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Educational attainment in Australia

Gene Tunny¹

Australians have increased their educational attainment over the past few decades, essentially catching up with their peers in the rest of the OECD. Although older Australians have lower upper secondary attainment, the educational attainment of young Australians is similar to the OECD average. With strong educational attainment among young Australians, the flow of younger well-educated cohorts into the working-age population will gradually improve Australia's total stock of human capital. While it seems plausible to believe that such increases in measured educational attainment will benefit Australia's economic performance, it is difficult to find statistical support for such a conclusion from a cross-country comparison of productivity and educational attainment.

1 The author is from the Macroeconomic Policy Division of the Australian Treasury. This paper has benefited from comments and suggestions from fellow Treasury officers, including Greg Coombs, Graeme Davis, David Gruen, John Hawkins, Rob Heferen, Hamish McDonald, David Parker, Jyoti Rahman and Dominic Regan. The views in this article are those of the author and not necessarily those of the Australian Treasury.

Introduction

This article compares the educational attainment of Australians with their peers in the rest of the OECD. Discussions of educational attainment often focus on average years of schooling. However, estimates of average years of schooling require assumptions about the number of years of schooling a particular level of attainment represents. This has resulted in discrepancies between estimates from different sources. Furthermore, average years of schooling can give a misleading picture of overall educational attainment, especially if a large tertiary-educated segment of the population skews the average upward.

Arguably, a population's educational attainment is better summarised by its educational attainment profile, which is the distribution of people at different levels of educational attainment. For example, the educational attainment profile shows the percentage of the population that has at least an upper secondary education.

Although a more informative measure than average years of schooling, the educational attainment profile is still subject to the significant caveats that attach to international comparisons of educational attainment. It is difficult to compare levels of attainment across countries with different education systems, especially where there may be quality differences in the provision of education.

Section 2 contains an overview of the evolution of Australia's educational attainment profile relative to the rest of the OECD and, in particular, the United Kingdom (UK) and the United States (US). Then Section 3 discusses the relationship between educational attainment and labour productivity across the OECD. Section 4 summarises and concludes.

Australia's educational attainment profile

Educational attainment profiles for Australia and the rest of the OECD by age group are presented in Chart 1. The profile for the rest of the OECD is an average of the profiles of member countries, weighted by their relative populations. The US and Japan are given a greater weight than Denmark and Sweden, for example. This gives a truer picture of where Australia is in the OECD compared with the simple average or country mean, which can be skewed by a number of smaller countries. The youngest age group presented is 25-34, to allow for differences in typical ages of graduation among OECD countries.

Two broad levels of educational attainment are used: at least upper secondary and tertiary. In Australia, in addition to university qualifications, the tertiary category includes diploma and advanced diploma courses awarded in the Vocational Education and Training (VET) sector, which conducts approximately one-sixth of tertiary

education in Australia (OECD 2005b). All the other VET qualifications are classified as upper secondary education, which includes post-school non-tertiary qualifications.

Chart 1: Educational attainment, Australia and rest of OECD, 2003^(a)

Chart 1a: At least upper secondary

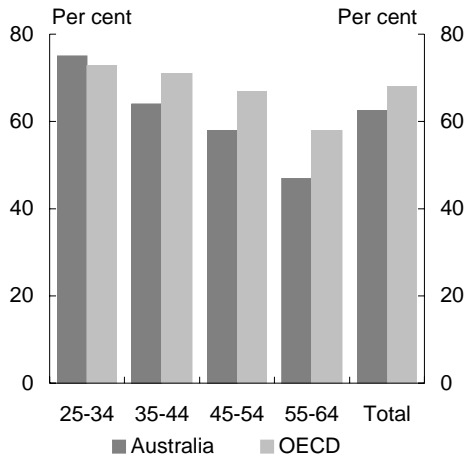
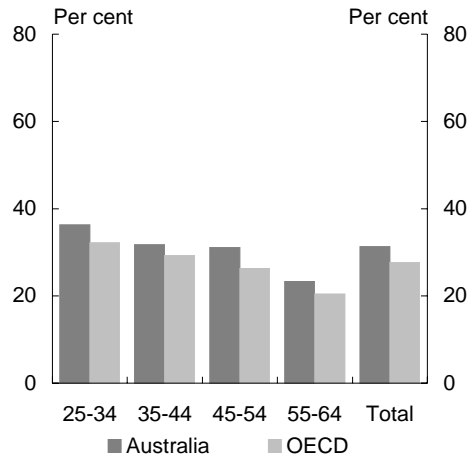


Chart 1b: Tertiary



(a) 2002 data for Iceland, Italy, and Netherlands.
Source: OECD (2005a; 2005c).

Charts 1a and 1b suggest a substantial increase in Australia’s educational attainment over the last few decades of the twentieth century. While the proportion of Australians aged 55-64 with at least upper secondary attainment was 11 percentage points below the weighted average of the rest of the OECD, this shortfall diminishes and disappears for younger age groups. The proportion of Australian 25-34 year olds with at least upper secondary attainment was marginally higher than for 25-34 year olds in the rest of the OECD. A large part of the increase in educational attainment from one age group to the next was the increase in educational attainment among females relative to males (Chart 2).

Chart 2: Educational attainment, males and females, Australia, 2003

Chart 2a: At least upper secondary

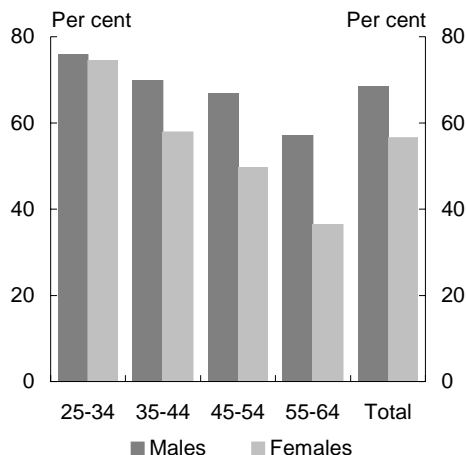
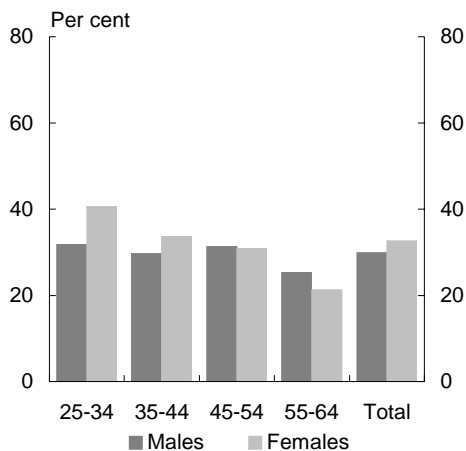


Chart 2b: Tertiary

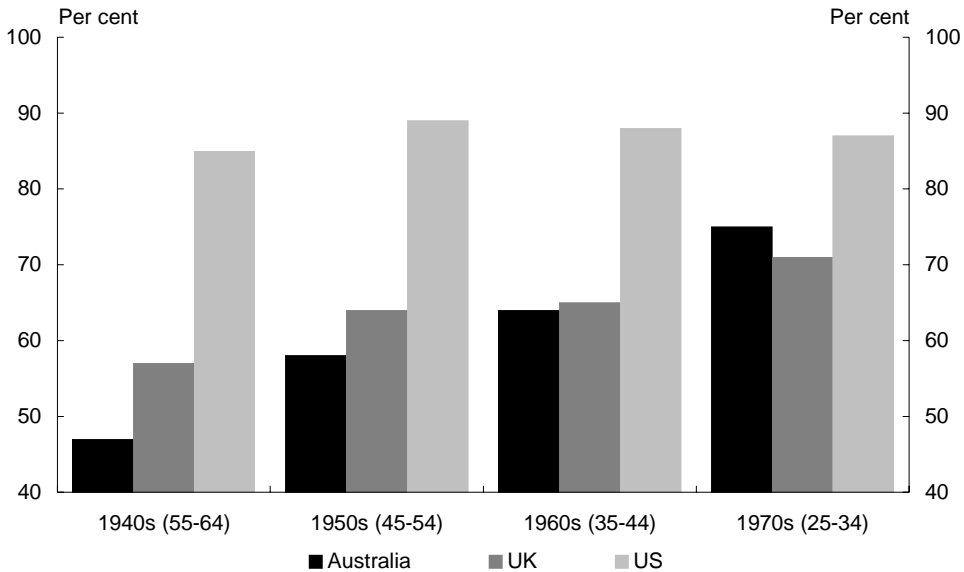


Source: OECD (2005c).

Along with high tertiary attainment across all age groups, the increase in educational attainment with each successive cohort has made the aggregate educational attainment profile ‘hollow’ in the middle. Proportionately, Australia has more tertiary qualified people than the rest of the OECD. Also, as Australia has proportionately fewer people with at least upper secondary attainment, it has more people with only lower secondary attainment. The youngest age group, however, has comparable if not higher educational attainment than their peers in the rest of the OECD. This suggests that the hole in the middle will be gradually filled in as younger cohorts replace older cohorts over the decades to come.

While the comparison with the rest of the OECD is informative, it masks a wide variation in the educational attainment profiles of member countries. Narrowing the comparison to countries with broadly similar histories and institutions, such as the UK and the US, shows a substantial increase in Australia’s educational attainment relative to the UK and US over the last few decades.

The increase in educational attainment from older to younger age groups is more easily seen if the age groups are presented in reverse order, from oldest generation to youngest. Taking the 55-64 age group as the generation of the 1940s, the 45-54 age group as the generation of the 1950s, and so on, Chart 3 shows Australia’s substantial increase in at least upper secondary attainment relative to the UK and US.

Chart 3: At least upper secondary attainment by generation (age group), 2003

Source: OECD (2005a).

As Chart 3 highlights, the upward shift in Australia's educational attainment was still occurring comparatively recently. While there was a significant shift in Australia's educational attainment between the 1940s and 1950s generations, the change between the 1950s and 1960s generation was about half the size. There was, however, a large change in (at least) upper secondary attainment between the 1960s and the 1970s generations. This increase resulted in Australian 25-34 year olds having higher upper secondary attainment than their peers in the UK. The US has had a high and stable level of upper secondary attainment across the generations.

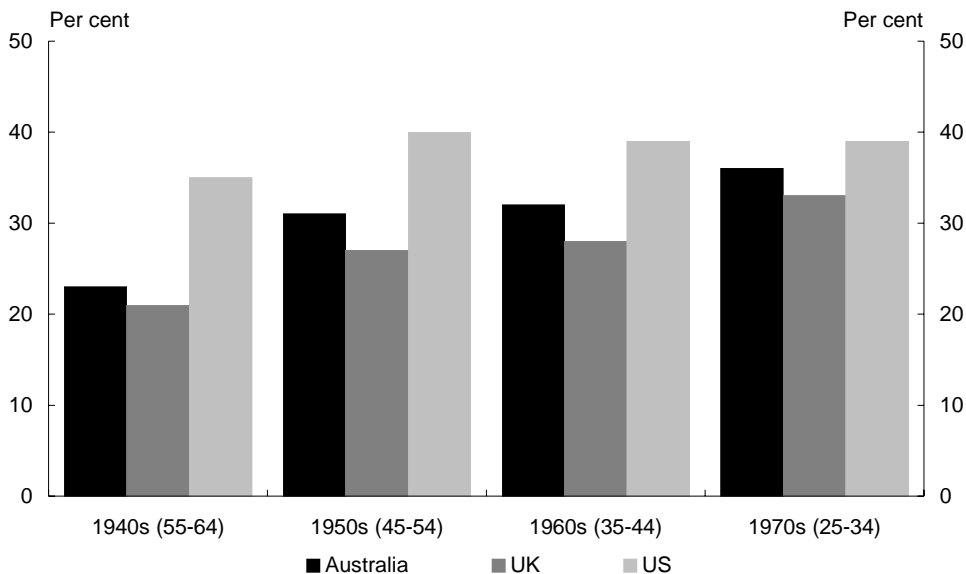
Australians have also increased their tertiary attainment from generation to generation, although not as substantially as upper secondary attainment (Chart 4). This is partly due to Australians having relatively high tertiary attainment across all generations. The 1970s generation in Australia has tertiary attainment almost at the US level.

It is difficult to project the educational attainment of future cohorts. For example, a cohort's average upper secondary attainment will depend on school retention rates, but also on completion rates of VET qualifications that are measured as equivalent to upper secondary. There will also be a small proportion of each cohort that attain upper secondary qualifications beyond the traditional age of high-school completion.

Nonetheless, some indication of the likely educational attainment of future cohorts is given by current year 12 retention rates (Chart 5). The maintenance of retention rates at around historically-high levels suggests that younger cohorts are likely to be just as

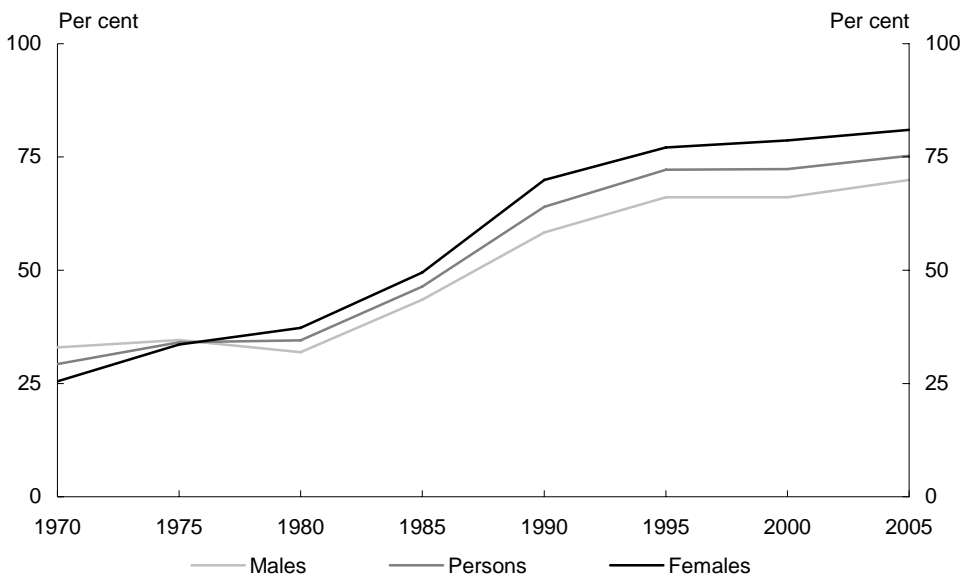
well qualified as current 25-34 year olds. This continued inflow of highly-educated young people will gradually increase the average educational attainment of the Australian population.

Chart 4: Tertiary attainment by generation (age group), 2003



Source: OECD (2005a).

Chart 5: Year 12 retention rates, Australia



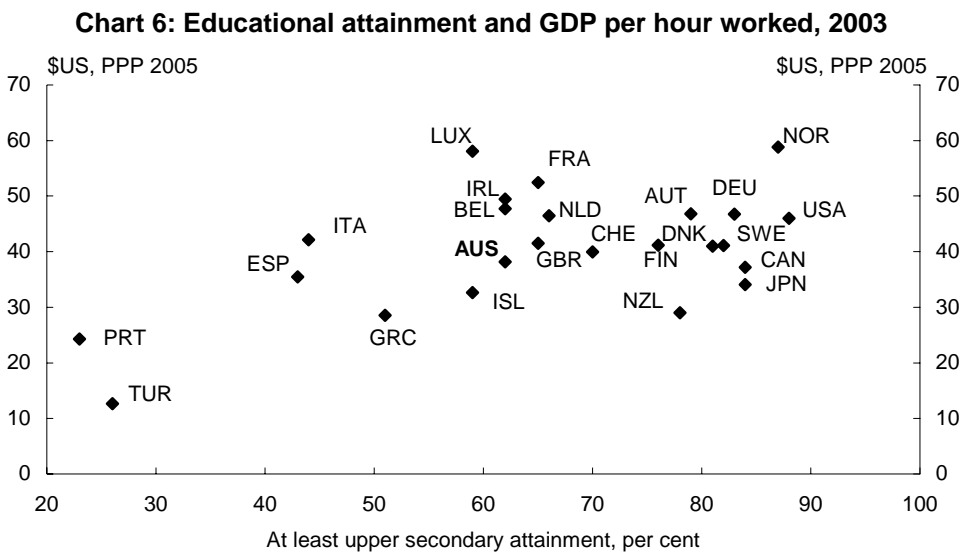
Source: ABS Schools, Australia, various years, cat. no. 4221.0.

Note: Data presented in this chart are at five-yearly intervals.

Educational attainment and labour productivity

This article has reviewed trends in educational attainment for Australia and comparator countries, but has not considered whether a particular educational attainment profile is desirable. Studies relating to this issue in the Australia context include Dowrick (2003), Access Economics (2005), and Borland (2002), for example. Although a full exploration of this issue is beyond the scope of this article, it is worthwhile considering the relationship between educational attainment and labour productivity currently observed across the OECD.

Chart 6 plots educational attainment and labour productivity (GDP per hour worked) across the OECD in 2003. While there is broadly a relationship between a country's average educational attainment and labour productivity, this relationship may not extend beyond a 'threshold' level of educational attainment.² Australia is one of the cluster of countries where there is not a strong relationship between the level of labour productivity and levels of educational attainment.



Source: OECD (2005a) and Groningen Growth and Development Centre and the Conference Board (January 2006). Data are for the 24 longest standing OECD member countries.

The evidence in Chart 6 tends to suggest that higher measured educational attainment is, alone, no guarantee of stronger economic performance. For example, despite the substantial difference in educational attainment between Australia and Japan, Australia had a 12 per cent higher level of labour productivity than Japan in 2003.

² This parallels the finding of the effect of education on economic growth made by Krueger and Lindahl (2001, p 1130) that 'education was statistically significant and positively associated with subsequent growth only for the countries with the lowest level of education'.

Nonetheless, it seems plausible that the mix of education and training, and its quality, will be important.

In addition to education mix and quality differences, another possible explanation for the breakdown in the education-productivity relationship among high-income countries could be that their populations might have different preferences for education. To varying degrees, as countries reach a threshold level of economic development their populations may increasingly demand education for lifestyle and personal development reasons, rather than for any income benefit it might provide.

There are also a range of other institutional and macroeconomic factors that might explain the particular performance of particular countries. These would include country-specific contextual factors and policy settings, including product and labour market regulations. These possible influences are discussed by Rahman (2005) in the context of labour productivity differences between Australia and the US.

Conclusion

Australia has experienced a substantial increase in the educational attainment of its working-age population over the past few decades. Australia has caught up with the rest of the OECD and has substantially increased its educational attainment relative to the UK and US. Indeed, it appears that young Australians have surpassed their peers in the UK in upper secondary and tertiary attainment. Although lower than the US in tertiary attainment, Australia has a relatively high level of tertiary attainment among OECD countries. Furthermore, the remaining gap with the US for the youngest cohort is small.

Despite some concerns about the international comparability of education systems and levels of educational attainment, it appears that the educational attainment of younger Australians is encouraging. With strong educational attainment among younger Australians, the flow of younger well-educated cohorts into the working-age population will gradually improve Australia's total stock of human capital.

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Wellbeing and happiness in OECD countries

Greg Coombs¹

GDP per capita is the most commonly used measure of a country's economic success, yet it is frequently criticised as a guide to a nation's wellbeing. A recently released study by the OECD considers some alternatives. The OECD uses illustrative calculations to 'extend' GDP to include leisure time, the sharing of income within households and income distribution. A key result of the study is that cross-country ranking based on these indicators and GDP per capita are generally similar, giving support to the conclusion that GDP per capita can serve as a reasonable proxy of overall wellbeing. Also, the OECD researchers find that survey-based data on happiness and life satisfaction across OECD countries are only weakly related to levels of GDP per capita. This article briefly explores the findings of the OECD's study, and reflects on some of the difficulties in attempting to develop other indicators of wellbeing.

1 The author is from the Macroeconomic Policy Division, the Australian Treasury. This article has benefited from comments and suggestions provided by Graeme Davis, John Hawkins, Ken Henry, David Parker, Jyoti Rahman, Dominic Regan and Gene Tunny. The views in this article are those of the author and not necessarily those of the Australian Treasury.

Introduction

In recent years, the Australian Treasury has embraced a framework to encapsulate economic aspects of Australian wellbeing as a corporate tool to improve the quality of our policy analysis and advice to Treasury Ministers and, through them, to the Government. The conceptual basis for the wellbeing framework and discussion on some policy implications in applying the framework are found in various speeches and articles on the Australian Treasury website including Australian Treasury (2004).

Many OECD member countries, including Australia, encouraged the OECD secretariat to review the adequacy of GDP per capita in measuring economic progress and identifying policy priorities. In response, the OECD released a study '*Alternative Measures of Well-being*' in the report *Economic Policy Reforms: Going for Growth 2006* and a supporting OECD working paper by Boarini, Johansson and D'Ercole (2006). This study discusses whether economic concepts other than GDP per capita may better capture notions of wellbeing and how country performance is influenced by using different concepts. GDP is 'extended' to include leisure time, the sharing of income within households and income distribution. The study also discusses the relationship between GDP per capita and subjective notions of wellbeing, based on survey-based measures of happiness and life-satisfaction.

Wider measures of social welfare have always been at the core of practical economic thought. As Sen (1999) notes, while the founders of economic analysis devised national accounts around the modern concept of income, their attention was never confined to this one concept. A move towards generalised determinants for utility, beyond income, as measures for welfare can be seen as reclaiming the original ground of welfare economics.

GDP: the less than perfect measure

GDP per capita is not the best possible indicator of wellbeing for a range of well rehearsed reasons. These include that GDP: is a measure of production whereas wellbeing depends more on income and consumption of individuals and households; does not allow for the using-up of non-renewable resources; excludes leisure time; does not account for variations in income distribution; and rarely takes account of co-production 'externalities' such as pollution and the impact on the environment, species and habitat. In addition, as *The Economist* (2006) points out, GDP makes no allowance for the depreciation of the capital stock.

There is also a class of well-understood measurement issues concerning the use of GDP per capita, such as difficulties in valuing of the informal market, particularly in countries with binding minimum wages (for example, services often priced-out of formal markets include household work, home cooking, shoe shines, home and pool

maintenance); unreliable data (for example, nomadic populations), and incomplete measurement (for example, black economy); the services of volunteers and productivity of the government sector.

When GDP per capita rankings are used, a further problem arises. International rankings of GDP per capita are volatile and close comparisons in ranking convey little economic meaning. Rankings can change from year to year as countries move through different stages of their business cycles and are subject to changes in exchange rates, purchasing power calculations and revisions to historical data.

There are better measures of wellbeing than GDP

The OECD finds that other national accounts indicators exist that are better measures of the economic aspects of wellbeing, notably Net National Income (NNI) and measures of household income and consumption.

Conceptually, NNI is an attractive measure for two reasons. First, it takes account of income flows across borders that contribute to the wellbeing of foreigners. This is particularly important for countries such as Ireland that have a large stock of foreign investment. Second, it takes account of the value of capital consumed in production and hence which cannot be passed onto future generations.

However, in practice, the distinction between GDP and NNI does not appear to be important to OECD country rankings. The OECD shows that both levels and growth rates in NNI are closely correlated with GDP per capita.

Another challenge is data availability. While other national accounts measures are arguably better suited as measures of wellbeing, it is difficult to get reliable non-contentious data series that are as widely available as GDP in most OECD countries. The OECD concludes that given the normal degree of uncertainty that surrounds international comparisons of economic data, for most purposes the level of GDP per capita is a good summary measure of consumption possibilities.

Of course, the national accounts framework does not provide a perfect measure of wellbeing. The OECD explains the implications of extending GDP to include a number of social indicators.

Illustrative calculations to 'extend' GDP to include leisure time, the sharing of income within households and the effect of income distribution suggest that cross-country ranking based on these indicators and GDP per capita are generally similar. Furthermore, across OECD countries, levels of most measures of specific social conditions such as self-sufficiency, good health, and a feeling of belonging to a group or a community are positively related to GDP per capita.

However, in the working paper by Boarini et al (2006) supporting the OECD study, the authors raise the difficulty in attempting to rank countries by combining other data with GDP per capita or by constructing composite measures of wellbeing from social indicators. Preferences differ widely both within countries and between countries, and it seems most unlikely that objectively ranking the wellbeing of different countries will ever be possible.

One example of this problem, presented in the paper, concerns income inequality. A measure of effective equally-distributed household income is presented using a range of different aversions to inequality. However, people in different societies and cultures have very different aversions to inequality. Recent research suggests that inequality makes people unhappy in Europe but not in the United States (Alesina et al 2001). Rankings based on any fixed aversion to inequality risk giving a misleading impression of wellbeing across countries.

A second example of this problem concerns social indicators. A synthetic index of wellbeing is presented that assigns a weight to each standardised indicator. Of course, these weights need not match anybody's idea of wellbeing. From a statistical perspective, we remain completely uncertain about the appropriate weights and country rankings. Presenting aggregate indicators of wellbeing such as these create risks. A false impression could be created of the certainty with which we can measure wellbeing and rank countries accordingly.

Leisure time is very important for measuring wellbeing. For example, the different split between labour and leisure could be argued to more than fully explain the difference between GDP per capita in the United States and France. This too is a difficult area. Boarini et al (2006) consider only the leisure time available to workers on the basis that the leisure of someone who is unemployed, or has involuntarily taken early retirement, is worth far less to them than the leisure time of a worker. However, this ignores voluntary differences in the length of working lives and retirement across countries and the distribution of labour within households through part time work. A better measure of leisure should perhaps estimate time available for leisure of the whole population over their whole lives.

Happiness and income

An alternative to the evaluation of wellbeing using objective indicators is to use subjective indicators. One way of determining whether people are happy and satisfied with their lives (or not) is to ask them, through the use of surveys.

The OECD finds that a striking feature of the survey results is that most people in most OECD countries rate themselves as being fairly to very happy and satisfied with their

lives, almost irrespective of their income levels. Reported levels of happiness are high: in around two-thirds of OECD countries, close to 90 per cent of the people sampled claim to be very or fairly happy with their lives. There is only a weak tendency for the richer OECD countries to report higher levels of life satisfaction.

The OECD findings are not unexpected. The weak link between money income and happiness appears to be explained by the combination of two aspects of human behaviour. Firstly, individuals adapt to higher income. People get used to higher income so its effect on life-satisfaction evaporates over time ('hedonic treadmill'). Second, once basic needs are satisfied, aspirations increase with higher income ('satisfaction treadmill') but also become harder to achieve as the achievement hurdle is higher, leading to unaccomplished goals and greater frustration. Evidence supporting the existence of 'adaptation' has been provided by several empirical and experimental studies (Diener and Seligman 2004; Layard 2005; Van Praag and Frijters 1999).

Secondly, individuals tend to make social comparisons. Several authors argue that subjective satisfaction is affected by an assessment of one's own situation relative to one's peers. Research also suggests that social comparisons matter more for individuals with higher income, and for those earning less than their reference group. Layard (2005) reviews evidence supporting the existence of social comparisons (for example, US studies suggesting that perceived relative income matters more for personal wellbeing than one's own income, and Swiss studies showing that personal happiness depends only on one's own income relative to that of people living in the same community). Social comparisons may, however, also increase life-satisfaction, for example when it provides information on the prospects for own improvement (Senik 2004).

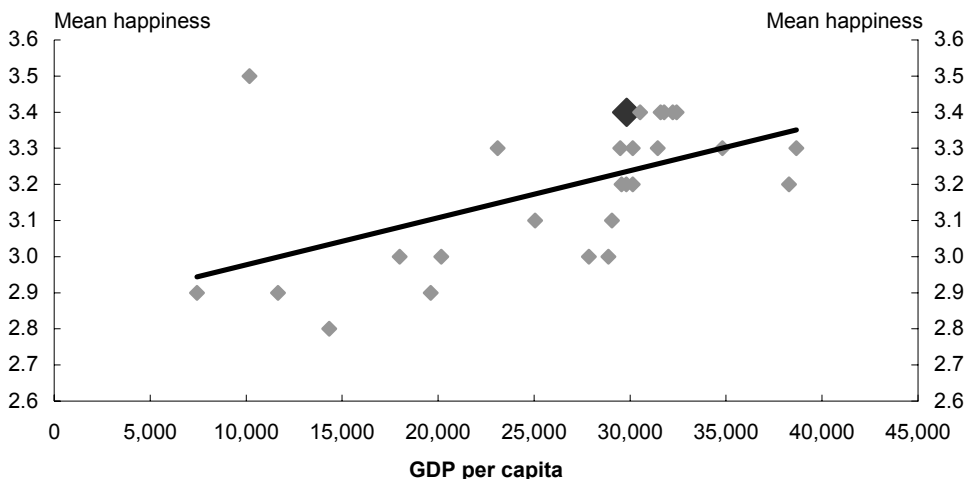
Analysis of the happiness data indicates that there appears to be, at least on the surface, a positive link between happiness and GDP per capita levels across OECD countries.

Data on mean happiness scores were derived from the World Values Survey, as published in Layard (2005) from the data collection wave closest to 2000 for each country. The survey asks the question: 'Taking all things together, would you say you are: 1 Not at all happy, 2 Not very happy, 3 Quite happy, 4 Very happy', and then averages the numbers corresponding to each response.

The scatter-plot chart below shows a positive link between average GDP per capita in 2000 and mean happiness scores. Roughly, in countries with incomes that are higher by US\$10,000 per capita, happiness scores tended to be higher by around 0.1 (and this relationship is statistically significant). This observation does not represent the outcome of a well-specified formal econometric study. More serious statistical

investigation is warranted to better understand, among other things, if the relationship holds for the high income OECD group and, if so, its functional form.

Chart 1: Relationship between happiness and GDP per capita, OECD countries



Notes: Chart covers 27 OECD countries excluding Luxembourg and Czech Republic. Australia is depicted by the dark shape.

Source: Mean happiness scores from World Values Survey in Layard (2005). Data on US\$ GDP per capita purchasing power parity for the year 2000 from Groningen Growth and Development Centre.

One proposition explored by the author was that if a country’s GDP per capita grew more rapidly during the 1990s than during the 1980s, so that incomes grew more rapidly than people might have expected given historical experience, then people in that country might be happier. This proposition was tested, but no statistical link between happiness and recent trends in GDP growth rates was found.

Happiness: a concept for policy formulation?

The interpretation of data on subjective happiness remains controversial. Happiness lacks a coherent statistical, and even conceptual, framework for policy purposes.

The slippery nature of happiness is illustrated in recent papers by different authors from the US-based National Bureau of Economic Research. Blanchflower and Oswald (2005) note an Australian ‘paradox’. According to the 2004 UN Human Development Index (HDI), our homeland ranks 3rd in the world. But when Blanchflower and Oswald rank Australia using point-scale data on happiness from approximately 50,000 randomly sampled individuals from 35 nations, they conclude that we are just not that happy.

By contrast, Leigh and Wolfers (2006) see no paradox. Using a simple chart of a cross-country comparison of happiness and the HDI, Australians appear happier, not

sadder, than Australia's HDI score would predict. This analysis highlights that the ordinal rankings-based comparison by Blanchflower and Oswald is not particularly informative. There are only very fine differences in the HDI across industrialised nations, but there is a lot of noise in the measurement of happiness.

Leigh and Wolfers also highlight difficulty in interpreting happiness results. Using data from the World Values Survey, Iceland is the only industrialised country to have a significantly higher level of both life satisfaction and happiness than Australia. But how many Australians would be keen to swap? Maybe you need to be an Icelander to understand, or perhaps adaptation is everything. The interpretation of happiness means more in comparisons between individuals than in the summary scores and cross-country comparisons.

While these papers highlight certain problems with happiness data and its interpretation, the controversy runs much deeper. A number of issues that have been identified are summarised below.

Lack of a common unit of measure

Unlike the unit of currency which is the common thread of economic indicators, we do not have an equivalent measure for happiness: the 'happiness utile' does not exist, at least not yet. So there are problems with addition and subtraction, counting things twice or not at all and with preference mapping.

Lost in translation

The interpretation of happiness does not universally translate from other languages to English (Duncan 2005). Happiness is a latter-day derivative of the old English word to 'hap' or 'to happen' – that is to occur by chance, and thus the word is associated with good fortune, luck and success. An alternative interpretation of happiness is 'good feelings'. But feeling good could imply being care-free; that is, being irresponsible (for example avoiding taxes) or engaging harmful pleasures. Thus happiness status may be affected by language and how societies interpret the language. Some of the interpretations of the meaning of happiness (for example luck) are not tractable for policy development.

Differences in underlying concepts

Studies of subjective wellbeing rarely take a comprehensive set of measures and often use generic terms such as 'all things considered, how happy are you' rather than constructing indicators that target positive and negative emotions (Diener and Seligman 2004).

Transient influences

Subjective happiness appears to vary according to the time of day and seasons (Layard 2005), phases of an economic cycle, population age-profile and differences between expectations and outcomes. Thus the timing of information gathering on happiness status and its interpretation (permanent or transient effects) is an important complicating factor in happiness measurement.

Social and cultural influences

Value systems and the willingness to express values are diverse across countries. This poses considerable difficulty in identifying a particular bundle of social goods that maximises happiness. For example, the Maori people of New Zealand place a spiritual value on fish caught that is not taken into account in standard economic wellbeing (Duncan 2004).

Direction of causation

Some studies suggest that causation appears to run both ways. That is, higher incomes are associated with higher happiness, particularly if the higher income is unexpected or lifts the recipient above subsistence level. Running the other way, happier people are likely to earn higher incomes because they are better able to reach social networks important for income earning (Diener and Seligman 2004).

Self-responsibility

There is a question over the dividing line between self-responsibility and government. As Layard (2005) states, 'happiness depends on your inner life as much as on your outer circumstances'. An implication is that relevant improvements in public policy will not necessarily result in higher ratings in happiness surveys.

Adaptability and rivalry

Finally, and importantly, there is the question of where do the human characteristics of adaptation and rivalry take subjective happiness literature for policy purposes (Henry 2004). As mentioned in the previous section, the cited explanation for why there is only a weak tendency for richer OECD countries to report higher levels of life satisfaction is that individuals adapt to higher incomes and are driven by the rivalry of social comparisons with other individuals. Suppose that, in respect of subjective happiness, adaptation and rivalry are powerful drivers. Thus, we tend to 'get over' anything that happens to us – good or bad, endowed or acquired through the passage of life. On this basis, there is no apparent reason for policy intervention because such intervention would not lift happiness. Layard (2005) has a different view: he mounts the case for growth-suppressing policy intervention. But it seems that Layard unintentionally (obviously) provides an equally strong case for no policy at all.

This article has focused on cross-country studies of life satisfaction, but before concluding, some mention is warranted of within-country studies as these studies have the potential to provide useful context for micro policy design. These studies are based on the internal preferences of the individual in specific circumstances, in contrast with the aggregate ‘all things considered’ approach to the measurement of life satisfaction.

Helliwell (2005) summarises recent empirical studies on the determinants of life satisfaction, and suggests that social capital, the quality of government and non-financial workplace characteristics such as workplace trust have substantial effects on wellbeing. Another example of these studies is the *Australian Unity Wellbeing Index* developed by Deakin University, which monitors the subjective wellbeing of the Australian population based on surveys. The Index has identified the importance of several factors including personal security, feeling part of the community, sound personal relationships and health status, all of which have potentially important implications for policy. Another survey in this series (ACQOL 2005) examined wellbeing issues associated with city and country living. This survey, along with others on community connectedness, is potentially relevant to the planning and development of cities.

Conclusions

All economic indicators have their problems. GDP per capita has the advantage of being objectively measured in a manner that is reasonably comparable across countries and time periods. It appears to do a good job of measuring one dimension of wellbeing – consumption opportunities.

Other social indicators capture many other important aspects of wellbeing and presentation of internationally comparable data in future stocktaking exercises could help policy makers to identify potential policy priority areas. However, they cannot be meaningfully combined with GDP per capita into a single indicator of wellbeing.

Nevertheless, GDP per capita seems to be broadly correlated with many of these indicators suggesting that it is a good starting point for understanding the capabilities and opportunities available to people. Moreover, the long and wide international data set available on GDP per capita makes this an appealing measure for comparisons.

Happiness as an aggregate social concept is in its embryonic stages of development. It is too early to tell if it will ever be useful to policy formulation, though there are reasons to be sceptical.

Within-country studies have identified several factors that influence individual life satisfaction. These studies provide a potentially useful context for micro policy design.

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Brilliant minds: the Nobel Prize in Economics

Gerry Antioch¹

This paper answers some frequently asked questions about the Nobel Prize in Economics. The Prize is won predominantly by United States citizens or other academics working at United States institutions who tend to be around 66 years of age. Although during the 1980s the Prize was awarded to single recipients, more recently the Prize has always been shared. The awards do not appear to be skewed toward any particular field of economics.

1 The author is General Manager of Foreign Investment and Trade Policy Division, the Australian Treasury. I thank John Hawkins and David Parker for helpful suggestions. The views in this article are those of the author and are not necessarily those of the Australian Treasury.

Thought can never be compared with action
except when it awakens in us the image of truth.

Germaine de Staël

Introduction

The Prize in Economic Sciences in Memory of Alfred Nobel (colloquially known as the Nobel Prize in Economics) is not an 'original' Nobel in that it was not created by Alfred Nobel's famous will.² It was created by the Central Bank of Sweden to commemorate its tercentenary in 1968. Apart from that difference in origin, the Economics Prize is awarded by the same rules and administered in much the same way as the other prizes.³

The Nobel prizes are awarded for specific achievements: discoveries, inventions and improvements. They are not awarded to outstanding individuals. Therefore, someone who makes a path-breaking discovery is favoured over someone who is an all-round scholar. No more than three can share in the prize nor can it be awarded to the deceased.

Assar Lindbeck, chairman of the Economics Prize Committee for around 15 years until the mid-1990s, has penned illuminating articles on the origins and administration of the Economics Prize (Lindbeck (1985) and (2004)⁴). What is not found in the later Lindbeck article is the controversy that attended the 1994 Prize awarded to John Nash

2 The will was drawn up in 1895, and the first Nobel prizes were awarded in 1901 for physics, chemistry, medicine, literature and peace.

3 The Economics Prize is awarded by the Royal Swedish Academy of Sciences, which also awards the Prizes in Physics and Chemistry. The Prize in Medicine is awarded by Sweden's Karolinska Institute; the Prize in Literature is awarded by the Swedish Academy; and the Peace Prize is awarded by the Norwegian Nobel Committee whose five members are appointed by the Norwegian Parliament. All six awards are administered by the Nobel Foundation and have the same value – 10 million kronor or over \$US 1.3 million.

4 Although the title of Lindbeck's 2004 paper claims to cover the period 1969-2004, it contains unfortunate errors and inconsistencies. Early in the paper the title of the section 'A Classification of Prizes for the First 32 years' begins the confusion as it indicates the period being spanned is 1969-2000! In the section 'Sharing of Prizes', Lindbeck notes that 'so far, eleven prizes out of thirty have been shared'. That statement is correct only if he stopped counting after the 1998 Prize. In the section 'Do the Prizes Reflect New Trends in Economic Analysis?', Lindbeck states 'out of 52 Laureates, 35 (about 65 per cent) have been US citizens'. Those figures agree with the awards made up to 2003. But while he seems to have counted Robert Engle (a US citizen) in the US tally, he unaccountably leaves out Clive Granger (a UK citizen) in the UK tally (reporting the UK tally as seven rather than eight laureates). This error is somewhat glaring because Engle and Granger shared the 2003 prize! In other respects, however, the paper is an excellent stocktake.

(jointly with John Harsanyi and Reinhard Selten). That controversy re-ignited lingering concerns within segments of the Swedish Academy of Sciences as to the appropriateness of a prize in economics.⁵ Those issues, along with Lindbeck's dominant role and personal style in selecting the Prize winners, are covered in Sylvia Nasar's book on John Nash's life (Nasar 1998, chapter 48). Nasar also brilliantly describes the volatile internal political dynamics of the Nobel Prize Committee.

There are also the lectures delivered by 18 laureates at Trinity University, Texas over the years since 1984 (Briet and Hirsch (2004)). The lectures provide intimate insights into how those laureates evolved as economists as well as a vista of economics from some of its leading practitioners. Advanced information sheets on each prize, prepared by the Nobel Prize Committee, and articles by laureates and their acceptance speeches can be found on the official website: www.nobelprize.org.

Considering these excellent resources, this short article confines itself to a few frequently asked questions about the Economics Prize.

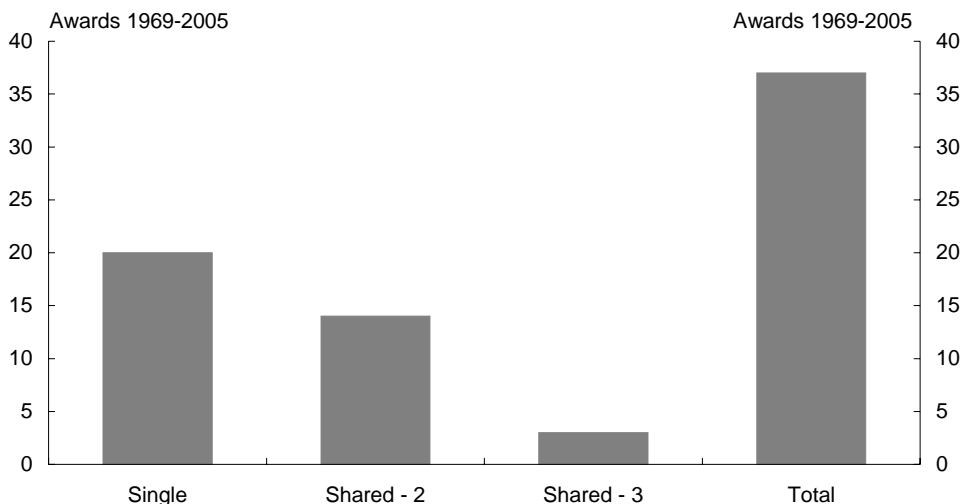
How often is the Prize shared?

With the 2005 award, the Economics Prize has been given 37 times to 57 laureates. The Prize has been shared 17 times. Although single and multiple recipients were equally common in the 1970s and the 1990s, in the 1980s the Prize went to single recipients only. By contrast, every prize awarded in the new millennium has been shared.

Shared prizes in general do not always represent recognition for complementary or contemporaneous work. Each shared prize has involved different considerations. For example, the prize given to Sir John Hicks and Kenneth Arrow reflected intergenerational work in the same field. Hicks initiated a profound transformation in general equilibrium theory and Arrow provided it with fresh nourishment. The Prize given jointly to Markovitz, Miller and Sharpe in 1990 was for complementary contributions in financial economics and the Prize given to Merton and Scholes in 1997 may be considered as a follow-up (Lindbeck 2004). Whereas, the joint awards in 2000 (for economic psychology and experimental economics) and 2002 (for econometrics) recognise distinct contributions. A chronological list of the awards is in Table 1 at the end of this article.

5 Lindbeck (1985) records a 'certain scepticism towards the new prize idea among some natural scientists in the Academy ...' but that it was accepted after some discussion within the Academy.

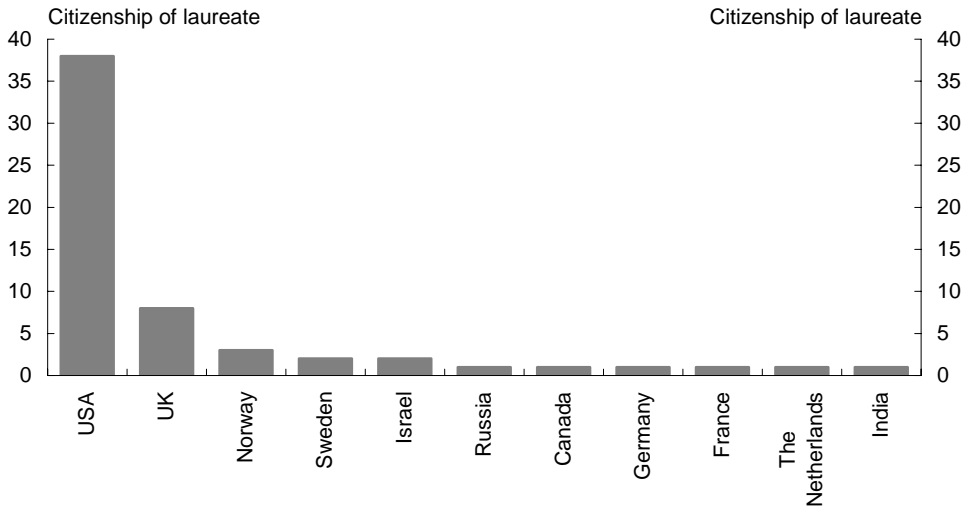
Chart 1: Distribution of awards between recipients



What is the citizenship of the laureates?

US citizens dominate the list of laureates – 40 in total. Two laureates (Kahnemann 2002 and Aumann 2005) hold dual US/Israeli citizenship. It has been observed that this reflects the dominant role of the US in modern economic analysis as well as the brain gain to the US from those laureates who became naturalised US citizens after being largely trained in other countries (Lindbeck 2004). Therefore, I have recomputed the tally by re-assigning those naturalised US citizens to their country of birth. That re-assignment reduces the US tally to 34 (58 per cent).

Evidently, there cannot be any doubt that economics is very much a US-centred intellectual endeavour. The real US influence is magnified further still when one recognises that the type of graduate training economists receive in other places increasingly mirrors the US model. For a small country, Norway’s contribution of three laureates (Frisch 1969, Haavelmo 1989 and Kydland 2004) is particularly noteworthy.

Chart 2: Countries with at least one laureate

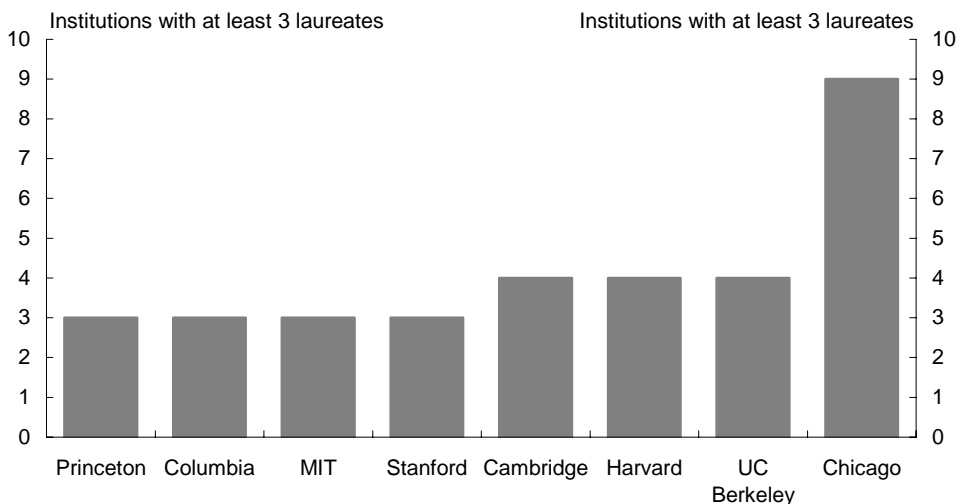
Note: The two US dual citizens are counted in their other country of citizenship, Israel.

Where do the laureates tend to work?

Not surprisingly, when they received their prizes, 45 laureates (76 per cent) were working at a US institution. This is perhaps a better indication of the brain gain to the US than counting the number of naturalised US citizens. The drift to the US is striking on this measure: nearly one-fifth of the pool of laureates are non-US born but were working and making their reputations in the US.

Another striking feature is how strongly the University of Chicago features in the institutional pecking order, with its tally of nine laureates (15 per cent of the total). Together, the eight institutions shown in Chart 3 account for a little over half of the awards.

Chart 3: Institutional distribution of laureates



How young are the laureates?

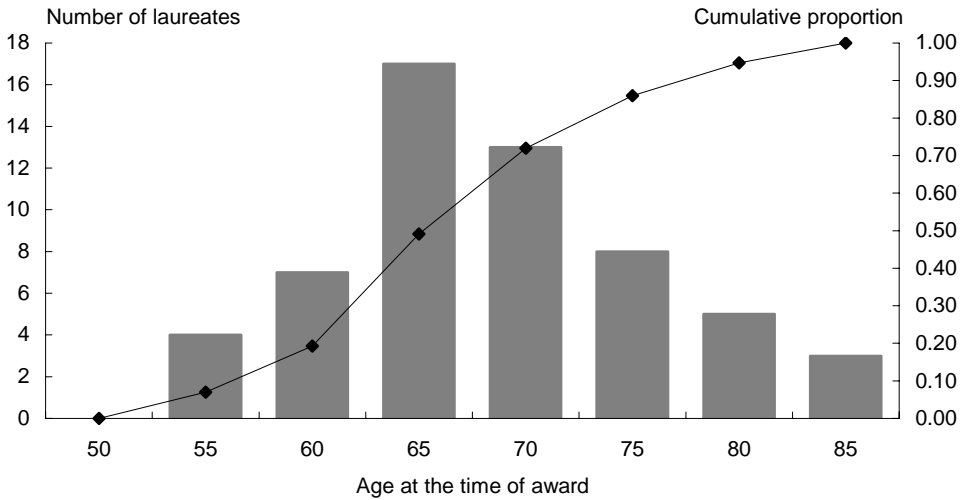
The laureates ranged in age from 51 (Arrow 1972) to 84 (Schelling 2005)⁶, with an average age of 66 years. Apart from Kenneth Arrow, the other laureates who were 55 years or younger were Robert Merton (53 years), James Heckman (54 years) and Paul Samuelson (55 years).

The overwhelmingly non-experimental basis of testing economic theories means that recognition tends to come later in life than in other scientific fields.⁷ Vernon Smith's award in 2002 marks the Nobel Prize Committee's acknowledgment of the growing contribution experimental methods are making in certain areas.⁸

6 Ronald Coase, 1991 and William Vickrey, 1996 are the other octogenarians. Vickrey died suddenly a few days after his award was announced.

7 The youngest winners of the Physics, Medicine and Chemistry Prizes were respectively 25 years (awarded in 1915), 32 years (awarded in 1923) and 35 years (awarded in 1935). But these disciplines also boast the oldest winners: Physics, 87 years (awarded in 2002 and in 2003), Medicine, 87 years (awarded in 1966 and in 1973), and Chemistry, 85 years (awarded in 2002). Interestingly, the last time the Prize was given to someone in their early thirties was in 1973 for Physics. As an aside, Rudyard Kipling is the youngest winner (at 42 years) of the Literature Prize which was awarded to him in 1907.

8 Those interested in the methodological aspects of experimental economics might consult Guala (2005).

Chart 4: Age distribution of laureates

For what work is the Nobel Prize awarded?

Following Lindbeck (2004), Table 2 at the end of this article groups the awards into six broad categories: Macroeconomics, Economic Growth Theory, Microeconomics, Partial and General Equilibrium Theory, Interdisciplinary Research and New Methods. For analytic and methodological reasons, it is appropriate to consider growth theory to be part of macroeconomics. Although this (five- or six-) classification scheme does not remove overlaps, it does provide a rough guide as to where the awards have been going. Table 2 also shows that 17 years after the prize was awarded to Solow, growth theory was once again recognised, albeit partially, through the 2004 Prize to Kydland and Prescott.⁹ By contrast, general equilibrium theory was last recognised in 1988.

⁹ This reflects the growth cycles of growth theory. The first modern wave began in the mid-1950s with the contributions of Solow and Swan and lasted until the early 1970s. The second (endogenous growth) wave began in the mid-1980s and shows no sign of weakening vigour.

Chart 5: Awards by broad category

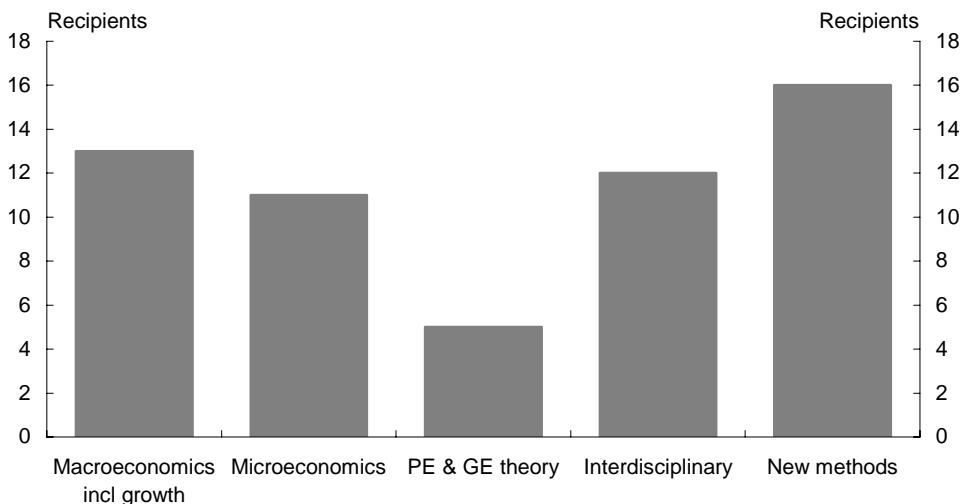


Chart 5 suggests that the awards do not appear to be markedly skewed toward any particular field. Considering that the purpose of the Nobel prizes is to acknowledge ‘discoveries, innovations and improvements’, it is to be expected that ‘new methods’ accounts for the largest number of awards.

New methods naturally encompasses a diverse range of work from econometrics (with the inaugural prize going to Frisch and Tinbergen) to national income accounting (Stone 1985) and input-output analysis (Leontief 1973) to the five awards given for game theory more recently. In Table 2, I have listed Schelling’s award in both the ‘new methods’ and ‘interdisciplinary research’ categories but I have counted it only in the new methods category.

Eclectic and insightful, Schelling’s work is often hard to categorise as it has typically focused on problems somewhat outside the traditional domain of his home discipline of economics.¹⁰ Richard Zeckhauser (1989) quotes Paul Samuelson as saying ‘In Japan Thomas Schelling would be named a national treasure. Age cannot slow down his

¹⁰ Thomas Schelling’s early landmark work was in national defence and the strategic issues associated with nuclear war and the strategic value of brinkmanship. He was elected to the Institute of Medicine and the National Academy of Sciences and was a fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science and the Association for Public Policy and Management before his election as a Distinguished Fellow of the American Economic Association (Zeckhauser 1989).

creativity, nor custom stifle his infinite variety'.¹¹ Nasar (1998, page 363) records that he was on the list of potential Nobel candidates in the mid-1990s.

The repeated and multiple awards for the economics of information and financial economics almost entirely characterise the microeconomics category. As the recipients of these prizes are with one exception (Mirrlees 1996) US citizens, it would seem that microeconomics is without parallel the domain of US economists.

The Nobel Prize Committee also recognised early and often the immense value of interdisciplinary work – with the awards in this category rivalling those given for discoveries in macroeconomics and microeconomics.

Summary

Like winners of the five 'original' prizes, winners of the Economics Prize enjoy a little public fame, a small fortune and inestimable kudos from their peers and students.¹² Whichever way one views the statistics, the dominance of the US in economics is absolute.¹³ But in the eyes of some, perhaps even a great majority of physical scientists, the value of the Economics Prize remains questionable.

University administrators, however, do not seem to harbour such prejudices. Welcoming Schelling's Prize William W Destler, senior vice president for academic affairs and provost of the University of Maryland, said 'Maryland's flagship public university is now known for more than the physics department that put it on the national academic map'. He said having two Nobel laureates on the faculty could help the university raise more money and attract top students and researchers (Anderson 2005).

And what of Australia's connection to the laureates? The only direct association is with the game theorist John Harsanyi, joint winner of the 1994 Prize, who came to Australia in the great post-War migration wave. After obtaining a Master of Arts degree from the University of Sydney, Harsanyi lectured at the University of Queensland. Then he

11 Upon retiring in 2003, Schelling was planning to learn how to program a computer to finish research on racial segregation that he had started decades ago. But after the Nobel Prize, the University of Maryland has un-retired him to raise funds (Harford 2005).

12 Gary Becker says 'There's no question you get better treatment. You get all kinds of discounts, mostly when you're overseas in Europe and Asia. In response to the question what does the actual Nobel Prize look like?, Becker says 'It's a small gold medal, not worth a lot of money. There's a picture of Alfred Nobel on one side and your name on the other. Plus you get a check, the largest check I've gotten. They give you that on Nobel's birthday.' (Van Fossen 2006). The award ceremonies and banquets are actually held each year on 10 December – the anniversary of Alfred Nobel's death.

13 I do not know of any work that describes the country affiliation of the other prizes.

spent the years 1959-1961 as senior research fellow at the Australian National University before moving to the United States.

It may be apt to end with Harsanyi's words:

'I was not an immediate success in Australia. My English was not very good and my Hungarian university degrees in pharmacy and philosophy were not recognized in Australia. It was clear that I would have to do factory work, which I did on and off for three years. Often I was unemployed because my manual skills were very deficient. I typically could not keep any factory job for more than a few days. Sometimes I would keep a job for a couple of weeks, but this was the exception ... I enrolled at the University of Sydney as an evening student. I did so as a student in economics ... I loved the logical elegance of economic theory' (Breit and Hirsch 2004, page 226).

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Table 1: Chronological list of the economics prize

Year	Laureate	Country	Institutional affiliation	Award citation
1969	Ragnar Frisch	Norway	University of Oslo, Norway	'for having developed and applied dynamic models for the analysis of economic processes'
	Jan Tinbergen	Netherlands	The Netherlands School of Economics, Rotterdam	'for having developed and applied dynamic models for the analysis of economic processes'
1970	Paul A Samuelson	USA	Massachusetts Institute of Technology	'for the scientific work through which he has developed static and dynamic economic theory and actively contributed to raising the level of analysis in economic science'
1971	Simon Kuznets	USA	Harvard University	'for his empirically founded interpretation of economic growth which has led to new and deepened insight into the economic and social structure and process of development'
1972	Sir John R Hicks	UK	All Souls College, Oxford UK	'for their pioneering contributions to general economic equilibrium theory and welfare theory'
	Kenneth J Arrow	USA	Harvard University	'for their pioneering contributions to general economic equilibrium theory and welfare theory'
1973	Wassily Leontief	USA	Harvard University	'for the development of the input-output method and for its application to important economic problems'
1974	Gunnar Myrdal	Sweden	University of Stockholm, Sweden	'for their pioneering work in the theory of money and economic fluctuations and for their penetrating analysis of the interdependence of economic, social and institutional phenomena'
	Friedrich August von Hayek	UK	University of Freiburg	'for their pioneering work in the theory of money and economic fluctuations and for their penetrating analysis of the interdependence of economic, social and institutional phenomena'
1975	Leonid Vitaliyevich Kantorovich	USSR	Academy of Sciences, Moscow USSR	'for their contributions to the theory of optimum allocation of resources'
	Tjalling C Koopmans	USA	Yale University	'for their contributions to the theory of optimum allocation of resources'

Table 1: Chronological list of the economics prize (continued)

Year	Laureate	Country	Institutional affiliation	Award citation
1976	Milton Friedman	USA	University of Chicago	'for his achievements in the fields of consumption analysis, monetary history and theory and for his demonstration of the complexity of stabilization policy'
1977	Bertil Ohlin	Sweden	Stockholm School of Economics, Sweden	'for their pathbreaking contribution to the theory of international trade and international capital movements'
	James E Meade	UK	University of Cambridge, UK	'for their pathbreaking contribution to the theory of international trade and international capital movements'
1978	Herbert A Simon	USA	Carnegie-Mellon University, Pittsburg	'for his pioneering research into the decision-making process within economic organizations'
1979	Theodore W Schultz	USA	University of Chicago	'for their pioneering research into economic development, with particular consideration of the problems of developing countries'
	Sir Arthur Lewis	UK	Princeton University	'for their pioneering research into economic development, with particular consideration of the problems of developing countries'
1980	Lawrence R Klein	USA	University of Pennsylvania	'for the creation of econometric models and their application to the analysis of economic fluctuations and economic policies'
1981	James Tobin	USA	Yale University	'for his analysis of financial markets and their relations to expenditure decisions, employment, production and prices'
1982	George J Stigler	USA	University of Chicago	'for his seminal studies of industrial structure, functioning of markets and causes and effects of public regulation'
1983	Gerard Debreu	USA	University of California, Berkeley	'for having incorporated new analytical methods into economic theory and for his rigorous reformulation of the theory of general equilibrium'
1984	Sir Richard Stone	UK	University of Cambridge, UK	'for having made fundamental contributions to the development of systems of national accounts and hence greatly improved the basis for empirical economic analysis'
1985	Franco Modigliani	USA	Massachusetts Institute of Technology	'for his pioneering analyses of saving and of financial markets'

Table 1: Chronological list of the economics prize (continued)

Year	Laureate	Country	Institutional affiliation	Award citation
1986	James M Buchanan Jr	USA	George Mason University, Fairfax Virginia	'for his development of the contractual and constitutional bases for the theory of economic and political decision-making'
1987	Robert M Solow	USA	Massachusetts Institute of Technology	'for his contributions to the theory of economic growth'
1988	Maurice Allais	France	Ecole Nationale Supérieure des Mines de Paris	'for his pioneering contributions to the theory of markets and efficient utilization of resources'
1989	Trygve Haavelmo	Norway	University of Oslo, Norway	'for his clarification of the probability theory foundations of econometrics and his analyses of simultaneous economic structures'
1990	Harry H Markowitz	USA	CUNY, NY	'for their pioneering work in the theory of financial economics'
	Merton M Miller	USA	University of Chicago	'for their pioneering work in the theory of financial economics'
	William F Sharpe	USA	Stanford University	'for their pioneering work in the theory of financial economics'
1991	Ronald H Coase	UK	University of Chicago	'for his discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy'
1992	Gary S Becker	USA	University of Chicago	'for having extended the domain of microeconomic analysis to a wide range of human behaviour and interaction, including non-market behaviour'
1993	Robert W Fogel	USA	University of Chicago	'for having renewed research in economic history by applying economic theory and quantitative methods in order to explain economic and institutional change'
	Douglass C North	USA	University of Washington, St Louis, MO	'for having renewed research in economic history by applying economic theory and quantitative methods in order to explain economic and institutional change'
1994	John C Harsanyi	USA	University of California, Berkeley	'for their pioneering analysis of equilibria in the theory of non-cooperative games'
	John F Nash Jr	USA	Princeton University	'for their pioneering analysis of equilibria in the theory of non-cooperative games'
	Reinhard Selten	Germany	Rheinische Friedrich-Wilhelms Universität, Bonn Germany	'for their pioneering analysis of equilibria in the theory of non-cooperative games'

Table 1: Chronological list of the economics prize (continued)

Year	Laureate	Country	Institutional affiliation	Award citation
1995	Robert E Lucas Jr	USA	University of Chicago	'for having developed and applied the hypothesis of rational expectations, and thereby having transformed macroeconomic analysis and deepened our understanding of economic policy'
1996	James A Mirrlees	UK	University of Cambridge, UK	'for their fundamental contributions to the economic theory of incentives under asymmetric information'
	William Vickrey	USA	Columbia University	'for their fundamental contributions to the economic theory of incentives under asymmetric information'
1997	Robert C Merton	USA	Harvard University	'for a new method to determine the value of derivatives'
	Myron S Scholes	USA	Stanford University	'for a new method to determine the value of derivatives'
1998	Amartya Sen	India	Trinity College, Cambridge University UK	'for his contributions to welfare economics'
1999	Robert A Mundell	Canada	Columbia University	'for his analysis of monetary and fiscal policy under different exchange rate regimes and his analysis of optimum currency areas'
2000	James J Heckman	USA	University of Chicago	'for his development of theory and methods for analysing selective samples'
	Daniel L McFadden	USA	University of California, Berkeley	'for his development of theory and methods for analyzing discrete choice'
2001	George A Akerlof	USA	University of California, Berkeley	'for their analyses of markets with asymmetric information'
	A Michael Spence	USA	Stanford University	'for their analyses of markets with asymmetric information'
	Joseph E Stiglitz	USA	Columbia University	'for their analyses of markets with asymmetric information'
2002	Daniel Kahneman	USA and Israel	Princeton University	'for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty'
	Vernon L Smith	USA	George Mason University	'for having established laboratory experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms'

Table 1: Chronological list of the economics prize (continued)

Year	Laureate	Country	Institutional affiliation	Award citation
2003	Robert F Engle III	USA	New York University	'for methods of analyzing economic time series with time-varying volatility (ARCH)'
	Clive W J Granger	UK	University of California, San Deigo	'for methods of analyzing economic time series with common trends (cointegration)'
2004	Finn E Kydland	Norway	Carnegie-Mellon University; University of California, Santa Barbara	'for their contributions to dynamic macroeconomics: the time consistency of economic policy and the driving forces behind business cycles'
	Edward C Prescott	USA	Arizona State University; FRB Minneapolis	'for their contributions to dynamic macroeconomics: the time consistency of economic policy and the driving forces behind business cycles'
2005	Robert Aumann	Israel and USA	Center for Rationality, Hebrew University of Jerusalem	'for having enhanced our understanding of conflict and cooperation through game-theory analysis'
	Thomas C Schelling	USA	University of Maryland College Park, Maryland	'for having enhanced our understanding of conflict and cooperation through game-theory analysis'

Table 2: Economics prize by field

Macroeconomics

Year	Laureate	Country	Institutional affiliation	Award
1976	Milton Friedman	USA	University of Chicago	Macroeconomics
1977	Bertil Ohlin	Sweden	Stockholm School of Economics, Sweden	International Economics
	James E Meade	UK	University of Cambridge, UK	International Economics
1980	Lawrence R Klein	USA	University of Pennsylvania	Macroeconometrics
1981	James Tobin	USA	Yale University	Macroeconomics
1985	Franco Modigliani	USA	Massachusetts Institute of Technology	Macroeconomics
1995	Robert E Lucas Jr	USA	University of Chicago	Macroeconomics
1999	Robert A Mundell	Canada	Columbia University	International Macroeconomics
2004	Finn E Kydland	Norway	Carnegie-Mellon University; University of California, Santa Barbara	Macroeconomics
	Edward C Prescott	USA	Arizona State University; FRB Minneapolis	Macroeconomics

Growth theory

Year	Laureate	Country	Institutional affiliation	Award
1979	Theodore W Schultz	USA	University of Chicago	Development Economics
	Sir Arthur Lewis	UK	Princeton University	Development Economics
1987	Robert M Solow	USA	Massachusetts Institute of Technology	Economic Growth Theory
2004	Finn E Kydland	Norway	Carnegie-Mellon University; University of California, Santa Barbara	Macroeconomics
	Edward C Prescott	USA	Arizona State University; FRB Minneapolis	Macroeconomics

Table 2: Economics prize by field (continued)

Microeconomics

Year	Laureate	Country	Institutional affiliation	Award
1982	George J Stigler	USA	University of Chicago	Industrial Organisation
1990	Harry H Markowitz	USA	CUNY, NY	Financial Economics
	Merton M Miller	USA	University of Chicago	Financial Economics
	William F Sharpe	USA	Stanford University	Financial Economics
1996	James A Mirrlees	UK	University of Cambridge, UK	Economics of Information
	William Vickrey	USA	Columbia University	Economics of Information
1997	Robert C Merton	USA	Harvard University	Financial Economics
	Myron S Scholes	USA	Stanford University	Financial Economics
2001	George A Akerlof	USA	UC Berkeley	Economics of Information
	A Michael Spence	USA	Stanford University	Economics of Information
	Joseph E Stiglitz	USA	Columbia University	Economics of Information

Partial and general equilibrium

Year	Laureate	Country	Institutional affiliation	Award
1970	Paul A Samuelson	USA	Massachusetts Institute of Technology	Partial and General Equilibrium Theory
1972	Sir John R Hicks	UK	All Souls College, Oxford UK	General Equilibrium Theory
	Kenneth J Arrow	USA	Harvard University	General Equilibrium Theory
1983	Gerard Debreu	USA	University of California, Berkeley	General Equilibrium Theory
1988	Maurice Allais	France	Ecole Nationale Supérieure des Mines de Paris	Partial and General Equilibrium Theory

Table 2: Economics prize by field (continued)

Interdisciplinary research

Year	Laureate	Country	Institutional affiliation	Award
1971	Simon Kuznets	USA	Harvard University	Economic Growth and Economic History
1974	Gunnar Myrdal	Sweden	University of Stockholm, Sweden	Economic, Social and Political Processes
	Friedrich August von Hayek	UK	University of Freiburg	Economic, Social and Political Processes
1978	Herbert A Simon	USA	Carnegie-Mellon University, Pittsburg	Administrative (Management) Science
1986	James M Buchanan Jr	USA	George Mason University Fairfax Virginia	Economics and Political Science
1991	Ronald H Coase	UK	University of Chicago	Economics, Law and Organisations
1992	Gary S Becker	USA	University of Chicago	Microeconomics and Economic Sociology
1993	Robert W Fogel	USA	University of Chicago	Economics and History
	Douglass C North	USA	University of Washington, St Louis	Economics and History
1998	Amartya Sen	India	Trinity College, Cambridge University UK	Economics and Philosophy
2002	Daniel Kahneman	USA and Israel	Princeton University	Economic Psychology
	Vernon L Smith	USA	George Mason University	Experimental Economics
2006	Thomas C Schelling	USA	University of Maryland College Park, Maryland	Game Theory

Table 2: Economics prize by field (continued)

New methods

Year	Laureate	Country	Institutional affiliation	Award
1969	Ragnar Frisch	Norway	University of Oslo, Norway	Econometrics
	Jan Tinbergen	Netherlands	The Netherlands School of Economics, Rotterdam	Econometrics
1973	Wassily Leontief	USA	Harvard University	Input-Output Analysis
1975	Leonid Vitaliyevich Kantorovich	USSR	Academy of Sciences, Moscow, USSR	Theory of Optimum Allocation of Resources
	Tjalling C Koopmans	USA	Yale University	Theory of Optimum Allocation of Resources
1984	Sir Richard Stone	UK	University of Cambridge, UK	National Income Accounting
1989	Trygve Haavelmo	Norway	University of Oslo, Norway	Econometrics
1994	John C Harsanyi	USA	University of California, Berkeley	Game Theory
	John F Nash Jr	USA	Princeton University	Game Theory
	Reinhard Selten	Germany	Rheinische Fredrich-Wilhelms Universitat, Bonn Germany	Game Theory
2000	James J Heckman	USA	University of Chicago	Econometrics
	Daniel L McFadden	USA	University of California, Berkeley	Econometrics
2003	Robert F Engle III	USA	New York University	Econometrics
	Clive W J Granger	UK	University of California, San Deigo	Econometrics
2005	Robert Aumann	Israel and USA	Center for Rationality, Hebrew University of Jerusalem	Game Theory
	Thomas C Schelling	USA	University of Maryland College Park, Maryland	Game Theory

Key themes from the Treasury Business Liaison Programme — December 2005 to March 2006

Treasury officers met with around 50 companies and organisations in Sydney, Melbourne, Canberra and Geelong through the Business Liaison Programme between December 2005 and March 2006.¹ The companies interviewed employ over 200,000 Australian residents and represent a broad cross section of Australian industry.

Sales are continuing at the more moderate pace established since late 2005, and appear quite sensitive to petrol price fluctuations, according to retailers. Most businesses report high levels of capacity utilisation, and some note that shortages of capital equipment are limiting their investment. Farmers have welcomed the recent rains.

Real estate agents report stable house prices, and this is improving affordability and the outlook for house builders. Other builders report that infrastructure projects are supporting activity.

While businesses continue to report skill shortages, they remain optimistic this will not lead to an acceleration in wages. A number of businesses are reporting significant cost increases but most are experiencing very competitive markets in which they can not raise prices.

Treasury remains greatly appreciative of the commitment of time and effort made by the Australian businesses, industry associations and government agencies that participate in the Business Liaison Programme.²

1 A detailed explanation of the Treasury Business Liaison Programme is provided in the Treasury *Economic Roundup*, Spring 2001.

2 This summary of business conditions reported in liaison meetings reflects the views and opinions of participants. It is provided for the information of readers. While Treasury's evaluation of the economic outlook is informed by findings from business liaison, a much wider range of information and data are utilised to ensure a rigorous assessment of the Australian economy.

Retail trade

Most retailers report that sales have continued at the slower pace evident since the latter part of 2005. This slower pace is expected to continue, with retailers suggesting this is a return to normal conditions after some years when rising house prices led to unsustainable increases in household spending. In support of this argument, a number of retailers note that demand for luxury items has weakened noticeably, and strategies to address slower sales, including an increase in advertising, are being employed.

Retailers report that higher petrol prices are affecting consumers in a number of ways. Apart from greater expenditure on petrol crowding out spending on other goods and services, contacts suggest that the high visibility of petrol prices affects consumer sentiment and influences their purchasing decisions. Petrol price rises are also affecting shopping patterns with, for example, people making fewer trips to shopping malls, which in turn means they are making fewer impulse buys and eating fewer meals at malls.

Retailers comment that a warmer summer helped sales of some household appliances and seasonal clothing. Furthermore, a spate of major televised sporting events in 2006, such as the Winter Olympics, Commonwealth Games and the soccer World Cup, are regarded as improving sales of televisions and recorders, along with the ongoing price declines and improved features on much of this equipment.

Production and investment

Few businesses report substantial excess capacity. A key theme to emerge from discussions is how investment is currently directed to boosting productivity rather than increasing production. Some companies report that shortages of equipment are hampering their investment plans.

Manufacturing

Manufacturers supplying the mining industry continue to be more confident than other manufacturers. A number of manufacturers complain that the Australian dollar is excessively strong and hampering their international competitiveness.

Housing

Real estate agents report that house prices have plateaued in most of the country. There is optimism in Sydney that the period of falling house prices has ended, while there is a solid consensus that prices are still rising in Perth. In regional areas, house prices are unsurprisingly strongest in areas where population is growing rapidly.

There is also a belief that rising incomes and steady interest rates will translate into improved housing affordability.

Construction

Businesses noted that construction activity is strong. Furthermore, builders comment that infrastructure spending by state governments is particularly robust.

Mining

Australian mining companies report large expenditures to boost production. However, many miners regret that both internal and public infrastructure capacity and supply constraints are limiting their ability to expand production. In particular, world-wide shortages of large vehicles and other capital equipment are often mentioned. Firms are responding to the constraints by placing more emphasis on maintenance and methods of reducing wear on vehicles and other equipment.

Rural sector

Rural contacts, especially crop growers in the eastern states, are pleased with recent rains. A bumper wheat harvest is predicted for 2005-06 and beef producers are rebuilding herds.

Tourism

Tourism industry contacts described concerns about competitors in Asian markets who are benefiting from cheaper airfares in the region. This, they argue, is making trips to neighbouring countries more attractive than holidays in Australia. The Commonwealth Games are giving some boost to tourism.

High petrol prices are a concern to the domestic tourism industry although, as with retailing, good weather enjoyed over the summer contributed to sales.

Employment

Current employment levels are viewed as satisfactory by most businesses. Some report a continuing move to outsource non-core activities. Shortages remain for some categories of skilled labour, with the occupations most frequently mentioned including nurses and tradespeople in the mining and related industries. Reflecting the current strength in mining, there are also some reports of competition from the mining sector making it harder for businesses in other sectors to retain good semi-skilled or experienced unskilled labour. Some companies say that experienced managers are in

short supply and ageing, while fewer businesses report shortages of IT professionals than had been the case a year ago.

Increasingly, businesses, especially those with international operations, speak of bringing in workers from overseas (especially from related companies) to meet labour demands. Another response, described by some large mining and construction companies, is staggering projects as a way of overcoming skill shortages.

Labour costs

For those occupations where skills are in excess demand, businesses mention upward pressure on labour costs. But even in these areas, contacts say they are reluctant to offer higher wages to bid away workers, as this may just be matched by higher wage offers by their current employers. Overall wages growth is steady. Most non-wage labour costs are growing at similar rates to wages.

Costs, prices and profits

Businesses report that the rise in global oil prices has flowed through to freight charges and the prices of other materials such as plastics and polyesters. There have been steep rises in prices of some other raw materials such as cement and aluminium, but steel and timber prices have stabilised. Most contracts have not allowed these cost increases to be passed on, which is squeezing margins. Farmers report that they are facing increased costs for fertilisers and chemicals.

Regional economic conditions

As has been the case for some time, activity is particularly strong in Western Australia and Queensland, and weak in New South Wales.

This business liaison round included meetings in Geelong. Businesses in Geelong report generally strong conditions, with strong population growth supporting investment in the region.

What's new on the Treasury website

The Treasury's website is <http://www.treasury.gov.au>. It includes past issues of the *Economic Roundup*. Some of the other items posted on the website since the previous issue of *Roundup* that may be of interest to readers are listed below.

Working papers

2006-02: The concept of competitiveness (April 2006)

<http://www.treasury.gov.au/contentitem.asp?NavId=002&ContentID=1097>

John Hawkins

A number of concepts of 'competitiveness' are applied to national economies, not always clearly or helpfully. This paper suggests a possible taxonomy of these concepts, and applies them to Australian data. Australia performs well on the internal competitiveness of its markets. It also does well in measures of competitiveness based on other fundamental drivers of economic growth. Other indices of competitiveness, comparing prices and costs in Australia with those overseas, suffer from conceptual and measurement problems and are therefore of limited value.

Consultation papers

Corporate and financial services regulation review (April 2006)

<http://www.treasury.gov.au/contentitem.asp?NavId=037&ContentID=1068>

The Consultation Paper contains a variety of corporate and financial services regulatory issues that reflect the feedback that has been provided to the Government, as well as information which has been gathered through specific reviews. The paper covers the areas of financial services regulation, company reporting obligations, auditor independence, corporate governance, fundraising, takeovers, collective investments and dealing with regulators.

Component pricing (March 2006)

<http://www.treasury.gov.au/contentitem.asp?NavId=037&ContentID=1085>

The Trade Practices Legislation Amendment Bill (No 3) 2006 responds to the increased use of component pricing. The draft amendments will mean that consumers will not have to perform a calculation to determine the total price they will be required to pay for goods or services. This will help consumers to compare the price of similar products and make informed purchasing decisions. The draft amendments do not prohibit component pricing. Instead, corporations will be required to include a prominently displayed, single figure, total minimum price when making price representations.

Other publications

The Australian Guidelines for Electronic Commerce (March 2005)

<http://www.treasury.gov.au/contentitem.asp?NavId=035&ContentID=1083>

The Australian Guidelines for Electronic Commerce seek to enhance further consumer confidence in electronic commerce by providing guidance to businesses on how to deal with consumers when engaged in business to consumer electronic commerce. The guidelines update and replace the Australian E-Commerce Best Practice Model, which was released by the Australian Government in May 2000.

Sources of economic data

The following table provides sources for key economic data. Australian Bureau of Statistics (ABS) data can be obtained over the internet at <http://www.abs.gov.au>. The Reserve Bank of Australia information is available at <http://www.rba.gov.au>. Similarly, OECD information is available at <http://www.oecd.org>. Information on individual economies is also available via the IMF at <http://www.imf.org>.

International economy

Output, current account balance and interest rates	OECD Main Economic Indicators
Consumer price inflation	ABS cat. no. 6401.0

National accounts

Components of GDP, contributions to change in GDP	ABS cat. no. 5206.0
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Incomes, costs and prices

Real household income	ABS cat. nos. 5204.0 and 5206.0
Wages, labour costs and company income	ABS cat. nos. 5204.0, 5206.0 and 6302.0
Prices	ABS cat. nos. 6401.0 and 5206.0
Labour market	ABS cat. no. 6202.0

External sector

Australia's current account, external liabilities and income flows	ABS cat. nos. 5368.0, 5302.0 and 5206.0
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Past editions of Economic Roundup

Details of articles published in the past two editions of the Economic Roundup are listed below:

Summer 2006

Perspectives on Australia's current account deficit
A tale of two terms-of-trade booms
Understanding productivity trends
Water and Australia's future economic growth
Innovation across the OECD: a review of recent studies
Demographic challenges and migration
Australian net private wealth

Spring 2005

Mining and commodities exports
The road to Hong Kong: what's at stake for the Doha Round
Flat personal income taxes: systems in practice in Eastern European economies
Australian Treasury submission to the Agriculture and Food Policy Reference Group
International comparisons of research and development
The Chinese currency: how undervalued and how much does it matter?
Recent developments in Australian bond yields
2004-05 in review: strong labour market outcomes and continuing growth
Key themes from the Treasury Business Liaison Programme – October 2005

Copies of these articles are available from the Treasury. Written requests should be sent to Manager, Domestic Economy Division, The Treasury, Langton Crescent, Parkes, ACT, 2600. Telephone requests should be directed to Ms Amy Burke on (02) 6263 2756. Copies may be downloaded from the Treasury web site <http://www.treasury.gov.au>.

