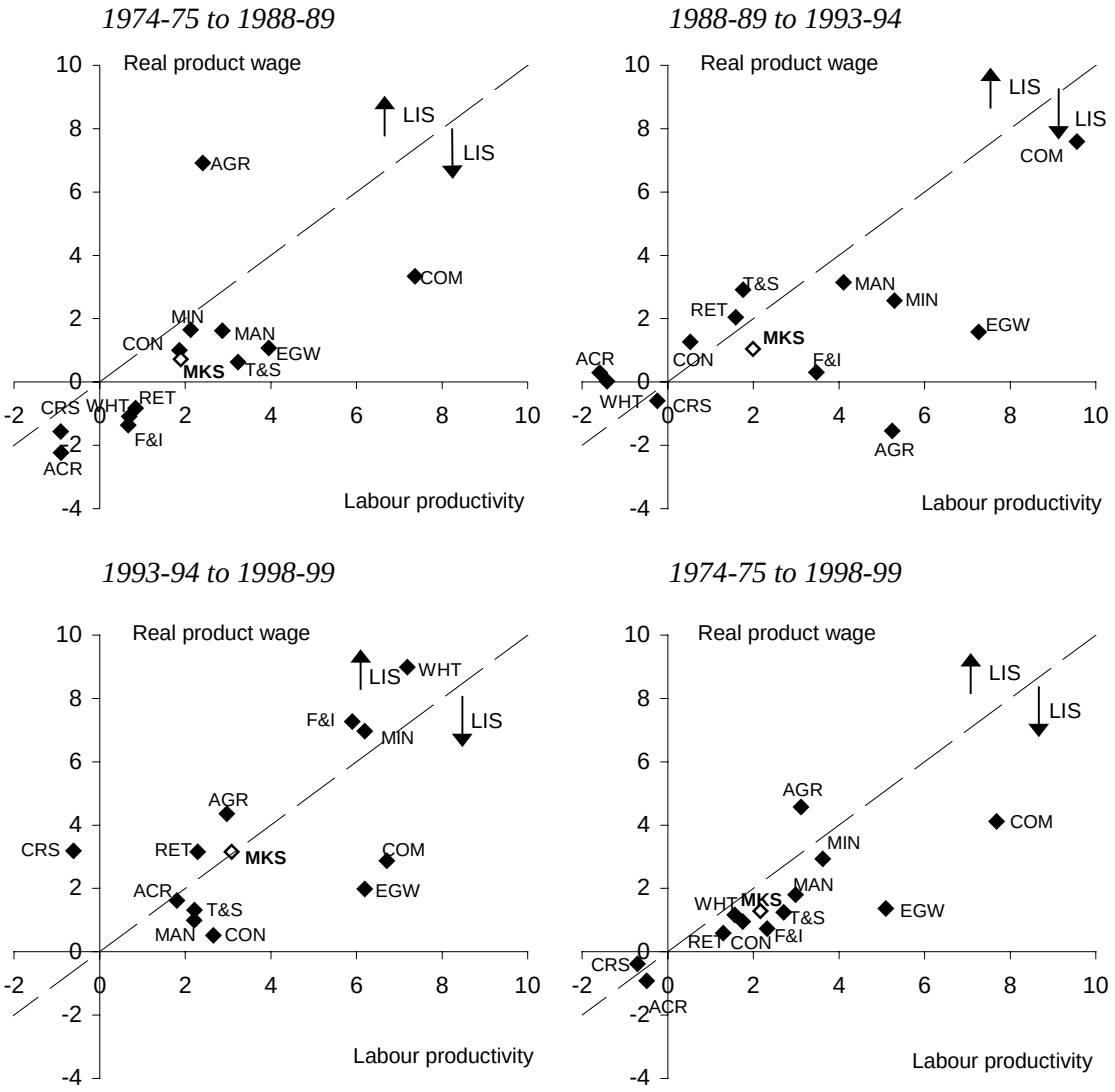
Figure C.4 **(continued)**



Data source: PC estimates based on ABS data.

Figure C.5 **Annual average growth in the real product wage and labour productivity, various periods**

Per cent per year



ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

The majority of sectors show a positive correlation between the real product wage and labour productivity, with the Agriculture sector being an exception. This is further illustrated in figure C.5 and table C.3.

The charts in figure C.5 show that the correlation between growth in the real product wage and growth in labour productivity is relatively high. The correlation coefficients indicate a higher correlation over the longer periods. For the period 1974-75 to 1998-99 the correlation coefficient was 0.80, while for the sub-periods 1974-75 to 1988-89 and 1988-89 to 1998-99 the correlation coefficients were 0.63 and 0.65 respectively.

Table C.3 **Mean, variance, correlation coefficient, coefficient of variation in growth in labour productivity, real product wages and real consumption wages, various periods**

	1974-75 to 1988-89	*1988-89 to 1998-99*	*1974-75 to 1998-99*
Mean			
Labour productivity	1.90	2.54	2.16
Real product wage	0.72	2.10	1.29
Real consumption wage	0.35	1.09	0.66
Variance			
Labour productivity	5.16	6.76	5.23
Real product wage	6.46	2.37	2.70
Real consumption wage	4.13	3.99	0.52
Coefficient of variation[a]			
Labour productivity	1.20	1.02	1.06
Real product wage	3.54	0.73	1.27
Real consumption wage	5.86	1.84	1.10
Correlation coefficient			
Labour productivity and real product wage	0.63	0.65	0.80
Labour productivity and real consumption wage	0.45	-0.37	0.32

a The coefficient of variation is the ratio of the standard deviation to the mean.

Source: PC estimates.

Capital income shares

Capital income shares can be decomposed into output per unit of capital and a real profitability measure. Real profitability is the ratio of gross operating surplus, deflated by the producer price index, to the real value of net capital stock.

Capital income shares are a mirror image of labour income shares, which means that those sectors that experienced declines in the labour income share experienced increases in the capital income share. Figure C.6 shows output per unit of capital falling in most sectors. Real profitability showed little trend across the sectors,

except for Electricity, gas and water and Communication services which showed a slight increase over the period 1974-75 to 1998-99. The Construction sector has shown a significant increase in real profitability over the 1990s, while the Wholesale sector has seen a decrease in its real profitability, both of which are reflected in their respective capital income shares. Figure C.7 further shows the correlation between real profitability and output per unit of capital.

Figure C.6 **Capital income share, output per unit of capital and real profitability by sector, 1974-75 to 1998-99**

Index 1997-98 = 100 (LHS) and per cent (RHS)

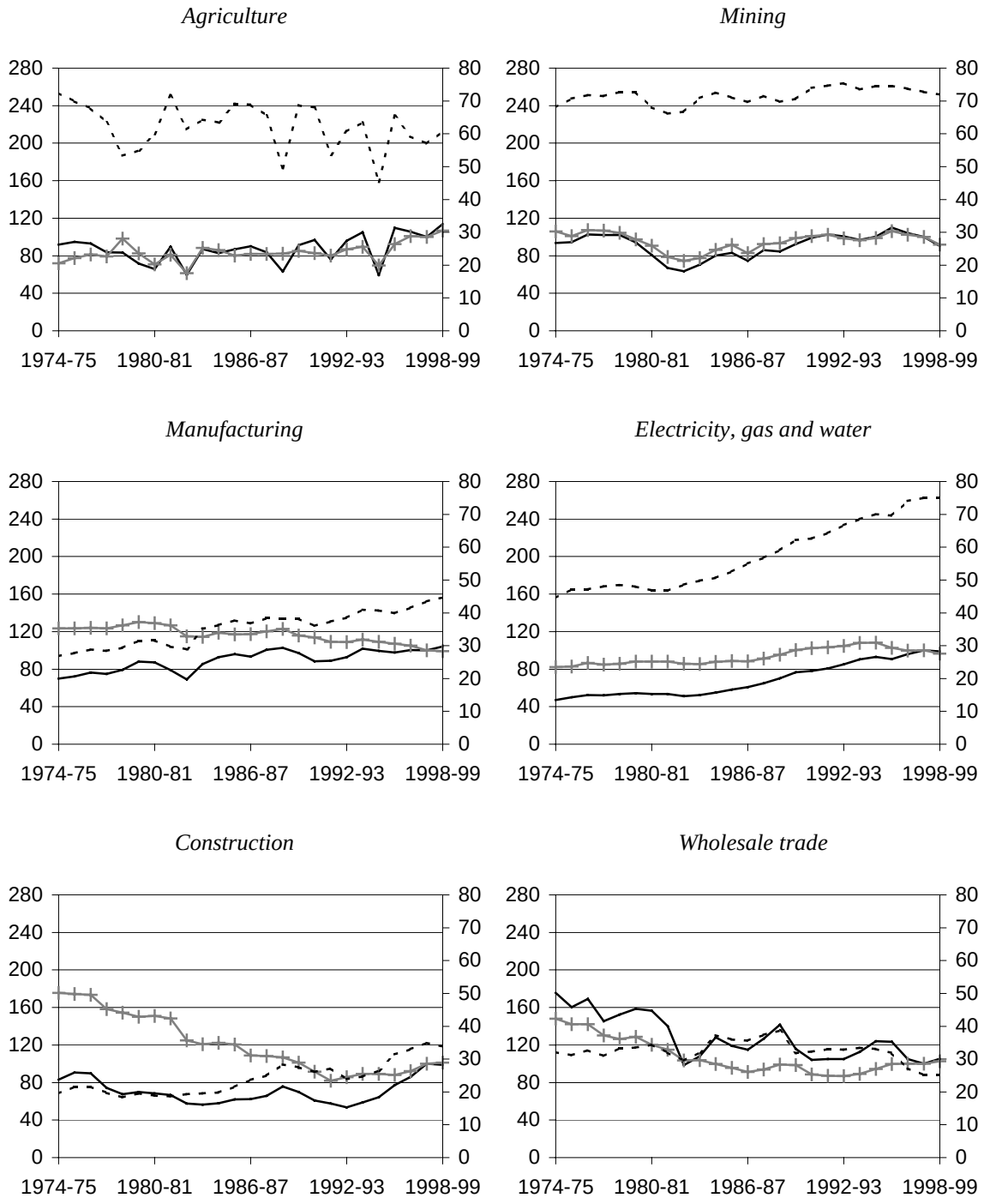


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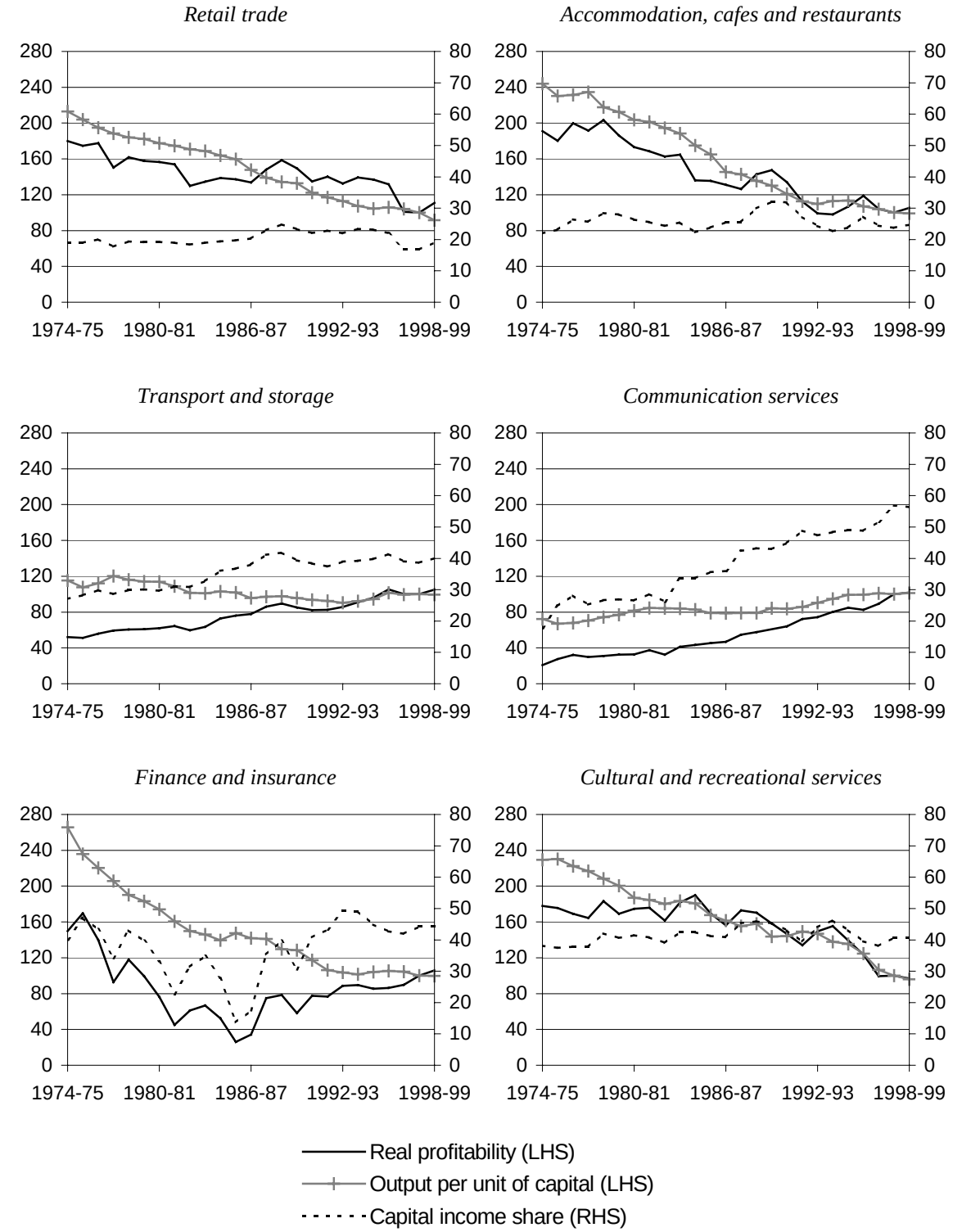
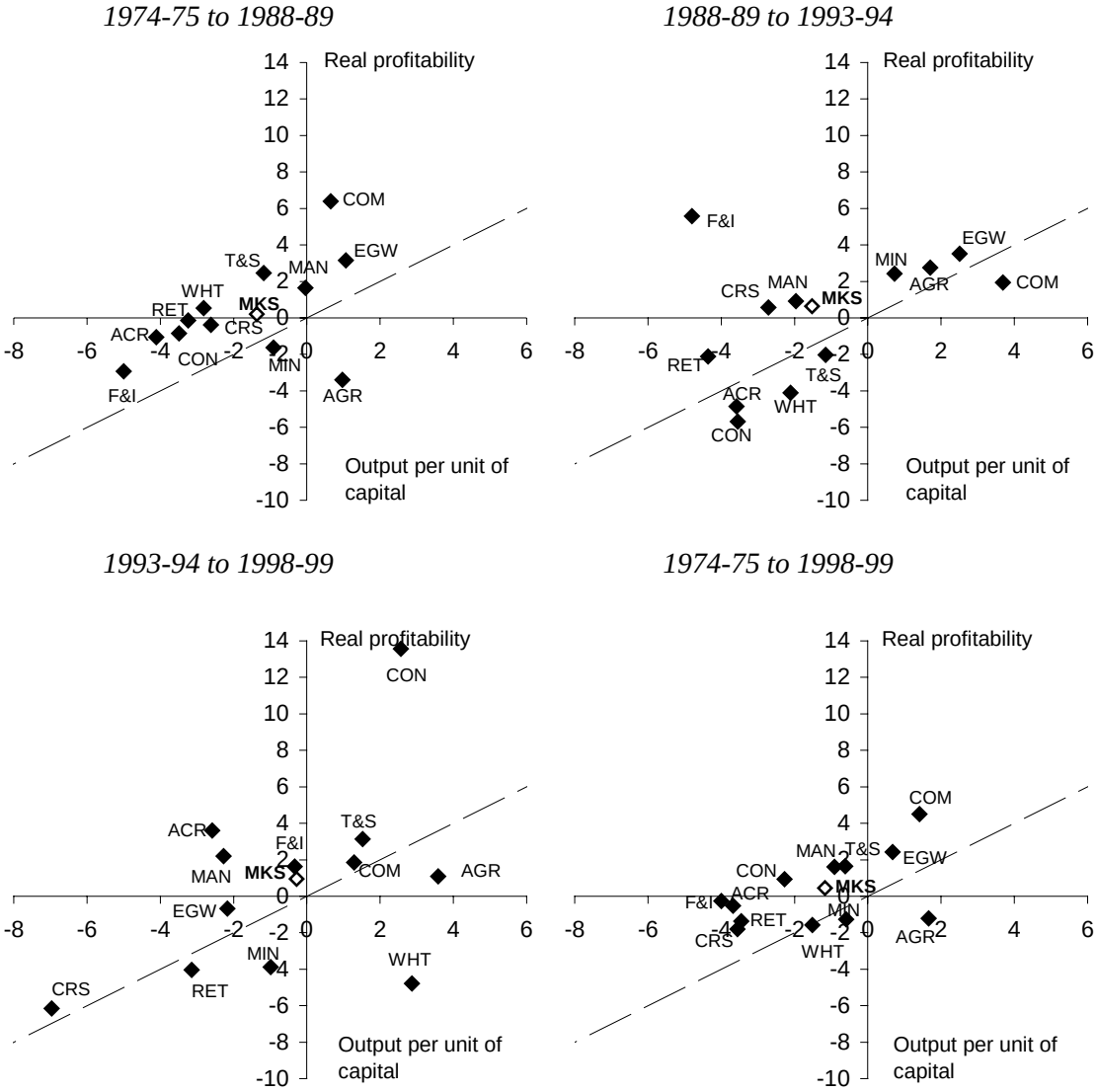
Figure C.6 **(continued)**



Data source: PC estimates based on ABS data.

Figure C.7 **Annual average growth in real profitability and output per unit of capital, various periods**

Per cent per year



ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

C.3 Productivity, wages, profits and prices

This section examines possible correlations between productivity and wages, prices and profits. The objective here is to see whether productivity improvements have led to lower prices, higher profits, higher wages, or some combination of all three. Figures C.8 to C.11 are used to examine the possible correlations over a selection of periods. The correlation coefficients are presented in table C.4.

Table C.4 presents correlation coefficients between MFP and the real product wage, the real consumption wage, the rate of profit (ratio, in current prices, of gross operating surplus to net capital stock) and prices. The data provide evidence of the correlation between productivity and wages, profits and prices. The data show positive correlations between MFP and the rate of profit, especially during the 1980s. There is a high negative correlation between MFP and prices across the periods, especially over the 1990s. When agriculture is excluded from the estimates of the correlation coefficient, the data show that these correlations are even higher.

The table also shows that across the various periods the correlation between MFP and the real consumption wage across the sectors is relatively weak, while at the aggregate market sector level improved productivity is associated with increased rates of pay (chapter 4).

Table C.5 presents OECD estimates of the distribution of productivity gains for each sector (OECD 2000b). The table shows average annual percentage changes for prices and wages over the period 1988-89 to 1997-98 and for profits over the period 1993-94 to 1997-98. A trend series for each variable is used. The sectors in bold represent those sectors with above average growth in total factor productivity over the period 1988-89 to 1997-98. The majority of these sectors had lower than average growth in prices, except for Manufacturing and Finance and insurance. For wages growth, only Wholesale trade did not record above average growth for the high growth productivity sectors. For profits, Mining and Wholesale trade had profit growth at or below the average. There are some similarities with the results presented here — the inverse relationship between productivity and prices and the generally lower correlation with wages and profits — but there are some differences for individual industries.

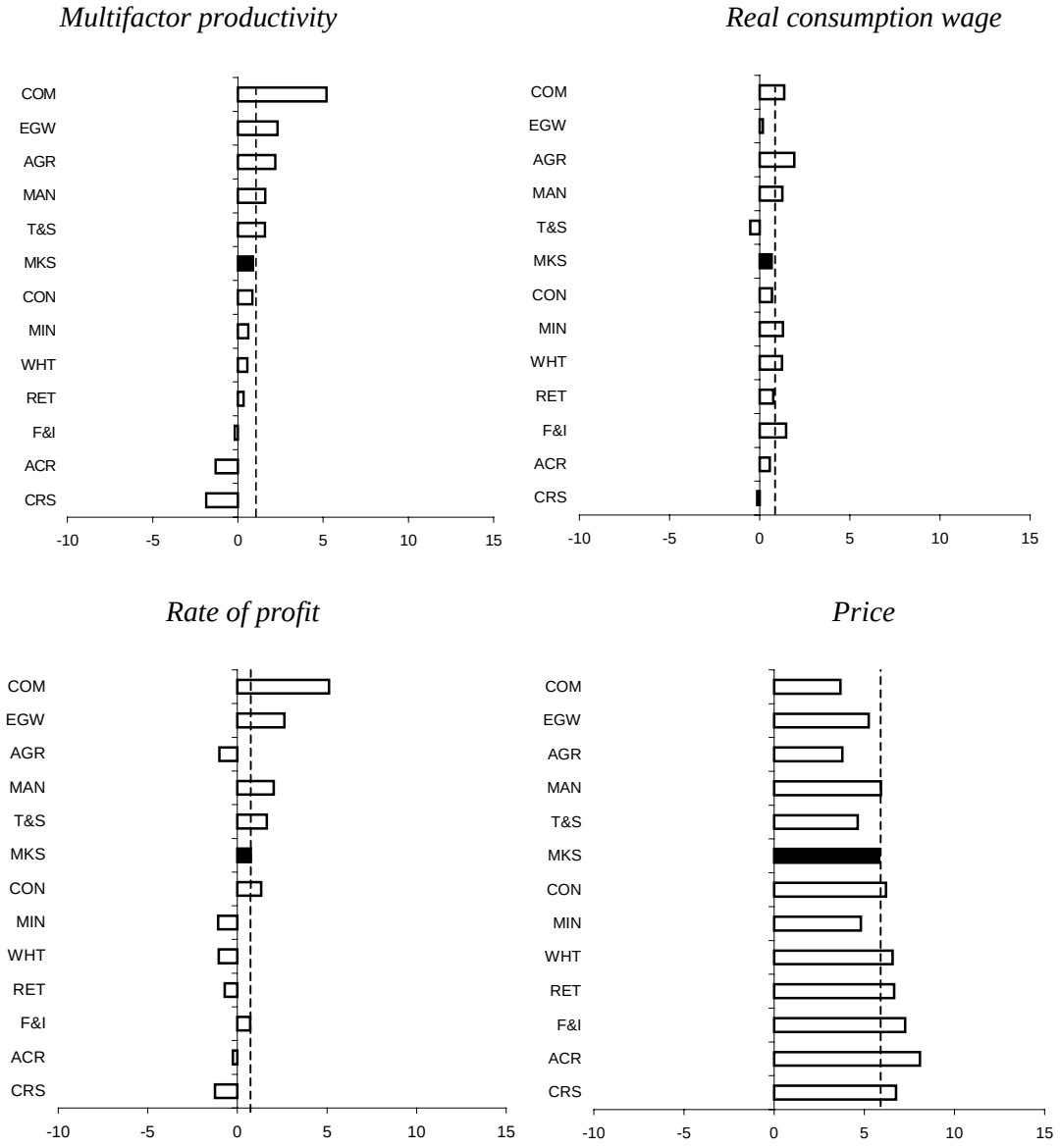
Figure C.12 presents growth in MFP, the real product wage, the real consumption wage and the labour terms of trade. This figure provides some further evidence of the positive correlation between MFP and the real product wage.

The charts also show that there is little variation in wage increases over the entire period 1974-75 to 1998-99 (except for Agriculture). The figures indicate that the high productivity industries were able to recoup profits, especially in the late 1980s.

In the 1990s, improved productivity meant that sectors were able to going rate of wages increases, while any additional productivity gains went predominantly into lowering prices.

Figure C.8 **Average annual growth in multifactor productivity, real consumption wage, rate of profit and prices, 1974-75 to 1998-99**

Per cent per year

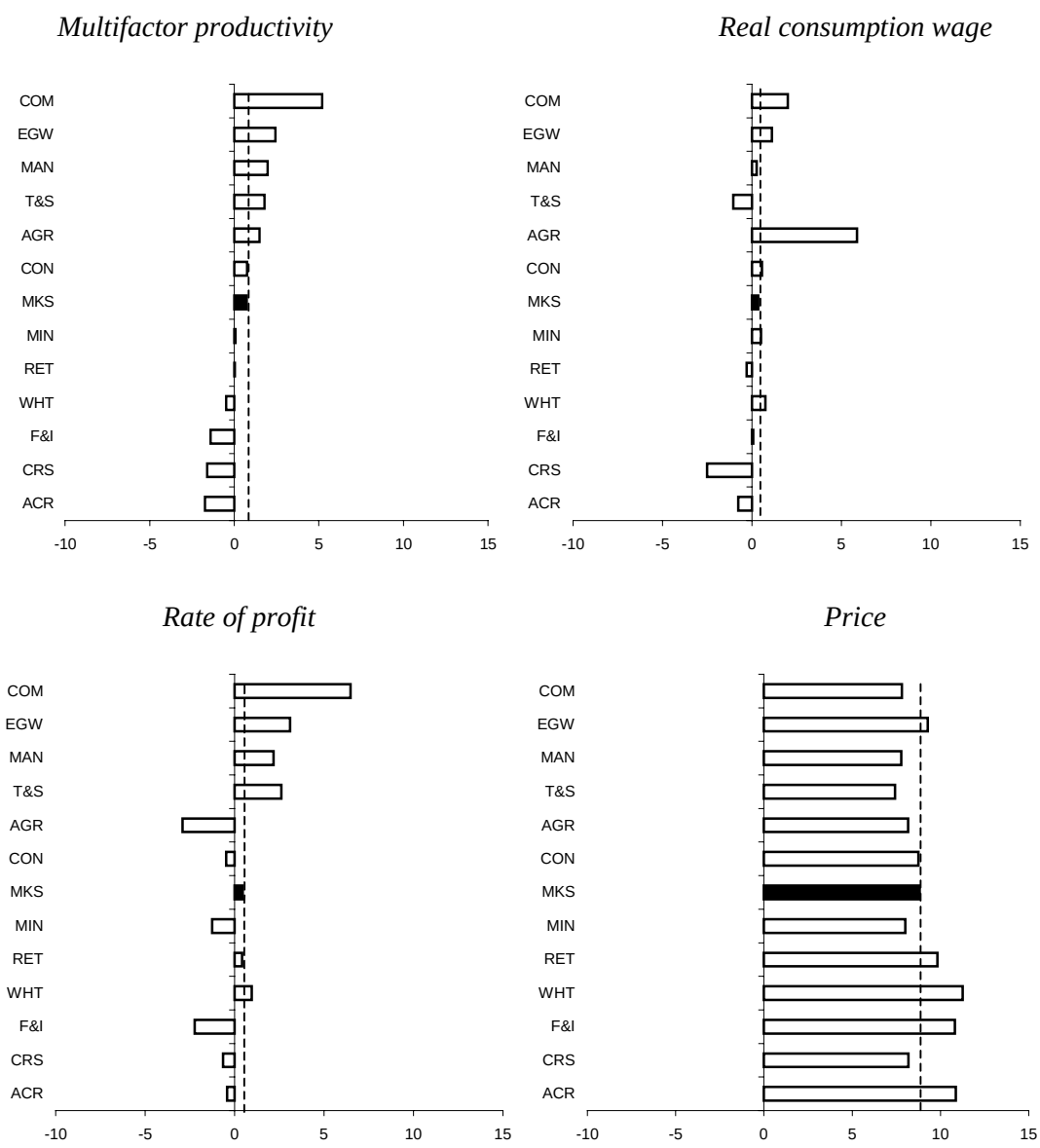


ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

Figure C.9 **Average annual growth in multifactor productivity, real consumption wage, rate of profit and prices, 1974-75 to 1988-89**

Per cent per year

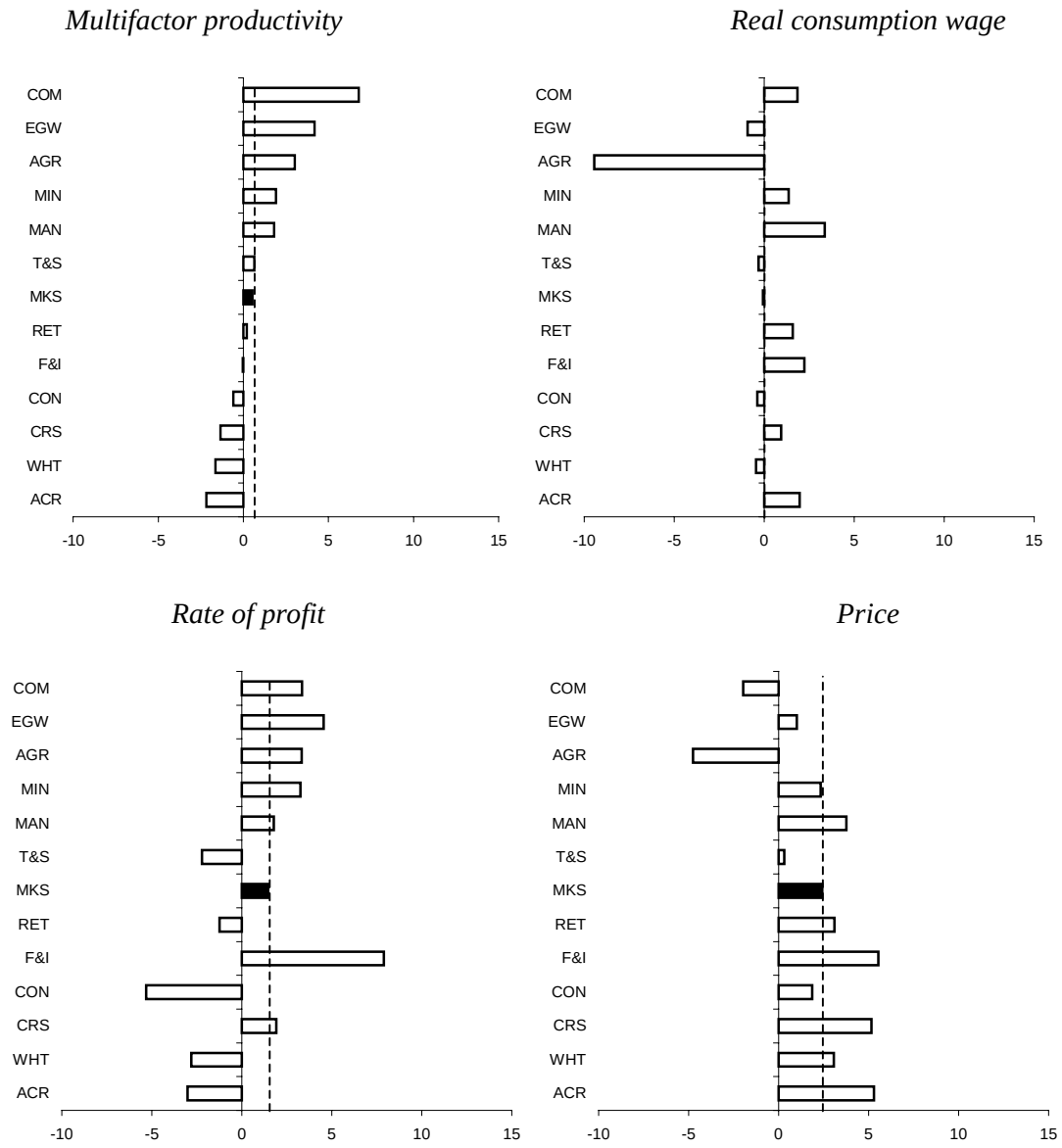


ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

Figure C.10 **Average annual growth in multifactor productivity, real consumption wage, rate of profit and prices, 1988-89 to 1993-94**

Per cent per year

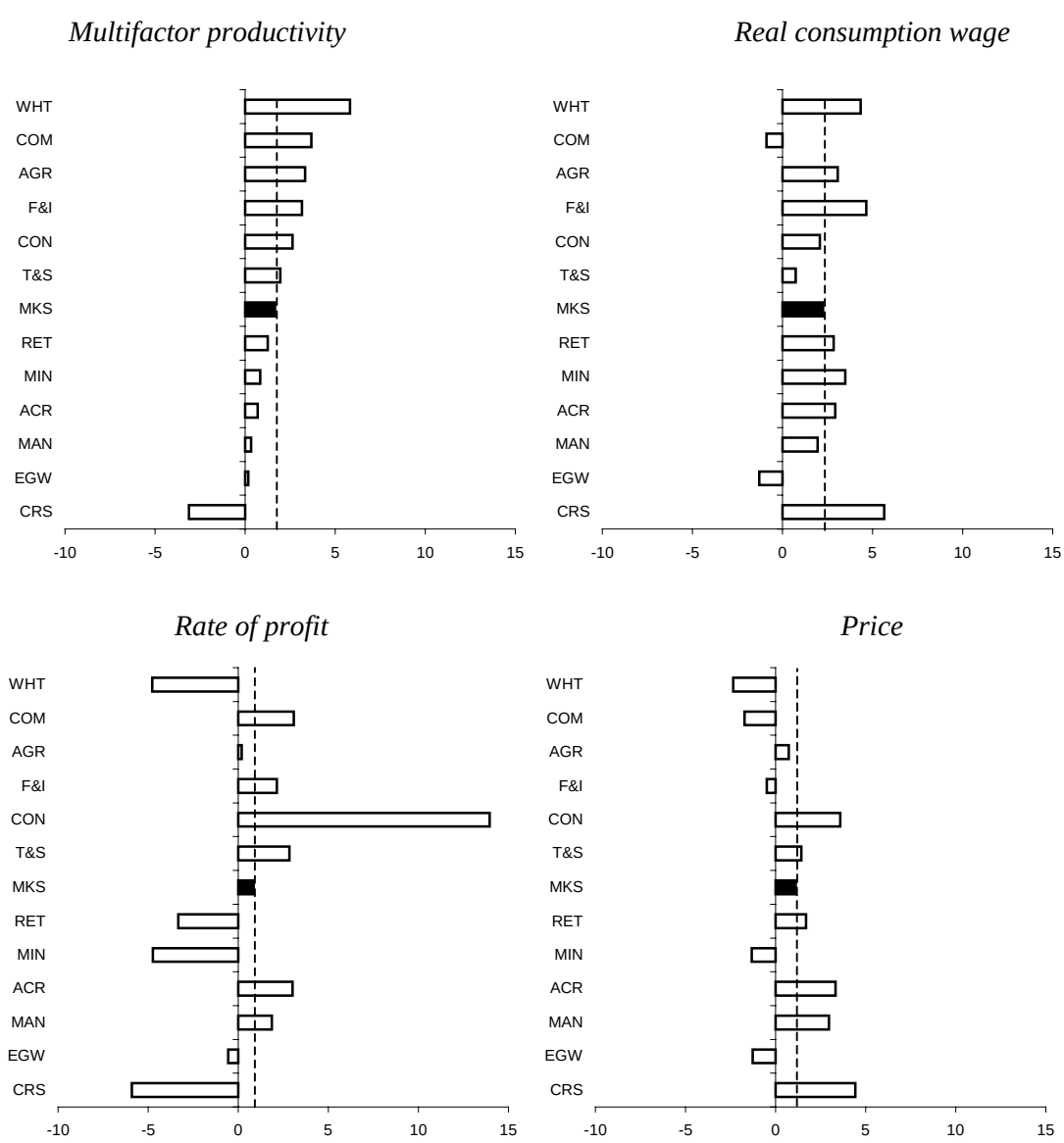


ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

Figure C.11 **Average annual growth in multifactor productivity, real consumption wage, rate of profit and prices, 1993-94 to 1998-99**

Per cent per year



ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

Table C.4 **Correlation coefficient between growth in MFP and growth in real product wage, real consumption wage, rate of profit and implicit price deflator, various periods**

	1974-75 to 1988-89	*1988-89 to 1993-94*	*1993-94 to 1998-99*	*1988-89 to 1998-99*	*1974-75 to 1998-99*
Total market sector					
MFP and					
Real consumption wage	0.48	-0.18	-0.11	-0.57	0.31
Real product wage	0.67	0.65	0.46	0.57	0.80
Rate of profit	0.77	0.53	0.25	0.41	0.77
Implicit price deflator	-0.59	-0.70	-0.62	-0.90	-0.82
Market sector excluding agriculture					
MFP and					
Real consumption wage	0.67	0.08	-0.14	-0.53	0.25
Real product wage	0.90	0.85	0.45	0.70	0.86
Rate of profit	0.91	0.51	0.26	0.40	0.88
Implicit price deflator	-0.58	-0.77	-0.63	-0.90	-0.84

Source: PC estimates based on ABS data.

Table C.5 **Distribution of productivity gains[a,b]**

Per cent per year

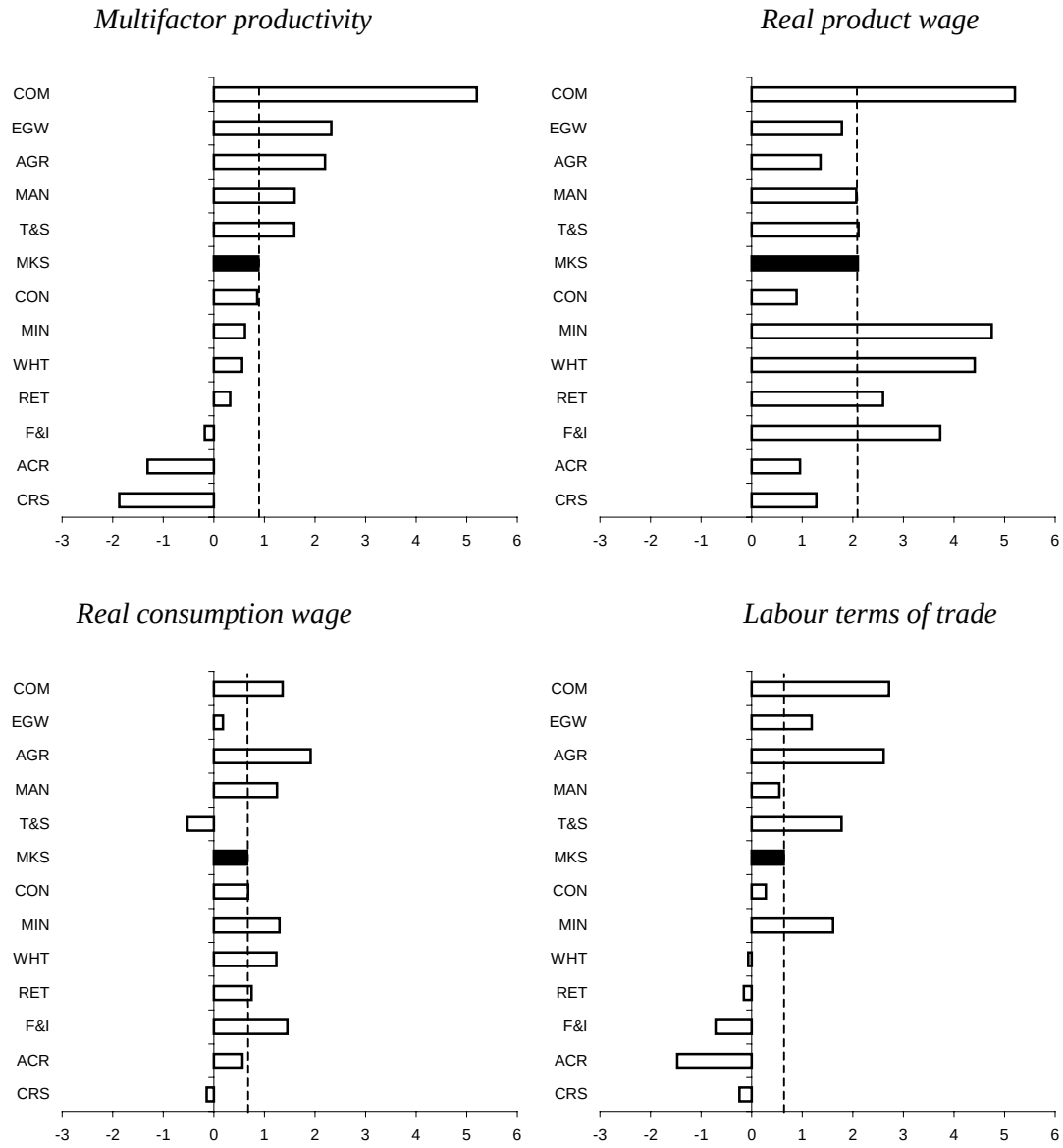
	Price deflators	*Wage compensation per hour*	*Operating surplus and mixed income per unit of net capital stock*
	1988-89 to 1997-98	*1988-89 to 1997-98*	*1993-94 to 1997-98*
Agriculture	2.4	4.3	1.4
Mining	1.2	5.1	1.1
Manufacturing	2.8	4.7	1.9
Electricity, gas and water	0.7	4.9	1.7
Construction	1.1	0.1	1.1
Wholesale trade	1.2	4.6	0.8
Retail trade	1.3	4.2	-4.2
Accommodation, cafes and restaurants	5.0	4.6	1.1
Transport and storage	2.7	5.2	1.6
Communication services	-0.9	5.3	1.7
Finance and insurance	3.8	6.6	5.2
Cultural and recreational services	5.4	5.8	-0.0
Simple average	2.2	4.6	1.1

a The sectors in bold are those with above average growth in trend total factor productivity. **b** Based on trend data, which was calculated using a Hodrick-Prescott filter.

Source: OECD (2000b).

Figure C.12 **Average annual growth in MFP, real product wage, real consumption wage and the labour terms of trade, 1974-75 to 1998-99**

Per cent per year



ACR	Accommodation, cafes and restaurants	MAN	Manufacturing
AGR	Agriculture	MIN	Mining
COM	Communication services	MKS	Market sector
CON	Construction	RET	Retail trade
CRS	Cultural and recreational services	T&S	Transport and storage
EGW	Electricity, gas and water	WHT	Wholesale trade
F&I	Finance and insurance		

Data source: PC estimates based on ABS data.

D Selected distributional trends

Summary measures of inequality, detailed in chapter 2, indicate a trend towards increasing market income inequality in the 1990s, which has been largely offset by the redistributional effect of the tax and transfer system.

This appendix provides more details of the trends in distribution discussed in chapter 5. Issues covered include distribution of earnings within the workforce, distribution of capital, trends in government revenue and transfer payments, and rural and urban distribution. The focus of the review is on the 1980s and 1990s.

D.1 Trends in earnings distribution

Analysis by Norris and Mclean (1999) found that earnings inequality increased during the 1990s for both male and female workers (table D.1). Their results suggest that there was a widening gap between high and low earning groups in the workforce. From 1990 to 1998, male earnings of the highest decile increased as a percentage of median income from 156.3 per cent to 162.6 per cent, and from 147.6 per cent to 150.4 per cent for females. In this period, earnings in the lowest decile declined as a percentage of median income, from 69.5 per cent in 1990 to 65.5 per cent in 1998 for males and from 74.9 per cent to 71.8 per cent for females.

Table D.1 **Distribution of earnings for full-time adult non-managerial workers, 1980[a] to 1998**

Earnings as a percentage of median earnings[b]

	Lowest decile	*Lower quartile*	*Upper quartile*	*Highest decile*
Males				
1980	73.8	84.0	123.2	150.4
1985	72.5	80.7	125.7	154.1
1990	69.5	80.6	126.0	156.3
1995	67.7	79.4	127.8	160.7
1998	65.5	78.4	128.7	162.6
Females				
1980	81.8	88.0	119.3	142.8
1985	78.6	87.3	121.2	147.9
1990	74.9	84.1	123.1	147.6
1995	73.4	84.1	125.3	152.0
1998	71.8	82.3	127.5	150.4

a Data for the years before 1983 are not strictly comparable with those for later years. **b** Based on data from the ABS Employee Earnings and Hours survey.

Source: Norris and Mclean (1999).

Skill

Data on wage trends for three levels of skill grouping, high-skilled white collar (HSWC), high-skilled blue collar (HSBC) and low-skilled, indicate that there has been some change in relative terms between skill groups (table D.2). As would be expected, high-skilled workers continued to earn more than low-skilled workers. But HSWC earnings also increased, by a total of 9.5 per cent between 1987 and 1996, compared with a 4.7 per cent increase for HSBC earnings and a 6.7 per cent increase for low-skilled earnings.[1]

HSBC and low-skilled earnings relative to HSWC earnings have fallen slightly for both skill groups (table D.3). Most of this fall was experienced between 1987 and 1993, with relative wages remaining virtually constant between 1993 and 1996. This indicates that, although there has been some downward trend in the earnings of HSBC workers and low-skilled workers relative to HSWC workers, there has been little movement in relative earnings in the late 1990s.

1 Average earnings of all full-time permanent adult employees increased by a total of 11.3 per cent from 1987 to 1996, a greater increase than any individual skill group. This was most likely due to shifts of workers between skill groupings, with more workers moving to higher skill groupings or skill groups with faster earnings growth rates.

Table D.2 **Real average full-time earnings[a], by skill group, 1987 to 1996[b]**

Weekly earnings (1989-90 dollars)

Year	*High-skilled white collar*	*High-skilled blue collar*	*Low-skilled*	*All employees*
1987	686.85	485.99	457.13	531.06
1988	693.40	477.36	453.24	530.49
1989	695.53	482.22	459.11	536.00
1990	695.20	486.70	457.80	536.40
1991	693.53	478.31	452.05	538.15
1992	703.44	475.49	461.10	545.78
1993	719.42	483.50	466.36	555.06
1994	719.10	482.69	467.53	558.39
1995	742.29	497.27	478.06	575.15
1996	752.15	508.76	487.89	590.98

a Real average weekly ordinary time earnings of full-time permanent adult employees. Total non-farm industries. Based on data from the ABS Employee Earnings and Hours survey. **b** May data. Data after 1996 not readily available due to changes in ABS occupational classification.

Sources: Estimates based on ABS (*Australian National Accounts, 1995-96,* Cat. no. 5204.0; unpublished data).

Table D.3 **Relative average earnings[a], by skill group, 1987 to 1996**

Relative to the wages of HSWC workers (Index 100 = wages of HSWC workers)

Year	*High-skilled white collar*	*High-skilled blue collar*	*Low-skilled*
1987	100	71	67
1988	100	69	65
1989	100	69	66
1990	100	70	66
1991	100	69	65
1992	100	68	66
1993	100	67	65
1994	100	67	65
1995	100	67	64
1996	100	68	65

a Real average weekly ordinary time earnings of full-time permanent adult employees. Based on data from the ABS Employee Earnings and Hours survey.

Sources: Earnings estimates based on ABS (*Australian National Accounts, 1995-96*, Cat. no. 5204.0; unpublished data).

Another way of analysing distribution trends on the basis of skill is to look at earnings by more detailed occupational groupings. Wage data based on occupation groups indicate that higher skilled occupational groups (managers and administrators, professionals and para-professionals) clearly enjoy a substantial wage premium over less-skilled workers (table D.4). However, there is little evidence to suggest that this premium has increased during the 1990s (Vickery 1999). Relative wages remained reasonably constant over the period, with

the most significant changes being a rise in female wages for para-professionals and salespersons, and the relative fall in male wages in some low-skilled occupations. It is difficult to establish a clear trend from the data for 1986 to 1995. Earnings of some low-skilled occupations have increased relative to professional wages, whilst some have decreased. There is no clear pattern indicating an increased premium for skill at this level of disaggregation (Vickery 1999). There may nevertheless have been increased inequality *within* skill and occupational groups.

Productivity growth may have influenced the skill composition of the workforce through technological change. As the increased openness of the economy has allowed the importation of more goods and services from overseas, the range of available technology in Australia has also increased (PC 1999b). The effect of technology on skill levels and earnings within the workforce is not clear. Technology can have a deskilling effect, where the technology allows low-skilled workers to undertake tasks previously only performed by skilled workers. Alternatively, the use of technology by workers may make it necessary for an increased proportion of the workforce to have the appropriate knowledge and expertise to utilise it (Barnes et al. 1999).

Table D.4 **Wages for full-time workers, by occupation, 1986 to 1995**

Relative to the wages of professionals (Index 100 = wage of professionals)[a]

	Males			*Females*		
Occupation group	*1986*	*1990*	*1995*	*1986*	*1990*	*1995*
Professionals	100	100	100	100	100	100
Managers and administrators	100	98	99	91	98	102
Para-professionals	86	82	86	80	87	88
Clerks	71	72	72	68	72	72
Salespersons and personal service workers	69	72	72	58	63	66
Plant and machine operators	72	73	71	58	61	57
Tradespersons	68	67	64	57	60	58
Labourers and related workers	61	62	58	59	58	56

[a] Based on data from the ABS Weekly Earnings of Employees (Distribution) survey.

Source: Vickery (1999, p. 25).

D.2 Trends in distribution of capital income

Capital income typically consists of dividend or interest payments earned by the owners of capital. Analysis in chapter 4 indicated that the capital share of total income remained fairly constant during the 1990s. The distribution of this capital income in the 1990s is examined in this section.

Share ownership

The extent of share ownership gives an indication of the distribution of capital income, as shares provide income through dividend payments and capital growth. As detailed in appendix A, share ownership in Australia increased significantly between 1986 and 1999, with particularly high growth in the late 1990s. The most recent growth in share ownership can be, in part, attributed to increased opportunity for share ownership through recent large public floats such as Telstra and the Commonwealth Bank. Indirect share ownership has increased with the introduction of compulsory superannuation contributions. Increasing share ownership in Australia in the 1990s is an indication that income from share ownership was distributed to an increasing proportion of the population.

Foreign capital

A significant amount of the capital income generated in Australia flows overseas to foreigners. Australia traditionally attracts significant amounts of capital from overseas to facilitate the development of business and infrastructure in Australia.

The outflow of capital income from Australia during the 1990s grew by 2.1 per cent per year in real terms (table D.5). Comparing the 1990s with the 1980s, income outflow grew at a significantly faster rate in the 1980s, averaging annual growth of 14.0 per cent. The large growth in the outflow of capital income during the 1990s and 1980s may have been facilitated by the increased openness of the Australian economy during the period. In particular, the deregulation of the financial sector relaxed restrictions to capital movements. As a result, both the inflow and outflow of capital increased during the 1980s and 1990s. Capital income earned by Australians overseas in the 1990s grew at an average rate of 11.3 per cent a year, faster than the growth of capital outflow to foreigners (2.1 per cent a year).

Table D.5 **Investment income flows into and out of Australia, 1980-81 to 1998-99**

1997-98 dollars

Year	*Investment income inflow*[a]	*Percentage of GDP*	*Investment income outflow*[b]	*Percentage of GDP*
	$m	%	$m	%
1980-81	1 650	0.5	7 009	2.2
1981-82	1 422	0.4	6 887	2.1
1982-83	2 002	0.6	6 338	1.9
1983-84	2 589	0.7	9 775	2.8
1984-85	2 549	0.7	11 981	3.3
1985-86	3 073	0.8	13 473	3.6
1986-87	3 888	1.0	14 957	3.9
1987-88	4 854	1.2	16 917	4.1
1988-89	4 822	1.1	19 459	4.6
1989-90	4 620	1.0	22 040	5.0
1990-91	3 682	0.8	22 757	5.2
1991-92	4 339	1.0	19 738	4.5
1992-93	5 978	1.3	19 755	4.3
1993-94	5 582	1.2	20 160	4.2
1994-95	6 705	1.3	25 887	5.2
1995-96	6 691	1.3	26 860	5.2
1996-97	7 981	1.5	27 663	5.1
1997-98	9 637	1.7	27 597	4.9
1998-99	9 140	1.5	27 478	4.6

[a] Income on Australian investment abroad (direct investment abroad, portfolio investment assets and other investment assets). [b] Income on foreign investment in Australia (direct investment in Australia, portfolio investment liabilities and other investment liabilities).

Sources: ABS Time Series Plus database on EconData (accessed 17 August 2000); ABS National Accounts (1998/99) database on EconData (accessed 29 August 2000).

D.3 The government sector

Revenue

Trends in government revenue are shown in table D.6. During both the 1980s and 1990s, government revenue, as a percentage of GDP remained fairly constant. In the 1990s, revenue was highest in 1996-97 at 33.2 per cent, and lowest in 1992-93 at 29.7 per cent. The lack of variation in government revenue as a percentage of GDP during the 1990s indicates that government has shared in the income gains of the 1990s.

Table D.6 **General government revenue[a], 1980-81 to 1997-98**
Percentage of GDP

Year	*Total revenue*
1980-81	29.4
1981-82	30.0
1982-83	30.8
1983-84	30.1
1984-85	31.7
1985-86	32.3
1986-87	33.2
1987-88	32.6
1988-89	31.9
1989-90	31.6
1990-91	31.6
1991-92	30.3
1992-93	29.7
1993-94	30.4
1994-95	31.2
1995-96	32.3
1996-97	33.2
1997-98	32.8

a Total General Government (Commonwealth, state and local governments and universities).

Sources: RBA Australian Economic Statistics database on EconData (accessed 17 August 2000); ABS National Accounts (1998/99) database on EconData (accessed 17 August 2000); ABS (*Government Finance Statistics*, Cat. no. 5512.0).

Tax and transfer payments

Transfer payments are a means for government to influence the distribution of income in the economy. There are three broad categories of income support payments — pensions, such as the age pension and disability pension, allowances such as family allowances and job search allowances, and special benefits. Australia's system provides means-tested income support payments to over five million adults. Maximum payment rates vary according to category (pension or allowance), presence of a partner and/or dependents, and age (Reference Group on Welfare Reform 2000).

Recent trends in income support payments, as a proportion of GDP, are reported in table D.7. Interpretation of these data needs to be guarded, as an increase or decrease in income support payments can be influenced by a number of factors, such as the prevailing economic conditions, changes to eligibility requirements for payments and the demographic make-up of the population (such as the number of elderly and families with dependent children).

Obviously this is an area of significant complexity, and it is not the intention of this section to assess the finer details on the movements of income support payments. Rather it is to report, at a broad level, the influence of the income support payments system as a whole during the two periods of interest, the 1980s and the 1990s. It does appear from the data that there has been a significant increase in government income support payments from the 1980s to the 1990s.

The measure in table D.7 is an indication of the total amount spent on income support payments, but does not give any indication of the distribution of payments. Data from the National Centre for Social and Economic Modelling (NATSEM 2000) indicate that family income coming from government cash payments increased for all families other than those in the top two income deciles during the 1980s and 1990s (table D.8). The effect of this real increase in government cash benefits for low and middle income households was to largely offset the decline in real private (market) income.

Table D.8 also highlights the progressive nature of the income tax system, where those at higher incomes pay a higher rate of income tax than those in low income groups. Therefore, the net effect of the tax and transfers system is to increase the disposable income of low income earners, by providing income support and lower rates of taxation. Between 1982 and 1996-97, there has was a decline in the tax paid by families in income deciles 2 to 6. A fall in private income is one obvious possibility, but there may be others. It cannot be assumed that this is a result of lower tax rates, as these deciles experienced declines in private income. These families may be paying a lower amount of tax because of their decline in income.

Table D.7 **Income support payments, 1982 to 1998**

Percentage of GDP

Year	*Income support payments*
1982	6.0
1983	6.7
1984	6.8
1985	6.6
1986	6.3
1987	6.1
1988	5.8
1989	5.4
1990	5.4
1991	6.2
1992	7.2
1993	7.5
1994	7.7
1995	7.4
1996	7.3
1997	7.4
1998	7.1

Source: ABS (*Australian Social Trends*, Cat. no. 4120.0).

Table D.8 **Real changes in family income, by decile, 1982 to 1996-97**

Dollars

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Private (market) income[a]	22.81	-34.75	-71.10	-108.21	-54.07	-42.70	8.98	79.37	78.65	300.72
Government cash benefit income	23.80	75.21	80.80	76.80	51.07	32.93	17.42	1.50	-3.88	-7.02
Total income	46.61	40.46	9.70	-31.41	-3.00	-9.77	26.39	80.87	74.77	293.70
Tax	1.76	-0.60	-7.02	-16.49	-9.94	-10.44	1.18	18.70	16.66	75.29
Disposable income	44.85	41.06	16.71	-14.92	6.93	0.67	25.21	62.17	58.11	218.40

a Consisting mainly of wage, business and investment income.

Source: NATSEM (2000, p. 9).

D.4 Distribution between rural and urban Australia

Undertaking analysis of living standards on the basis of geographical distribution brings with it problems of definition. To compare different regions, these regions need to be defined, but there is no generally accepted definition of rural Australia. Data presented in the various literature on the topic therefore involve several different definitions for rural Australia. The Productivity Commission, in its inquiry into the impact of competition policy on rural and regional Australia, covered the 'three Rs' — rural, regional and remote communities — a definition which typically covered all regions outside the major cities. In this section, given the data available, a similar approach is taken.

Population changes

Although there is a common perception that there is a flow of people leaving rural and regional Australia for better opportunities in the large cities, table D.9 indicates that there has actually been a decline in the proportion of the population living in large cities.

The proportion of the population living in Australia's five large cities declined from 57.9 to 53.1 per cent in the period 1971 to 1996. Small cities and large towns increased their proportion of the population in the same period, and the number of large towns in Australia doubled from 25 to 50. There was virtually no change in the share of population in small towns.

Table D.9 **Australia's population, by size of centre, selected years, 1971 to 1996**

Category (population range in persons)		*1971*		*1981*	*1991*	*1996*	
		%	no.	%	%	%	no.
Large cities	(more than 500 000)	57.9	5	55.5	53.3	53.1	5
Small cities	(100 000 – 499 999)	6.5	5	7.4	9.0	9.2	8
Large towns	(20 000 – 99 999)	7.0	25	8.3	8.8	9.7	50
comprised of:	(50 000 – 99 999)	2.5	5	3.1	2.7	3.0	8
	(20 000 – 49 999)	4.5	20	5.1	6.1	6.7	42
Small towns	(1 000 – 19 999)	14.0	450	14.4	14.2	13.9	676
comprised of:	(15 000 – 19 999)	2.3	17	2.9	1.6	1.3	14
	(10 000 – 14 999)	2.1	23	1.4	2.5	2.5	36
	(5 000 – 9 999)	3.7	67	4.2	3.7	3.6	87
	(1 000 – 4 999)	5.9	343	5.8	6.3	6.5	539
Localities	(200 – 999)	2.9	793	2.8	2.7	2.5	923
Balance	(less than 20)	11.7	..	11.6	12.0	11.5	..

.. Not applicable.

Source: PC (1999a, p.19).

Income

During the 1990s a majority of regions in Australia experienced increases in average income relative to the national average. Data in table D.10 indicate that in the period 1991 to 1996, 32 of Australia's 58 statistical divisions experienced an increase in income relative to the national average. However, 6 of the 8 capital cities experienced a fall in average incomes relative to the national average.

Those areas with the largest rises relative to the national average were predominantly non-metropolitan areas. Western Australia contained 6 of the 11 highest change regions, all of which were non-metropolitan regions. However, there was considerable variation across non-metropolitan regions throughout Australia.

The 1980s were generally worse than the 1990s for regional Australia. In the 1980s, a majority of Australia's regions experienced declines in average incomes relative to the national average. Between 1981 and 1991, 48 of 58 statistical divisions experienced relative income declines (table D.10). This widespread decline was most likely due to the recession of the early 1990s. Whereas in the period 1991 to 1996 non-metropolitan regions experienced higher relative growth than metropolitan regions, the reverse was true in the 1980s. Of the 10 regions that did manage to maintain relative income growth during the 1980s, 6 were metropolitan. Again, there was considerable variation across non-metropolitan regions.

Comparing the 1990s with the 1980s illustrates the greater variance of non-metropolitan incomes than those in metropolitan areas over the two periods. Regions such as Kimberley and Pilbara in Western Australia and Eyre in South Australia experienced large swings in income, from large relative declines in the 1980s to large relative increases in the 1990s. This may be explained by the dominant industries in rural regions, mining and agriculture, which are reliant on international commodity prices that can be volatile. However, it is evident that, during times of economic growth, incomes in some non-metropolitan areas grow as fast or faster than those in urban areas. However, there is significant variation between regions.

Table D.10 **Average household income, by statistical division[a], 1981 to 1996**

	1981		1986		1991		1996	
Region	*Average household income*	*Ratio to national average*	*Average household income*	*Ratio to national average*	*Average household income*	*Ratio to national average*	*Average household income*	*Ratio to national average*
	$'000	%	$'000	%	$'000	%	$'000	%
Australia[b]	16.0	100.0	23.0	100.0	31.0	100.0	38.0	100.0
Sydney	17.4	109.1	25.9	112.7	37.4	120.7	45.7	120.1
Hunter	15.5	97.2	21.5	93.7	29.8	96.2	34.4	90.4
Illawarra	15.3	95.6	20.4	88.7	28.2	91.1	32.7	86.1
Richmond-Tweed	13.7	85.9	17.5	76.1	24.3	78.3	28.6	75.1
Mid-North Coast	13.0	81.2	16.9	73.6	22.6	73.1	27.0	71.0
Northern	14.6	91.1	19.4	84.3	25.7	82.8	30.0	78.9
North Western	14.2	88.9	18.4	79.8	23.6	76.0	29.6	77.9
Central West	14.4	90.4	19.6	85.3	25.8	83.3	31.9	83.9
South-Eastern	13.5	84.7	19.4	84.5	25.1	80.9	32.4	85.1
Murrumbidgee	15.7	98.0	20.1	87.2	25.9	83.5	33.5	88.1
Murray	15.2	95.0	19.8	86.1	24.8	80.1	31.4	82.5
Far Western	15.4	96.4	19.3	84.0	25.3	81.5	28.0	73.7
Melbourne	16.6	104.0	24.8	108.0	34.2	110.4	40.9	107.7
Barwon	13.2	82.7	19.4	84.2	25.6	82.7	29.7	78.2
Western District	13.7	85.6	19.8	86.1	24.9	80.4	30.4	80.0
Central highlands	13.5	84.3	19.6	85.3	25.7	82.9	29.9	78.5
Wimmera	14.2	88.9	18.3	79.5	23.0	74.2	28.8	75.7
Mallee	15.1	94.4	19.0	82.7	24.4	78.7	29.5	77.5
Loddon-Campaspe	13.5	84.6	19.8	86.0	26.1	84.3	30.2	79.4
Goulburn	14.1	88.0	19.3	84.0	24.6	79.5	30.3	79.7
Ovens-Murray	14.5	90.7	21.9	95.2	26.5	85.5	36.2	95.2
East-Gippsland	12.8	80.2	18.0	78.4	23.3	75.2	25.7	67.6
Gippsland	14.0	87.6	19.2	83.3	23.7	76.5	25.8	67.8
Brisbane	16.0	100.0	23.5	102.1	32.4	104.4	39.9	104.9
Moreton	13.2	82.3	17.3	75.3	24.8	79.9	31.3	82.4
Wide Bay-Burnett	13.6	84.9	17.3	75.3	21.9	70.7	27.2	71.4
Darling Downs	13.6	85.0	18.9	82.3	25.4	81.9	30.6	80.6
South-West	13.6	85.2	19.8	86.1	24.0	77.4	31.2	82.2
Ftizroy	17.1	106.9	22.6	98.3	29.2	94.1	37.7	99.1
Central West	15.1	94.7	20.5	89.3	24.4	78.8	33.1	87.2
Mackay	19.0	118.8	23.6	102.8	30.0	96.8	44.8	117.7
Northern	16.9	105.7	22.9	99.5	29.8	96.1	37.4	98.3
Far North	16.5	103.3	21.4	93.2	28.1	90.6	38.4	101.1
North Western	19.5	121.9	27.3	118.5	35.9	115.8	48.2	126.7

(Continued on next page)

Table D.10 **(continued)**

Region	1981		1986		1991		1996	
	Average household income	*Ratio to national average*	*Average household income*	*Ratio to national average*	*Average household income*	*Ratio to national average*	*Average household income*	*Ratio to national average*
	$'000	%	$'000	%	$'000	%	$'000	%
Adelaide	15.2	95.0	23.1	100.4	31.1	100.3	35.2	92.5
Outer Adelaide	11.7	73.5	17.1	74.3	23.4	75.6	28.1	73.8
Yorke and Lower North	10.6	66.5	13.6	59.0	16.6	53.4	20.7	54.3
Murray Lands	12.3	77.0	16.2	70.5	20.2	65.2	25.9	68.0
South East	14.3	89.8	19.6	85.4	24.6	79.2	30.9	81.2
Eyre	14.0	87.5	16.7	72.5	19.4	62.4	26.6	70.0
Northern	15.2	94.9	20.9	91.0	24.8	80.1	30.2	79.3
Perth	16.0	100.1	23.7	103.1	32.1	103.6	39.1	102.9
South West	12.9	80.8	17.7	76.9	24.1	77.8	30.2	79.3
Lower Great Southern	14.4	89.9	17.7	77.1	22.9	74.0	29.3	77.0
Upper Great Southern	16.7	104.8	18.2	79.1	24.0	77.3	35.8	94.1
Midlands	14.4	90.2	16.9	73.5	21.3	68.8	31.0	81.5
South Eastern	17.8	111.1	25.6	111.3	34.5	111.3	57.2	150.5
Central	16.8	105.4	22.9	99.7	26.6	85.8	39.6	104.1
Pilbara	31.1	194.7	36.3	157.9	42.7	137.8	61.1	160.6
Kimberley	25.0	156.5	30.3	132.0	30.2	97.4	46.2	121.6
Hobart	15.5	97.0	23.0	100.1	29.7	95.7	34.4	90.5
Southern	9.5	59.7	13.5	58.8	17.2	55.6	20.0	52.6
Northern	12.5	84.6	19.5	85.0	25.1	81.1	29.0	76.3
Mersey-Lyell	14.6	91.4	20.5	89.2	24.8	79.9	29.3	77.0
Darwin	22.7	142.2	30.6	133.0	38.5	124.2	49.9	131.3
Balance of NT	21.4	113.8	30.1	131.1	34.7	112.0	45.7	120.1
Canberra	21.4	134.1	34.1	148.4	45.3	146.2	51.8	136.2
Balance of ACT	13.4	83.9	22.9	99.4	30.3	97.6	30.7	80.7

a Offshore areas and Migratory and Other Territories have been omitted. **b** Australian average has been calculated by weighting statistical division averages by population.

Source: PC (1999a); ABS (*Census of Population and Housing*, various years).

Employment

Trends in employment, such as unemployment rates and job growth rates, can give an indication of the economic opportunities and development in a region.

Unemployment

During the 1990s, the unemployment rate fell in a majority of regions in Australia, facilitated by economic recovery and an upturn in the business cycle. Data on unemployment rates by statistical division between 1991 and 1996 indicate all but 4 of Australia's 58 statistical divisions experienced a fall in their unemployment rate, with one region (Canberra) recording no change and 3 regions recording increases (table D.11).

On average, the unemployment rate in metropolitan regions fell by more than that of non-metropolitan regions between 1991 and 1996 (2.7 percentage points compared with 1.9 percentage points), and metropolitan regions maintained an average unemployment rate lower than that of non-metropolitan regions. Despite this trend in the overall averages, there was significant variation across non-metropolitan regions. Many non-metropolitan regions experienced significant falls in the unemployment rate, particularly in Western Australia in regions such as the Kimberley (4.8 percentage points decline) and Upper Great Southern (3.2 percentage points decline). New South Wales was the only state where the capital city recorded the lowest unemployment rate, and the greatest fall in the unemployment rate in the 1990s, of all regions in the state. In all other states, several non-metropolitan regions experienced lower unemployment rates than the capital city in 1996, and a greater decline in unemployment rates between 1991 and 1996.

Data in table D.11 indicate that the 1980s brought increasing unemployment rates across all regions, again reflecting the business cycle. On average, metropolitan unemployment rates rose marginally faster between 1981 and 1991 than non-metropolitan unemployment rates, at an annual rate of 7.0 per cent compared with 6.8 per cent for non-metropolitan regions.

Table D.11 **Unemployment rates[a], by statistical division[b], 1981 to 1996**

					Growth	
Region	*1981*	*1986*	*1991*	*1996*	*1981-1991*	*1991-1996*
	%	%	%	%	% per year	% per year
Average – Metropolitan[c]	5.7	8.2	11.2	8.5	7.0	-5.4
Average – Non-metropolitan[c]	6.4	11.1	12.3	10.4	6.8	-3.3
Sydney	4.9	8.6	10.3	7.4	7.7	-6.4
Hunter	5.7	12.4	11.9	11.3	7.6	-1.0
Illawarra	7.1	13.1	13.7	11.7	6.8	-3.1
Richmond-Tweed	10.6	19.2	17.7	15.1	5.3	-3.1
Mid-North Coast	9.9	18.6	17.8	16.6	6.0	-1.4
Northern	6.8	11.5	11.9	10.4	5.8	-2.7
North Western	7.6	13.0	13.0	10.3	5.5	-4.5
Central West	6.3	10.2	10.9	8.8	5.6	-4.2
South-Eastern	6.7	8.8	9.7	8.9	3.8	-1.7
Murrumbidgee	5.8	10.1	10.5	7.7	6.1	-6.0
Murray	5.6	8.7	10.5	8.7	6.5	-3.7
Far Western	7.5	16.4	15.1	13.5	7.2	-2.2
Melbourne	5.4	6.6	12.0	9.1	8.3	-5.4
Barwon	7.5	8.2	12.6	11.3	5.3	-2.2
Western Districts	6.4	6.6	10.7	8.8	5.3	-3.8
Central Highlands	7.6	9.1	13.8	11.5	6.1	-3.6
Wimmera	4.6	6.5	9.5	7.2	7.5	-5.4
Mallee	6.0	10.2	12.7	8.1	7.8	-8.6
Loddon-Campaspe	6.1	8.7	12.6	11.8	7.5	-1.3
Goulburn	6.2	8.2	11.9	8.6	6.7	-6.3
Ovens-Murray	5.3	6.9	9.6	8.2	6.1	-3.1
East-Gippsland	6.0	9.0	12.7	11.9	7.8	-1.3
Gippsland	4.3	7.4	12.0	12.3	10.8	0.5
Brisbane	5.6	9.5	10.6	8.8	6.6	-3.7
Moreton	8.2	15.7	14.6	12.9	5.9	-2.4
Wide bay-Burnett	5.7	13.7	15.7	14.9	10.7	-1.0
Darling Downs	5.1	9.2	9.4	7.6	6.3	-4.2
South-West	5.6	8.5	7.9	6.3	3.5	-4.4
Fitzroy	5.2	9.5	10.1	9.1	6.9	-2.1
Central West	3.7	6.1	5.9	6.6	4.8	2.3
Mackay	5.3	11.2	10.2	7.7	6.8	-5.5
Northern	6.0	10.9	9.9	8.7	5.1	-2.6
Far North	7.5	15.7	11.5	8.1	4.4	-6.8
North Western	4.0	8.4	7.9	6.0	7.0	-5.4

(Continued on next page)

Table D.11 **(continued)**

					Growth	
Region	*1981*	*1986*	*1991*	*1996*	*1981-1991*	*1991-1996*
	%	%	%	%	% per year	% per year
Adelaide	8.3	9.5	11.7	10.6	3.5	-2.0
Outer Adelaide	5.9	8.1	9.9	8.9	5.3	-2.1
Yorke and Lower North	5.3	10.3	13.5	11.0	9.8	-4.0
Murray Lands	5.7	9.9	12.7	9.0	8.3	-6.7
South East	4.7	7.9	10.6	6.9	8.5	-8.2
Eyre	5.9	10.1	13.6	10.4	8.7	-5.2
Northern	7.6	11.8	12.8	13.1	5.4	0.5
Perth	6.8	9.5	12.9	8.3	6.6	-8.4
South West	5.3	10.4	12.6	9.4	9.0	-5.7
Lower Great Southern	5.4	10.6	12.5	7.9	8.8	-8.8
Upper Great Southern	2.7	5.8	7.5	4.3	10.8	-10.5
Midlands	3.4	7.7	11.0	6.7	12.5	-9.4
South Eastern	5.5	8.7	9.8	5.9	5.9	-9.7
Central	6.3	10.0	13.2	8.8	7.7	-7.8
Pilbara	5.1	7.4	7.8	5.4	4.3	-7.1
Kimberley	6.4	11.6	10.6	5.8	5.2	-11.4
Hobart	8.2	9.1	12.2	9.7	4.1	-4.5
Southern	8.8	12.0	15.5	12.5	5.8	-4.2
Northern	6.8	10.2	13.0	11.3	6.7	-2.8
Mersey-Lyell	7.5	10.7	15.8	12.4	7.7	-4.7
Darwin	4.9	9.5	12.6	7.7	9.9	-9.4
Balance of Northern Territory	4.9	12.3	10.3	7.2	7.7	-6.9
Canberra	5.0	4.7	7.3	7.3	3.9	0.0
Balance of ACT	6.0	7.4	10.5	8.3	5.8	-4.6

a Differences in methodology between the ABS Census of Population and Housing and the ABS Labour Force Survey mean that the employment and unemployment data used in this appendix differ from those examined elsewhere in the paper. **b** Offshore areas and Migratory and Other Territories have been omitted. **c** Weighted average.

Sources: PC (1998); ABS (*Census of Population and Housing*, unpublished data).

Job growth

On average, the job growth experiences of metropolitan and non-metropolitan regions were similar in the 1990s (table D.12). This result, however, does not reflect the significant differences across regions. In the 1990s there were vastly different employment growth conditions across non-metropolitan regions. Some, particularly in Queensland and Western Australia, experienced significant employment growth. Others, particularly in Tasmania and South Australia, experienced employment decline during the 1990s. The same can be said for the 1980s, where on average metropolitan and non-metropolitan regions experienced the same job growth (1.2 cent a year). As in the 1990s, there was significant variation in employment growth across non-metropolitan regions, a factor that the average measure does not illustrate. However, in nearly all cases metropolitan areas experienced job growth in both the 1980s and 1990s.

These job growth figures need to be interpreted with caution due to the statistical problems associated with having a small base for comparison. Particularly in the case of regions with small populations, the creation or loss of a small number of jobs can represent a relatively larger proportion of employment.

Also, these data also only give a very broad indication of rural and regional employment because the distinction between metropolitan and non-metropolitan areas means major centres that have urban characteristics, such as Newcastle and Geelong, are included in the non-metropolitan data.

Table D.12 **Job growth rates[a], by statistical division[b], 1981 to 1996**

Per cent per year

Region	*1981-1991*	*1991-1996*
Average – Metropolitan regions[c]	1.2	1.5
Average – Non-metropolitan regions[c]	1.2	1.3
Sydney	0.7	1.4
Hunter	0.7	0.9
Illawarra	0.6	1.2
Richmond-Tweed	2.3	2.7
Mid-North Coast	2.1	1.7
Northern	0.0	-0.7
North Western	0.2	0.3
Central West	-0.2	1.0
South-Eastern	2.6	0.7
Murrumbidgee	-0.2	1.1
Murray	0.4	0.4
Far Western	-2.2	-3.0
Melbourne	0.7	1.0
Barwon	1.2	1.2
Western Districts	-0.2	0.1
Central Highlands	1.3	-0.2
Wimmera	-0.8	-0.1
Mallee	-0.2	1.6
Loddon-Campaspe	1.5	-2.6
Goulburn	1.2	3.5
Ovens-Murray	2.3	-0.2
East-Gippsland	1.0	3.2
Gippsland	0.2	-2.6
Brisbane	2.6	2.9
Moreton	5.1	5.0
Wide bay-Burnett	2.3	2.8
Darling Downs	1.3	1.3
South-West	0.9	-1.0
Fitzroy	0.9	1.7
Central West	1.1	-1.9
Mackay	1.8	3.0
Northern	1.7	1.4
Far North	3.7	3.4
North Western	-0.1	0.2

(Continued on next page)

Table D.12 **(continued)**

Region	*1981-1991*	*1991-1996*
Adelaide	1.2	-0.2
Outer Adelaide	3.1	0.8
Yorke and Lower North	-0.5	-1.3
Murray Lands	0.2	-0.5
South East	0.0	-0.1
Eyre	-0.8	-0.8
Northern	-0.5	-3.3
Perth	2.2	2.9
South West	2.6	4.4
Lower Great Southern	-0.1	2.0
Upper Great Southern	-1.3	-1.6
Midlands	-1.1	1.7
South Eastern	2.2	3.9
Central	1.5	1.0
Pilbara	-0.2	-1.4
Kimberley	3.5	3.2
Hobart	0.6	1.2
Southern	1.5	-1.6
Northern	0.8	0.3
Mersey-Lyell	-0.5	-0.1
Darwin	2.8	2.3
Balance of the Northern Territory	3.1	2.2
Canberra	3.3	1.4
Balance of the Australian Capital Territory	-0.6	-21.7

a Differences in methodology between the ABS Census of Population and Housing and the ABS Labour Force Survey mean that the employment and unemployment data used in this appendix differ from those examined elsewhere in the paper. **b** Offshore areas and Migratory and Other Territories have been omitted. **c** Weighted average.

Sources: PC (1998); ABS (*Census of Population and Housing*, unpublished data).

Prices

Looking at price levels is important when comparing living standards across regions, as they partly determine the real value of incomes in the region. Unfortunately, there is no overall measure of price levels outside capital cities. The regularly quoted price index, the Consumer Price Index, only takes data from the eight major capital cities. Therefore an analysis of the price differential between rural and urban areas is restricted to looking at a limited range of items for which data are available.

One indication of costs incurred in different regions is housing affordability. During the period 1984 to 1999, housing outside capital cities was consistently more affordable than that in the capital cities (table D.13).

There were fluctuations in this period, mainly due to the high interest rate environment in the late 1980s and early 1990s, which saw affordability fall significantly.

Over this period, the difference between capital and non-capital city housing affordability has increased, with it becoming relatively more affordable to buy housing outside capital cities.\

Table D.13 **Housing affordability[a] in Australia, 1984 to 1999[b]**
Index

	Capital cities	*Other areas*	*National average*
1984	161.6	173.2	165.6
1985	145.7	143.7	145.0
1986	137.3	149.1	140.7
1987	138.8	144.2	140.4
1988	106.5	139.4	115.9
1989	98.4	125.9	106.6
1990	105.2	133.3	113.7
1991	120.1	147.5	128.4
1992	142.8	164.5	150.5
1993	150.5	177.7	160.8
1994	127.1	153.0	135.7
1995	132.0	161.5	141.6
1996	158.3	194.0	169.0
1997	153.1	202.6	168.0
1998	151.6	205.1	167.4
1999	127.0	187.1	144.1

a Housing affordability is measured by the ratio of average household disposable income to the income required to meet payments on a typical dwelling. An increase in the index represents an improvement in affordability. **b** December quarter.

Source: CBA-HIA (2000) and CBA-HIA unpublished data.

In terms of other prices, there is a common perception that many items are more expensive in rural, regional and remote Australia. One of the more important items in this category is petrol, where studies have established differences between petrol prices in rural and regional areas compared to major cities. Various studies over the years have reported average price differences of between 4 and 12 cents per litre (PC 1999a). There are several possible explanations for the difference between city and country petrol prices. Given the lower population densities in country areas, country petrol stations tend to sell a lower volume than those in the cities, resulting in smaller scale of operations and higher margins. Also the lower numbers of petrol outlets in country areas may mean that competitive pressures are not as strong between outlets, giving outlets less incentive to discount their prices. Increased distance from refineries also increases freight costs (PC 1999a).

Provision of services

Aside from the economic measures of wellbeing already examined, the provision of services to communities has an influence on living standards. Services include those provided by the government, such as health, education and transport infrastructure, and those provided by the private sector, such as banking facilities and retail outlets. This analysis is not intended to be comprehensive, but rather to give an indication of differences in living standards between rural and urban regions, beyond the income and employment factors already discussed.

The level of services provided to rural and regional Australia has become a matter of concern for many communities. A recent trend in country Australia has been the growth in the population of large regional towns, for example Dubbo in NSW and Toowoomba in Queensland. These centres have benefited from improved transport infrastructure, and the increased reliability of vehicles has allowed people in remote areas to travel further distances to access services such as banking, retail services and post offices. The consequence of this has been that smaller centres have suffered and local services have declined (PC 1999a).

The deregulation of the financial sector and the introduction of technology, such as ATMs, EFTPOS, telephone and internet banking, has contributed to the declining number of bank branches in country Australia. There has also been a significant decline in the number of urban branches. However, urban customers have greater flexibility in accessing banking services, such as through ATMs, supermarkets and post offices, than smaller country communities do. The loss of banking services can expedite population loss and economic decline of a country town, as local people who have to travel to access banking services in the large regional centres are likely to take other business to that centre (PC 1999a).

As with income and employment trends, there has been significant variability in changes to service provision across regions in the 1990s. Both urban and regional areas have experienced changes in the provision of services, facilitated by technology and infrastructure improvements. However, the impact of these changes has been notable in some smaller rural towns, where there has been a shift of services to larger regional centres.

References

AASE (Australian Associated Stock Exchanges) 1986, *Australian Shareownership 1986*, Australian Associated Stock Exchanges, Sydney.

ABS (Australian Bureau of Statistics) 1995, *Australian Social Trends 1995*, ABS Cat. no. 4102.0, AGPS, Canberra.

—— 1996, *Family and Labour Force Characteristics*, Cat. no. 2017.0, ABS, Canberra.

—— 1999, *Income Distribution 1997-98*, Cat. no. 6523.0, ABS, Canberra.

—— Labour Force Statistics (database), EconData Pty Ltd (vendor), Armadale, Victoria, monthly updating.

—— National Accounts (1998/99) (database), EconData Pty Ltd (vendor), Armadale, Victoria, annual updating.

—— Time Series Statistics Plus (database), EconData Pty Ltd (vendor), Armadale, Victoria, monthly updating.

Access Economics 1998, 'Australian wealth', *Economics Monitor*, October, pp. 12–17.

ACIRRT (Australian Centre for Industrial Relations Research and Training) 1999, *Australia at Work: Just Managing*, Prentice Hall, Sydney.

Aghion, P., Caroli, E. and García-Peñalosa, C. 1999, 'Inequality and economic growth: the perspective of the new growth theories', *Journal of Economic Literature*, vol. 37, pp. 1615–60.

AIHW (Australian Institute of Health and Welfare) 1996, *Australia's Health 1996*, AGPS, Canberra.

—— 1998a, *Australia's Health 1998*, AGPS, Canberra.

—— 1998b, *Health in Rural and Remote Australia*, AIHW, Canberra.

—— 1998c, *International Health — How Australia Compares*, AIHW Cat. no. PHE8, AIHW, Canberra.

—— 1999, *Australian Hospital Statistics 1997-98*, AIHW, Canberra.

—— 2000, *Australia's Health 2000*, http://www.aihw.gov.au/publications/health/ah00.html (accessed 22 June 2000).

ASX (Australian Stock Exchange) 1997, *1997 Australian Shareownership Survey*, Australian Stock Exchange Limited, Sydney.

—— 2000, *Share Ownership 2000 Survey*, http://www.asx.com.au (accessed 9 February 2000).

Atkinson, A. 1999, 'Equity issues in a globalising world: the experience of OECD countries', in Tanzi, V., Chu, K. and Gupta, S. (eds), *Economic Policy and Equity*, IMF, Washington.

Barnes, P., Johnson, R., Kulys, A. and Hook, S. 1999, *Productivity and the Structure of Employment*, Productivity Commission Staff Research Paper, AusInfo, Canberra.

Barrett, G., Crossley, T. and Worswick, C. 2000, 'Consumption and income inequality in Australia', *Economic Record*, vol. 76, no. 233, pp. 116–38.

BIE (Bureau of Industry Economics) 1986, *Manufacturing Industry Productivity Growth: Causes, Effects and Implications*, Research Report 21, AGPS, Canberra.

—— 1990, *Manufacturing Investment*, Research Report 33, AGPS, Canberra.

—— 1996, *Automotive Case Study: Micro Reform — Survey of Impacts on Firms*, Report 96/17 , AGPS, Canberra.

Blanchard, O. 1997, 'The medium run', *Brookings Papers on Economic Activity*, no. 2, pp. 89–158.

Blundell, R. and Preston, I. 1998, 'Consumption inequality and income uncertainty', *Quarterly Journal of Economics*, May, pp. 603–40.

Bosworth, B. and Perry, G. 1994, 'Productivity and real wages: Is there a puzzle?', *Brookings Papers on Economic Activity*, vol. 1, pp. 317–44.

Bruno, M and Sachs, J. 1985, *The Economics of Worldwide Stagflation*, Basil Blackwood, Oxford.

Burtless, G. 1995, 'International trade and the rise in earnings inequality', *Journal of Economic Literature*, vol. 33, June, pp. 800–16.

Butlin, M.W. 1977, *A Preliminary Annual Database 1900-01 to 1973-74*, Research Discussion Paper 7701, Reserve Bank of Australia, Sydney.

Carter, M. and Maddock, R. 1984, 'Working hours in Australia: some issues', in Blandy, R. and Covick, O. (eds), *Understanding Labour Markets*, George Allen and Unwin, Sydney, pp. 222–45.

Castles, I. 1998, 'Short responses' in Eckersley, R. (ed.), *Measuring National Progress: Is Life in Australia Getting Better?*, CSIRO Publishing, Melbourne, pp. 351–3.

CBA-HIA (Commonwealth Bank–Housing Industry Association) 2000, *Housing Report*, HIA, Canberra, June and earlier issues.

Commonwealth Treasury 1973, *Economic Growth: Is it Worth Having?*, Treasury Economic Paper no. 2, AGPS, Canberra.

Cully, M. 1999, 'A more or less skilled workforce? Changes in the occupational composition of employment, 1993 to 1999', *Australian Bulletin of Labour*, vol. 25, no. 2, pp. 98–104.

Cutler, D. and Katz, L. 1992, 'Rising inequality? Changes in the distribution of income and consumption in the 1980's', *American Economic Review*, vol. 82, no. 2, pp. 546–51.

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.

DETYA (Department of Education, Training and Youth Affairs) 1998, *Selected Higher Education Student Statistics, 1998*, AGPS, Canberra.

—— 1999, *Students 1999: Selected Higher Education Student Statistics*, http://www.detya.gov.au/highered/statistics/student99shes.pdf (accessed 7 March 2000).

DISR (Department of Industry, Science and Resources) 1998, *State of the Australian Automotive Industry 1997*, AusInfo, Canberra.

—— 1999, *Key Automotive Statistics Australia*, AusInfo, Canberra.

DIST (Department of Industry, Science and Tourism) 1995, *State of the Automotive Industry 1995*, DIST, Canberra.

Dowrick, S. and Quiggin, J. 1998, 'Measures of economic activity and welfare: the uses and abuses of GDP' in Eckersley, R. (ed.) 1998, *Measuring National Progress: Is Life in Australia Getting Better?*, CSIRO Publishing, Melbourne, pp. 93–107.

Easton, B. 1996, 'Income distribution' in Silverstone, B., Bollard, A., Lattimore, R. (eds), *A Study of Economic Reforms: The Case of New Zealand*, Elsevier, Amsterdam.

Eckersley, R. 1999, *Quality of Life in Australia: an Analysis of Public Perceptions*, Discussion Paper no. 23, The Australia Institute, Canberra.

EPAC (Economic Planning Advisory Commission) 1996, *Future Labour Market Issues for Australia*, Commission Paper no. 12, AGPS, Canberra.

Fluet, C. and Lefebvre, P. 1987, 'The sharing of TFP gains in Canadian manufacturing: a price accounting approach 1965-1980', *Applied Economics*, vol. 19, p. 245–57.

Gretton, P.K. and Fisher, B. 1997, *Productivity Growth and Australian Manufacturing Industry*, Industry Commission Staff Research Paper, AGPS, Canberra.

Hamilton, C. and Saddler, H. 1997a, *The Genuine Progress Indicator for Australia*, Discussion Paper no. 12, The Australia Institute, Canberra.

—— 1997b, *The Genuine Progress Indicator for Australia: A New Index of Changes in Well-being in Australia*, Discussion Paper no. 14, The Australia Institute, Canberra.

Harding, A. 1997, 'The suffering middle: trends in income inequality in Australia 1982 to 1993-94', *Australian Economic Review*, vol. 30, no. 4, pp. 341–58.

—— 1998, 'Indicators of income inequality', in Eckersley, R. (ed.), *Measuring National Progress: Is Life in Australia Getting Better?*, CSIRO Publishing, Melbourne, pp. 239–53.

——, Warren, N., Robinson, M. and Lambert, S. 2000, 'The distributional impact of year 2000 tax reforms in Australia', *Agenda*, vol. 7, no. 1, pp. 17–32.

IC (Industry Commission) 1996a, *GBE Price Reform — Effects on Household Expenditure*, Staff Information Paper, AGPS, Canberra.

—— 1996b, *Reform and the Distribution of Income — an Economy-wide Approach*, Staff Information Paper, AGPS, Canberra.

—— 1997a, *Assessing Australia's Productivity Performance*, Research Paper, AGPS, Canberra.

—— 1997b, *The Automotive Industry*, Report no. 58, vol. 1, AGPS, Canberra.

Johnson, D., Manning, I. and Hellwig, O. 1995, *Trends in the Distribution of Cash Income and Non-cash Benefits*, Report to the Department of the Prime Minister and Cabinet, AGPS, Canberra.

Katz, L. 1998, 'Commentary: the distribution of income in industrialized countries', *Income Inequality Issues and Policy Options Symposium: Jackson Hole, Wyoming, 27–29 August*, Federal Reserve Bank of Kansas City, pp. 33–48, http://www.kc.frb.org/publicat/sympos/1998/sym98prg.htm (accessed 8 March 2000).

Kelly, P. 2000, 'Our split-personality society', *The Weekend Australian*, 17-18 June, p. 1.

Kryger, T. 1999, *Private Sector Executive Salaries*, Parliamentary Library, Research Note 24, 1998-99, http://www.aph.gov.au/library/rn/1998-99/99rn24.htm (accessed 3 April 2000).

Luxembourg Income Study 1998, *LIS Income Distribution Measures*, as computed by K. Vleminckx, Luxembourg Income Study, August, http://lissy.ceps.lu/ineq.htm (accessed 1 March 2000).

Mackay, H. 1999, *The Mackay Report: the Mind and Mood of Australia*, no. 95, September.

Macken, J. 2000, 'Money not the only feel-good factor', *The Australian Financial Review*, 3 May, p. 18.

Mathers, C. and Harvey, R. 1988, *Hospital Utilisation and Costs Study: Survey of Public Hospitals and Related Data*, vol. 2, Australian Institute of Health, AGPS, Canberra.

McLean, I. 1987, 'Economic wellbeing', in Maddock, R. and McLean, I. (eds), *The Australian Economy in the Long Run*, Cambridge University Press, Melbourne, pp. 319–52.

—— and Richardson, S. 1986, 'More or less equal? Australian income distribution in 1933 and 1980', *Economic Record*, March, pp. 67–81.

Murtough, G., Pearson, K. and Wreford, P. 1998, *Trade Liberalisation and Earnings Distribution in Australia*, Industry Commission Staff Research Paper, AGPS, Canberra.

NATSEM (National Centre for Social and Economic Modelling) 2000, 'Income distribution trends 1982 to 1996-97', prepared for *The Australian*, http://www.highered.theoz.com.au/flathtml/extra/where/data/trends.pdf (accessed 30 June 2000).

Neutze, M. 1987, 'Housing affordability in Australia' in Judd, B. (ed.), *Housing Issues 3: Housing Affordability*, Royal Australian Institute of Architects, Canberra.

Nickell, S. and Layard, R. 1998, *Labour Market Institutions and Economic Performance*, Discussion Paper no. 407, Centre for Economic Performance, London School of Economics and Political Science, London.

Norris, K and Mclean, B. 1999, 'Changes in earnings inequality, 1975 to 1998', *Australian Bulletin of Labour*, vol. 25, no. 1, pp. 23–31.

OECD (Organisation for Economic Co-operation and Development) 1998, *OECD Employment Outlook June 1998*, OECD, Paris.

—— 1999a, *OECD Employment Outlook June 1999*, OECD, Paris.

—— 1999b, *OECD Historical Statistics 1960–1997*, OECD, Paris.

—— 2000a, *A New Economy? The Changing Role of Innovation and Information Technology in Growth*, OECD, Paris.

—— 2000b, *OECD Economic Surveys 2000: Australia*, OECD, Paris.

Oxley, H., Burniaux, J-M., Dang, T-T. and d'Ercole, M.M. 1999, 'Income distribution and poverty in 13 OECD countries', *OECD Economic Studies*, no. 29, pp. 55–94.

PC (Productivity Commission) 1998, *Aspects of Structural Change in Australia*, Research Paper, AusInfo, Canberra.

—— 1999a, *Impact of Competition Policy Reforms on Rural and Regional Australia*, Report no. 8, AusInfo, Canberra.

—— 1999b, *Microeconomic Reforms and Australian Productivity: Exploring the Links*, Commission Research Paper, AusInfo, Canberra.

Pusey, M. 1998 'Incomes, standards of living and quality of life: preliminary findings from the Middle Australia Project' in Eckersley, R. (ed.), *Measuring National Progress: Is Life in Australia Getting Better?*, CSIRO Publishing, Melbourne, pp. 183–97.

RBA (Reserve Bank of Australia) Australian Economic Statistics (database), EconData Pty Ltd (vendor), Armadale, Victoria, three-yearly updating.

Reference Group on Welfare Reform. 2000, *Participation Support for a More Equitable Society: the Interim Report of the Reference Group on Welfare Reform*, Department of Family and Community Services, Canberra.

Reith, P. 2000, *Casual Employment and Working Hours in Australia*, Ministerial Information Paper, Federal Minister for Workplace Relations and Small Business, Canberra, March.

Scarpetta, S., Bassanini, A., Pilat, D. and Schreyer, P. 2000, *Economic Growth in the OECD area: Recent Trends at the Aggregate and Sectoral Level*, Economics Department Working Papers no. 248, OECD, Paris, http://www.oecd.org/eco/wp/onlinewp.htm#2000 (accessed 21 July 2000).

Sharpe, A. 1999, 'A survey of indicators of economic and social well-being', Paper prepared for Canadian Policy Research Networks, July 22, http://www.csls.ca/pdf/paper3a.pdf (accessed 17 May 2000).

Steketee, M. 2000, 'Unhappy days are here again', *The Weekend Australian*, 17-18 June, p. 22.

Stevens, G. 2000, 'Aspects of Australian economic performance in 2000', *AIG Conference, Sydney, 22 February*, http://www.rba.gov.au/speech/sp_ag_220200.pdf (accessed 9 June 2000).

Sullivan, L., Buckingham, J., Maley, B. and Hughes, H. 1999, *State of the Nation: Indicators of a Changing Australia*, The Centre for Independent Studies, St Leonards, NSW.

Terrill, M. and Brodie-Reed, I. 1998, 'It's not just about money — a project to examine living standards', *Social Security Journal*, no. 1, pp. 37–55.

Travers, P. and Richardson, S. 1993, *Living Decently: Material Well-being in Australia*, Oxford University Press, Melbourne.

Trewin, D. 1998, 'A framework for the presentation of indicators of national progress' in Eckersley, R. (ed.), *Measuring National Progress: Is Life in Australia Getting Better?*, CSIRO Publishing, Melbourne, pp. 109–21.

Vickery, J. 1999, *Unemployment and Skills in Australia*, Reserve Bank of Australia Research Discussion Paper, RBA, Sydney.

Visco, I. 1998, 'Commentary: the distribution of income in industrialized countries', *Income Inequality Issues and Policy Options Symposium: Jackson Hole, Wyoming, 27–29 August*, Federal Reserve Bank of Kansas City, pp. 49-58, http://www.kc.frb.org/publicat/sympos/1998/sym98prg.htm (accessed 8 March 2000).

Waters II, W.G. and Tretheway, M.W. 1998, 'Comparing total factor productivity and price performance: concepts and application to Canadian railways', *Journal of Transport Economics and Policy*, vol. 33, part 2, pp. 209–20.

Webster, E. 2000, *The Effects of Wages on Aggregate Employment: A Brief Summary of Empirical Studies*, Melbourne Institute Working Paper no. 14/00, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne, Melbourne.

Whiteford, P. 1997, 'Measuring poverty and income inequality in Australia', *Agenda*, vol. 4, no. 1, pp. 39–50.

Winston, C. 1988, 'US industry adjustment to economic deregulation', *Journal of Economic Perspectives*, vol. 12, no. 3, pp. 89–110.

Wooden, M. 2000a, 'The changing skill composition of labour demand', *Australian Bulletin of Labour*, vol. 26, no. 3, pp. 191–8.

Wooden, M. 2000b, *The Transformation of Australian Industrial Relations*, The Federation Press, Sydney.

World Bank 1999, *World Development Indicators 1999 CD-ROM*, World Bank, Washington DC.

—— World Tables (database), EconData Pty Ltd (vendor), Armadale, Victoria, annual updating.