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Mining and commodities exports

Angelia Grant, John Hawkins and Lachlan Shaw¹

Mining commodities form a large share of Australia's exports, and Australia is a leading producer of many commodities. Their contribution to the Australian economy can be volatile, however, as commodity prices often rise or fall by large amounts and there are long lags in increasing production.

Contrary to some expectations, there does not appear to be a long-run tendency for the prices of mined commodities to fall relative to the price of manufactures. Recently, mineral prices have been very strong. Most notably, increased demand from steel producers, especially in China, has driven up the prices of iron ore and coal. Australian mining houses are trying to ramp up supply in response, as are producers elsewhere in the world.

An important issue is how quickly supply can expand to meet the rising demand, and what this implies for prices. Looking at past experiences suggests that the projected increase in demand will underpin current prices for at least another year, but beyond that the prospects are less certain.

1 The authors are from Macroeconomic Division, the Australian Treasury. This article has benefited from data and suggestions provided by Simon Richmond at the Australian Bureau of Agricultural and Resource Economics. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

Introduction

Australia's mineral resources are an important source of national income. The mining sector accounted for around \$43 billion, or 5 per cent, of Australia's GDP in 2004-05. This share is rising following the large price rises for some of our key resource exports. As mining is a capital-intensive sector, its share of national employment is significantly lower at around 1 per cent.² The mining sector is very export-oriented. Australia's exports of resource commodities amounted to \$54 billion in 2004-05.³ Mining production and exports come disproportionately from Queensland and Western Australia.

The main resources Australia exports are coal (\$17 billion in 2004-05), oil and gas (\$10 billion), iron ore (\$8 billion), gold (\$5½ billion), alumina (\$4½ billion) and nickel (\$3½ billion). The major markets are now in Asia.

The value of Australia's resource exports has grown at an average annual rate of 8 per cent over the past two decades. About 3 percentage points of this reflect changes in prices. Thus, Australia's exports of resources have grown at an annual rate of around 5 per cent in volume terms since the mid-1980s. However growth in total resource exports has declined in recent years as falling petroleum exports have offset solid growth elsewhere (Table 1, Chart 1).

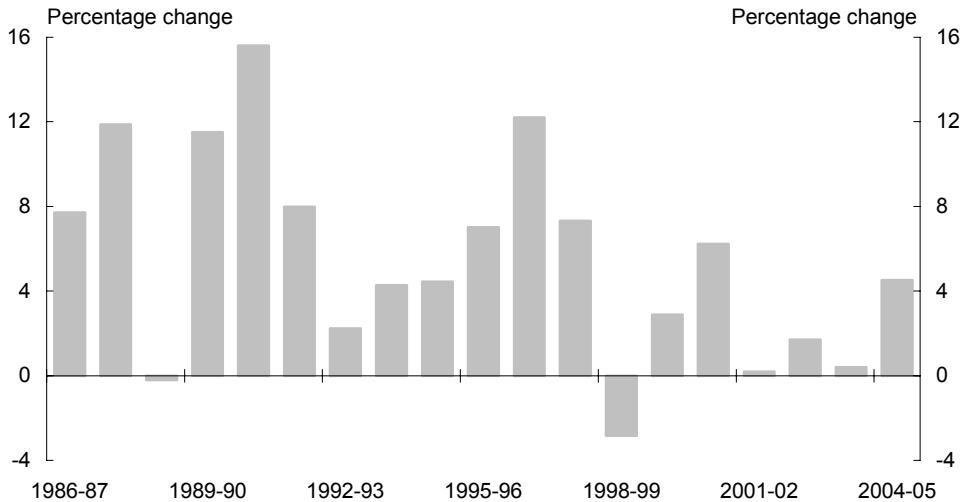
Table 1: Australia's exports of resource commodities
(average annual percentage change; chain volume measure)

| | 1985-86 to 1991-92 | 1991-92 to 2000-01 | 2000-01 to 2004-05 | % of total 2004-05 |
|--------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Metalliferous ores | 5 | 5 | 6 | (37) |
| Coal, coke and briquettes | 5 | 5 | 5 | (28) |
| Petroleum | 8 | 9 | -12 | (12) |
| Gas | 25 | 6 | 9 | (9) |
| Gold (non-monetary) | 26 | 1 | 0 | (13) |
| Other minerals and crude fertilisers | 12 | 4 | 3 | (1) |
| Total | 9 | 5 | 2 | (100) |

Sources: derived from data supplied by ABS.

2 A further 4 per cent are employed in manufacturing industries which process minerals. These industries contribute 5 per cent of GDP.

3 In this paper, the terms 'mining' and 'resources' are used synonymously to refer to Standard International Trade Classification divisions 27, 28, 32, 33, 34 and 97. This means they include oil and gas extraction and non-monetary gold, but not resource-based manufactures such as smelted iron and steel.

Chart 1: Australian resource export volumes

Source: derived from data provided by ABS.

The historical development of Australia's resources sector⁴

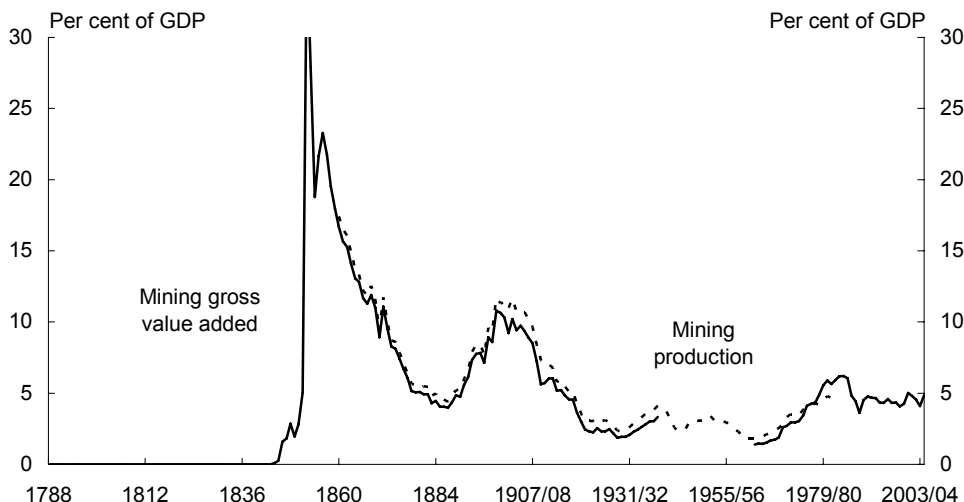
The first mineral resource discovered in Australia was coal, found in 1796 in the region later called Newcastle (after the English coal port), with the first exports (to Bengal) occurring in 1799. By the 1840s, copper was being mined by Cornish immigrants near Adelaide and the first iron ore was being smelted at Mittagong. However mining really only came to prominence during the gold rush of the 1850s, which occurred predominantly in Victoria (Chart 2). This saw the population of Victoria soar from under 100,000 to over half a million in the space of a decade.

Following further discoveries at Kalgoorlie in the 1890s, gold still accounted for the majority of mining production in the early years of federation – with Australia being the world's leading gold miner in some years. However, copper, lead and silver (notably from the mines at Broken Hill) had also become important. The end of World War I saw metal prices collapse and many mines closed. In the 1930s mining commenced at Mount Isa, initially of silver, lead and zinc, and later copper.

Coal production slumped during the 1930s depression, and was subsequently held back by competition from petroleum products. Prolonged industrial unrest exacerbated the decline.

⁴ Short histories of Australia's mining industry are given in Doran (1984), McKay, Lambert and Miyazaki (2000) and Saddler (1987). A more detailed and literary history is provided by Blainey (1963).

Chart 2: Mining activity



Source: based on data from ABS, Saddler (1987), Butlin (1987).

Pessimism emerged during the 1930s about the future of the mining industry as the view became common that Australia was not well-endowed with resources. In 1938 reserves of iron ore were thought so low that the government placed an embargo on their export (which was not lifted until 1960).

More systematic surveying, better understanding of Australian geology (assisted by the establishment of the Bureau of Mineral Resources), technological advances in mining and increased exploration by foreign mining companies led to many discoveries of viable deposits in the 1950s and 1960s, notably the iron ore and nickel deposits in Western Australia. At the same time the rapid growth of Japan’s economy provided a ready market. During this period, iron ore and coal became more important exports than gold and base metals.

While minor discoveries of oil and gas date back to the nineteenth century, substantial production only commenced in the 1960s following the development of the oil fields in Bass Strait. The oil shocks of 1973 and 1979 transformed the economics of the industry. As well as increased onshore production and exploration, attention turned to offshore exploration and development. The first of the North West Shelf gas fields had been discovered in 1971 and further exploration found more reserves there, while Jabiru in the Timor Sea was discovered in 1983.

Australian resource production boomed in the 1970s but by the early 1980s it was evident that global demand had slowed for most resources and production stagnated for a time. (An exception was gold, where new technology allowed increased production from old fields.) Solid growth in the world economy, and particularly the industrialisation of Asia, underpinned resource production for the latter 1980s and

1990s, although the Asian financial crisis of 1997 led to a temporary decline in metal prices. As discussed below, demand for resources picked up substantially in the new millennium.

Australia is one of the world's leading miners and exporters of many minerals (Table 2).⁵ Australia has also become a leading exporter of mining software and expertise.

Table 2: Australia's ranking for major minerals

| | As exporter | As producer | Reserves |
|----------|-------------|-------------|----------|
| Gold | 3rd | 5th | 2nd |
| Iron Ore | 1st | 3rd | 3rd |
| Bauxite | na | 1st | 1st |
| Coal | 1st | 5th | 6th |
| Uranium | 2nd | 2nd | 1st |
| Nickel | 2nd | 2nd | 1st |

Source: Australian Bureau of Agricultural and Resource Economics (ABARE).

Long-term trends in relative commodity prices

The conventional wisdom has long been that the relative price of commodities would decline over time.⁶ The argument is that as wealth increases, demand will shift towards services and sophisticated manufactures.

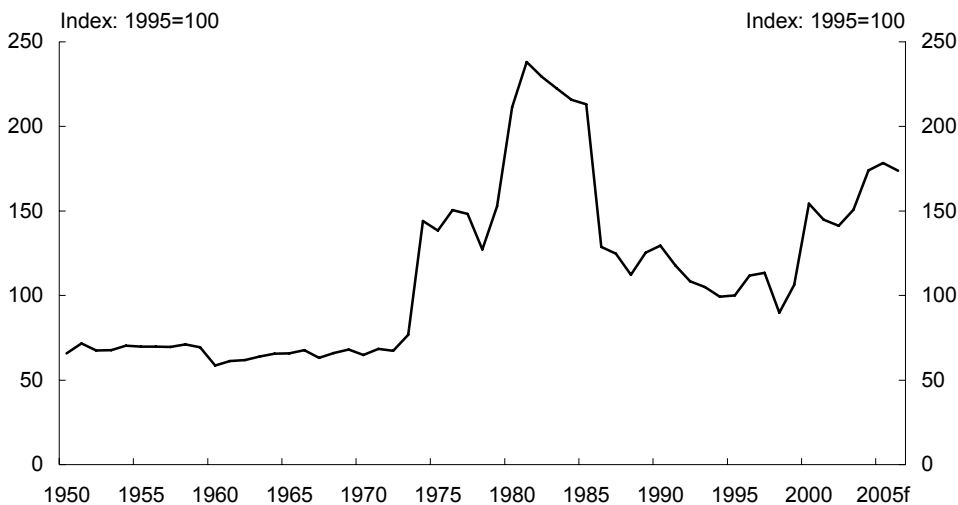
Over the period since 1850, the oft-cited *Economist* index of commodity prices⁷ dropped by around 80 per cent relative to overall prices. However, overall mineral resource prices have increased relative to the prices of manufactures over the past half-century (Chart 3). This period has been dominated by supply shocks driving up oil prices in the 1970s and the more recent increases in prices driven largely by demand (discussed further below). From the mid-1990s the increase in relative commodity prices has been reinforced by falls in prices of manufactures.

5 In addition to the major exports listed, Australia is one of the world's leading producers and exporters of diamonds, lead, manganese, titanium, zinc and zircon.

6 This is sometimes termed the Prebisch-Singer hypothesis after Prebisch (1950) and Singer (1950). Gillitzer and Kearns (2005) survey empirical studies which broadly support the hypothesis, noting that Grilli and Yang (1988) have been particularly influential. Cashin and McDermott (2002) find a small downward trend in real commodity prices since the 1860s, but note it is swamped by the (increasing) volatility.

7 The *Economist* index includes rural commodities as well as minerals. The 'real' version is calculated by deflating by the US GDP deflator. See Gillitzer and Kearns (2005) for a description.

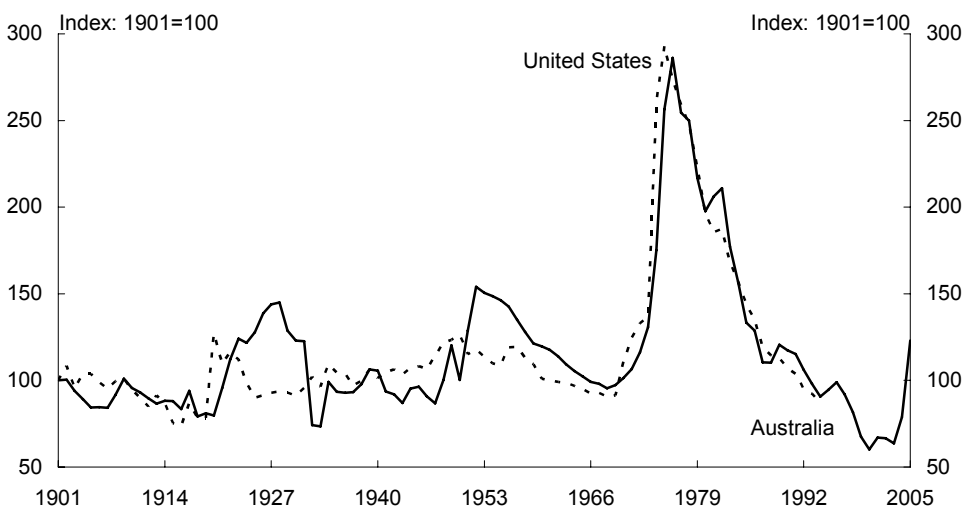
Chart 3: Relative price of global mining exports
(World mining export prices / manufactures exports)



Source: based on data from World Trade Organization.

Looking more specifically at the price of one of Australia’s key commodity exports, coal (Chart 4), the relative price surged during the 1970s energy crisis and then fell back until the recent rises. But there is no clear trend over the past century.

Chart 4: Relative price of coal
(US dollar price of coal exports relative to US CPI)

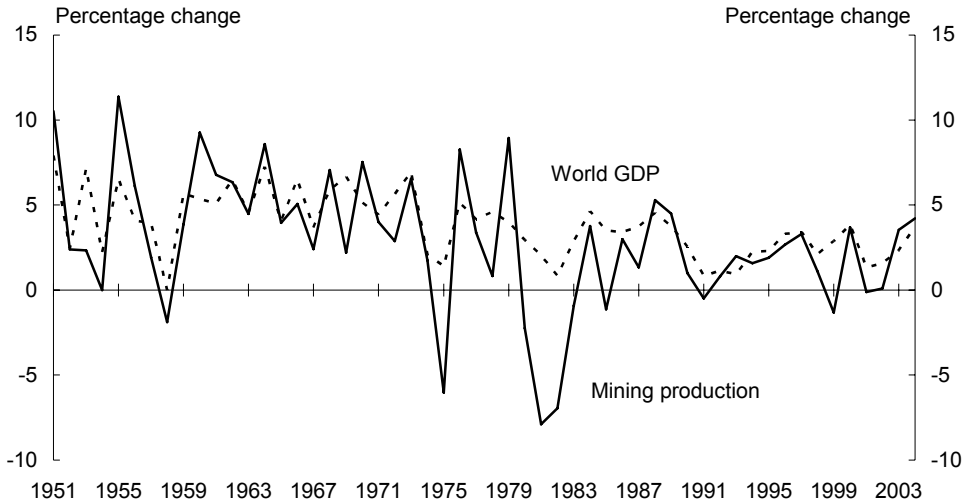


Source: ABARE, Mitchell (2003), IMF and Treasury derived.

Cyclical variations in commodity prices

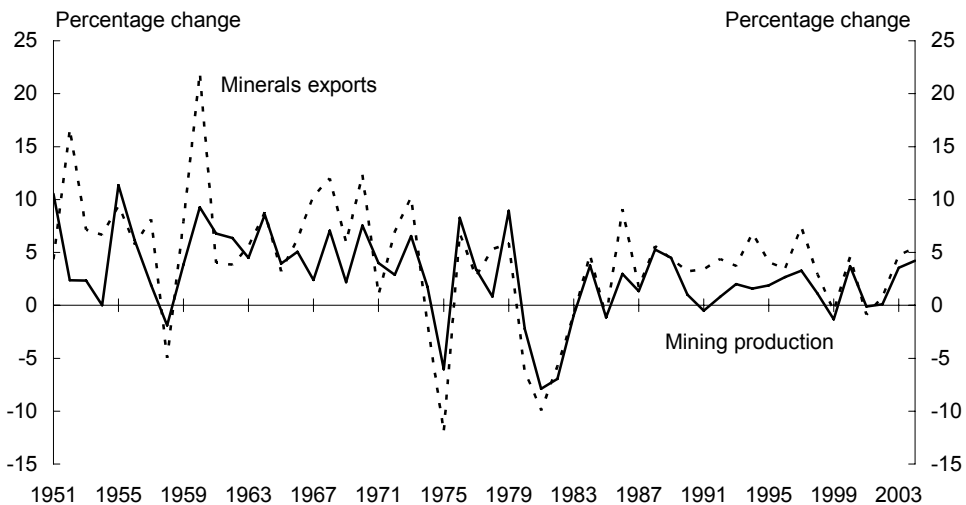
Global mining production moves with global economic activity but with more pronounced swings (Chart 5). Whereas real GDP for the world as a whole has not fallen for almost 60 years, mining production contracted quite heavily during the global slowdowns in 1975, 1981 and 1982. Mineral exports are in turn even more variable than mineral production (Chart 6).

Chart 5: World GDP and mining production



Source: Derived from World Trade Organization data.

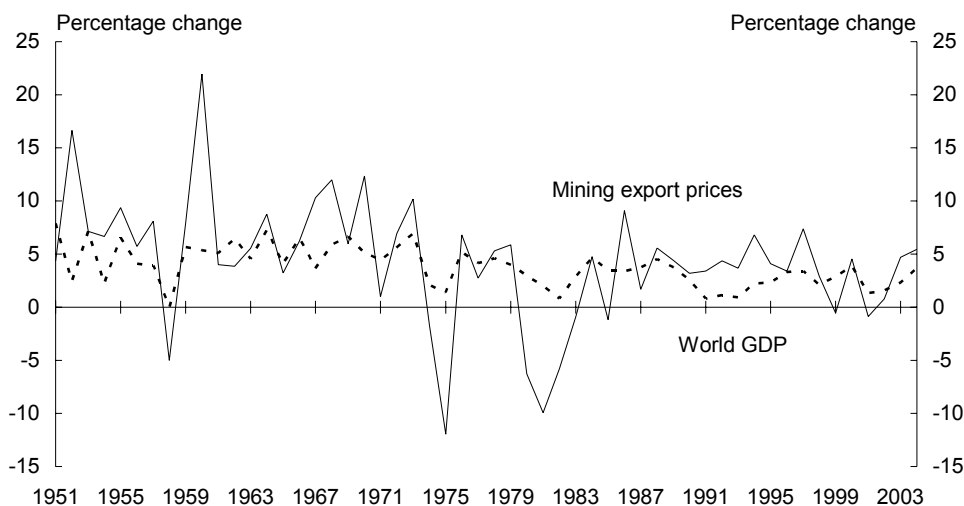
Chart 6: World minerals production and exports



Source: derived from World Trade Organization data.

Mining export prices are highly pro-cyclical, with absolute price falls common during global slowdowns in activity (Chart 7). In part, this reflects the fact that mining companies attempt to increase production when prices rise, but due to the large fixed costs and capital-intensive nature of modern mining technology, new production may lag the initial investment decision by a number of years. As a result, prices run up more than ‘desired’ and are followed by periods of weakening as global supply expands, with prices falling in absolute terms during recessions. However, it is hard to identify the lags involved using aggregate data. Cashin and McDermott (2002) identify cycles in real commodity prices, with the median duration of booms and slumps both around four years. (See also the box on Cobweb models below.)

Chart 7: World mining export prices



Source: derived from World Trade Organization data.

Current surge in demand for coal and iron ore

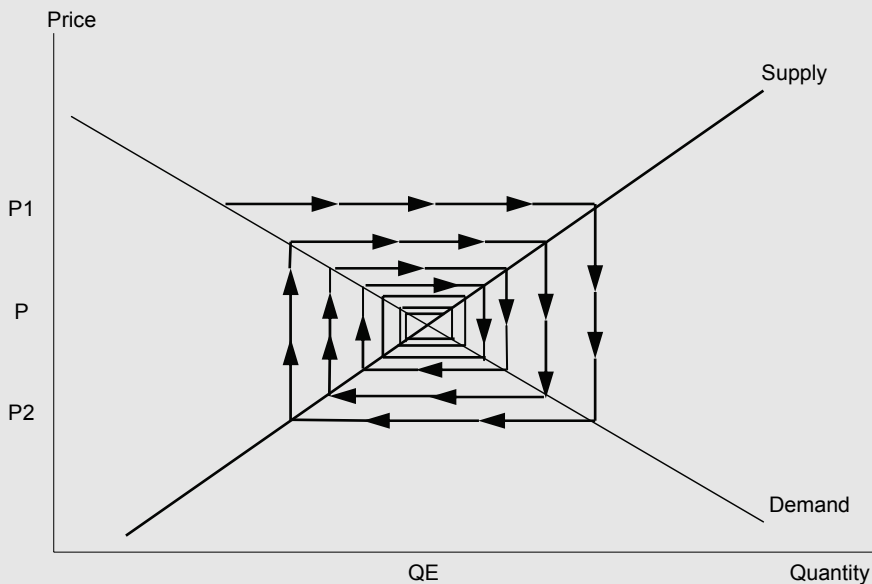
World GDP growth in recent times has been strong, underpinned by the continued industrialisation of China (chart 8). Industrial production in China has grown rapidly over the last decade. As a result, China’s demand has increased for a wide range of raw materials to generate electricity and supply inputs for its burgeoning construction, investment and manufacturing sectors.

Stimulated by stronger world growth, global production of many products has grown at well above long-run average rates in recent times. Steel production, for instance, has grown at an annual average rate of around 6 per cent over the last five years, compared with a long run annual average rate of under 2 per cent since 1970.

Cobweb models

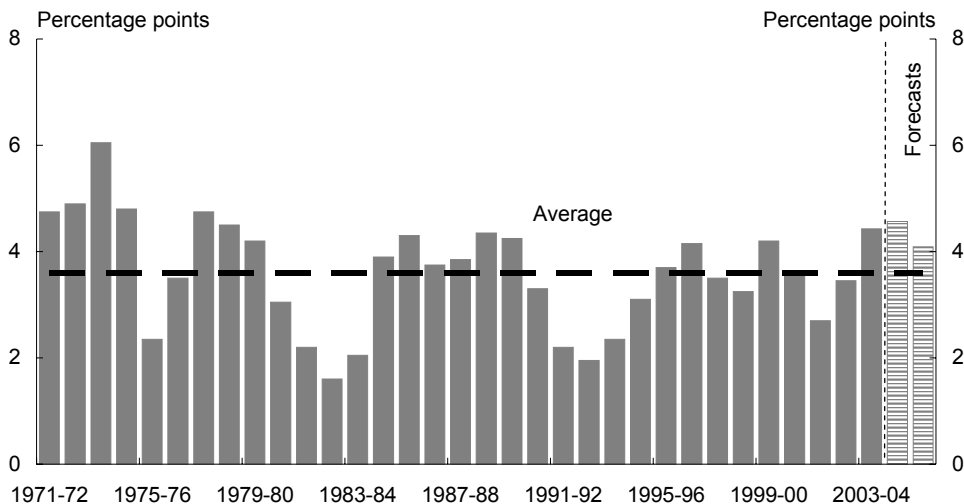
Cobweb models provide a framework for considering the fluctuating nature of prices in the mining industry. They were developed in the 1930s (for example Kaldor (1934)) to explain the price fluctuations seen in many agricultural markets. The models apply to markets where production takes time, the quantity produced depends on an anticipated price and supply at the time of sale determines the actual market price. That is, the model applies to situations where there is a lag between the responses of producers to a change in the price. This is the case for the mining industry.

Basically, according to cobweb models prices can over- and under-shoot along the way. If the price is anticipated to be high, producers will increase production over time and the actual price will be lower given the increased supply. The lower price results in a lower anticipated price and a subsequent reduction in supply over time, which works to increase the actual price. Depending on the slopes of the demand and supply curves (the elasticities), this process continues until equilibrium is reached. The models get their name because, when stable, the market follows a cobweb-like path to the equilibrium price.



The theory behind cobweb models was first developed under the assumption of static price expectations – the predicted price equals the actual price in the last period. However, in 1958 Nerlove instead assumed adaptive expectations, where economic agents form their expectations of the price on the basis of past prices and errors in their earlier price predictions. In 1961 Muth developed the implications of rational expectations for cobweb models, where the expectations of future prices incorporate all available information and are based on the predicted economic structure of the market. If the strong assumption of rational expectations holds, it implies that price fluctuations are explained by the cyclical pattern of exogenous variables or by the summation of random shocks.

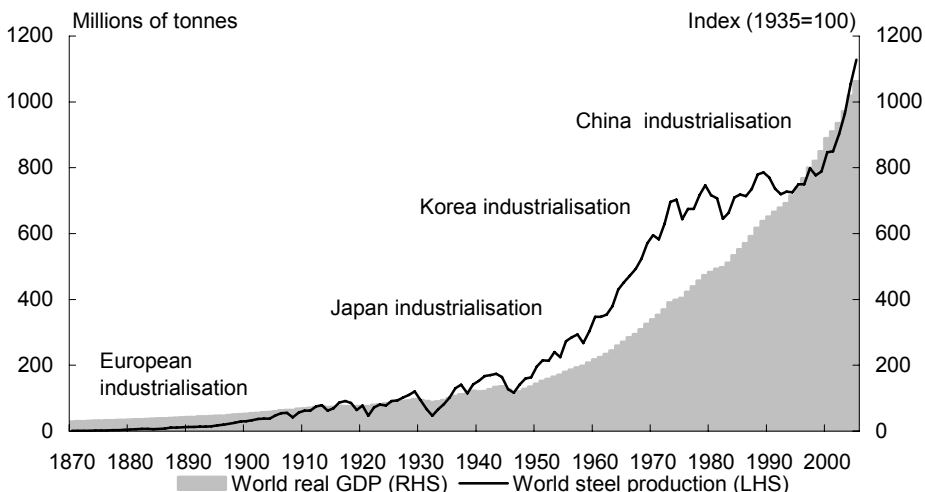
Chart 8: World GDP growth.



Source: IMF, Treasury.

Chart 9 shows that periods of above-average steel production growth correspond to periods of Japan’s industrialisation (1950s and 1960s) and South Korea’s industrialisation (1980s). More recently, the chart shows global steel production entering an above-average growth phase that corresponds to China’s present industrialisation.

Chart 9: World GDP and steel production growth.
(Levels)

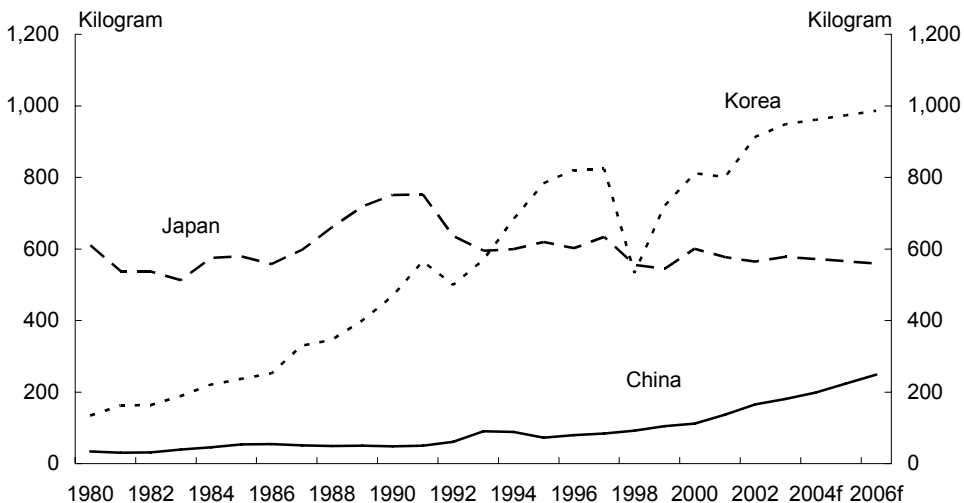


Source: derived from various sources, especially Maddison (2003) and Mitchell (2003).

Strong growth in steel production has, in turn, stimulated demand for the key inputs into steel production – iron ore and metallurgical coal – resulting in dramatic price increases of about 120 per cent for metallurgical coal and about 70 per cent for iron ore earlier in 2005. In addition, global prices for thermal coal grew by 20 per cent this year in response to power companies, especially in Asia, competing to secure additional coal feedstock to meet growing electricity demand.

The demand shock that has precipitated these price increases has, in turn, been due to growth in China's construction, investment and manufacturing sectors. And this growth is likely to continue for some time. Maurer et al (2004) observe that on a per capita basis, China lags well behind developed regional neighbours such as Japan and Korea for consumption of a range of resources and resource-intensive manufactures, such as steel (Chart 10).⁸

Chart 10: Per capita consumption of finished steel



Source: ABARE.

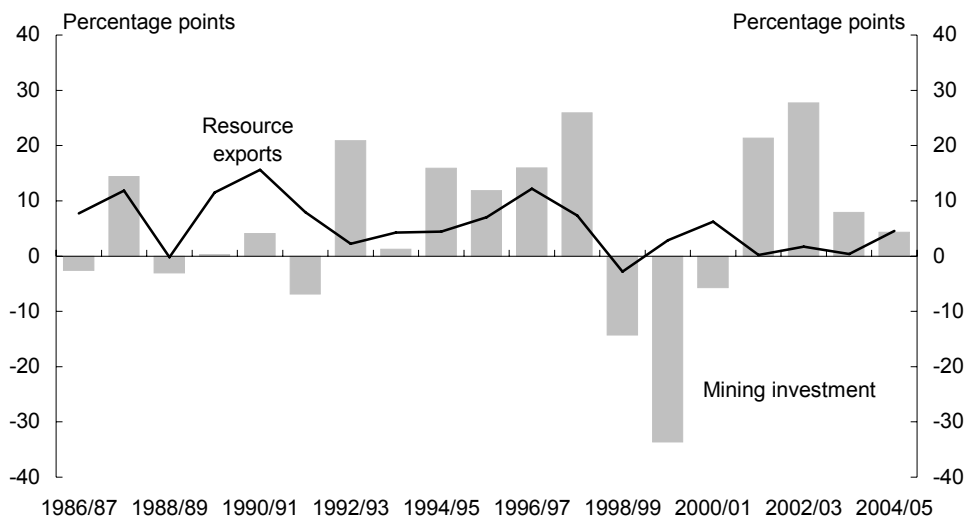
In previous eras of industrialisation, growing incomes have led to shifts in the composition of economic activity to encompass higher shares of consumption and services, at the expense of other sectors such as investment, construction, manufacturing and mining commodity industries. While China and India are likely to follow this path also, the sheer size of their population means that this transition could be expected to take years, possibly decades. Given this, it is likely that growth in their consumption of raw materials will remain robust for some time yet.

⁸ Other commodities included aluminium and copper, but as the main focus in this paper is iron ore and coal, the analysis here focuses on steel.

Recent investment and production

Mining investment has grown strongly in recent years, with mining companies investing almost \$30 billion over the last three years alone (Chart 11). However, this has been slow to translate through to similarly impressive rates of growth of resource export volumes. This is due to the nature of the mining industry. Projects are highly capital-intensive, typically requiring extensive supporting infrastructure, as well as complex and sophisticated plant and equipment. The complex nature of many resource projects explains why a lengthy lag is usual between the decision to expand capacity and the additional capacity coming into production. Given recent strong world demand, these lags in the supply response have contributed to the recent growth in mining commodity prices.

Chart 11: Mining investment and resource exports
(annual percentage change: volumes)



Source: derived from ABS Cat. No. 5204 and 5302.

One reason why mining commodity export growth has been muted recently is that while new mines and wells are being developed, older ones are running low or becoming more expensive to tap. For example, oil and gas are usually first extracted under the field’s own pressure. But as more oil and gas are produced, the field pressure declines, which leads to lower volumes of oil and gas exiting the well. Miners have evolved a range of technologies to extend field production rates, ranging from pumping water or gas into a field, to fracturing the geological structure to allow the oil and gas to flow to the well heads more easily, to injecting steam into fields to superheat the oil to make it more viscous and easier to extract. However, all these technologies involve higher capital expenditure and per unit costs.

In Australia's case, production from our largest oil and gas field is in decline. ABARE (2005) reports that production from the Bass Strait fields off the Gippsland coast in south-east Victoria has declined at an annual average rate of 17 per cent since 1999-2000. Many billions of dollars have been invested in new oil and gas production across Australia, but most of this has just offset the decline from our largest field.

Supply responses and implications for prices

Mining firms in Australia have responded to higher prices with increased investment. Recently completed projects include the North West shelf 4th train, the Mutineer/Exeter oil fields, the Hail Creek coal mine, the first stage of the Bayu/Undan oil and gas fields, and BHP's MAC iron ore mine. In addition, projects currently underway include the second stage of the Bayu/Undan fields, the Rolleston coal and the Yandicoogina iron ore mines.

Overseas producers are also expanding capacity. ABARE's (2005) judgment in September was that increases in global production of coal and iron ore are likely to allow world stocks to increase sufficiently to place downward pressure on negotiated prices, with Japanese financial year 2006-07 prices forecast to fall between 14 and 18 per cent.

ABARE predicts that world seaborne metallurgical coal trade will grow by 4 per cent in 2005 and a further 5 per cent to 227 million tonnes in 2006. Australia is forecast to supply almost 60 per cent of this, drawing on new operations that are in development or ramp-up stage, and the expected commissioning of a number of new projects.

Stronger growth is forecast in world seaborne iron ore volumes, with ABARE forecasting a 9 per cent rise in 2005 and a further 7 per cent to 699 million tonnes in 2006. Brazilian and Australian producers are providing the lion's share of supply growth over this time, with Australian producers forecast to gain market share due to cost advantages conferred by our proximity to the burgeoning Chinese steel industry.

Conclusions

Mining commodity prices have risen strongly recently. This appears more than a fluctuation around a long-term downward trend. Rather it reflects the strong state of world demand, and in particular the rapid industrialisation of China. However, the long lead times in developing mining projects mean there is a 'cobweb' aspect to the market. As more productive capacity comes into operation around the world, commodity prices will slow or fall back somewhat.

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The road to Hong Kong: what's at stake for the Doha Round

Gerry Antioch, Ian Beckett and Bruce Donald¹

The current Doha Round of multilateral trade negotiations has the potential to deliver significant economic benefits to Australia and the rest of the world. The outcome of the Hong Kong Ministerial Conference, scheduled for 13-18 December, will determine whether these benefits are likely to be realised. In order for Doha Round negotiations to deliver an ambitious outcome by the end of 2006, it is necessary for participants at the Hong Kong meeting to agree at least on a detailed package of reforms covering agriculture and non-agricultural market access.

1 The authors are from Foreign Investment and Trade Policy Division, the Australian Treasury. This article has benefited from comments and suggestions from officers of the Department of Foreign Affairs and Trade. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

Introduction

This article provides a brief 'stock take' of the World Trade Organization's (WTO) current Doha Round of trade negotiations in the lead-up to the Hong Kong Ministerial Conference, which is scheduled for 13-18 December. It begins with an overview of the role of the WTO and the potential economic significance of the Doha Round. It then examines why the Hong Kong meeting is so important to the successful conclusion of the round. The article next discusses the three issues that are expected to dominate negotiations in Hong Kong: agriculture, non-agricultural market access (NAMA) and services. It also identifies key three issues that should be considered in assessing any agreements reached at Hong Kong. It concludes by considering how the failure of the Doha Round might affect future trade reform.

The World Trade Organization

Established on 1 January 1995, the WTO has three key functions. Firstly, it administers a series of agreements between member countries that provide the legal framework for international commerce. The main agreements cover goods, services and intellectual property.² Under these agreements, member countries undertake to observe certain minimum standards in their trade policies. Secondly, it is responsible for resolving trade disputes between countries. The WTO's Dispute Settlement Body makes rulings about the interpretation of WTO agreements. This function is fundamental to the operation of a rules-based system of international trade. Thirdly, it provides a forum in which members are able to negotiate revised agreements on a multilateral basis. Such negotiations are known as 'rounds'. Each round enables WTO members to negotiate to reduce trade barriers on a non-discriminatory basis. At the end of each round, members typically make binding commitments to lower maximum tariffs and reduce other impediments to international trade.³ Members can also agree to change the rules governing the WTO's operation. In addition to these three key functions, the WTO also monitors members' trading policies and provides technical assistance and training for developing countries.

2 The three main WTO agreements are the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS) and the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Other agreements deal with the establishment of the WTO, dispute settlement and trade policy reviews. There are also plurilateral agreements on civil aviation and government procurement.

3 Bound tariff rates are the maximum rates that can be applied to imports under WTO rules. Applied tariff rates are often much lower than bound rates. In addition, many WTO members offer even lower preferential tariff rates to particular countries, either because they are partners in a preferential trade agreement or to assist least developed countries. For example, Australia offers tariff and duty-free access to imported goods from around 50 least developed countries (LDCs).

The Doha Round

The Doha Declaration, which was issued in November 2001 by the fourth Ministerial Conference of the WTO, provided a mandate for negotiations on a wide range of trade-related matters. The Doha agenda includes negotiations on agriculture and services, which commenced in 2000. Other agenda items include trade in goods and WTO rules covering dumping, subsidies, regional trade agreements and dispute resolution. These issues are required to be dealt with in a single package from which no member can selectively derogate. 1 January 2005 was initially set as the target date for concluding negotiations.

The declaration foreshadowed consideration of, but did not immediately mandate negotiations on, the four 'Singapore issues' of investment, competition policy, trade facilitation and government procurement.⁴ However, following concerted opposition to the discussion of these issues by developing countries, all but trade facilitation were formally excluded from the Doha agenda in July 2004.

Development is a key theme of the Doha Round. This is reflected in its focus on trade in agriculture as well as issues relating to trade and development. Participation in the global trade system is an important factor in determining the economic performance of developing countries (and hence their capacity to reduce poverty and improve living standards). However, many developing countries have restricted access to developed country markets for key exports or lack the necessary institutional capacity to develop trade linkages. The Doha Round aims to address these issues so as to integrate developing countries more closely into the global trade system.

The Doha Round in context

The characteristics of negotiating rounds have changed considerably since the initial Geneva GATT round in 1947. The number and diversity of participants have increased. While the first round involved just 23 mostly developed countries, the WTO now has 148 members including many developing and least developed countries (LDCs)⁵. It is now three-quarters the size of the United Nations. The scope of rounds has also expanded. The first five rounds were narrowly focused on reducing manufacturing tariffs. During the 1960s and 1970s, their coverage expanded to encompass anti-dumping, development issues and non-tariff barriers. Agriculture, services, intellectual property and dispute settlement issues became important components of the agenda for the Uruguay Round, which commenced in 1986. Although three of the

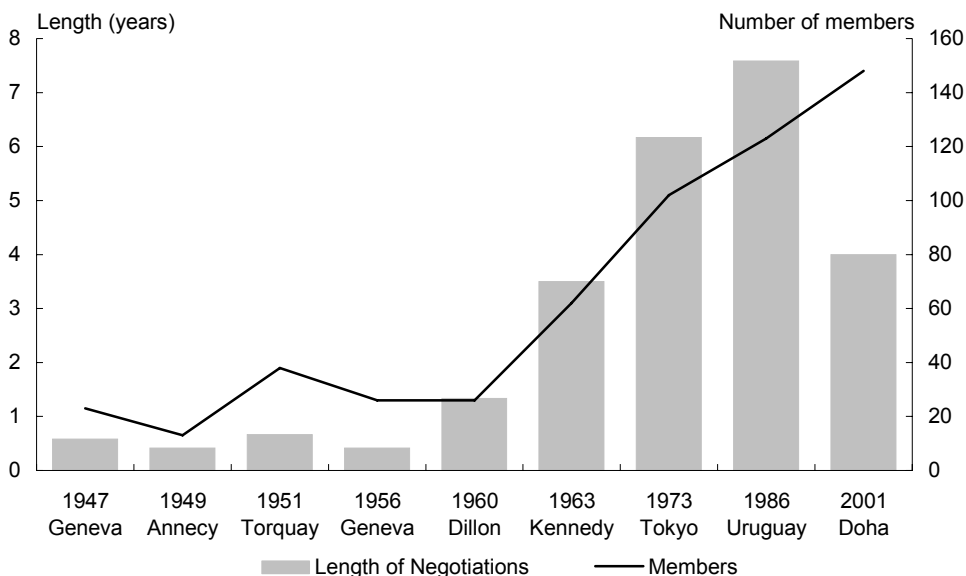
4 These issues were first raised in the WTO at the 1996 Singapore Ministerial Conference.

5 Saudi Arabia is expected to become the WTO's 149th member by the time of the Hong Kong meeting.

four 'Singapore issues' were excluded in 2004, the agenda for the Doha Round is no less broad and ambitious than that of any of its predecessors.

Reflecting these developments, the duration of rounds has been gradually increasing (Chart 1). Against this backdrop, the Doha Round's initial deadline of 1 January 2005, appears to have been particularly optimistic. It is now hoped that the current round of negotiations can be completed by the end of 2006.

Chart 1: Participation and duration of rounds



The economic significance of the Doha Round

The economic significance of the Doha Round derives from the efficiency benefits that can be achieved by liberalising global trade flows. There have been many attempts to estimate these potential benefits. However, results have varied widely, reflecting the use of different data, methodologies and assumptions.

The World Bank has estimated the potential economic gains of the Doha Round at between US\$59 billion and US\$269 billion, depending on whether it achieves a 'low' or a 'high' ambition outcome (2005a, pp. 134-5). These gains are attributable solely to the liberalisation of global merchandise trade and do not include the potential benefits of liberalising international trade in services. Around 40 per cent of gains are estimated to go to developing countries, especially in Asia. Some LDCs are forecast to suffer small losses as a result of losing preferential access to protected developed country markets. As a result, the World Bank acknowledges that additional aid flows will be required to cushion their adjustment to a more liberal trading regime (see Wolfowitz 2005).

Significance of the Hong Kong Ministerial Conference

Ministerial conferences are the WTO's peak decision-making body. They must be held at least every two years. The Doha Round was launched in November 2001 by the Doha Ministerial Conference. The next Ministerial Conference was held at Cancún in September 2003. The purpose of this meeting was to agree on priorities for ongoing negotiations in the round. However the meeting ended in disarray because of disagreement over whether the Doha Round should include discussion of the four 'Singapore issues', dissatisfaction amongst developing countries over the lack of progress of negotiations on agriculture and the emergence of a deal between the European Union (EU) and the United States (US) that appeared to preclude further progress on this issue. After the breakdown of the Cancún meeting, momentum in the Doha Round was only restored in July 2004, when members endorsed a package of frameworks and other agreements negotiated by senior trade officials (the 'July 2004 package').

The Hong Kong meeting needs to secure sufficient consensus on the key features of a reform package to enable detailed provisions to be finalised by the end of 2006. As the Director-General of the WTO, Pascal Lamy, recently stated, the Hong Kong Ministerial is 'the last and best chance to conclude the Round by next year' (Lamy 2005). The 2006 deadline is significant because the US President's current Trade Promotion Authority (TPA) expires in mid-2007. It is widely believed that it would be very difficult for the US Administration to obtain congressional approval to extend the TPA. The TPA restricts Congress to either wholly accepting or rejecting a trade agreement negotiated by the President rather than 'cherry picking' particular elements.⁶

Key issues on the Hong Kong agenda

Agricultural goods: a focus of the Doha Mandate

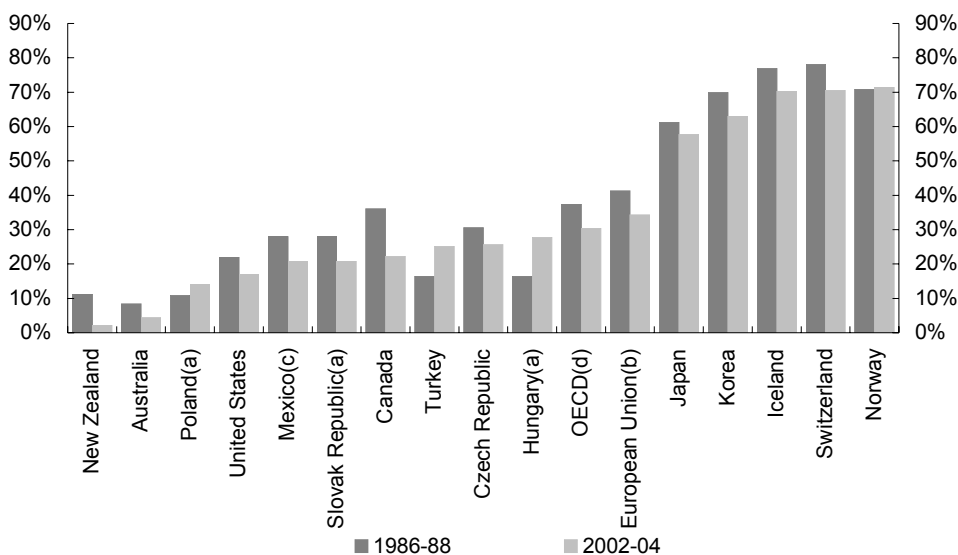
The most important task for participants at the Hong Kong meeting is to agree on the details of how to lower tariffs, reduce trade-distorting domestic support and eliminate export subsidies. This objective is fundamental to the outcome of the entire Doha Round. The 2003 Cancún Ministerial Conference broke down because of inadequate progress on reform of trade in agricultural goods. Many developing countries will not agree to liberalise NAMA or services in the absence of substantial progress in agricultural trade.

6 The TPA was 'purchased' by the US Administration with protectionist side deals, including significant increases in domestic subsidies for agriculture and duties on steel imports.

Distortions in agricultural trade

Although agriculture accounts for only 4 per cent of global GDP and 10 per cent of trade flows, 60 per cent of the estimated gains from liberalising global merchandise trade are expected to come from freeing up trade in agricultural goods (World Bank 2005, pp. 133-4). This reflects the wide-ranging distortions that currently exist in global agricultural trade. According to the WTO, 'the agricultural sector is characterised by the highest tariffs in the trading system'. A 2001 study cited by the WTO estimated the level of the world's average bound agricultural tariffs at around 62 per cent (more than twice the estimate for manufactured products). This study also estimated the average applied tariff for agricultural goods at 17 per cent (compared with 9 per cent for manufactured goods) (WTO 2003a, p. 127). The OECD estimated that government support to agricultural producers across the OECD in 2004 was US\$279 billion (around 30 per cent of farm receipts in these countries) (2005a, p. 36). As Chart 2 illustrates, producer support as a proportion of farm receipts varied from less than 5 per cent in New Zealand and Australia to over 60 per cent in Japan and Korea, and around 70 per cent in four European Free Trade Association countries.⁷

Chart 2: OECD percentage producer support estimates



- (a) For the Czech Republic, Hungary, Poland and the Slovak Republic, 1986-88 is replaced by 1991-93 and 2002-04 by 2001-03.
- (b) EU-12 for 1986-94 including ex-GDR from 1990; EU-15 for 1995-2003; EU-25 from 2004.
- (c) For Mexico, 1986-88 is replaced by 1991-93.
- (d) Austria, Finland and Sweden are included in the OECD total for all years and in the EU from 1995. The OECD total does not include the six non-OECD EU member states.

Source: OECD (2005a).

⁷ Iceland, Liechtenstein, Norway and Switzerland.

Interests and objectives of WTO members

WTO members have different interests and objectives in relation to agricultural trade reform. The most ardent proponents of liberalisation are efficient producers likely to benefit from increased production and higher world food prices as a result of lower tariffs and trade-distorting subsidies. These include the US (although it is also a major subsidiser of agricultural production), members of the Cairns Group⁸ and members of the G-20 group of developing countries with an interest in agriculture.⁹

While many developing countries are expected to benefit from liberalising agricultural trade, it will not assist food-importing countries that are unable to increase production. In addition it may pose issues, particularly in the short term, for LDCs that would lose preferential access to protected developed country markets.¹⁰

Greatest resistance to liberalisation of trade in agriculture has come from the EU and members of the G-10 group (which includes Japan, Korea, Norway and Switzerland).¹¹ Although liberalisation of trade in agricultural goods is expected to provide these countries with large net benefits in the form of lower consumer prices, it would disadvantage producers that benefit from subsidies and artificially high domestic prices. Taxpayers in these countries are also likely to benefit from the reduction or elimination of support payments.

From the perspective of protectionist developed countries and LDCs that currently rely heavily on preferential access to developed country markets, success in agricultural trade negotiations involves minimising liberalisation (or, in the case of LDCs, securing compensation for the impact of preference erosion).

8 Established in August 1986, the Cairns Group is a coalition of 17 agricultural-exporting countries that account for around 23 per cent of the world's agricultural exports. Convened by Australia, its membership also consists of Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Indonesia, Malaysia, New Zealand, Paraguay, the Philippines, South Africa, Thailand and Uruguay. The Cairns Group played an important role in the early stages of the Uruguay Round in moving agriculture to the forefront of the multilateral trade agenda.

9 The G-20 was created in August 2003 in the lead-up to the Cancún Ministerial Conference. Convened by Brazil, it currently has 18 other members: Argentina, Bolivia, Chile, China, Cuba, Egypt, India, Indonesia, Mexico, Nigeria, Pakistan, Paraguay, the Philippines, South Africa, Tanzania, Thailand, Venezuela and Zimbabwe. Nine of its members are also members of the Cairns Group.

10 Agricultural preference erosion is a key issue for the G-90, a group of poor (mostly African) countries that are highly dependent on preferential access to developed country markets (although the United Nations Conference on Trade and Development recently concluded that many LDCs do not rely heavily on preferences and that any negative impact from their removal would be limited to a few countries (UNCTAD 2005)).

11 The G-10 grouping currently has nine members: Iceland, Japan, Korea, Liechtenstein, Mauritius, Norway, Switzerland, and Chinese Taipei.

Market access

Barriers to market access, in the form of tariffs, tariff rate quotas (TRQs) and other import restrictions, are the major source of distortion in the global agricultural market.¹² According to a recent study, elimination of barriers to market access would contribute 93 per cent of the potential economic gains that could be achieved from removing all agricultural trade distortions (Anderson and Martin 2005, p. 1312).

It was agreed as part of the July 2004 package that maximum bound agricultural tariffs would be divided into bands and that tariffs within each band would be reduced in accordance with an agreed formula. To narrow tariff differentials, it was also agreed that tariffs in higher bands would be subject to deeper cuts than those in lower bands. The task of the Hong Kong meeting is to agree on the details of this tariff reduction formula, including the following key issues:

- the number of bands into which tariffs should be divided and the width of each band;
- the size of the cuts that should be applied to tariffs within each band (including the extent of progressivity across bands);
- whether there should be an upper limit or cap on all agricultural tariffs; and
- the extent to which developing countries should be able to make lesser cuts to tariffs in accordance with the principle of 'special and different treatment'.

It must also agree on rules for dealing with 'sensitive products'. The July 2004 package provided that certain goods could be treated as sensitive and be subject to lower tariff reductions in return for concessions such as an increase in relevant TRQs. Therefore, the Hong Kong meeting must also agree on:

- the maximum number of products that should be able to designated as sensitive;
- the extent of tariff reductions required for sensitive products; and
- the amount that TRQs should be expanded to offset lower tariff reductions.

¹² In addition, many agricultural products are also subject to tariff escalation, under which much higher tariffs are imposed on imports of processed goods than on imports of raw materials (World Bank, 2004, pp. 123-5).

Domestic support

Domestic support consists of financial assistance provided to agricultural producers.¹³ Under WTO rules, support measures are categorised according to the extent to which they are likely to stimulate over-production and therefore distort trade. Subsidies that are considered least trade-distorting are categorised as 'green box' measures. These are not currently subject to any restrictions. WTO restrictions apply to trade-distorting subsidies. Three categories of trade-distorting subsidies are currently permitted: 'amber box' measures (which are the most trade-distorting), 'blue box' measures (which are 'partially de-coupled' from production and therefore less trade-distorting) and '*de minimis*' support (under which members are permitted to make distorting payments that do not exceed a fixed proportion of the value of domestic production).

The Doha mandate included the objective of reducing expenditure on trade-distorting subsidies. The July 2004 package contained an agreement that the largest subsidisers (the EU, US and Japan) would make the largest cuts. The Hong Kong meeting must try to agree on lower overall spending limits as well as on whether reductions or caps should apply to particular categories of expenditure (that is, amber box, blue box or *de minimis*).

Export subsidies

Export subsidies are payments made by governments to producers to increase their competitiveness in export markets by allowing them to sell at prices below the cost of production. They are often used as a means of clearing surpluses created as a result of domestic production incentives. Export subsidies have a negative impact on large food exporters because they depress prices in targeted export markets and reduce domestic adjustment pressures that might arise in countries with high domestic tariffs.

The mandate for the Doha Round called for reductions in, with a view to phasing out, all forms of agricultural export subsidies. In an important breakthrough, it was agreed as part of the July 2004 package that all forms of export subsidies would be eliminated by a 'credible' date through a process of phased annual reductions. The Hong Kong meeting is to consider the date for ending export subsidies as well as rules relating to export credits, food aid and state trading enterprises.

13 In 2003, the WTO stated that the value of domestic support measures notified to it totalled US\$104 billion. The EU, US, Canada and Japan accounted for 84 per cent of this expenditure. Developing countries accounted for 12 per cent, with the remaining 4 per cent spent by other industrialised countries (WTO 2003a, p. 136).

Negotiations on agriculture in the lead-up to Hong Kong

Intensive high-level negotiations on agriculture have been taking place in October in the lead-up to the Hong Kong meeting. The main participants in these talks have been the 'Five Interested Parties' (FIP): the US, the EU, Australia, Brazil and India. An important development in these negotiations was the release by the US on 10 October of a major new proposal to reform agricultural trade (USTR 2005). This proposal immediately prompted revised proposals from both the EU and the G-20 (Mandelson 2005, G-20 2005). A further EU offer was released on 28 October. Their respective negotiating positions as at the end of October 2005 are set out in Table 1.

During the October negotiations, the US and the EU have each proposed substantial reductions in maximum levels of expenditure on trade-distorting domestic support. In particular, the US has moved away from its previous position of refusing to move in the absence of any EU offer of major tariff reductions. Importantly, the US has also proposed 2010 as an end date for the elimination of export subsidies.

The issue of market access remains a key area of deadlock. The US has proposed that developed countries make major reductions in their agricultural tariffs with limited flexibility for sensitive products. Substantial improvements in market access for US producers are seen as necessary to gain congressional support for any proposal to reduce support payments to US producers. The US position on market access has been supported by Australia (Vaile 2005) and the G-20 (although the G-20 itself has not requested such large cuts by developed countries). By contrast, the EU has proposed lower tariff cuts combined with extensive flexibility for sensitive products. As this position is not regarded as acceptable by the four other members of the FIP, the EU will have to make a more ambitious offer if there is to be agreement in Hong Kong. However, the capacity of EU negotiators to make an improved offer is limited by the opposition of some members, especially France, to any reform proposal that goes beyond the tariff cuts agreed in the Uruguay Round or the reductions in domestic support agreed as part of the EU's 2003 reforms to its Common Agricultural Policy.

The other significant area of disagreement concerns the amount of liberalisation that should be expected of major developing countries. The G-20 has proposed that its own members make much smaller tariff cuts and that their reductions be implemented over a longer period. By contrast, the US and the EU are likely to press for greater reciprocity from major developing countries on agricultural reform, as well as in relation to NAMA and services.

Table 1: Negotiating positions of US, EU and G-20 on agriculture (October 2005)

| | United States | European Union | G-20 |
|--|---|---|--|
| Market access | <p>Tariff cuts of 55 to 90 per cent (with maximum cuts where bound tariffs are over 60 per cent).</p> <p>Tariffs capped at 75 per cent.</p> <p>No flexibility in basic formula.</p> <p>Sensitive products limited to 1 per cent of tariff lines.</p> | <p>Tariff cuts of 20 to 60 per cent (with maximum cuts where bound tariffs are over 90 per cent). Tariff cuts between 20 and 45 per cent in lowest band.</p> <p>Tariffs capped at 100 per cent.</p> <p>Up to 8 per cent of tariff lines can be designated sensitive (partially offset by larger TRQs).</p> <p>Special safeguards to be retained.</p> | <p>Tariff cuts of 45 to 75 per cent (with maximum cuts where bound tariffs are over 75 per cent).</p> <p>Minimum average cut of 54 per cent across all tariff lines.</p> <p>Tariffs capped at 100 per cent.</p> <p>Sensitive products limited to 1 per cent of tariff lines (1.5 per cent for developing countries).</p> |
| Domestic support | <p>Overall ceiling reduction of 53 per cent (in return for 75 per cent from EU and 53 per cent from Japan).</p> <p>Amber box ceiling reduction of 60 per cent (in return for reductions of 83 per cent by EU and Japan).</p> <p>Cap blue box ceiling at 2.5 per cent of value of agricultural production.</p> <p>Cap <i>de minimis</i> support ceiling at 2.5 per cent of value of agricultural production.</p> | <p>Overall ceiling reduction of 70 per cent (in return for 60 per cent from US, at least 60 per cent from Japan and 50 per cent by other large users).</p> <p>Cap blue box ceiling at 5 per cent of value of agricultural production with new disciplines to ensure minimal trade distortion.</p> <p>Reduction of at least 80 per cent in maximum levels of <i>de minimis</i> support by developed countries.</p> | <p>Overall ceiling reduction of 80 per cent by EU and 75 per cent by US. Japan either 75 or 80 per cent. Other developed countries 70 per cent.</p> <p>Reduction in <i>de minimis</i> support ceiling related to overall level of cuts.</p> |
| Export subsidies | <p>Elimination by 2010.</p> | <p>No date for elimination suggested. Contingent on disciplines covering other export promoting policies.</p> | <p>Elimination in 5 years.</p> |
| Special and different treatment | <p>Slightly lesser tariff cuts and longer phase-in periods to ensure real improvements in access while ensuring import-sensitive sectors in those countries are afforded adequate protection.</p> | <p>Tariff cuts two-thirds of developed countries applying to bands with higher thresholds.</p> <p>Tariffs capped at 150 per cent.</p> | <p>Tariff cuts of 25 to 40 per cent for developing countries (with highest reductions over 130 per cent).</p> <p>Maximum average cut of 36 per cent.</p> <p>Tariffs capped at 150 per cent.</p> |

Non-agricultural market access: progress must continue

While agricultural reform has become the focus of the round, further liberalisation of trade in manufactured goods is a key element of the Doha agenda.

Distortions in trade in manufactured goods

Because it has been a central component of all previous rounds of multilateral trade negotiations, trade in manufactured goods is generally subject to far fewer distortions than agricultural trade.¹⁴ Developed countries generally have low bound and applied tariffs.¹⁵ However, some goods are subject to major market access restrictions or tariff peaks.¹⁶ These market access barriers often apply to manufactured goods that are of particular interest to exporters in developing countries, such as textiles, clothing and footwear.¹⁷

In addition, developing countries themselves frequently impose high tariffs on imports of manufactured goods (much higher than those of developed countries) and these are largely unconstrained as their bound tariffs are higher still. Developing countries have only recently begun to participate in multilateral trade negotiations and, under the special and differential treatment principle, they often made much shallower tariff cuts than their developed counterparts. As a consequence, substantial efficiency gains could be achieved by further liberalising trade in manufactured goods.

Interests and objectives of WTO members

Developed countries have expressed an interest in an approach that would give them better access to markets in large developing countries (for example, Brazil, China and India). Many of these markets are characterised by high bound tariffs, although applied tariffs have fallen in recent years. While they may disagree with one another on the issue of agricultural market access, the US and the EU have both called for a NAMA outcome that leads to further reductions in applied tariffs on imports of manufactured goods in large developing countries.

Developing countries have argued for better access to developed country markets for products that they can produce efficiently and that are currently subject to tariff peaks (especially in the key TCF sector). As with agriculture, LDCs that currently have

14 The original GATT applied to both agricultural and manufactured goods. However, at the insistence of the US and European countries, successive GATT negotiations focused on liberalising trade in manufactured goods, allowing more protectionist policies to persist in the agricultural sector (FAO 2000).

15 As Trade Minister Vaile has noted, average applied manufacturing tariffs have fallen from 40 per cent in 1948 to under 4 per cent today. The two rounds prior to Doha, the Toyko and Uruguay rounds, delivered cuts in developed country tariffs of 33 per cent and 40 per cent respectively (Vaile 2004).

16 For developed countries, tariffs higher than 15 per cent are generally regarded as tariff peaks.

17 According to Anderson and Martin (2005, p. 1304), average applied tariffs on imports of manufactured goods (other than textiles and wearing apparel) in 2001 were 1 per cent in developed countries and 8 per cent in developing countries. By contrast, average applied tariffs on imports of textiles and apparel were 8 per cent in developed countries and 17 per cent in developing countries.

preferential access to these markets are concerned that they will lose market share as a result of preference erosion if others obtain equal market access.

Negotiations on NAMA in the lead-up to Hong Kong

The July 2004 package incorporated an agreement on the key features of an approach to improving market access for trade in manufactured goods. Most importantly, it was agreed to work on reducing tariffs using a non-linear formula approach (such as a 'Swiss formula'¹⁸), with some flexibility for developing countries. The task of the Hong Kong meeting is to agree on the details of how this should be implemented.

Negotiations on NAMA have made slower progress than those on agricultural trade. This is because a number of major developing countries (especially Brazil and India) have been unwilling to participate fully in the absence of clear progress towards what they would regard as a satisfactory agreement on other issues – mainly agriculture but also, in the case of India, services. A key issue for Hong Kong is whether a trade-off will emerge under which developed countries could agree to substantial agricultural liberalisation while major developing countries agree to lower their own manufacturing tariffs significantly.

Services: differing interests drive different priorities

Market access commitments governing services are the third key topic for discussion at the Hong Kong meeting. Services negotiations operate differently from those covering agriculture and NAMA. The rules are based on a positive list of commitments by each WTO member to provide market access according to four modes of delivery.¹⁹ These commitments can be 'horizontal' (so that they apply to all sectors) or sectoral (so that they are confined to particular industries such as banking or telecommunications). Commitments can also be subject to restrictions that limit their application in terms of market access and national treatment.

In contrast to agriculture and NAMA, services negotiations are still based on a process of bilateral requests and offers. WTO members make requests of one another for

18 The Swiss formula is an approach to cutting tariffs that is designed to maximise harmonisation by minimising the difference between high and low tariffs. According to the WTO, it uses a single mathematical formula to produce a narrow range of final rates from a broad range of initial rates. The formula is $Z = AX/(A+X)$ (where X is the initial tariff rate, A is the coefficient, and Z is the final tariff rate). The lower the coefficient, the faster tariffs are reduced, and the lower the maximum rate is at the end of the process. It is known as the Swiss formula because it was proposed by Switzerland during the Tokyo Round of multilateral trade negotiations (WTO 2003b).

19 The GATS defines these four modes as Mode 1: cross-border supply; Mode 2: consumption abroad; Mode 3: supply through commercial presence abroad; and Mode 4: supply through movement of natural persons.

further market access in particular areas. At the completion of this process, each country decides an appropriate offer of additional market access that will be made available to other WTO members. This can be followed by another round of requests and offers. In general, members are able to proceed at their own pace, and are not required to consent to any particular request for additional market access.

Distortions in services trade

Distortions in services trade derive from restrictions in domestic legislation that limit market access and competition. Australia's Department of Foreign Affairs and Trade has estimated that a 50 per cent liberalisation of the global services market would boost global GDP by US\$250 billion (DFAT 2004). The OECD argues that 'gains from more open services trade are substantially greater than those from liberalising trade in goods'. This reflects the size of service sectors around the world, the extent of current restrictions on cross-border supply and the flow-on benefits of efficiency gains for the agriculture and manufacturing sectors (OECD 2005b).

Interests and objectives of WTO members

In common with NAMA, negotiations on market access in services have highlighted differences in the priorities of developed and developing countries. Many developed countries are exporters of services and have a strong interest in lowering barriers to market access (both in other developed countries and in large developing countries).

However, most developing countries (India being an important exception) are not major exporters of services and do not have similar interests in this area. They generally perceive requests to liberalise key services markets as a threat to domestic producers and sometimes also to government control. Their main focus is on securing greater flexibility to supply unskilled or semi-skilled workers to developed countries, reflecting the importance of overseas remittances to their economies (see World Bank 2004, pp. 148-9).

Negotiations in the lead-up to Hong Kong

The July 2004 package called for more progress in services negotiations and the tabling of revised offers by May 2005. To date, there has been one full round of requests and offers. A number of WTO members, including Australia, have submitted revised offers. A total of 69 initial offers (covering 94 members) have now been tabled, as well as 28 revised offers covering 53 members (including the 25 EU members) (DFAT 2005).

In the lead-up to the Hong Kong Ministerial Conference, WTO members that aspire to a more ambitious outcome on services than currently appears likely are searching for ways to encourage other members to make broader and deeper market access offers as part of a new round of revised offers in 2006. Australia is part of a newly formed

group on services whose objective is to secure the support of the Hong Kong meeting to raise the WTO's overall level of ambition in this area and set a new date for a further round of revised offers in 2006.

The Hong Kong meeting will also consider whether to complement the request-offer process with measures that could include:

- identifying a target for WTO members to aim at when preparing their offers (which could include specific and detailed targets or objectives relating to both sectoral coverage and depth of offers);
- using plurilateral and sectoral approaches to identify restrictions on market access to be eliminated (such as nationality and residency requirements);
- common requests in high-priority services sectors; and
- greater focus of measuring the extent of progress by WTO members towards agreed benchmarks for liberalisation.

These approaches aim to encourage major developing countries to agree to more rapid liberalisation of their services markets than is currently contemplated.

Challenges for Hong Kong

It is generally believed that the Hong Kong Ministerial Conference has to agree on a specific package of reforms covering agriculture and NAMA if a worthwhile outcome to the Doha Round is to be achieved by the end of 2006. In relation to services, it is simply hoped that participants will agree to pursue more ambitious outcomes in 2006 and support the use of complementary approaches to the existing process of requests and offers.

It is not possible to know whether participants at Hong Kong will reach agreement on agriculture and NAMA. However it is possible to identify three issues that need to be considered in assessing the potential economic benefits of any agreements that are reached.

The first is the potential impact of any agreement on current applied tariff levels and, in the case of agriculture, current levels of expenditure on trade-distorting domestic support measures. This is important because agreements will involve reductions to bound tariff levels and baseline levels of domestic support and these are often much

higher than applied tariffs and current levels of spending.²⁰ The difference between bound and applied tariff levels is sometimes termed the 'water in the tariff' (Stoeckel and Reeves 2004, p. 29). The same term is also applied in the context of domestic support to the difference between commitment levels and actual spending.

If there is substantial 'water' in a country's tariffs, very large reductions in bound tariffs may be necessary before applied tariffs begin to be lowered. The same applies in relation to expenditure on domestic support. The potential economic efficiency gains from the Doha Round that were identified earlier in this article will only be realised if current distortions are reduced. If this is not achieved, the contribution of the Doha Round in relation to agriculture and NAMA will be limited to lowering ceilings on future increases in protection.²¹

The second issue relates to agriculture and concerns about the extent to which members will be permitted to designate 'sensitive' products that will be subject to lower tariff cuts. This is a key area of disagreement between the US (along with members of the Cairns and G-20 groups) and the EU (and G-10 countries). Because the products likely to be designated sensitive are presently characterised by high market access barriers (including TRQs), their exclusion in large numbers from the overall tariff reduction formula for agricultural goods would quickly reduce potential gains from agricultural liberalisation (although some benefits could still be realised if significant compensatory increases in the size of TRQs are able to be negotiated).²²

The third issue, which applies in relation to both agriculture and NAMA, concerns the extent to which agreements require major developing countries to reduce their own

20 According to one estimate, bound weighted average agricultural tariffs exceed actual applied weighted average agricultural tariffs by 93 per cent (developed countries), 129 per cent (developing countries) and 500 per cent (LDCs). To reduce the global actual average tariff by one third, it would be necessary to reduce bound rates for developed countries by at least 45 per cent, and up to 75 per cent for the highest tariffs (Anderson and Martin, 2005, pp. 1305 and 1313).

21 On the basis of 2001 subsidy levels, Anderson and Martin have estimated that a 75 per cent reduction in ceilings for 'amber box' support would only require the US to cut actual expenditure by 28 per cent and the EU to do so by only 18 per cent (2005, pp. 1313-4). In announcing a proposal for a 70 per cent reduction in 'amber box' support, EU Trade Commissioner Peter Mandelson stated that the proposal would 'in effect, bind in Geneva, internal reform already undertaken as part of the current CAP reform'.

22 Anderson and Martin (2005, p. 1314) state that many of the potential gains from Doha are likely to 'evaporate' if large numbers of sensitive farm products are quarantined from substantial tariff cuts. They estimate that welfare gains from agricultural reform would shrink by three-quarters if only 2 per cent of agricultural tariff lines in developed countries and 4 per cent of agricultural tariff lines in developing countries were subject to just a 15 per cent tariff cut.

levels of protection.²³ The growing importance of trade between developing countries (so-called 'South-South trade') means that they can make large gains by cutting their own agricultural and industrial tariffs. By the same token, an unwillingness to reduce their own tariffs will reduce their potential economic gains from the Doha Round. In addition, by agreeing to make their own substantial reductions in protection, major developing countries may be able to exert more pressure on developed countries to offer genuine improvements in market access, especially in relation to agricultural trade.

Conclusion

The outcome of the Hong Kong meeting will determine whether the Doha Round is able to be completed by the end of 2006 and whether it will deliver an agreement that will expand global trade. If the meeting is unable to agree on specific reforms to agriculture and NAMA, the Doha Round is likely either to collapse or proceed on a 'low road' towards an agreement involving only modest reductions in protection.

While it is to be hoped that the Hong Kong meeting can reach an agreement that boosts prospects for a successful conclusion to the Doha Round, a failure to achieve further significant liberalisation does not mean that the world will not continue to benefit from the existence of a rules-based trading system that limits protectionism and provides a mechanism to settle international trade disputes.

Countries can continue to pursue liberalisation within the overall WTO framework through reciprocal agreements with major trading partners.²⁴ These agreements have proliferated over the past decade (World Bank 2005b, p. 27). They are likely to become even more widespread if the Doha Round collapses or fails to deliver an ambitious outcome. Preferential trade agreements have the potential to deliver 'WTO plus' outcomes by reducing or eliminating tariffs and other obstacles to trade. They can also address issues such as investment and competition policy that have implications for trade but are not part of the Doha agenda. However, the potential benefits that may be derived from individual agreements must be weighed against their potential to divert international trade flows away from efficient producers and, on an aggregate basis, their potential to fragment the world trading system by creating a complex web of overlapping preferences. The principle of non-discrimination, under which tariff cuts

23 In the words of the World Bank (2004, p. 220), 'the overuse of non-reciprocity in previous market access negotiations has excluded developing countries from the major source of gain from trade liberalization – namely the reform of their *own* policies ... a willingness to pursue liberalisation at home is critical to increase developing countries' participation in global trade, particularly South-South trade, which is subject to significant barriers', (emphasis in original).

24 These are permitted under Article XXIV of the GATT and Article V of the GATS.

negotiated in a round are extended to all participants, was intended to overcome the problems caused by the extensive use of preferential trade arrangements in the period prior to World War II.

Finally, while the principle of reciprocity, as reflected in both multilateral and bilateral trade agreements, plays a valuable role in allowing countries to trade off 'concessions' with one another, it is widely acknowledged that significant economic benefits can be achieved by a country going it alone and lowering trade barriers without seeking immediate reciprocal concessions from others (Bhagwati 2002). As the World Bank notes, in the past 20 years unilateral tariff reductions by developing countries have been larger than reductions under the Uruguay Round and preferential agreements combined (World Bank 2005b, p. 27). It is therefore, just possible that in the absence of a multilateral trade negotiation round, all countries may be more willing to liberalise access to their own markets on a unilateral basis rather than maintaining current barriers as 'negotiating coin' for trade talks. However, it is also possible that a failure of the Doha Round to deliver an ambitious trade outcome could entrench protectionist attitudes in the years to come.

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Flat personal income taxes: systems in practice in Eastern European economies

Sue Piper and Carol Murphy¹

Several Eastern European economies have introduced flat personal income tax rates in recent years. The following article outlines the systems being used. There is no single flat personal income tax system, with most countries incorporating tax free thresholds and tax credits which add a degree of progressivity to the system as well as reducing simplicity. The countries adopting flat personal income tax systems also tend to have high levels of social security contributions and indirect taxation.

1 The authors are from Individuals and Exempt Tax Division, the Australian Treasury. This article has benefited from comments and suggestions provided by other Treasury officers. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

Introduction

The creation of newly independent nation states in Eastern Europe in the 1990s has brought new governments to power with opportunities to fully restructure their economies and rebuild their tax systems. Several of these governments have chosen to introduce 'flat', rather than progressive personal income tax rates.

This article describes the various types of flat personal income taxes, and how they have been introduced in some Eastern European countries.

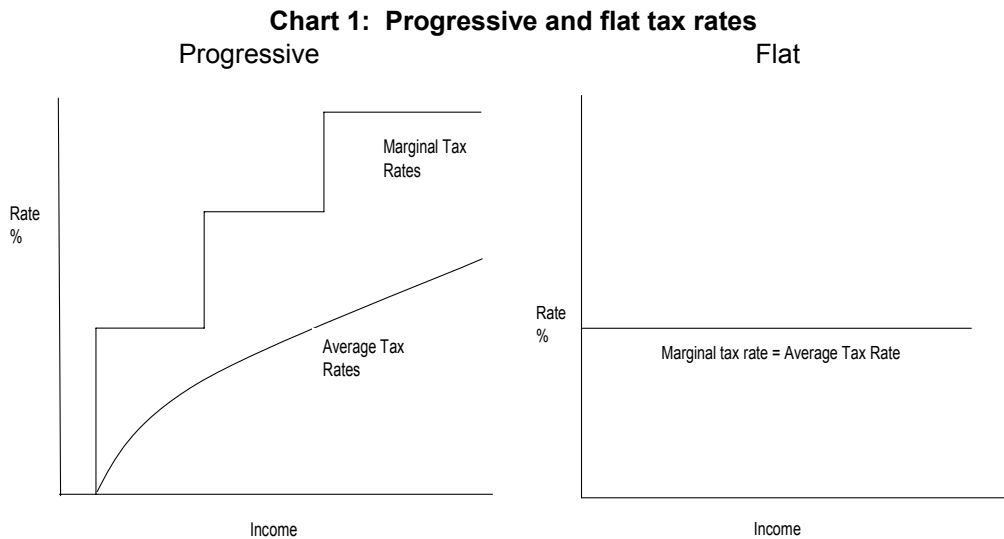
What is a flat tax?²

In its simplest form, a flat income tax describes a situation where income is taxed at the same percentage rate along the full range of income. For example, a flat tax rate of 10 per cent would result in a person with \$1,000 of taxable income paying \$100 in tax, and a person with \$50,000 of taxable income paying \$5,000 in tax. No tax free thresholds would exist. Marginal and average tax rates would always be the same; the tax would be strictly proportional.

Flat taxes are sometimes proposed as alternatives to progressive taxes. A tax is progressive if the average tax rate (the ratio of tax to income) rises when moving up the income scale. This is generally achieved by applying increasing marginal tax rates to a series of income brackets. A simple representation of flat and progressive taxes is shown in Chart 1 (see page 39).

The term flat tax is commonly used to describe any situation where there is a single marginal tax rate imposed on the given tax base. However, in practice there are many variations.

2 The term 'flat tax' can also refer to a form of expenditure tax (which taxes consumption rather than income) that has been advocated by Robert Hall and Alvin Rabushka.



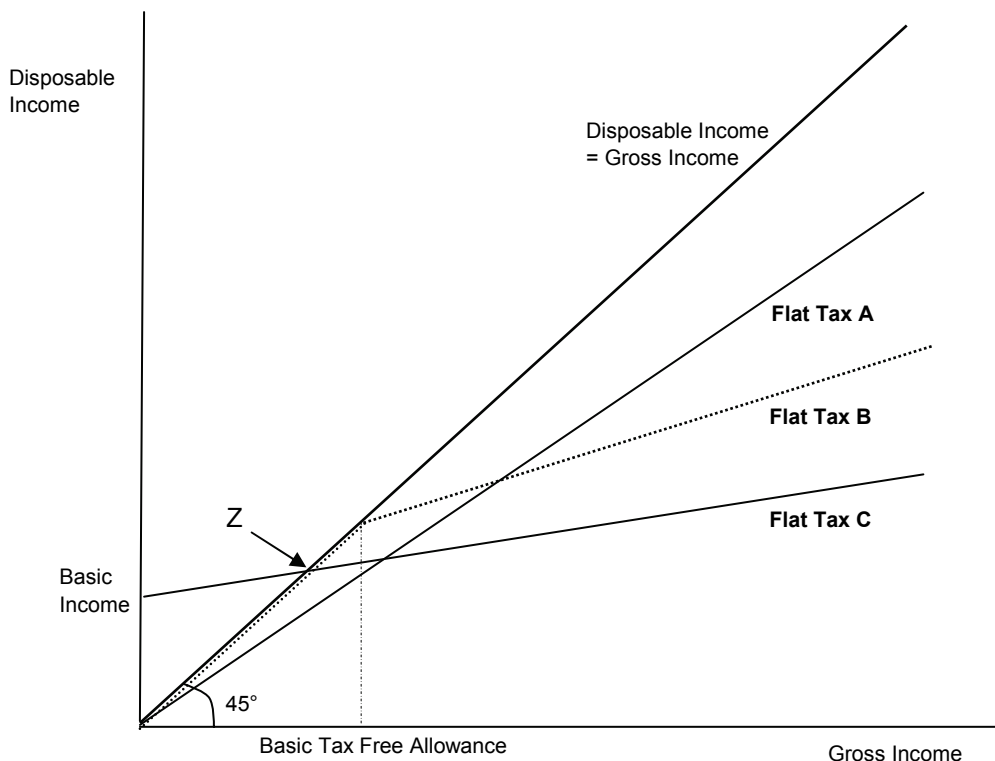
The OECD has identified different types of flat taxes, which vary in terms of their complexity.³ These are illustrated in Chart 2 (see page 40).

On Chart 2, the 45 degree line represents the points at which disposable income is the same as gross income, that is, no tax is payable. The area below this line represents points where tax is paid; and the area above this line represents points where disposable income is higher than gross income (where refundable income tax credits are paid, in order to provide a basic income).

- Flat tax type A is the simple or 'pure' flat tax, with all positive income taxed at a single flat rate.
- Flat tax type B is a flat rate tax, but it only applies to income above a tax free threshold (or basic allowance). Consequently, this is not a purely flat tax. The basic allowance adds progressivity and means that low income earners pay little or no tax. Average tax rates rise towards the (flat) marginal rate as income rises.
- Flat tax type C is a flat rate tax, with all taxpayers receiving a refundable tax offset which serves as a negative income tax for those at lower income levels. This is also not a purely flat tax. As Chart 2 shows, the offset is larger than tax liability at income levels below Z, so the balance is paid as a tax refund, lifting disposable income above gross income at income levels below Z.

3 Forthcoming OECD (2006).

Chart 2: Different types of flat taxes - an illustration



Source: Forthcoming OECD (2006).

The economies of Eastern Europe have tended to introduce personal tax systems along the lines of the type B model. Tax free thresholds and other credits have been introduced generally or for specific types of taxpayers.

Tax policy principles

The standard tax policy principles used to evaluate the potential effectiveness of a particular tax include: equity (fairness), efficiency (causing minimum distortions) and simplicity (easily understood). In practice, no single tax perfectly satisfies all these criteria, and each criterion will sometimes conflict with the others.

With regard to equity, two dimensions are usually considered in relation to tax: 'horizontal' and 'vertical'. Horizontal equity exists when taxpayers who are in the same economic circumstances are treated equally, while vertical equity exists when those with differing economic means are treated differently, that is, where individuals with a higher capacity to pay (measured in terms of higher incomes, wealth or expenditure) pay proportionally more tax.

A pure flat personal income tax would meet the horizontal equity axiom well in cases where all types of income were taxed at the same rate. However, as a pure flat tax system would impose the same rate of tax on high and low income earners, it would be unlikely to satisfy the vertical equity criterion. The imposition of a tax free threshold or a tax offset for low income earners would slightly improve the performance of a flat tax against the vertical equity criterion because it would result in average tax rates rising as incomes rose.

The efficiency criterion relates to the extent to which the tax system collects the necessary revenue without otherwise affecting economic behaviour. The concept of 'neutrality' is used to describe taxes which do not result in taxpayers altering their economic behaviour.

A pure flat income tax imposed at a low rate over a broad base should be relatively efficient. Taxpayers should be less likely to change their economic behaviour as there would be little scope to switch to other forms of lower taxed income. In addition, incentives to avoid taxation are reduced. However, distortions caused by tax free thresholds or tax concessions will compromise efficiency.

The simplicity criterion relates to how well taxpayers, policy makers and administrators understand the system and can comply with it. Compliance costs on taxpayers should be minimised and taxpayers should be able to readily understand the tax consequences of their actions.

Proponents of flat taxes often suggest that they are administratively simple. The imposition of a flat tax on a broad and clearly defined tax base should provide certainty for taxpayers. However, the addition of complications such as refundable tax offsets (for equity purposes), and the imposition of other income related taxes such as social security contributions will reduce simplicity.

Flat personal income taxes in Eastern Europe

The map below shows the location of most of the flat tax economies in Eastern Europe.

Map 1: Flat Personal Income Tax Economies in Eastern Europe



Some other economies outside of Eastern Europe have also adopted flat taxes. For example, since 1948, Hong Kong has operated a system in which taxpayers have the choice of either using the progressive rate scale or paying a flat rate of tax (currently 16 per cent) on their salary income. The Channel Islands of Jersey and Guernsey, and Bolivia, also use a flat personal income tax system.

Estonia was the first Eastern European nation to introduce a flat personal tax regime in 1994. This was followed by the other Baltic states; Lithuania (1994) and Latvia (1995). Russia flattened its personal income tax rates in 2001, followed by Serbia (2003), Slovakia (2004), the Ukraine (2004), Georgia (2005) and Romania (2005).

Why have flat taxes been adopted?

The Eastern European economies that have adopted flat personal income tax systems have tended to share more than just geographical proximity. Prior to tax reforms, the tax systems in several of these economies were not generating sufficient revenue to finance needed government expenditure. The general issues that prompted significant reforms in some of these economies included:

- compliance with the tax system. Tax administration in some economies was extremely weak, with significant informal economic activity outside the tax system. For example, the shadow economy has been estimated to have accounted for around half of total economic activity in Georgia and in the Ukraine in 1994-95.⁴ The absence of withholding systems in some countries also made tax compliance difficult, and penalties for non-compliance were also variable;
- complexity. In some economies, a wide range of taxes at various rates, combined with poor public education, made it difficult for taxpayers to understand their tax obligations; and
- some of the countries which have recently switched to flat personal income tax systems have joined, or are expected to join, the European Union, and have undertaken broader tax reforms in order to conform with European Union requirements. For example, Estonia and Slovakia have harmonized important elements of their tax system with European Union tax law, including direct taxes, mutual assistance, administrative cooperation and Value Added Tax (VAT).⁵

As Table 1 shows (see page 44), many of the flat personal income tax countries also levy consumption taxes and social security contributions, which often apply at relatively high rates.

Social security contributions are compulsory payments by employees and/or employers, which are generally levied at a flat rate on labour income, sometimes up to a maximum limit. Social security contributions are levied in many European countries (unlike Australia), and in some countries these contributions are the main element of the tax burden on labour.

4 Ivanova, Keen & Klemm (2005), page 42.

5 *European Tax Surveys* (2005); Moore (2005).

Table 1: Summary of sample flat personal tax regimes in Europe

| Country | Year flat tax introduced | Personal income tax rate | Company tax rate | Consumption tax/VAT rate | Tax free threshold (Approximate \$A equivalent) | Social security contributions |
|----------|--------------------------|--------------------------|------------------|----------------------------|---|---|
| Estonia | 1994 | 24% | 24% ⁶ | 18%, but 5% on some items | 20,400 EEK (A\$2,092) | Contributions of 1% by employees, 33.5% by employers. ⁷ |
| Russia | 2001 | 13% | 24% | 18%, but 10% on some items | Up to 4,800 RUB (A\$227) | Contributions apply at marginal rates of up to 26% by employers ⁸ |
| Serbia | 2003 | 14% ⁹ | 10% | 18%, but 8% on some items | Up to CSD 98,664 (A\$1,831) in 2004 | Contributions of 17.9% by employees, 17.9% by employers ¹⁰ |
| Slovakia | 2004 | 19% | 19% | 19% | 87,936 SKK (A\$3,623) | Contributions of up to 13.4% by employees, up to 38.3% by employers ¹¹ |
| Ukraine | 2004 | 13% | 25% | 20% | 131 UAH (A\$36) per month if income is less than 570 UAH (A\$155) per month | Contributions of up to 3.5% by employees, up to 50.6% by employers ¹² |
| Georgia | 2005 | 12% | 20% | 18% | Nil | Contributions of 20% by employers ¹³ |
| Romania | 2005 | 16% | 16% | 19%, but 9% on some items | Variable to 2.5 million ROL (A\$109) | Contributions of up to 17% by employees, up to 46.75% by employers ¹⁴ |

Sources: *European Tax Surveys* (2005); IMF (2005) Country Report No. 05/113 (for Georgia); USAID (2005) (for Georgia).

6 Estonian companies are subject to the 24 per cent tax rate on distributed profits only (no tax is levied on retained profits).

7 For further details of Estonia's social security contributions, see 'Box 1: Estonia' on page 45.

8 For further details of Russia's social security contributions, see 'Box 2: Russia' on page 46.

9 Serbia levies an additional personal income tax of 10 per cent at incomes above 986,640 CSD (A\$18,306) (in 2004).

10 Serbian employers make social security contributions, based on gross wages, of 11 per cent for pension and disability insurance, 6.15 per cent for health insurance and 0.75 per cent for unemployment insurance. Employees make contributions at the same rates (withheld by employers).

11 For further details of Slovakia's social security contributions, see 'Box 3: Slovakia' on page 48.

12 Ukrainian employers make social security contributions on behalf of employees, based on payroll, of 32.3 per cent for the pension fund, 2.9 per cent for social insurance, 1.6 per cent for employment assistance and between 0.84 and 13.8 per cent for accident and occupational disease insurance, subject to certain limits. Employees make contributions, based on total salary, of between 1 and 2 per cent to the pension fund, between 0.5 and 1 per cent for employment assistance and 0.5 per cent for social insurance, subject to certain limits.

13 For further details of Georgia's social security contributions, see 'Box 4: Georgia' on page 49.

14 Romanian employers make social security contributions, based on gross salaries, of between 22 and 32 per cent for general contributions (up to certain limits), 7 per cent for health insurance, 3 per cent for the national unemployment fund, between 0.5 and 4 per cent for the work accident and professional disease fund, and 0.25 or 0.75 per cent to the Territorial Labour Inspectorate. Employees make contributions of 9.5 per cent for general contributions (up to certain limits), 6.5 per cent for health insurance and 1 per cent to the national unemployment fund.

A flat headline personal tax rate does not necessarily mean that the whole tax system is simple. All of the Eastern European countries with flat taxes illustrated in Table 1 have social security taxes that add to the complexity of the overall tax system faced by individuals. Social security taxes, and the use of personal allowances to provide tax free thresholds for certain individuals, have to be taken into account before making judgements about overall simplicity.

Boxes 1, 2, 3 and 4 provide details on the tax reform packages adopted by four countries in Eastern Europe. These examples demonstrate that there has not been a consistent or standard flat tax model. Georgia is the only one of these countries to have adopted a pure flat tax with no tax free threshold. Most economies have added progressivity to some degree through the granting of tax free thresholds or tax credits for some or all members of society, and have generally introduced flat personal income taxes in conjunction with broader tax or economic reforms.

Box 1: Estonia

Estonia was the first country in Eastern Europe to introduce a flat personal income tax in 1994, initially at a rate of 26 per cent.

Following these reforms, the Estonian tax system was considered to be relatively transparent, simple and efficient.¹⁵

Employers pay social security contributions on payments made to their employees at a rate of 20 per cent for social insurance, 13 per cent for health insurance and 0.5 per cent for unemployment insurance. Employees are required to pay social security contributions for unemployment insurance at a rate of 1 per cent (this is withheld by the employer). Estonia's VAT rate is generally 18 per cent.

Personal income tax makes up around 19.1 per cent of total tax revenue, being exceeded by the share of social security contributions at 34.0 per cent and VAT at 27.2 per cent.

The Estonian government announced in December 2003 that it would reduce the flat tax rate for individuals and companies over time, from 26 per cent to an eventual 20 per cent, with the tax free threshold also increasing.

Sources: *European Tax Surveys* (2005); IMF (2000) *IMF Survey*; IMF (2004) Country Report No. 04/358; IMF (2005) Country Report No. 05/394.

15 IMF (2000) *IMF Survey*.

Box 2: Russia

After winning the Presidential election in 2000, Russian President Vladimir Putin introduced wide ranging tax reforms, which included the introduction of a flat personal income tax rate of 13 per cent in 2001. The objectives were generally to make the tax system fairer, simpler, more stable, more predictable and more efficient. Prior to the reforms, tax evasion was widespread, particularly amongst high income earners, and hence improvements in compliance were a critical element of the reform.

The single 13 per cent rate replaced a progressive schedule with rates of 12, 20 and 30 per cent, various exemptions from tax were eliminated, social security contribution rates were reduced, and the maximum tax free threshold was increased. Subsequently, personal income tax revenue increased, which led to suggestions that the lower rate had resulted in increased revenue. However, it has been estimated that the average effective tax rate (inclusive of social security contributions) only fell by 2.5 per cent; from 34.6 per cent down to 32.1 per cent, and hence the average tax cut was quite modest. An alternative view is that the growth in personal income tax revenue was largely driven by increases in real wages, which were unrelated to the tax reforms.¹⁶

Employers currently pay social security contributions on payments made to their employees at marginal rates of between 26 per cent and 2 per cent (lower marginal rates apply at higher levels of payment). Russia's VAT rate is generally 18 per cent.

Personal income tax makes up around 9.6 per cent of total tax revenue, being exceeded by the share of social security contributions at 15.9 per cent and VAT at 15.4 per cent. Customs tariffs amount to 20.1 per cent of total tax revenue, and resource extraction tax amounts to 10.5 per cent of total tax revenue.

Personal income tax receipts are distributed to the regional governments.

Sources: *European Tax Surveys* (2005); IMF (2004) Country Report No. 04/316; IMF (2005) Country Report No. 05/377; IMF (2005) *IMF Survey*; Ivanova, Keen & Klemm (2005).

As shown in Table 2 (see page 47), personal income tax is not the most significant form of taxation in many flat tax economies. Social security contributions are often charged at a higher percentage rate and make a significantly larger contribution to total tax revenue than personal income taxes. When combined with the personal income tax rate, social security taxation means that the tax burden on individuals is often higher than suggested by the low 'headline' personal rate.

Indirect taxes also remain an important source of revenue in these economies. In some countries, tax revenue from VAT and excise is high, and continuing to increase, while

16 Ivanova, Keen & Klemm (2005).

personal tax rates fall. In some cases, this has been due to requirements for European Union membership.

Table 2: Tax revenue in sample flat personal tax countries

| Country | Total tax revenue as a percentage of GDP (includes social security contributions) | Personal income tax revenue as a percentage of tax revenue | Social security tax revenue as a percentage of tax revenue | VAT as a percentage of tax revenue |
|-----------------------------|---|--|--|------------------------------------|
| Estonia (2005 projection) | 32.4 | 19.1 | 34.0 ¹⁷ | 27.2 |
| Russia (2005 projection) | 40.8 | 9.6 | 15.9 | 15.4 ¹⁸ |
| Serbia (2005 projection) | 37.9 | 13.7 | 27.7 | 32.5 |
| Slovakia (2005 budget) | 30.5 | 7.9 | 43.0 | 27.5 |
| Ukraine (2004) | 27.5 | 14.5 | 33.5 | 15.6 |
| Georgia (2005 IMF program) | 18.1 | 12.7 | 11.0 | 41.4 |
| Romania (2005 draft budget) | 28.6 | 10.5 | 32.9 | 25.5 |

Sources: IMF (2005) Country Report No. 05/394 (for Estonia); IMF (2005) Country Report No. 05/377 (for Russia); IMF (2005) Country Report No. 05/233 (for Serbia); IMF (2005) Country Report No. 05/71 (for Slovakia); IMF (2005) Country Report No. 05/417 (for Ukraine); IMF (2005) Country Report No. 05/314 (for Georgia); IMF (2004) Country Report No. 04/319 (for Romania).

17 Includes Estonia's social security tax, medical insurance tax and unemployment insurance tax.

18 In addition, Russia has a high level of customs tariffs, amounting to 20.1 per cent of tax revenue, and resource extraction tax amounts to 10.5 per cent of tax revenue.

Box 3: Slovakia

Slovakia introduced comprehensive reforms to its taxation and welfare systems in 2004, including a flat rate of 19 per cent tax on personal income, corporate income and VAT. Slovakia is the only 'flat tax country' of Eastern Europe that is a member of the OECD, and the only one to introduce the same flat rate on personal, company and consumption taxes.

The objectives for the tax reform programme were to attract investment, eliminate existing weaknesses and distortions and improve the fairness of the tax system. The reform was designed to be revenue neutral, with tax reductions in personal income tax and corporate income tax being broadly compensated for by increases in VAT. High unemployment was also a motivation for the Slovakian reform package, with an unemployment rate of 17.5 per cent in 2003, of which around 60 per cent was considered to be long term unemployment.¹⁹

Slovakia's tax free threshold was more than doubled as part of the reforms, and is now 19.2 times the minimum monthly subsistence. This threshold is currently SKK 87,936 in annual terms (around A\$3,623). In addition, taxpayers may also receive tax allowances for dependent spouses, and there is a refundable tax credit for dependent children.

Employees are required to pay social security contributions at a rate of 4 per cent for pension insurance, 4 per cent for health insurance, 3 per cent for disability insurance, 1.4 per cent for sick leave insurance and 1 per cent for unemployment insurance, up to certain limits (these contributions are withheld by the employer). Employers are required to pay social security contributions on behalf of employees, based on gross remuneration excluding fringe benefits, at a rate of 14 per cent for pension insurance, 10 per cent for health insurance, 3 per cent for disability insurance, 1.4 per cent for sick leave insurance, 1 per cent for unemployment insurance, between 0.3 and 2.1 per cent for accident insurance, 0.8 per cent for injury insurance, 4.75 per cent to the reserve fund and 0.25 per cent to the guarantee fund, up to certain limits. They are also required to make a contribution to the social fund, which varies between 0.6 per cent and 1 per cent of the payroll. Slovakia's VAT rate is 19 per cent.

Personal income tax makes up around 7.9 per cent of total tax revenue, being exceeded by the share of social security contributions at 43.0 per cent and VAT at 27.5 per cent.

The OECD has noted that overall taxes on labour remain high in Slovakia.

Sources: *European Tax Surveys* (2005); IMF (2005) Country Report No. 05/71; OECD (2005) Paper ECO/WKP(2005)35; OECD (2005) *Statistical Profile of the Slovak Republic*.

19 OECD (2005) *Statistical Profile of the Slovak Republic*.

Box 4: Georgia

Georgia has introduced comprehensive tax reform aimed at improving the business climate, establishing favourable conditions for investment, simplifying tax procedures and legalising the shadow economy. Commencing on 1 January 2005, a flat personal income tax rate of 12 per cent was imposed; there was a reduction in the social tax rate from 33 per cent to 20 per cent; and a reduction in the VAT rate from 20 per cent to 18 per cent (this applied from 1 July 2005).

To help offset the revenue loss, excise rates were increased, the tax base was broadened for the VAT and profit taxes, and administration was significantly enhanced.

The personal tax system is a 'pure' flat tax system, in that there is no tax free threshold. Under the old system a tax free threshold of 3,000 GEL applied.

Employers are required to pay social security contributions on behalf of employees, based on wage income, at a rate of 20 per cent for social tax. Georgia's VAT rate is 18 per cent.

Personal income tax makes up around 12.7 per cent of total tax revenue, being exceeded by the share of VAT at 41.4 per cent. Social security contributions make up 11.0 per cent of total tax revenue.

Of Georgia's 1.8 million population, 1.2 million are self-employed. Under the new tax regime, self-employed people who do not employ any other labour are exempt from income and social tax.

The IMF has noted there has been an impressive rise in Georgia's tax revenue sparked by improvements in tax administration. This has involved reorganising the Tax Department, strengthening Taxpayer Inspectorates, and establishing the Financial Police. Customs administration has also improved. A one-time write off of any undeclared taxes outstanding as of 1 January 2004 was also provided to encourage tax compliance.

Sources: IMF (2005) Country Report No. 05/113; IMF (2005) Country Report No. 05/314; USAID (2005).

Conclusion

When evaluating personal income tax rates between countries, caution needs to be applied as different countries impose additional taxes on labour income, for example through social security contributions. In this light it is important to examine the overall tax system in flat personal income tax countries, rather than just the headline flat tax rate, as social security contributions can be the main element of the tax burden on labour.

Flat personal income taxes: systems in practice in Eastern European economies

The economies that have introduced a statutory flat personal rate in Eastern Europe over the last decade or so have generally done so as part of reform packages designed to deal with issues such as tax compliance. Personal income tax is generally not the most significant form of taxation in many of these economies, making a comparatively small contribution to overall government tax revenues.

Overall, the personal income tax systems adopted in Eastern Europe in recent years have not been 'pure' flat tax systems, given the utilisation of tax free thresholds and tax credits, which add an element of progressivity, especially at lower income levels. These economies also tend to have high levels of social security contributions and indirect taxation.

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Australian Treasury submission to the Agriculture and Food Policy Reference Group

This article summarises a submission by the Australian Treasury to the Agriculture and Food Policy Reference Group (AFPRG).¹ The AFPRG was commissioned in March 2005 by the Minister for Agriculture, Fisheries and Forestry, the Hon Warren Truss MP to develop broad recommendations to improve the profitability, competitiveness, and sustainability of the Australian agricultural and food sectors.²

The submission identifies key economic influences that will affect the sector over the next 10 to 15 years. Cyclical factors such as the drought and the strong Australian dollar are likely to remain relevant in the near term. However, longer term issues such as the declining terms of trade in the farm sector, international developments, demographic change and environmental issues are likely to be more relevant to policy. Each of these factors will create both opportunities and challenges for the agriculture and food sectors.

1 The full version of the Australian Treasury submission to the AFPRG is available at http://www.agfoodgroup.gov.au/publications/australian_treasury.pdf.

2 Further information on the AFPRG can be found at <http://www.agfoodgroup.gov.au>.

Introduction and economic context

The agriculture sector is subject to rapid and constant change and may be substantially different in 10 to 15 years time to what it is today. However, most of the influences that will drive this change are not unique to the agriculture and food sectors and will therefore occur in the context of significant changes in the economy more broadly. Therefore, to ensure the long-term sustainability of the agriculture and food sectors, policy should be set with an understanding of the broader economic context within which the sectors operate.

Currently Australia benefits from a sound, medium-term framework for macroeconomic policy, which has enhanced the economy's resilience to external shocks and contributed to over a decade of macroeconomic stability. Microeconomic reform, including Australia's floating exchange rate, industrial relations reforms and competition policy, have also contributed by facilitating the movement of labour and other resources between industries.

Short-term challenges facing the agricultural and food sectors

Two short-term challenges for the agricultural sector are the recent drought and the current relatively high value of the Australian dollar.

Although not uncommon events, droughts affect agricultural production and economic performance and can harm long-term profitability if not well managed. The current drought has had a severe impact on the Australian economy. In addition, drought can have a devastating impact on individuals and affected communities. Even after drought breaks, the agriculture sector will continue to experience consequences since herds will need to be rebuilt and the depleted water storage will continue to affect production.

The relatively high Australian dollar reflects, to some extent, developments in the non-rural commodity price cycle. Sustained global economic growth, particularly in the USA and China, has seen a significant increase in demand for non-rural commodities such as oil, iron ore and coal. Such increases in world commodity prices have generally been accompanied by an appreciation of the Australian dollar.

Looking ahead, Australia's climate will remain highly variable and droughts will continue to occur. Similarly, it is reasonable to expect that international commodity price cycles will continue to influence the Australian dollar. Like other business risks, it will be important that these risks are managed. In general, individual farmers are best placed to make assessments about the risks facing their farm business and how to manage these in light of their individual circumstances and preferences.

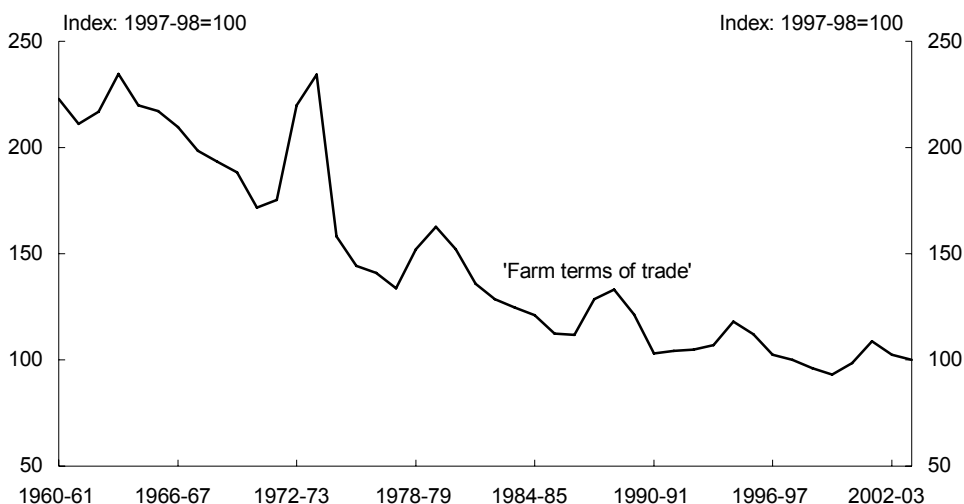
Long-term developments likely to affect the agricultural and food sectors

In the near term, cyclical factors such as the drought and the strong Australian dollar are likely to continue to have an adverse impact on the agriculture and food sectors. However, as policy settings generally last beyond the duration of these effects, it is important that policy does not focus unduly on the short term, but takes into account longer term trends such as the declining terms of trade in the farm sector, international developments, demographic change and environmental issues.

Farmers' terms of trade and international developments

The farm sector has for a number of years faced a long-term decline in farm output prices relative to farm input costs, as can be seen in Chart 1. This ratio is sometimes referred to as the 'farm terms of trade'. This decline reflects the fact that the prices of farm inputs have been rising faster than the prices received for rural commodities (Department of Agriculture, Fisheries and Forestry 2005).

Chart 1: Farm output prices relative to input costs — the 'farm terms of trade'^(a)



Source: Australian Bureau of Resource Economics, *Australian Commodity Statistics 2004*.

(a) This represents the ratio of an index of prices received by farmers to an index of prices paid by farmers.

World growth has been consistently stronger than anticipated in recent years. To the extent that strong economic growth implies increased global demand for agricultural products, there may be opportunities for Australian producers to benefit from higher international prices or through capturing market share in new export markets. This will especially be the case if Australian producers can identify and fulfil the particular demands of consumers in these markets.

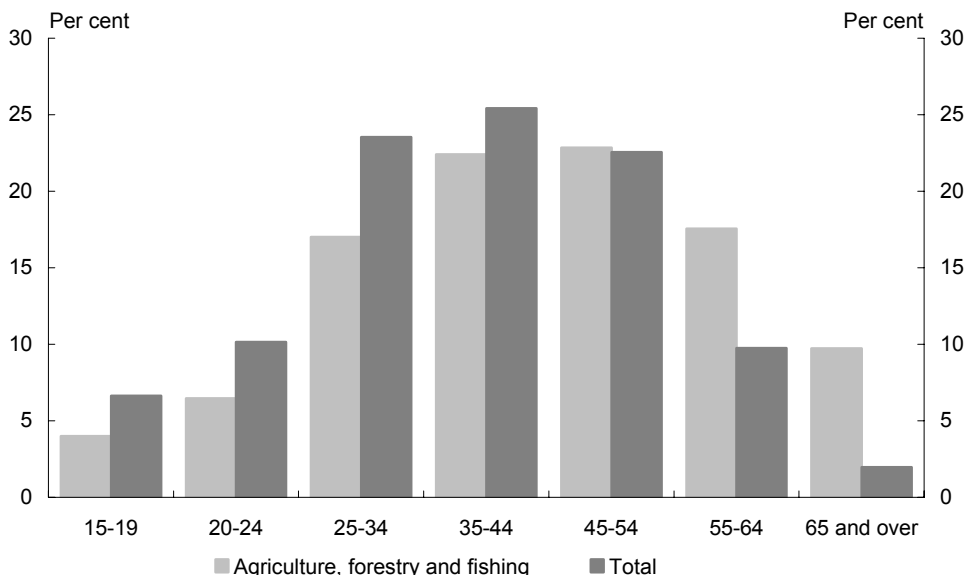
While strong world economic growth is likely to create opportunities, it is also likely to pose challenges. As other countries become more efficient primary producers, competing Australian producers will face increasingly intense competition. Further, if supply to global markets increases as a result, it is likely that agricultural commodity prices will continue to decline, relative to other prices.

Australia’s demographic challenges

Over the next decade or so, Australia’s ageing population is likely to have significant impacts on the Australian economy. The comparatively older workforce in the agriculture, fisheries and forestry sector can be seen in Chart 2. At the time of the 2001 census, 50 per cent of people employed in the agriculture, fisheries and forestry sector were over 45 years of age, and 27 per cent were over 55, compared to just 34 and 12 per cent respectively of the total workforce.

Many people employed in the agriculture, fisheries and forestry sector aged 45 and over will leave the industry over the next two decades. Given the trend towards a decline in the number of new farmers and farm employees entering the industry, this exit due to age will need to be accompanied by increased productivity (output per worker) if production levels are to be maintained.

Chart 2: Age profile of workers in the agriculture, fisheries and forestry industry



Source: Australian Bureau of Statistics, 2001 Census of Population and Housing.

Generational change will create challenges within the agricultural and food sectors. For example, labour shortages are a risk if large numbers of experienced farmers or farm workers retire in a short period of time. Other challenges could relate to the retirement decisions of farmers who wish to continue living on the farm but are unable to pass the running of the farm onto their children.

However, demographic change also represents a potential 'once in a generation' opportunity to restructure and improve the productivity of Australia's agriculture and food industries. For example, the injection of new ideas could assist the sectors to innovate and achieve the structural change and productivity improvements that will be essential for long-term viability. It could also provide an opportunity to accelerate the rate of farm consolidation where this is economically desirable and where little has occurred to date.³

Environment and land use issues

While many of Australia's natural resources are renewable, there is a need to ensure that they are managed sustainably. The consequences of poor resource management practices have the potential to undermine the productive capacity of the agricultural and food industries both now and in the future.

Existing problems of dryland salinity and poor water quality in the Murray-Darling Basin illustrate the impact of previous land and water degradation on current production. It is likely that the agricultural sector will face further challenges of this nature as the consequences of poor practices in the past continue to emerge and where resource management practices remain unsustainable. While not easily quantifiable, the potential costs to production from unsustainable resource use are likely to be substantial.

It is therefore important that policy takes into account issues of resource access and pricing; trade in water and other resources; the role of regulation; public goods provision and inherent conflicting public and private interests; and broader social goals in relation to environmental sustainability and biodiversity.

³ Large farms typically achieve stronger productivity growth than smaller farms, partly because the benefits of new technologies can be greater for larger farms (Productivity Commission 2005).

Responding to opportunities and challenges

The importance of productivity growth

Productivity growth is central to the performance and international competitiveness of Australia's agriculture sector and to the economy more broadly. The productivity challenge facing the agriculture sector is no different to the choices that confront all other sectors of the economy. Changes in consumer tastes, technology and world markets mean that all sectors of the economy must evolve and adapt over time.

At the enterprise level, productivity growth involves producing more or better quality output with the same inputs or producing the same output with less inputs, and thus at lower cost. At the macroeconomic and industry levels, productivity growth is fostered by allowing resources such as capital, labour, land and water to move to the most productive activities. This may involve resources moving between different agricultural activities or changes in the mix of agricultural and other activities taking place within the economy.

Primary responsibility for achieving productivity improvements lies with individual farmers since they are best placed to assess the potential of specific changes on their particular farm. Individuals also have the greatest incentive to innovate since they receive a direct benefit if they can reduce their costs or achieve better prices for their product by better tailoring it to the needs and preferences of consumers. They are also best placed to take into account their own circumstances when making decisions that involve balancing the short-term risk that a potential productivity enhancement might fail against the longer term risk that they might become unviable if they don't change.

Government can also play an important role in maintaining and facilitating strong productivity growth over the longer term. However, historically, the bulk of assistance to the Australian agricultural sector was provided through a range of statutory marketing arrangements, regulations and price supports – policies which stifled competition, innovation and productivity. The gradual introduction of competition over the last two decades has given growers more marketing control over their products and enabled innovation and productivity improvements.

The objective of Government policy is to encourage competition, promote innovation, encourage better risk management, reduce regulation and business complexity and take into account possible impacts on the rest of the economy, now and in the future. One consideration that will remain relevant is the impact of agriculture on the environment and the future productivity of the resource base. In this regard, one challenge is how to design policies that will assist the future viability of agriculture through productivity improvement, while minimising environmental degradation and adverse impacts on the broader economy.

Industry assistance

Compared to other countries, government support provided to the agricultural sector in Australia is relatively low. Recent estimates from the Organisation for Economic Cooperation and Development (OECD) show that Australian assistance to agriculture (as a per cent of gross farm receipts) was around 4 per cent in 2003, which is markedly lower than the OECD average of 32 per cent.

However, while it compares favourably with the OECD, the Australian agricultural sector still receives a significant amount of assistance relative to other Australian industries. The agricultural sector benefits from an effective rate of assistance of 4.1 per cent of industry gross value added, including budgetary, tariff and regulatory assistance (Productivity Commission 2004). This is second only to the manufacturing sector.

When one sector receives special treatment such as subsidies or tax concessions, then the competitiveness of other sectors will be reduced since they will have to pay more taxes. Further, the supported industry will be larger than it would otherwise be and will therefore use more inputs such as labour and capital. For example, the Productivity Commission found that government subsidies to the ethanol industry raise the cost of wheat products, and so raise the cost of feed for the pork industry (Productivity Commission 2005). Such effects illustrate the need for agricultural policies to be evaluated within a long-term, economy-wide framework.

If assistance for an industry is considered necessary, it should be targeted at enhancing its long-term productivity. In practice, this is difficult since the provision of assistance to one sector can reduce productivity in other sectors. Similarly, it is important to avoid creating expectations that further assistance will be provided if productivity objectives are not met.

In addition to the efficiency losses that can result from assistance, there are also budgetary implications to be taken into account. Direct government payments for industry assistance either reduce the amount of government funds available for other areas of expenditure (such as health and education), or increase the tax burden, or do a combination of both. Like all sectors in the Australian economy, the agricultural sector will need to adapt as fiscal pressures intensify.

Trade

Government policy should also aim to promote increased international competition. The Australian agricultural sector is highly export-oriented – it is estimated that for the period 1997-98 to 1999-2000 around 64 per cent of Australia's agricultural production was exported (Department of Agriculture, Fisheries and Forestry 2005).

Future growth in Australian agriculture is likely to depend more on export markets than on the comparatively small domestic market.

Distortions and other barriers to trade can inhibit access to vital export markets. The Australian Government is committed to pursuing the removal of international trade barriers that preclude and restrict trade in agricultural products. Policies that promote free trade will be crucial to providing and improving access to international markets as well as ensuring Australian producers have access to competitively priced inputs.

The future of agriculture and food policy

The agriculture and food industry faces near-term pressures such as the drought and the relatively high Australian dollar. However, in the long term as these cyclical factors subside, the industry will face challenges such as the ageing of the population; the declining farm terms of trade; international developments; and environmental sustainability. Given this broader economic context, the viability of the industry depends on ongoing productivity improvement and increased international competitiveness.

In general, the policy settings that will allow the agriculture and food sectors to maximise their competitiveness and sustainability will be those which promote competition and innovation, reduce barriers to trade, encourage better risk management, address sustainable resource management and reduce regulation and business complexity. These policies should be determined with regard to their potential impacts on other sectors of the agricultural industry and the economy more broadly, including the natural resource base.

Given the importance of innovation and productivity improvement, it is important not to lock in existing practices or create other impediments to change. In this respect, the agricultural and food sectors will need to be increasingly flexible and adaptable to meet changing and often unpredictable circumstances.

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International comparisons of research and development

Graeme Davis and Gene Tunny¹

It is often argued that Australia's research and development (R&D) effort is low when compared with other OECD countries. While business expenditure on R&D in Australia appears relatively low, this is, to a significant extent, a result of Australia's industry structure. Also, it does not appear that policy towards business R&D is the main driver of R&D intensity. Countries with policies that promote R&D are typically not high R&D-spending countries. Finally, the relationship between R&D and more direct measures of innovation does not appear to be strong or stable across countries. R&D is one input into the process of innovation — the development of new products, services and business processes — that is a key driver of economic growth. Having lower levels of R&D expenditure does not necessarily mean a country is less innovative.

1 The authors are from the Macroeconomic Policy Division of the Australian Treasury. The article draws on previous research and analysis undertaken by Bryn Battersby and Robert Ewing. The article has benefited from comments and suggestions provided by fellow Treasury officers, including Greg Coombs, Ben Dolman, John Hawkins, Vanessa Laphorne, Janine Murphy, Paul O'Mara, David Parker and Jyoti Rahman. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

Introduction

One of the often-heard arguments in Australia is that, at around 1.6 per cent of GDP, R&D is low when compared with other OECD countries. This line of argument observes that R&D is important for innovation and economic growth in terms of both developing and absorbing new ideas.² There is a concern that if R&D is low then this will hold back innovation – the development of new products, services and business processes – and economic growth. Therefore, it is argued that Australia should have a higher level of R&D, with some suggestion that an appropriate target would be the OECD average of around 2.2 per cent of GDP or above.³

A number of R&D spending targets have emerged in OECD countries and the European Union (EU), as illustrated in Table 1.

Table 1: Examples of R&D spending targets

| Country/region | R&D intensity in 2002 (Per cent of GDP) | R&D target | Target date |
|----------------|--|-----------------------------------|-------------|
| European Union | 1.85 | 3.0 per cent of GDP | 2010 |
| Austria | 2.12 | 2.5 per cent of GDP | 2006 |
| Canada | 1.96 | Top 5 in OECD | 2010 |
| Germany | 2.53 | 3.0 per cent of GDP | 2010 |
| Hungary | 1.02 | OECD average | 2006 |
| Korea | 2.53 | Double national investment in R&D | 2007 |
| Norway | 1.67 | At least OECD average | 2005 |
| Spain | 1.03 | 1.4 per cent of GDP | 2007 |

Source: OECD (2004, 2005).

These targets are either expressed as a percentage of GDP in the country in question or relative to the OECD average, and are generally driven by the same logic outlined earlier – if a country does less R&D it will fall behind, and if it does more than the OECD average, it will make up ground or move ahead, in terms of economic growth. For example, the European target is focused on achieving the goal of turning the EU into ‘the most competitive knowledge-based society in the world by 2010’ (European Commission 2002). One obvious criticism of such targets is that, by definition, some countries have to be below the OECD average.

Not everyone sees this focus on R&D as appropriate, and it has been argued that it is being used, in some areas, as a substitute for real reform. For example, Martin Baily, a former chairman of President Clinton’s Council of Economic Advisers, has argued that

² See Dowrick (2003) for a discussion of how R&D might influence growth.

³ The OECD average is total R&D expenditure across the OECD as a percentage of overall GDP across the OECD.

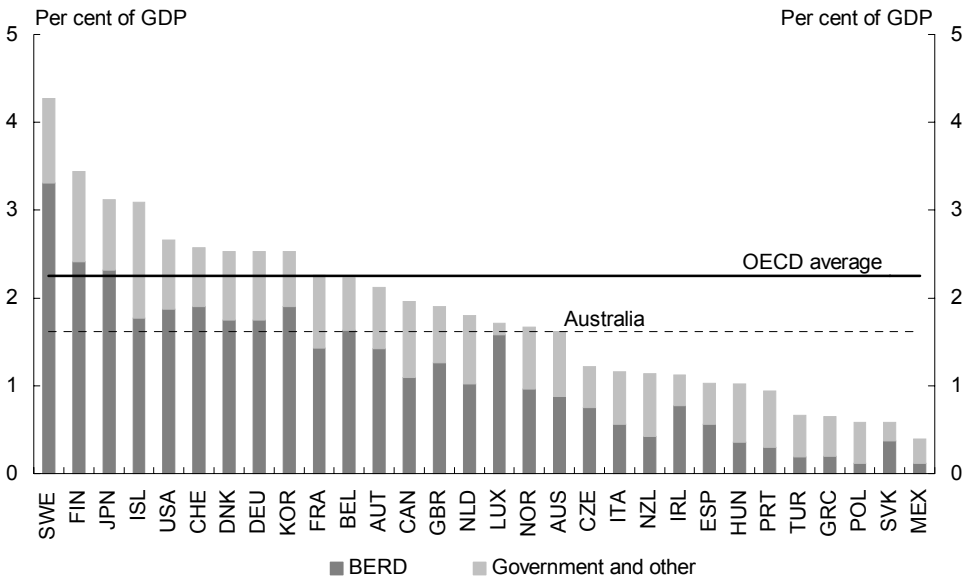
R&D alone is not sufficient to drive innovation and economic growth, but a competitive economy is necessary as well (Baily 2001).

This paper first considers how Australia’s R&D levels compare internationally. Then the extent to which R&D expenditure as a per cent of GDP may reflect a country’s particular industry structure is investigated. The paper then looks at the possible contribution of R&D policy to R&D differences across countries, followed by a brief consideration of why policy makers focus on R&D. Finally, the extent to which cross-country differences in R&D expenditures may be related to differences in levels of innovation is examined.

How do Australia’s R&D levels compare internationally?

Australian R&D expenditure as a per cent of GDP (R&D intensity) is relatively low when compared with the OECD average.⁴ This is true, whether looking at total R&D spending – Gross Expenditure on R&D (GERD) – or Business Expenditure on R&D (BERD) (Chart 1).

Chart 1: R&D intensities across the OECD, 2002



Source: OECD (2005) and ABS cat. no. 8104.0. Data are for 2002 or nearest available year.

Note: This chart uses updated BERD data for Australia for 2002-03 from ABS cat. no. 8104.0.

4 All international comparisons are subject to considerable uncertainty due to data limitations. Comparisons of R&D expenditures are no different. Nonetheless comparisons of R&D intensities continue to be made.

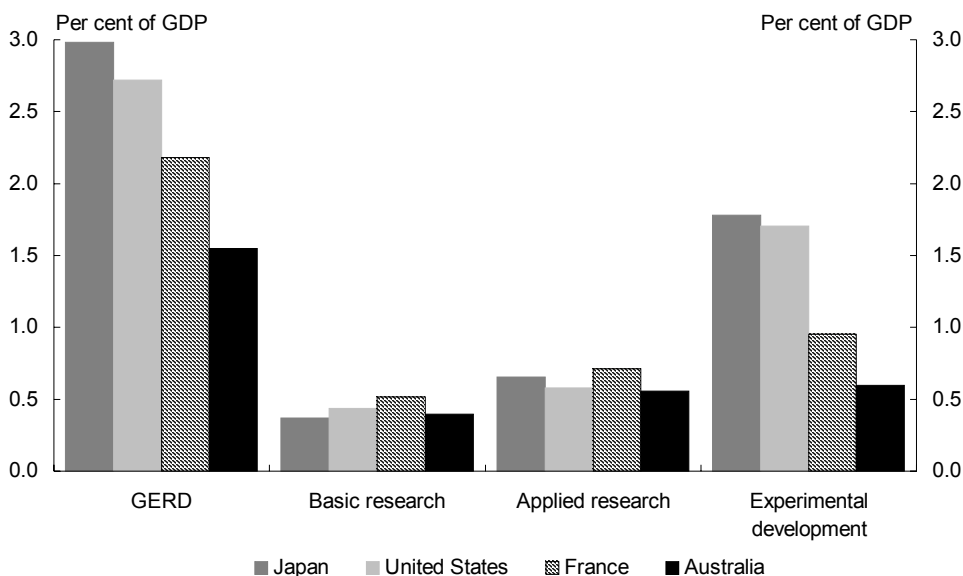
GERD is defined as total expenditure by all sectors – business enterprise, government, private non-profit, higher education – on R&D that is performed within the boundaries of the country. That is, overseas-funded R&D that is performed locally is included, but locally-funded R&D that is performed overseas is excluded (OECD 2002). BERD is that part of GERD where the expenditure on R&D is made, although not necessarily funded, by the business enterprise sector.

In 2002, Australia’s GERD intensity was 1.6 per cent of GDP compared with an OECD-average GERD intensity of 2.2 to 2.3 per cent of GDP. Australia’s BERD intensity in 2002 was 0.9 per cent of GDP compared with an OECD-average BERD intensity of around 1.5 per cent of GDP. In understanding the factors underlying these differences it is useful to consider R&D expenditures by activity type.

R&D expenditures by activity type

The OECD (1993) categorises R&D expenditures into three activity types: basic research; applied research; and experimental development (see Appendix 1 for definitions). Chart 2 shows GERD as a percentage of GDP broken down into these three components for Australia and three countries with higher R&D spending. As noted above, international comparisons should be interpreted cautiously, and even more so the further the data are broken down into smaller components.

Chart 2: R&D spending as a per cent of GDP, by group, 2000



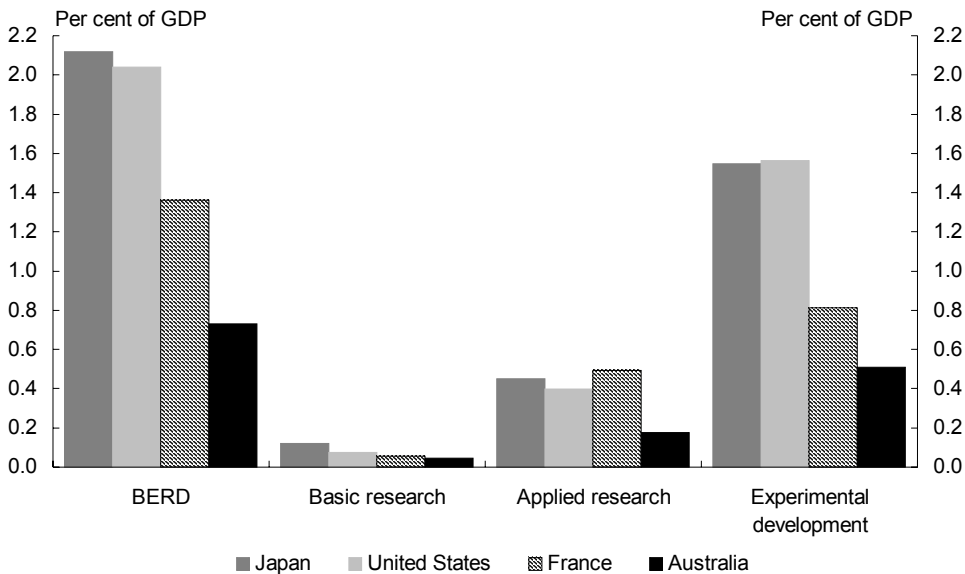
Source: OECD Research and Development Statistics database.

As Chart 2 shows, there is relatively little gap between Australia and the three higher spending countries in terms of basic and applied research, which together make up the

'R' of R&D. In 2000, Australia spent 0.95 per cent of GDP on basic and applied research, compared with 1.02 per cent in Japan and the United States, and 1.23 per cent of GDP in France.

However, the difference in expenditure on experimental development – the 'D' of R&D – is substantial, with Australia's expenditure being over 1 percentage point less than Japan or the United States. That is, Australia's R&D gap versus the United States is almost solely determined by expenditure on experimental development. This picture is confirmed when the R&D expenditure of business is considered (Chart 3).

Chart 3: Business R&D spending as a per cent of GDP, by group, 2000

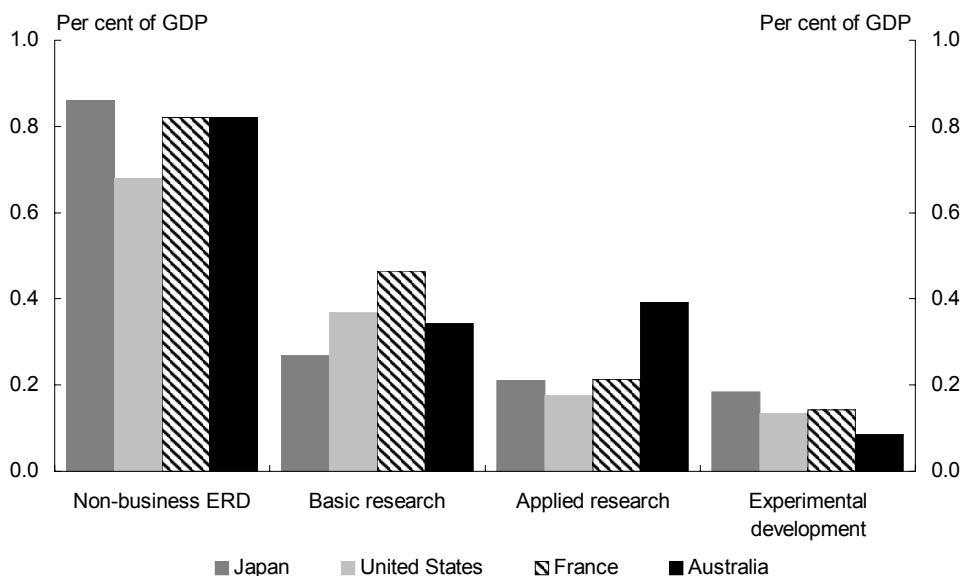


Source: OECD Research and Development Statistics database.

Business expenditure on R&D in Australia is low in all of the categories, but the absolute gap is smaller for the two research categories. Businesses in Australia spend around 0.2 per cent of GDP on basic and applied research by business, compared with 0.5 to 0.6 per cent spent by businesses in Japan, the United States and France. Also, business expenditure on experimental development is very low in Australia – less than a third of what the United States or Japan spends. It is clear that this accounts for the vast bulk of Australia's below-average R&D spending.

Australia's comparatively high non-business R&D spending on applied research (Chart 4), by government, non-profit, and higher education sectors, brings total applied research in Australia up to levels comparable with the other countries.

Chart 4: Non-business R&D spending as a per cent of GDP, by group, 2000



Source: OECD Research and Development Statistics database.

Note that total non-business R&D for Japan includes 0.2 percentage points of R&D not allocated into the three disaggregated types.

In summary, Australia’s lower R&D intensity is principally explained by lower applied research and experimental development by the business sector. This may be related to the nature of Australia’s industry structure. For example, experimental development might be higher in Japan and the US due, in part, to the larger relative size of industry sectors that undertake experimental development, such as vehicle manufacturing and electronics.

Does industry structure matter?

It has been recognised for many years that industry structure explains a lot of the difference in R&D intensities – both BERD and GERD – between countries. Different industries use R&D inputs more or less intensively. This variation occurs for a range of reasons, only some of which may be policy-related. For example, Sheehan and Wyckoff (2003) argue:

A country’s R&D intensity is largely a reflection of its industrial structure. Countries with high R&D intensities have a high share of their business R&D

and a significant part of their economic output in high-technology sectors.⁵ In Finland, Germany, Japan, Switzerland and the United States, these industries account for three-quarters or more of business-performed R&D. In low R&D-intensity countries, such as Norway and Australia, high-technology industries (and medium-high technology industries) account for less than 40 per cent – a fact that can be attributed to the natural resource endowments that these countries enjoy that affects their industrial structure. (Sheehan and Wyckoff 2003, page 20).

Sheehan and Wyckoff (2003) found that, for EU countries, meeting the EU targets for R&D would be unlikely to be achieved by increasing business R&D intensities within the existing industry structure. They argued it would require a significant change in industry structure. It is unclear what would drive such a change in industry structure, or why such a change would be considered desirable in a broader sense.

What about Australia? Hypothetically, if it was considered desirable for Australia to be at or above the OECD average, would it require either higher business R&D intensities within the existing industry structure, or a change in the industry structure, or both? The following analysis suggests that a change in industry structure would be required.

One way to consider the relationship between industry structure and business R&D intensity is to ask the following questions:

- If Australia operated in each industry sector at the business R&D intensities of large high-intensity countries, such as Japan or the United States, what would be the overall BERD intensity?
- If Australia operated at the highest business R&D intensities found in each industry sector across a range of countries what would be the overall BERD intensity?

In exploring these questions, the proportions of GDP spent on R&D in manufacturing, electricity, gas and water, and construction were looked at. Note that some industries with significant R&D – mining, for example – are not covered by the OECD ANBERD database.⁶ However, the industries for which comparative data are available cover the majority of BERD across the countries considered. In 1999 in the US, R&D in these sectors represented around 1.2 per cent of GDP (compared with BERD of around

5 As defined by the OECD, high technology industries include: pharmaceuticals (ISIC 2423), computing and office equipment (30); radio, television and communications equipment (32), scientific instruments (30), and aerospace manufacturing (353). Medium-high technology industries include: chemical products other than pharmaceuticals (24 less 2423); machinery and equipment (29); electrical machinery (31); automobiles (34); and railroad and other unclassified transportation equipment (352+359) (Sheehan and Wyckoff 2003, p. 20).

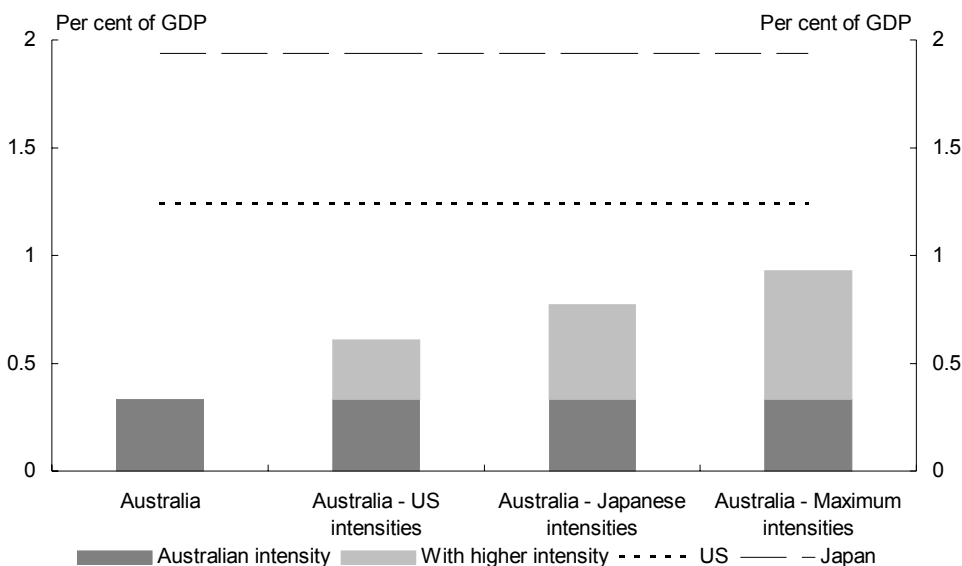
6 ANBERD stands for Analytical Business Enterprise Research and Development.

2 per cent of GDP), while for Australia this was 0.33 per cent of GDP (compared with BERD of 0.66 per cent of GDP in 1999).⁷

This exercise makes use of sub-industry data, with manufacturing sub-industries such as chemical and chemical products identified (see Appendix 2). This is important from an analytical perspective because the variation in industry structures is likely to be greater across countries when sub-industries are considered. For example, the sub-industry data may show that a country does not have high-technology manufacturing industries that undertake large amounts of R&D, even though industry-level data may show that the country has a significant manufacturing sector.

Business R&D intensities in 15 sub-industries were calculated for the United States, Japan, France, Germany, Italy and Canada. These intensities were then applied to Australia’s industry structure to see what difference they would make (Chart 5). That is, Australia’s industry structure was held constant, while the BERD intensities in sub-industries were adjusted to the levels seen in other countries.

Chart 5: R&D in manufacturing, electricity, gas and water, and construction as a per cent of GDP, 1999



Source: Australian Government Treasury calculations based on OECD ANBERD and STAN databases.

If Australia were hypothetically to achieve US business R&D intensities in these sectors it would only imply an increase in business R&D spending in Australia from 0.33 to

⁷ There are more than a few data issues in exploring this question. The approach taken is outlined in Appendix 2.

0.61 per cent of GDP – still less than half the US intensity. If Australia adopted Japanese intensities, spending would move up to 0.77 per cent of GDP – again less than half of the Japanese intensity of around 2 per cent of GDP. If Australia adopted the highest intensities found in the sample in each industry for any country, spending would move up to around 0.9 per cent of GDP, moving Australia above Canada (0.7 per cent) but remaining below France and the United States (both at around 1.2 per cent).

It is likely that the broad conclusions of this analysis would remain unchanged if there were BERD data available for all sub-industries, and not just those in manufacturing, construction, and electricity, gas and water. In part, the importance of these exclusions can be tested by looking at only that proportion of GDP covered by these sectors.⁸

When the R&D numbers are run against GDP generated in manufacturing, electricity, gas and water, and construction, the story remains similar. The adoption of either US or Japanese intensities would still leave a significant gap in aggregate business R&D intensities between Australia and other countries. Similarly, when the highest intensities across the sample of countries in each sub-sector are applied to Australia's industry structure, the aggregate business R&D intensity in Australia still remains below those of France, Japan and the US.

Industry structure, policy and R&D

Clearly, a major factor behind observed outcomes for R&D expenditures as a share of GDP is industry structure. Industry structures reflect a complex set of factors including geographic location, natural endowments, history and economic policy. Historically, government purchasing decisions have also influenced industry structures – the development of aviation and computer software industries in the US being examples (Lipsey and Carlaw 2002). Nonetheless, the influence of contextual factors means that industry structures are likely to change only gradually over time.

Australia is one of the most remote developed economies in the world, with a small population and a vast internal geography. In addition, Australia has many natural endowments – resource deposits and climatic conditions, for example – and historical linkages that will, to some extent, shape the industry structure. These factors are not static – they change over time in both an absolute and relative sense, although such changes are likely to be very gradual.

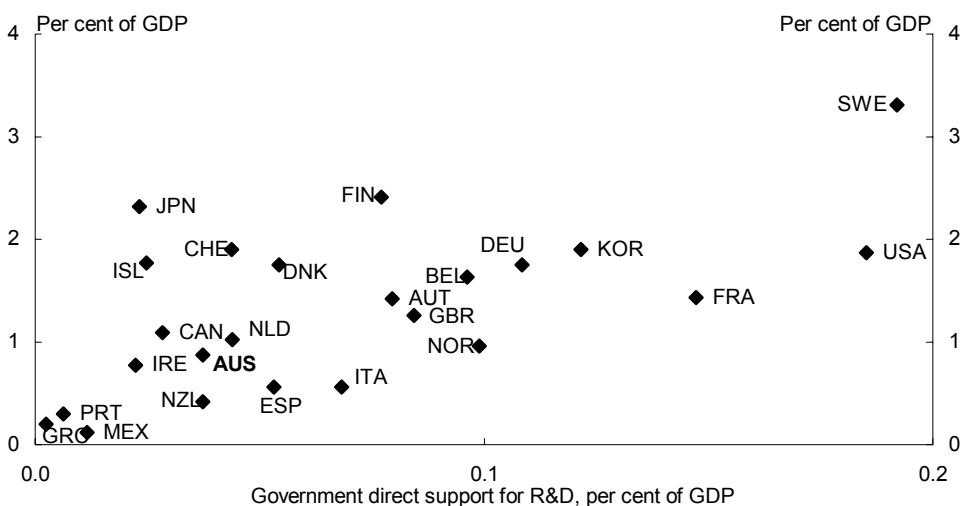
⁸ More precisely, the proportion of Gross Value Added accounted for by these industries was examined.

Thus policy can influence R&D in two ways. Through creating a policy environment in which firms have incentives to innovate, policy may increase the returns to R&D and the amount of R&D undertaken. There is significant evidence that competition is strongly related to innovation and productivity growth (Baily 2001; Baily and Gersbach 1995). Alternatively, policy can directly influence R&D through direct funding of R&D or through tax concessions that favour R&D expenditures.

The role that policy plays in directly influencing R&D expenditure might be secondary to the roles that context and industry structure play. There are some OECD data available that allow a preliminary investigation of the direct role of policy in influencing R&D.

Chart 6 presents a plot of BERD intensity and government direct support for BERD as a per cent of GDP. Government direct support comprises a mixture of grants and contracts with the private sector for activities with an R&D component. Australia provides relatively little direct support for BERD as a percentage of GDP compared with other OECD countries. In part, this reflects policy choices made by governments and, in part, might reflect the existing mix of firms in the economy. It is evident from Chart 6 that there is at most only a very loose correlation between the level of direct government support for BERD and the level of BERD as a share of GDP.

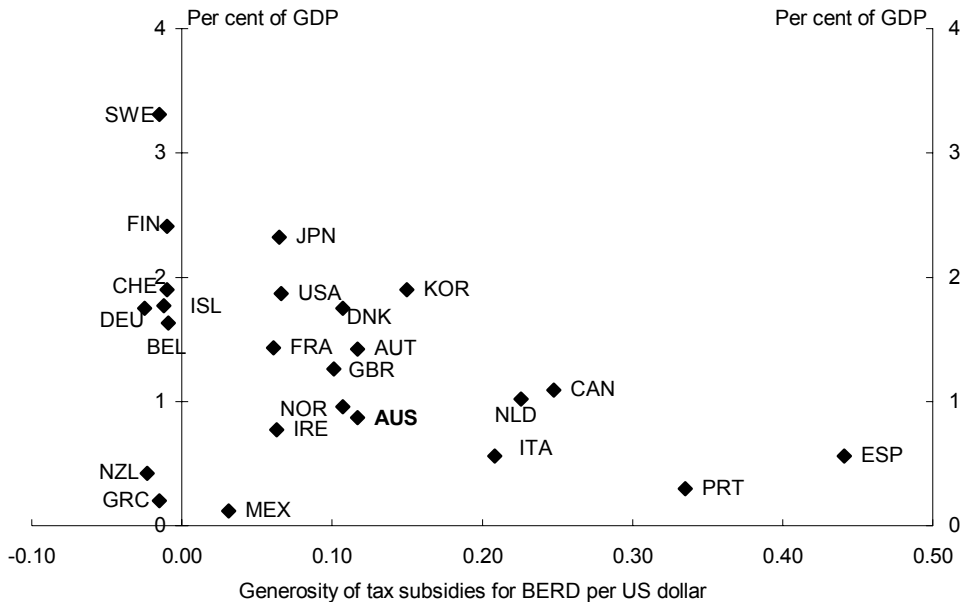
Chart 6: BERD as a per cent of GDP and government direct support for R&D, 2002



Source: OECD (2005).

In contrast to direct support, Australia has relatively generous tax concessions supporting BERD when compared with other OECD countries.⁹ It is also worth noting that some of the countries traditionally used as examples of high R&D-spending countries, particularly Japan, have tax systems that provide little if any support for R&D, and certainly less than Australia. Chart 7 plots BERD intensity against the generosity of the tax system to R&D expenditures.¹⁰

Chart 7: BERD as a per cent of GDP and generosity of tax subsidies, 2002



Source: OECD (2004, 2005) and ABS cat. no. 8104.0.

Notes: Government support for R&D is calculated as 1 minus the B-index for 2001. Further information can be found in Warda (2001). Note that the 2004 generosity figure for Australia is used due to the 2001 figure being over-estimated, as discussed in OECD (2005, p. 214, fn. 2). Generosity of tax subsidies for Canada, Italy, Japan, Netherlands, Norway and the UK was calculated as the average of the generosity of tax subsidies for small to medium enterprises and large enterprises.

The lack of any distinct correlation between the indicators in Charts 6 and 7 and the BERD intensities of these countries is consistent with the discussion above that there are other major forces at work that determine industry structures and consequent spending on R&D.

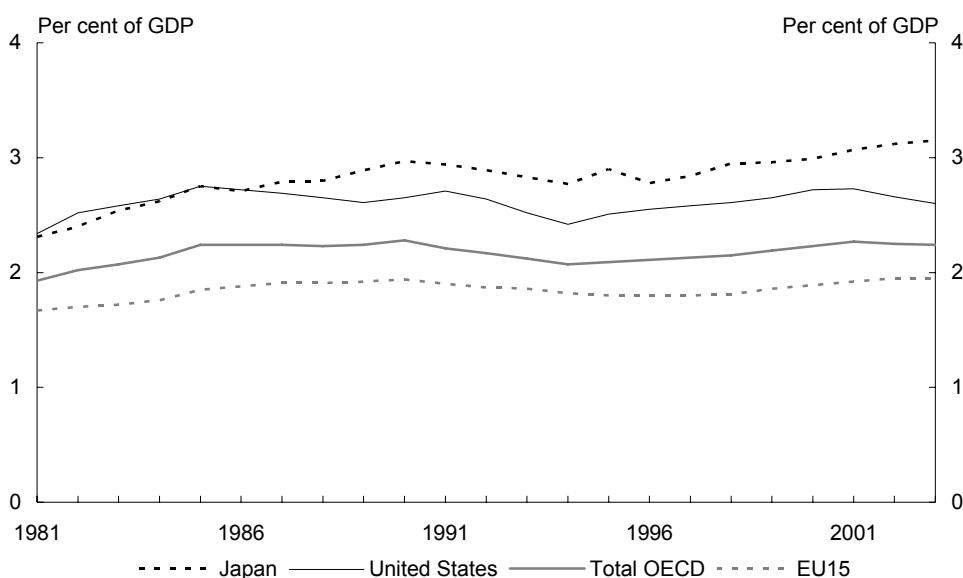
9 The construction of the 'generosity of tax subsidy' indicator is explained in Warda (2001). The calculation includes the consideration of depreciation allowances, tax credits and other allowances on R&D assets.

10 Note that the generosity of tax subsidies can be negative if there is less than a 100 per cent write-off of current R&D expenditures.

Strikingly, the relationship between the generosity of the tax system and BERD illustrated in Chart 7 seems, if anything, to be negative across countries. This may suggest reverse causality. That is, countries with relatively low BERD are inclined to offer more generous tax concessions.

Broadly speaking, the effectiveness of direct support and tax concessions in influencing R&D is unclear. Chart 8 shows trends in GERD as a per cent of GDP for a number of countries. This shows that, despite significant changes in the nature and generosity of tax concessions for R&D in many countries over time, there has been very little long-run movement in R&D intensities for the world's major economies, with the possible exception of Japan.

Chart 8: GERD as a per cent of GDP, 1981 to 2003



Source: OECD Main Science and Technology Indicators database, September 2005.

Even if policy were able to influence the level of R&D expenditure, R&D is only one input into the innovation process. Firms can innovate their products and business processes without necessarily spending large amounts on R&D. This raises two questions: why do policy makers focus on R&D, and what is the relationship between R&D and a broader concept of innovation?

Why do policy makers look at R&D?

The interest of policy makers in R&D is heightened by the recognition that, with the projected decline in the growth of the population of traditional working age, productivity improvements are going to be essential to economic growth in future years. Clearly, innovation is an important driver of growth, as noted by the OECD (2001). However, the focus on R&D intensities might, in part, be a case of looking under the lamp post because that is where the light is. Sheehan and Wyckoff (2003) argue that:

This interest persists notwithstanding the fact that the weaknesses of this indicator are well known, most notably that it measures only one type of Science and Technology (S&T) input (R&D) and not the results or S&T outputs. A primary reason why the indicator of R&D intensity is more popular than other data such as commercial successes from innovation or fundamental breakthroughs or the diffusion and adoption of technological advances that will boost productivity is that R&D spending is a quantifiable entity that has been measured in OECD countries for some 40 years. Furthermore, numerous econometric studies have demonstrated a quantifiable relation to economic growth that has been growing over time, providing further justification for efforts to improve economic performance by boosting R&D spending. (Sheehan and Wyckoff 2003, page 8).

Although R&D spending is related to economic growth, correlation does not necessarily imply causation. And it is innovation in the economy that drives productivity improvements and economic growth, to which R&D is only one input.

The link between business R&D and innovation

Innovation is a broad concept, including product innovation, plus all the process innovations firms continually employ in their workplaces to increase efficiency and productivity. It therefore encompasses a vast array of activities in the economy, including workforce skills, management, venture capital, technology uptake, work re-organisation and R&D. That is, R&D is only one of many inputs into innovation.

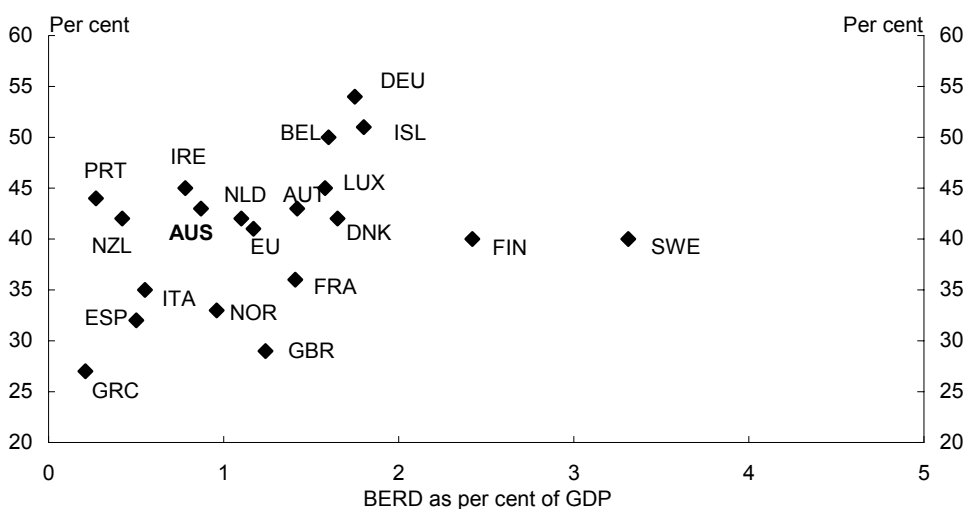
The OECD (2001, p. 51) has defined innovation as 'the development, deployment and economic utilisation of new products, processes and services.' In the services sector, innovation depends less on formal R&D than in the manufacturing sector. This informal R&D may include 'learning by doing', which is not counted in BERD or GERD.

Individuals and businesses within a particular country do not necessarily have to undertake R&D expenditures to innovate, but can for example take advantage of the

technology embodied in newly imported goods and services, especially of the information and communications technology (ICT) type. That is, there are significant international spillovers in R&D (Coe and Helpman 1995). The significance of international spillovers in Australia’s ‘productivity revival’ is discussed in Parham (2004).

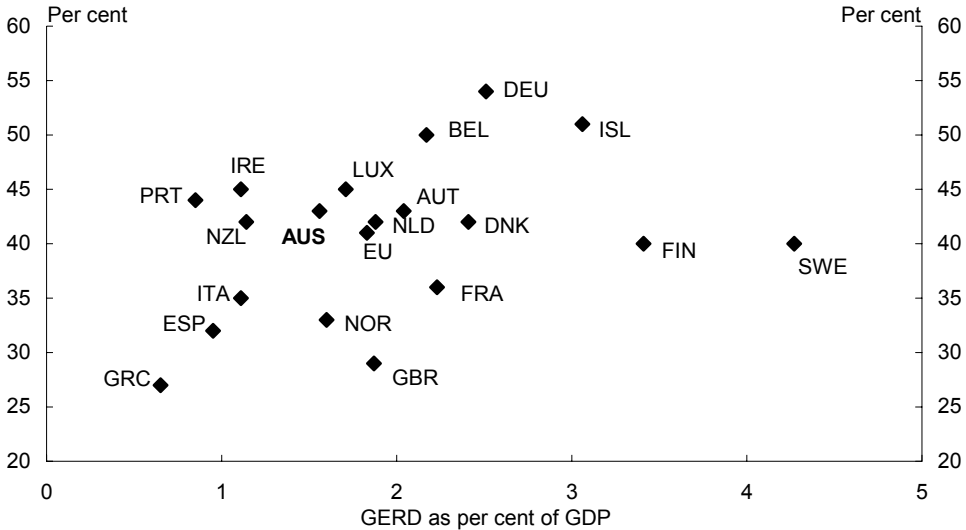
Although innovation is a broad concept that is difficult to define and measure, there are some survey data available on innovation by businesses. Consider the correlation between BERD intensity and the percentage of businesses engaged in innovation as an example (Chart 9).¹¹ For selected European Union countries, Australia and New Zealand, the correlation is positive but relatively low. Indeed, while Finland and Sweden have much higher BERD intensities, proportionately more businesses innovate in Australia than in Finland and Sweden. The same picture can be seen when comparing the percentage of businesses engaged in innovation with GERD (Chart 10).

Chart 9: Per cent of businesses engaged in innovation and BERD as a per cent of GDP, 2001



Source: BERD for 2001 is from OECD (2005) and ABS cat. no. 8104.0 for Australia; 2000 data used for Luxembourg and 2002 data used for Austria; Innovation data from ABS cat. no. 8158.0; figures are for 1998 to 2001 for European countries, and 2001 to 2003 for Australia and 2003 for New Zealand.

11 The ABS (cat. no. 8158.0, 2003, p. 2) defines innovation as ‘the process of introducing new or significantly improved goods or services and/or implementing new or significantly improved processes.’ This definition is comparable to that used by other statistical agencies in the OECD.

Chart 10: Per cent of businesses engaged in innovation and GERD as a per cent of GDP, 2001

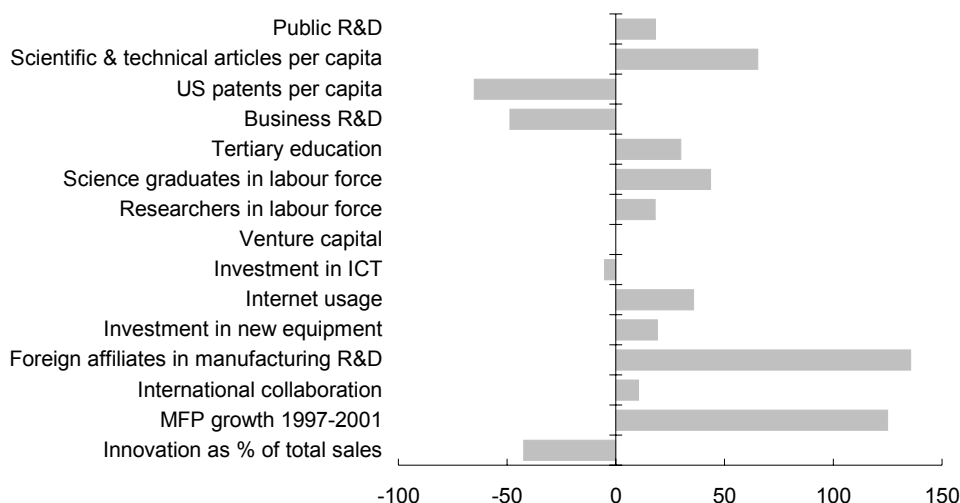
Source: GERD for 2001 is from OECD (2005); 2000 GERD data used for Australia and Luxembourg; Innovation data from ABS cat. no. 8158.0; figures are for 1998 to 2001 for European countries, and 2001 to 2003 for Australia and 2003 for New Zealand.

The point here is not that Australia does more innovation than Sweden. Rather, the point is that measures of R&D and innovation are not strongly correlated. Nor is it clear that there is a linear relationship between the input, R&D, and the output, innovation. What is clear is that our understanding of the link between R&D and innovation is at an early stage.

Looking at how Australia compares with the OECD average across a range of indicators of innovation – inputs, outputs and behaviours – the picture is mixed (Chart 11). All this suggests that the relationship between innovation and any one of the indicator variables is neither simple nor stable between countries.

In summary, while Australia's R&D intensity is below the OECD average, the implications for innovation are unclear. For example, even with below-average R&D, Australia exceeded OECD-average multi-factor productivity growth over the late 1990s.

Chart 11: Australia’s innovation performance compared with the OECD average (percentage difference)



Source: Department of Education, Science and Training (2005).

Conclusion

Drawing strong policy conclusions from cross-country comparisons is always difficult. The data here are subject to considerable uncertainty. However, it would seem that, while business expenditure on R&D in Australia is relatively low by international standards, this is, to a significant extent, a result of Australia’s industry structure. Industry structures, in turn, are determined by a wide range of factors and are likely to change only gradually over time.

Further, it does not appear that the level of direct support or the generosity of tax concessions towards business R&D is the main driver of R&D intensity. Countries with policies that promote R&D directly are typically not high R&D-spending countries.

Finally, the relationship between R&D, as an indicator of innovation, and more direct measures of innovation does not appear to be strong or stable across countries. Having lower levels of business expenditure on R&D does not necessarily mean a country is less innovative. Rather it is contextual factors and the level of competition that determine innovation in a country. Operating in one of the world’s most remote economies and in a dynamic domestic market, Australian firms have incentives to innovate, but not necessarily in the same ways as firms in other countries.

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APPENDIX 1

The OECD Frascati Manual (OECD, 1993) on R&D statistics breaks R&D expenditures down into three activity types:

- *Basic Research*, 'experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view.';
- *Applied Research*, 'original investigation undertaken in order to acquire new knowledge ... directed primarily towards a specific practical aim or objective.'; and
- *Experimental Development*, 'Experimental development is systematic work, drawing on existing knowledge gained from research and practical experience, that is directed to producing new materials, products and devices; to installing new processes, systems and services; or to improving substantially those already produced or installed.'

APPENDIX 2

The GERD and BERD data are sourced from the OECD's ANBERD and STAN ISIC revision 3 database.

Calculation of industry R&D intensities

The data used in the industry-based intensity calculations are sourced from the OECD's ANBERD and STAN databases (both databases are ISIC revision 3). Data availability limited the work that could be done. Sufficient data were available for all countries at the following classification levels:

- food products, beverages and tobacco (ISIC: 15+16);
- textiles, textile products, leather and footwear (ISIC: 17+18+19);
- wood, paper, printing, publishing (ISIC: 20+21+22);
- coke, refined petroleum products and nuclear fuel (ISIC: 23);
- chemicals and chemical products (ISIC: 24);
- rubber and plastics products (ISIC: 25);
- other non-metallic mineral products (ISIC: 26);
- basic metals and fabricated metal products, except machinery and equipment (ISIC: 27+28);
- machinery and equipment n.e.c. (ISIC: 29);
- electrical and optical (ISIC: 30+31+32+33);
- motor vehicles, trailers and semi-trailers (ISIC: 34);
- other transport equipment (ISIC: 35);
- furniture; manufacturing n.e.c. and recycling (ISIC: 36+37);
- EGW (Electricity, gas and water supply, ISIC: 40+41);
- construction (ISIC: 45).

The ratio of R&D expenditures to GVA (Gross Value Added) was used as the R&D intensity. Aggregation of some categories may bias these results. For example, the aggregation of ISIC categories 30 to 33 includes the relatively high-intensity categories: 'Office, accounting and computing machinery' and 'Radio, television and communication equipment'. As a result, it was not possible to control for cross-country differences in the size of these industries. The presented results are sensitive to this aggregation as these sectors do a large amount of R&D.

The Chinese currency: how undervalued and how much does it matter?

Phil Garton and Jennifer Chang¹

China's currency regime has recently become a contentious issue. Some commentators argue that significant undervaluation of the renminbi (RMB) is contributing to global external imbalances. Others assert that any plausible appreciation of the RMB is unlikely to affect global current account positions significantly. Instead, a more flexible exchange rate regime is argued to be necessary for internal balance by providing policy makers with a more effective monetary policy instrument. The Chinese Government has made cautious initial steps toward a more flexible regime, but faces continued pressure to allow further currency movement.

The size of the imbalance in China's external payments suggests that the RMB is significantly undervalued. This does not appear to have had significant adverse effects on the Chinese economy to date, but the costs of holding down the exchange rate are likely to rise in the future. While the contribution of the RMB to external imbalances is often exaggerated, currency adjustment will be a necessary element of the adjustment process. A more flexible exchange rate is in China's medium-term interests, but the pace of adjustment and its sequencing with other reforms will need to be carefully managed. Precipitate moves could be costly both to China and to global markets.

1 The authors are from International Economy Division, the Australian Treasury. This article has benefited from comments and suggestions provided by Nathan Dal Bon, Stephen Joske, David Parker, Martin Parkinson, David Pearl and Brian Thomas. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

Introduction

The value of China's currency, the renminbi (RMB), has recently become a contentious issue.² The RMB had, until July 2005, been pegged to the US dollar at a virtually unchanged rate for a decade. For most of this period China's exchange rate regime attracted little criticism: indeed, it was widely seen as contributing to internal and external stability. Under the peg, China was able to control previously high inflation and sustain GDP growth at an average rate of nearly 9 per cent. During the 1997-98 Asian financial crisis, China was praised for resisting pressure to devalue the RMB, which could have triggered further destabilising depreciations of other Asian currencies.

More recently, however, there has been mounting external pressure on China to allow the RMB to appreciate against the dollar. There is a widespread view that the RMB is now significantly undervalued, with some arguing that this is a matter of global concern. This change of attitude reflects a number of factors:

- the widening of the United States current account deficit to over 6 per cent of US GDP;
- depreciation of the US dollar (and hence, the RMB) against most other currencies from early 2002;
- China's rapid economic growth and increasing role in the world economy; and
- the scale of China's accumulation of foreign reserves, reflecting strong capital inflow and the authorities' efforts to hold the RMB stable against the US dollar.

A major source of external pressure has come from US manufacturing interests and elements within the US Congress who have threatened to impose retaliatory duties on Chinese imports if the RMB is not allowed to appreciate.³ These responses are to a large extent misguided, as RMB revaluation will by itself have limited impact on the US current account. But they highlight the risk of a protectionist backlash in the US and elsewhere – a backlash that would pose real risks for the world economy.

A concern of many observers, such as the International Monetary Fund (IMF), is that the continuing build-up of global imbalances entails substantial risks to the world economy. In this view, exchange rate adjustment by China is one element of a wider

2 The 'renminbi' is the official name of the Chinese currency, while 'yuan' is the denomination.

3 The Schumer-Graham bill calls for a 27.5 per cent ad valorem tariff on Chinese imports 180 days after the bill's passage unless the RMB is substantially revalued to near its fair market value. This figure is the mid-point of the range of estimates of RMB undervaluation (15 to 40 per cent) presented to Congress.

set of measures needed to address these imbalances, including fiscal consolidation in the US and structural reforms in Europe and Japan. A supporting argument is that greater flexibility would assist economic management in China by providing the capacity to run a more independent monetary policy, reducing the risk that an undervalued exchange rate will lead to excessive monetary expansion and inflation.

Against the background of these pressures and concerns, the Chinese Government revalued the RMB by 2 per cent against the US dollar on 21 July 2005. It also announced that the RMB would no longer be formally pegged to the US dollar, but would be managed with reference to a basket of currencies. In practice, the bilateral US dollar rate has continued to be tightly managed and further RMB appreciation against the dollar has so far been limited.

All indications are that China intends to proceed cautiously in increasing exchange rate flexibility. This caution can be attributed to a range of factors:

- the need to sustain rapid economic growth to absorb the exodus of workers from rural areas, and concerns about social unrest should growth falter;
- concerns that capacity to manage exchange rate volatility is limited, given fragile Chinese banks and underdeveloped financial markets; and
- a desire to avoid rewarding currency speculators.

As a result, China's new exchange rate arrangements have not had a material impact on its trade surplus or foreign reserve accumulation. This raises questions of how much further exchange rate adjustment might be needed and over what timeframe. This article will begin by examining the evidence on whether the RMB is significantly undervalued. It will then discuss the implications of an undervalued RMB for China and for the global economy and the considerations governing the pace of exchange rate adjustment.

The concept of an equilibrium exchange rate

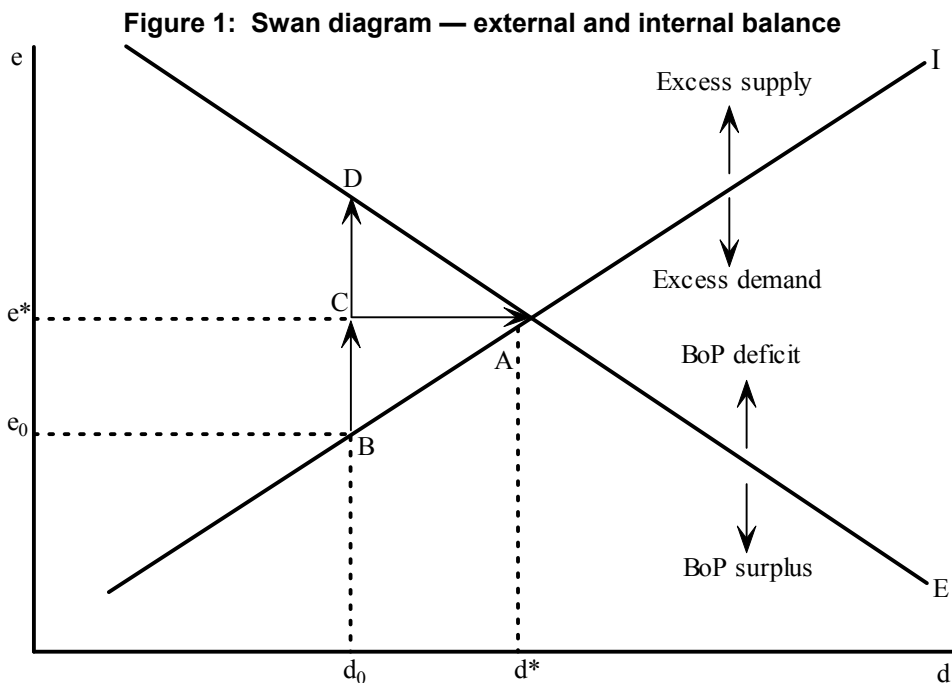
Assessing whether a currency is undervalued requires some benchmark for what the value of the currency ought to be. Economists normally think of this as the exchange rate consistent with equilibrium in the domestic economy (internal balance) and in the balance of payments (external balance). An undervalued exchange rate means that relative prices of domestic goods need to increase in order to switch spending from domestic to foreign goods.

Internal balance is normally defined as full (non-inflationary) employment. *External balance* is normally defined as requiring a current account equal to a level of capital

account flows that is sustainable in the medium term. This entails overall balance on external payments, with no ongoing accumulation or decumulation of foreign reserves.

While commentary tends to focus on the nominal exchange rate with the US dollar, it is preferable to focus on the *real effective exchange rate (REER)*, which is a measure of overall external competitiveness. The REER is calculated by adjusting the nominal effective exchange rate (NEER) for differences in relative prices between a country and its trading partners. The NEER (or nominal trade-weighted index, TWI) is the average of bilateral exchange rates (in index terms) with the currencies of trading partners, weighted by trade shares.

The Swan diagram (Swan 1963) provides a simple framework for understanding the relationship between the REER and internal and external balance (Figure 1). The curves I and E are combinations of domestic demand (d) and the REER (e) consistent with internal and external balance respectively. The curve I is upward-sloping because higher domestic demand requires a higher REER to maintain internal balance, as spending must be switched from domestic goods to imports to avoid excess demand. Conversely, the curve E is downward-sloping because higher domestic demand requires a lower REER to maintain external balance, as domestic traded goods need to become more competitive to offset increased imports. External and internal balance can only be simultaneously achieved at point A where the two curves intersect.



Note: An increase in e is an appreciation.

Suppose the economy is at point B, at internal balance but with a large balance of payments surplus. In this case the REER is undervalued, as restoring equilibrium requires an appreciation from e_0 to e^* . (If the economy were instead at point C, there would be no undervaluation, as the balance of payments surplus would be solely the result of insufficient domestic demand.)

Appreciation is not, however, sufficient to restore equilibrium. Domestic demand must also expand from d_0 to d^* , in order to move to the equilibrium point A. (Specifically, demand must expand relative to supply; equivalently, saving must fall relative to investment.) Appreciation alone would move the economy to point C, only partly correcting the external imbalance but creating an internal imbalance by pushing the economy into excess supply. An appreciation sufficient to remove the external imbalance (point D) would only exacerbate the internal imbalance. In either case, excess supply would put downward pressure on relative prices, reversing the real appreciation over time and pushing the economy back toward point B.

This illustrates a key point that is sometimes overlooked. In general, exchange rate adjustment is a necessary, but not sufficient, condition for addressing external imbalances while maintaining internal balance. A satisfactory resolution of global imbalances will require a combination of exchange rate adjustment, expansion of domestic demand (increase in investment relative to saving) in surplus economies and slowing of domestic demand (increase in saving relative to investment) in deficit economies.⁴ The RMB's role in global imbalances will be explored in more detail later in the article.

Note that the economy is not likely to stay at point B indefinitely. This is because accumulation of foreign reserves tends to drive monetary expansion, pushing the economy into excess demand. Eventually real appreciation may occur through higher inflation even if the nominal exchange rate is constrained. This issue will be discussed in more detail later in the article.

How undervalued is the RMB?

Chinese exchange rate developments

Chart 1 shows movements in China's nominal and real exchange rates since 1990. In response to a period of very high inflation in the period 1992 to 1995, the Chinese Government devalued the official exchange rate by 33 per cent in January 1994 and

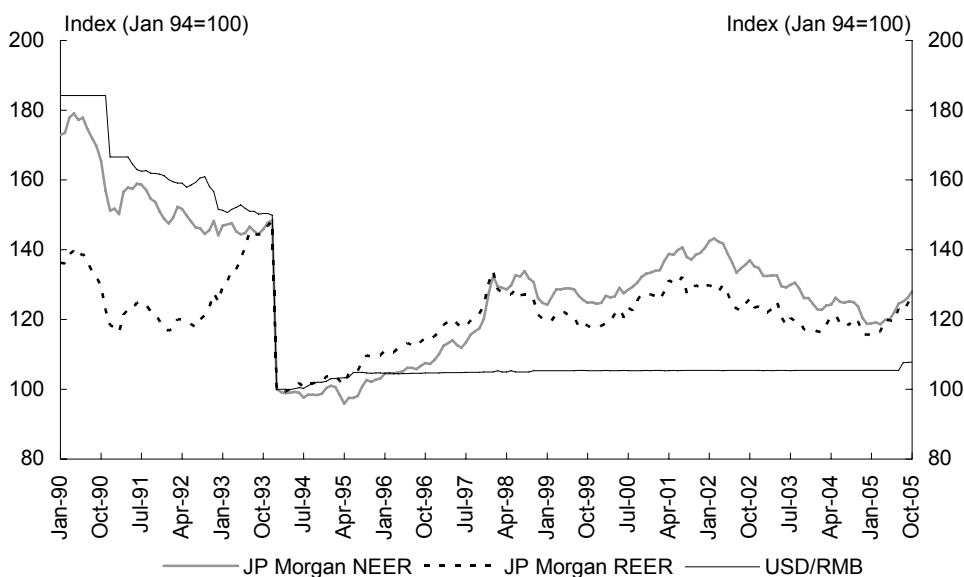
4 If either of the latter two adjustments were not to occur, the risk is that an unwinding of global external imbalances could result in the global economy experiencing lower growth in aggregate.

The Chinese currency: how undervalued and how much does it matter?

then, in mid-1995, pegged it to the US dollar at a rate that remained virtually unchanged until July 2005.⁵

Since 1995, therefore, movements in China's NEER have reflected movements of the US dollar against China's trading partners. The REER has generally followed the NEER, with divergences between the two series reflecting differences in inflation between China and its trading partners. Between 1994 and early 2002, appreciation of the US dollar caused China's NEER to appreciate by more than 40 per cent. This was partly offset by relative price deflation in China, so that REER appreciation was less than 30 per cent.

Chart 1: Real and nominal exchange rates



Source: Datastream.

Note: An upward movement in the index represents a real/nominal appreciation of the RMB. Pre-1994 measures are based on the official exchange rate (see footnote 5).

Since early 2002, the US dollar's depreciation has seen China's NEER depreciate by 10 per cent. This has been partly offset by relatively higher inflation in China, so that real depreciation has been only 2 per cent. China's REER is still close to 30 per cent above its January 1994 level, so the dollar peg has not precluded significant real effective appreciation.

5 The 1994 devaluation corresponded with the integration of the multiple exchange rates that previously existed. At the end of 1993, the official exchange rate stood at 5.8 RMB to the US dollar while the market swap rate was 8.7 RMB to the dollar. While the official exchange rate was lowered by 33 per cent, the effective devaluation was less than 7 per cent as 80 per cent of foreign exchange transactions were conducted in the swap market.

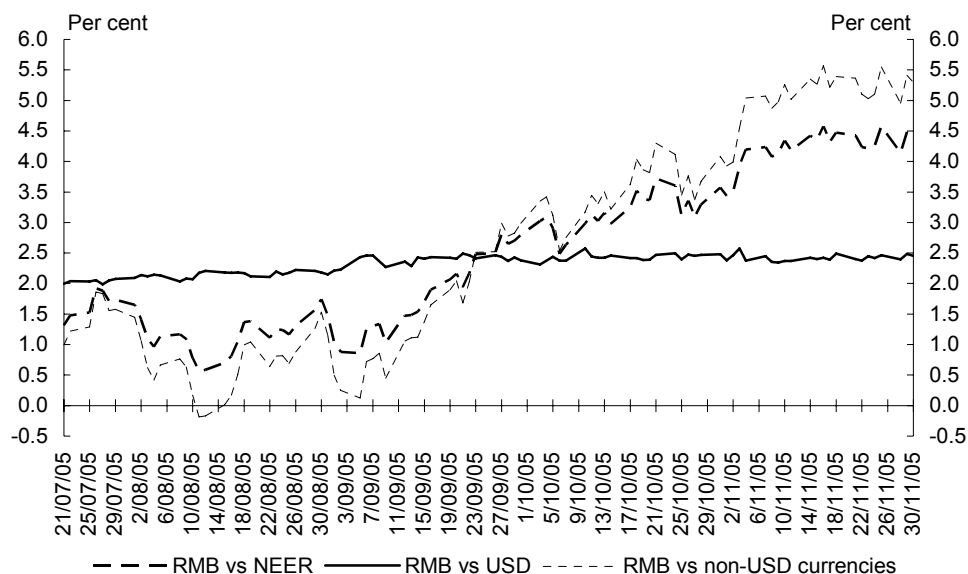
The RMB's peg to the US dollar was formally terminated on 21 July when Chinese authorities revalued the RMB by 2 per cent against the US dollar and announced that the RMB would henceforth be managed with reference to a basket of currencies.⁶ In practice, the RMB has continued to be tightly managed against the US dollar and the currency basket appears to have had little influence on its value to date. The RMB's daily fluctuation band against the US dollar has remained at +/- 0.3 per cent. Fluctuation bands against other currencies have been widened from +/- 1.5 per cent to +/- 3 per cent, reflecting the reality that if policymakers tightly control the RMB/USD rate their ability to control other bilateral rates is limited.

As Chart 2 indicates, the RMB has remained quite stable against the US dollar, gradually appreciating by a further 0.4 per cent over the four months since the initial revaluation. In contrast, the RMB has fluctuated widely against other currencies, broadly following the US dollar's movements. If the RMB were truly linked to a basket, it would be more stable against the NEER and variations against the US dollar would be more symmetric with variations against other currencies.⁷

6 The People's Bank of China has announced that the basket currencies are the US dollar, euro, Japanese yen, Korean won, Singapore dollar, Malaysian ringitt, Australian dollar, UK pound, Russian rouble, Thai baht and Canadian dollar. Basket weights have not been made public but are said to be broadly in line with trade shares.

7 Adherence to a currency basket following the 21 July revaluation would not have resulted in greater RMB appreciation than has occurred, either on a trade-weighted basis or against the US dollar. A basket based on trade weights acts to stabilise the trade-weighted exchange rate. When the US dollar appreciates against other currencies, as it has since early September, the RMB would depreciate against the dollar and appreciate against other currencies in order to keep the basket stable. The reverse occurs when the dollar depreciates, as it did in the immediate period after 20 July. Hence, the RMB would have initially appreciated against the dollar, but this would have been reversed with the dollar's subsequent appreciation.

Chart 2: Cumulative RMB movements since 20 July 2005⁸



Source: Datastream, Treasury estimates. Note: An upward movement represents an appreciation of the RMB.

Factors affecting China's real exchange rate in the medium term

Trends in real or nominal exchange rates cannot themselves tell us whether a currency is undervalued or overvalued. In order to make this assessment, we need to have some framework for estimating the equilibrium real exchange rate. Before looking at alternative approaches to these estimates, it is useful to consider the key factors likely to affect China's equilibrium real exchange rate over the medium term.

A commonly noted factor is *productivity catch-up* (the Balassa-Samuelson hypothesis). Lower income countries have lower productivity in traded goods production, which means lower wages, and hence, lower prices of non-traded goods. As traded goods productivity catches up to advanced economy levels, real wages throughout the economy are pushed up, increasing non-traded goods prices. Real appreciation must occur through either nominal appreciation or, failing that, higher price inflation.

The International Labour Organisation (2003) estimates that labour productivity in China grew at an average annual rate of about 5 per cent from 1980 to 2001, compared to average growth rates of 1-2 per cent for advanced economies and 3-4 per cent for other emerging Asian economies. All else being equal, this productivity catch-up

8 The NEER includes the basket currencies mentioned in footnote 6 plus the new Taiwan dollar. Weights reflect average shares of China's trade for 2002-04. Hong Kong's trade weight is included in the US dollar's weight, as its currency is pegged to the US dollar.

implies that China's equilibrium REER might have been appreciating at an average rate of around 2 to 2½ per cent over this period.

A second factor likely to drive real appreciation over time is *accumulation of net foreign assets* as a result of continuing current account surpluses. A creditor economy cannot expand its net external assets without bound because this would be incompatible with debtor economies being able to service these assets in the long run. A higher REER is therefore needed to reduce the current account surplus to a level that at least prevents net foreign assets from continuing to rise as a share of GDP.⁹

It is estimated that China's net foreign assets increased from near zero in 1994 to almost 30 per cent of GDP in 2003 (Wang 2004). Recent current account trends suggest continued increases in this ratio. Last year's current account surplus was 4 per cent of GDP and trade and balance of payments data point to a much larger surplus this year. A surplus of around 3 per cent of GDP would be needed to stabilise net foreign assets at 30 per cent of GDP (assuming nominal GDP growth of around 10 per cent).

There are also factors that may work in the opposite direction, reducing the equilibrium exchange rate and, therefore, reducing real appreciation.

Reducing trade barriers at a faster rate than trading partners tends to induce real depreciation by shifting spending from domestic goods towards imports. China's weighted average tariff rates are estimated to have been reduced from 40.6 per cent in 1992 to 6.4 per cent in 2002 (Rumbaugh and Blancher 2004).

China's increasing importance in international trade may be another factor. China now accounts for 7 per cent of world exports and 6 per cent of world imports, double its shares only five years ago. China's growth is likely to be pushing down world prices of manufactures and pushing up the prices of commodity inputs. The resultant fall in China's terms of trade would tend to push down the equilibrium REER.

Note, however, that these two developments have already been impacting on China's external balance. If there is an external imbalance despite these factors then it can still be concluded that the RMB is below equilibrium, even though that equilibrium is lower than would have been the case without these factors.

9 Abstracting from valuation effects, stabilising the ratio of net foreign assets (NFAs) to GDP requires a current account surplus no greater than the NFA ratio multiplied by the growth rate of nominal GDP. Valuation effects from RMB appreciation may reduce the NFA ratio somewhat, given that a large share of China's foreign assets is likely to be denominated in either US or Hong Kong dollars.

The Chinese currency: how undervalued and how much does it matter?

Some commentators argue that *capital account liberalisation* could push down the equilibrium REER in future. China's saving rate has been averaging over 40 per cent of GDP, and Chinese residents are likely to have an unmet demand for foreign assets. The rest of the world is also likely to have unmet demand for Chinese assets, but as China's saving rate is higher, portfolio rebalancing could entail net capital outflow. This is not an immediate prospect, as China is unlikely to liberalise its capital account fully until its financial sector is stronger. This may take several years, although the process could be accelerated if controls become less effective.

Alternative approaches to estimating the equilibrium value of the RMB

Balassa-Samuelson relationship

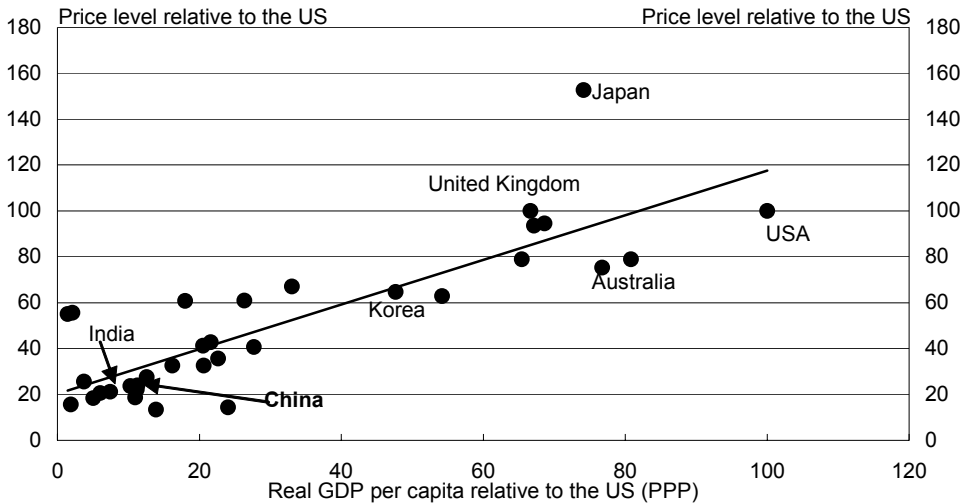
The Balassa-Samuelson hypothesis suggests there should be an inverse relationship between countries' per capita incomes and their real exchange rates. That is, relative price levels measured in a common currency should be lower in lower income economies. As Chart 3 indicates, the existence of such a relationship across economies is empirically supported. The implication is that developing economies should experience real appreciation (increasing relative prices) as their per capita incomes converge toward advanced economy incomes.

This implies that equilibrium real exchange rates might be based on the estimated relationship between real per capita incomes and relative prices, consistent with the Balassa-Samuelson effect. On this basis, the RMB appears significantly undervalued, although the degree of misalignment depends on the price index used and the point in time chosen. For example, Chart 3 suggests that China's exchange rate was undervalued by 25 per cent relative to the trend line in 2000, while Frankel (2005) estimates a 36 per cent undervaluation in the same year and Coudert and Couharde (2005) estimate an undervaluation of 43 to 50 per cent in 2003.¹⁰

The key shortcoming of the approach is that it focuses on only one factor affecting China's equilibrium REER and abstracts from the other factors discussed earlier. Many economies diverge from the real exchange rate that the Balassa-Samuelson model would imply, and China is not an extreme outlier in this regard. Hence, these estimates are not necessarily a reliable indicator of the extent of undervaluation.

10 Chart 3 is based on indexes of consumption prices. Coudert and Couharde (2005) and Frankel (2005) both use the GDP price index. Note that this is a measure of real undervaluation relative to the US dollar, rather than on a trade-weighted basis, as prices are benchmarked against US prices. Use of US prices as the benchmark does not mean that the US real exchange rate is necessarily in equilibrium.

Chart 3: Price levels and per capita income across countries, 2000¹¹



Source: Heston, A et al (2002).

Fundamental equilibrium exchange rate

A more sophisticated approach to assessing currency undervaluation is the macroeconomic balance or fundamental equilibrium exchange rate (FEER) approach, which is closely related to the Swan diagram framework outlined earlier. This involves:

- determining a level of GDP consistent with internal balance;
- determining a target current account balance in line with sustainable capital account flows;
- estimating the equilibrium REER required to achieve the target current account with GDP at its internal balance level.

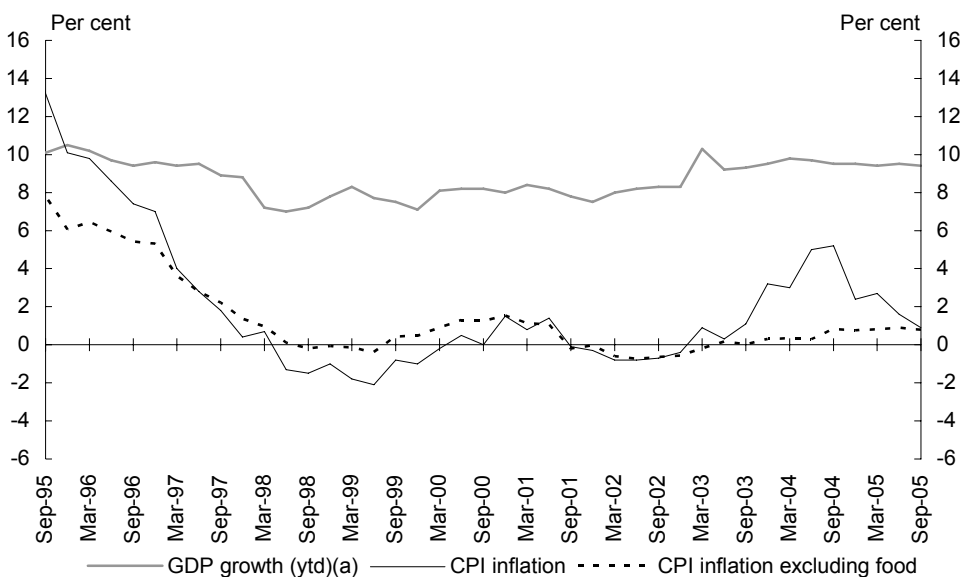
Inferences about *internal balance* may be drawn from the behaviour of inflation, abstracting from one-off influences. An underlying trend of rising inflation normally indicates excess demand in the economy, while falling inflation would indicate excess supply.

11 The vertical axis is the ratio of price levels in domestic currency to price levels in US dollars divided by the exchange rate (national currency per US dollar), which can be interpreted as the real exchange rate. A relative price level of 100 represents purchasing power parity with the US.

The Chinese currency: how undervalued and how much does it matter?

Chart 4 shows that China has returned to positive inflation levels in recent years after experiencing deflation over most of the period from 1998 to 2002. However, the increase in inflation through 2003-04 was exaggerated by a temporary spike in food price inflation. Underlying inflation has stabilised at moderate levels since late 2004. While it is difficult to be precise about the current position, it seems reasonable to conclude that the economy has recently been somewhere near full capacity.

Chart 4: GDP growth and price inflation



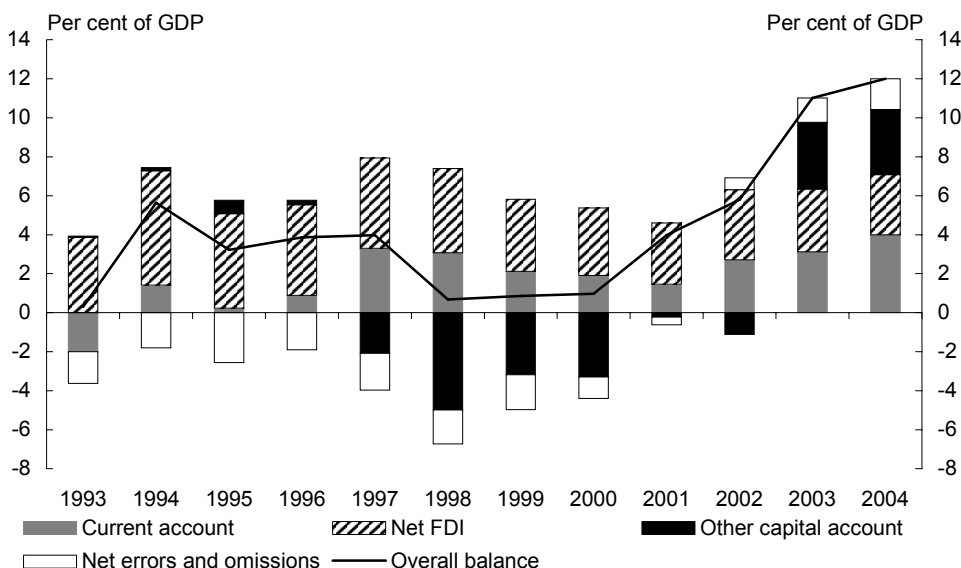
Source: CEIC, OECD Main Economic Indicators.
(a) Year-to-date (ytd).

Some argue that China is in a chronic excess supply situation due to its high levels of surplus rural labour. This argument is central to the 'Revived Bretton Woods' hypothesis (Dooley et al 2004). In this view, China will need a low exchange rate for perhaps the next decade in order to absorb the rural labour surplus into the industrial and service sectors.

This argument does not seem consistent with recent behaviour of prices in China. An economy in chronic excess supply should be experiencing underlying disinflation or deflation. The People's Bank of China's (PBoC's) efforts to limit money and credit growth also seem inconsistent with an economy in excess supply. Supply is undoubtedly increasing rapidly, but demand appears to have been increasing just as fast. There are also constraints on the rate at which rural labour can be brought into effective supply, including internal migration barriers and the need to build factories, housing and infrastructure. These limit the rate at which supply can be expanded.

In relation to *external balance*, Chart 5 shows that China recorded a balance of payments surplus (that is, accumulated foreign reserves) of 12 per cent of GDP in 2004. This comprised a current account surplus of 4 per cent of GDP and a capital account surplus of 6 per cent of GDP, evenly divided between foreign direct investment (FDI) and other capital inflows. The remainder came from net errors and omissions. Errors and omissions have been highly correlated with non-FDI capital flows, suggesting they are likely to reflect mainly unrecorded capital flows.

Chart 5: Composition of the balance of payments¹²



Source: CEIC, OECD Main Economic Indicators.

Substantial balance of payments surpluses have been the norm for China since 1994, apart from the period after the Asian crisis when capital flowed out of the country. In the past this mainly reflected surpluses on the current account and net FDI inflows. More recently, the balance of payments surplus has been driven to unusually high levels by a surge in inflows of capital other than FDI. Assuming errors and omissions mainly reflect unrecorded capital flows, non-FDI capital flows may have been 5 per cent of GDP in 2004. This has occurred despite China's extensive capital controls, suggesting that these controls are 'leaky'. Much of this inflow is likely to have been motivated by speculation on RMB appreciation, suggesting that recent levels are unlikely to be sustainable.

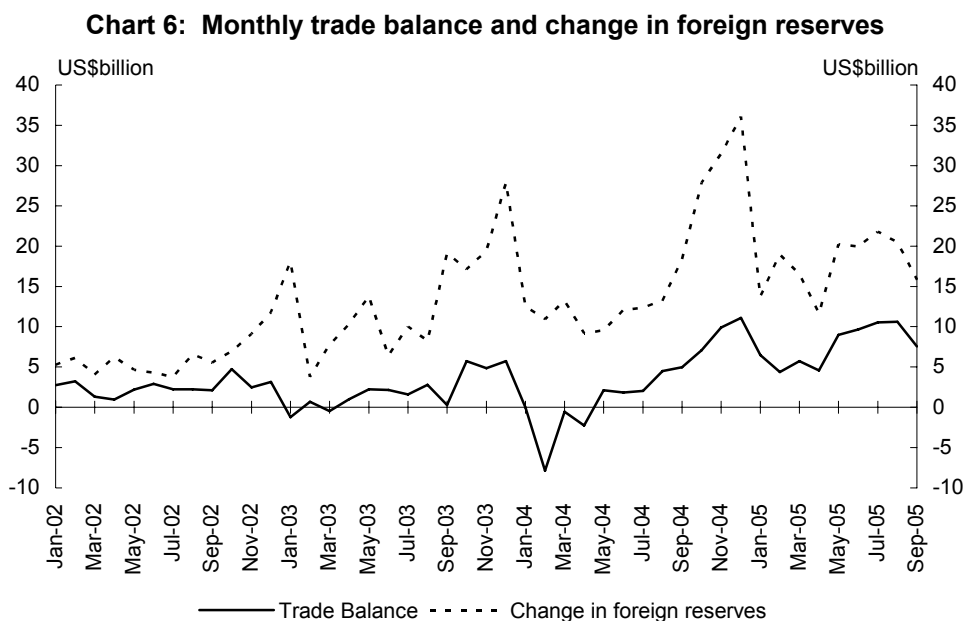
12 Data in this article are adjusted for the use of US\$45 billion in foreign reserves to recapitalise banks in December 2003. This transaction reduced recorded reserve accumulation and increased other capital outflows by about 3 per cent of GDP in 2003.

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As mentioned previously, the FEER approach requires an estimate of sustainable capital account flows in order to determine a current account target. This is difficult in current circumstances. One option is to use historical averages. Non-FDI capital flows have averaged an outflow of about 1 per cent of GDP over the past decade, with average net errors and omissions pointing to unrecorded outflows of a similar size. Speculation may also be disguised as trade flows, through leads and lags in payments, under-invoicing of imports and over-invoicing of exports.

With FDI inflows stable in recent years at around 3 to 4 per cent of GDP, this implies a sustainable capital account surplus (that is, a current account deficit) of around 1 to 2 per cent of GDP. This is similar to the current account targets suggested by others who have used the FEER approach, for instance, Goldstein (2004) and Coudert and Couharde (2005).

China's current account surplus was 4 per cent of GDP in 2004, but will be much higher this year as monthly trade surpluses have been larger than last year (Chart 6). The current account surplus to June was as large as the total surplus for 2004, while the cumulative trade surplus to October was around 2½ times the total for 2004 (1.9 per cent of GDP). Official Chinese estimates suggest the trade surplus this year will be three times its 2004 level. Capital inflows and other contributions to the balance of payments surplus (net transfers and the net income balance) appear to be running at similar levels to 2004. This implies the current account surplus this year may be 7 per cent of GDP or more and the overall balance of payments surplus could reach 15 per cent of GDP.



Source: CEIC.

On this basis, the current account this year might be 8 to 9 per cent of GDP above its equilibrium level. Even if this year's increase in the trade surplus is mainly due to temporary factors, this would still imply a gap of 5 to 6 per cent of GDP. Trade elasticity estimates for China suggest that a current account adjustment in this range would require a REER appreciation of something between 15 and 30 per cent.¹³ This is consistent with the range of estimates from studies using the FEER approach in recent years (for a summary see Coudert and Couharde 2005).

Behavioural equilibrium exchange rate

The key problem with the FEER approach is the uncertainty surrounding estimation of internal and external balance benchmarks, particularly for a rapidly changing economy like China. An alternative approach is to estimate a behavioural equilibrium exchange rate (BEER). This approach does not explicitly define external or internal balance, but is based on modelling economic fundamentals that explain past behaviour of the REER. For example, the REER could be considered undervalued if it is significantly below the value predicted by the model.

BEER models for China have generally produced much lower estimates of RMB undervaluation than FEER approaches.¹⁴ Wang (2004) estimated that China's REER was only about 5 per cent undervalued in 2003, relative to the value suggested by his estimated BEER model. Funke and Rahn (2005) conclude that the REER was undervalued by about 3 per cent at the end of 2002. An Economist article ('Precisely Wrong' 23 June 2005) reported that Stephen Jen of Morgan Stanley estimated the RMB to be only 7 per cent undervalued. Goldman Sachs economists were reported to have estimated an undervaluation of 10 per cent.

An obvious question raised by these estimates is their consistency with external balance. If the RMB is only moderately undervalued, this implies an equilibrium

13 Estimates of exchange rate elasticity of demand for China's exports converge around -0.3 (Cerra and Dayal-Gulati 1999; Dees 2001; and Anderson 2005), while elasticity estimates for China's imports are around 0.7 (Cerra and Dayal-Gulati 1999 and Anderson 2005). This means a 10 per cent real exchange rate appreciation results in a 3 per cent decrease in exports and a 7 per cent increase in imports in the medium term. As exports and imports are each around one-third of GDP, the trade surplus would fall by 3-3½ per cent of GDP.

14 Explanatory variables in BEER models typically include relative productivity growth and net foreign assets. Other variables may include measures of trade openness and budget balances. Due to the lack of direct productivity data, relative productivity growth is normally proxied by changes in the ratio of consumer and producer price indexes relative to those of China's trading partners. Assuming that CPI and PPI reflect prices of non-traded and traded goods respectively, a relative increase in the CPI/PPI ratio implies productivity catch-up in traded goods production, consistent with the Balassa-Samuelson hypothesis.

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current account surplus only moderately below its recent level. But this is only consistent with external balance if there is a matching capital outflow, which is contrary to China's experience. Since 1994, the sum of the capital account plus net errors and omissions has averaged a surplus of 2 per cent of GDP, and only went into moderate deficit in the post-Asian crisis period from 1998-2000.

This approach implicitly assumes the economy has, on average, been in balance over the period for which the model is estimated. If the economy has been in persistent disequilibrium then the BEER estimate may be biased. The previous section noted that China has run a balance of payments surplus over most of the period since 1994, implying a long-running external imbalance. A BEER model fitted over this period would therefore tend to underestimate the equilibrium REER.

What can we conclude on undervaluation of the RMB?

Analysis of internal and external balance points to undervaluation of the RMB. The size of the undervaluation is sensitive to a range of assumptions, and cannot be determined with any precision. Given the size of the imbalance in China's external payments on any reasonable measure, however, the size of the REER undervaluation could be substantial.

This assessment is necessarily conditional on China's economic circumstances at this point in time. If circumstances change then the equilibrium value may change. For instance, it is possible (though not certain) that future capital account liberalisation could reduce the equilibrium REER. However, as mentioned, substantial capital account liberalisation is highly unlikely in the immediate future, although the effectiveness of controls may be eroded over time.

A conclusion that a currency is undervalued does not imply that its appreciation would necessarily do much in itself to correct external imbalances. Supporting shifts in saving and investment are also needed. But this does not imply that the exchange rate is irrelevant. To re-emphasise the point made earlier, exchange rate adjustment is a necessary, but not sufficient, condition for external adjustment. The exchange rate is better thought of as a mechanism for facilitating adjustment in response to shifts in saving and investment, rather than as a primary driver of adjustment in itself.

Nor does the existence of undervaluation necessarily mean that this should be immediately corrected. Rapid adjustment may be destabilising for an economy with weak financial institutions and underdeveloped financial markets. The appropriate rate of adjustment depends on the balance between the costs and risks (both internal and external) associated with maintaining an undervalued RMB and the costs and risks associated with a rapid adjustment. The following sections discuss these issues.

RMB undervaluation and its implications for China

Many discussions of China's exchange rate present the issue in terms of China gaining an advantage at the expense of other countries. China has maintained strong economic growth, low inflation and financial stability over the past decade. It might be argued that an undervalued currency has promoted export-led growth, reserve accumulation has reduced vulnerability to external shocks, and exchange rate stability has assisted financial stability and promoted macroeconomic discipline.

Nonetheless, an undervalued exchange rate can be expected to entail significant costs for China, even if these costs are not apparent at present. Many of these costs are likely to rise over time if China resists market-based pressures for nominal appreciation. While exchange rate stability may have been beneficial in the past, the benefits of greater flexibility are likely to increase as the economy becomes more sophisticated, financial markets deepen, and policymaking and institutional capacity improves.

Monetary policy control and inflation

One cost of maintaining an undervalued exchange rate is that it may lead to higher inflation over time. If the nominal exchange rate regime does not allow sufficient appreciation, real exchange rate adjustment can only occur through increases in the price level over time, relative to trading partners.

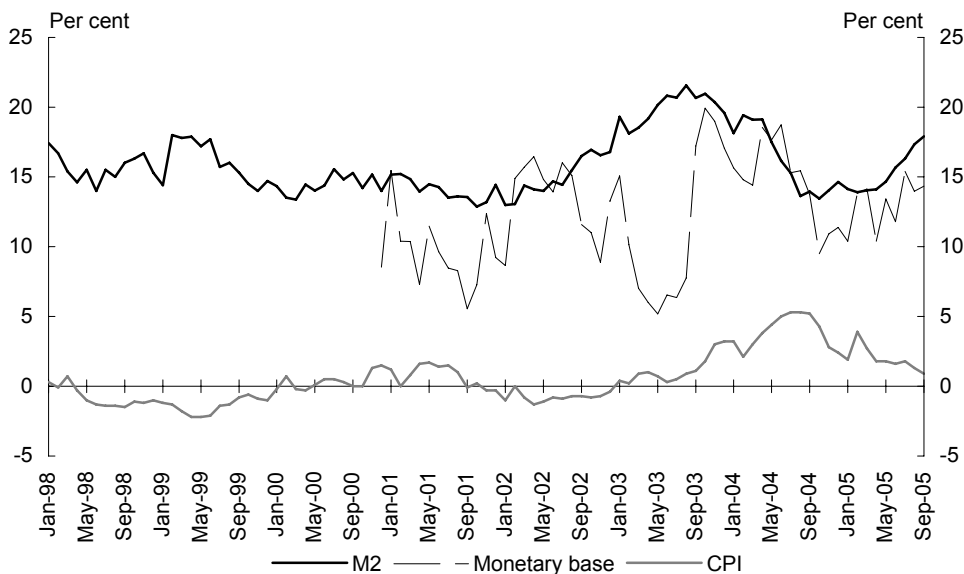
This is linked to the 'impossible trinity': when capital is mobile, policymakers cannot ultimately run an independent monetary policy while controlling the exchange rate. Accumulation of foreign reserves expands the monetary base (deposits at the central bank plus currency in circulation). While this monetary impact may be sterilised by offsetting central bank bond sales, this becomes harder to sustain over time. Eventually real appreciation occurs through higher inflation even if the nominal exchange rate is constrained.

Chart 7 suggests that inflation has not yet become a major problem for China. Indeed, for most of the period under the US dollar peg China was experiencing deflation. While inflation surged to over 5 per cent in 2004, this reflected a temporary spike in food prices, and inflation has now returned to low rates.

For most of the past 18 months, the Chinese authorities appear to have been reasonably successful in maintaining monetary control through sterilisation. The extent to which foreign reserve accumulation has been sterilised can be measured by the difference between increases in net foreign assets of the PBoC and increases in the monetary base. Chart 8 shows that the PBoC has sterilised an increasing proportion of its foreign asset purchases since late 2003.

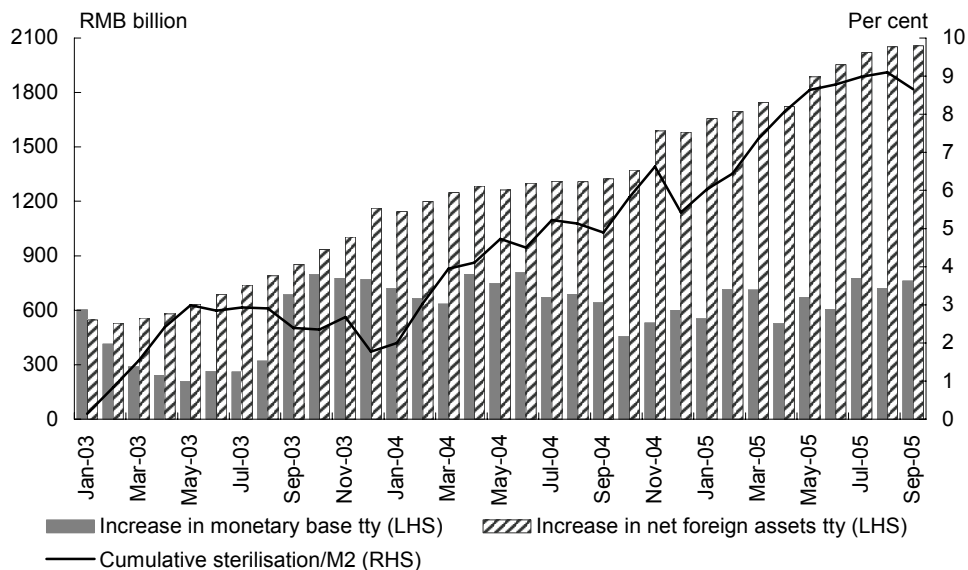
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Chart 7: Money growth and inflation (tty)^(a)



Source: CEIC, OECD Main Economic Indicators.
(a) Through-the-year (tty).

Chart 8: Sterilisation of foreign reserve accumulation



Source: CEIC.

Note: Cumulative sterilisation is the cumulative difference between increases in net foreign assets and increases in the monetary base since January 2003.

The increase in sterilisation contributed to a reduction in broad money supply (M2) growth from a peak of 22 per cent in August 2003 to below the PBoC's target growth rate of 15 per cent from August 2004 (Chart 7). While 15 per cent may seem a high rate of monetary growth it has, in fact, been consistent with near price stability in China in recent years. The fact that M2 growth has recently increased again to above the target rate (Chart 7) is likely, however, to be a cause of concern to Chinese authorities.

This raises the question of how long China can maintain monetary control through sterilisation. The basic problem, as shown by Chart 8, is that the stock of sterilisation debt issued by the PBoC is steadily growing relative to the stock of liquid financial assets (represented by M2). If this continues it will put upward pressure on interest rates. Higher interest rates would tend, in turn, lead to more capital inflow, further increasing the sterilisation problem. Recent rates of reserve accumulation are not, therefore, indefinitely compatible with continued control over monetary growth and inflation.

RMB undervaluation and its opportunity costs for China

Maintaining an undervalued currency means forgoing purchasing power over imports. A higher exchange rate improves a country's terms of trade, allowing consumption to increase by more than GDP. As Chinese imports are around one-third of GDP and half of these are for domestic use (according to Chinese customs data), a 20 per cent real effective appreciation could increase the purchasing power of Chinese incomes by roughly 3 per cent.

This opportunity cost is reflected partly in foregone current consumption and partly in foregone domestic investment, which reduces future consumption possibilities. In view of the widespread concerns about excessive and inefficient investment in China, the latter aspect may be less of a concern than would normally be the case. An undervalued exchange rate may, however, contribute to the problem of inefficient investment by causing over-investment in traded goods production capacity.

Opportunity costs also arise from the fact that accumulated foreign reserves could have otherwise been used to repay its foreign debt (estimated at 5 per cent of GDP). Interest rates paid by China on its external borrowing are higher than those received on its foreign reserve assets. Yields on long-term Chinese government external debt (about a quarter of the total) have recently been 60-70 basis points above US Treasury yields, and spreads on other debt are likely to be higher.

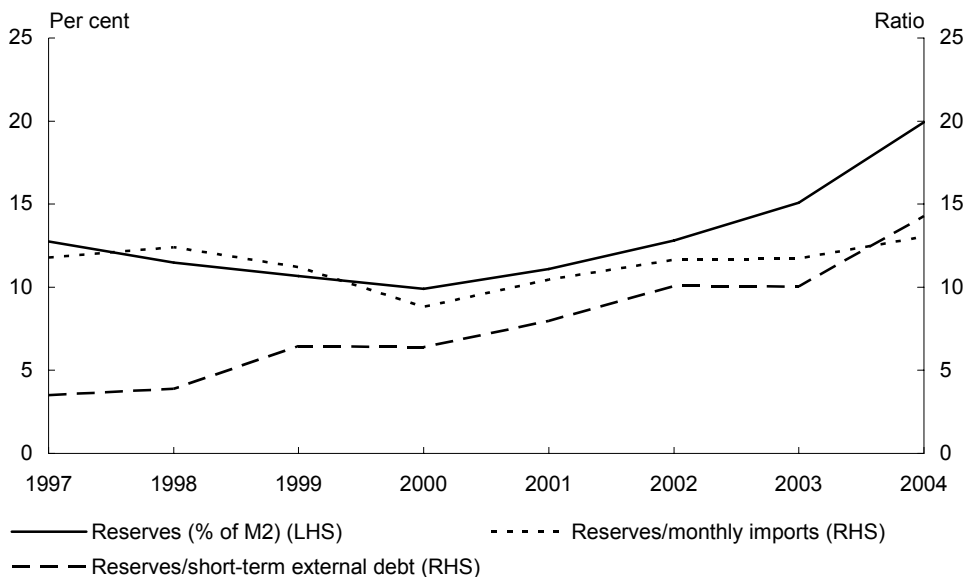
There is also a large exposure to future currency losses. China's foreign reserves were equal to 38 per cent of GDP at the end of 2004. Assuming at least 80 per cent of these reserves are dollar-denominated, each 10 per cent appreciation against the dollar

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would mean a currency loss equivalent to about 3 per cent of GDP. Potential losses increase the longer China continues to accumulate reserves to hold down the RMB.

A cost-benefit assessment must also take into account that foreign reserves provide benefits for emerging economies in reducing the risks of external payments crises. Gains from further accumulation, however, are likely to be limited beyond some point. Chart 9 shows China's foreign reserves in terms of standard measures of reserves adequacy: the ratios of foreign reserves to imports, short-term external debt and money supply (M2).

Chart 9: Measures of foreign reserves adequacy



Source: CEIC, OECD Main Economic Indicators, BIS-OECD-IMF-World Bank Statistics on External Debt.
Note: Short-term external debt is debt falling due within one year, regardless of original maturity.

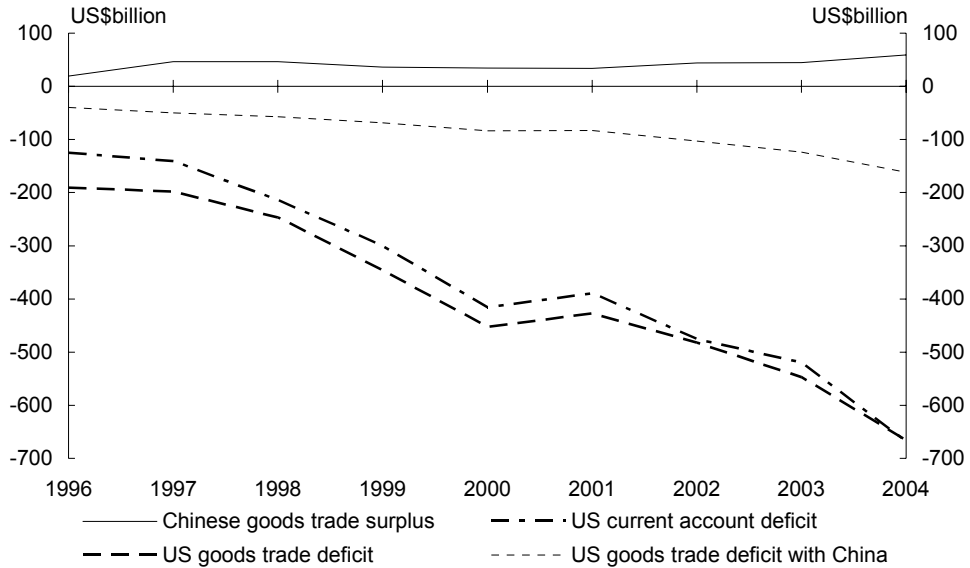
Chinese reserves are notably high relative to short-term external debt, which has been constrained by capital controls. The ratio of reserves to monthly imports is also high, with other emerging economies typically holding reserves equal to 5 to 9 months of imports (Prasad and Wei 2005).

The one measure on which China's reserves are comparatively low is the reserves to M2 ratio, which is a measure of vulnerability to capital flight by domestic residents. Most emerging economies have reserves equal to about 30 per cent of M2. Capital flight is not an immediate concern while China maintains capital controls. It may become more of an issue as China liberalises capital controls over coming years.

RMB undervaluation and global imbalances

How important is the undervalued RMB as a contributor to the US external imbalance? Chart 10 shows that the US deficit on trade with China accounts for about a quarter of the overall US goods trade deficit, which corresponds closely to the current account deficit. This is the same as its share in 1997, so China's 'contribution' to the increase in the US trade deficit since then has not been disproportionate.

Chart 10: China's trade surplus and the US trade deficit



Source: CEIC, US Bureau of Economic Analysis.

China's overall surplus on goods trade is much smaller than its surplus with the US, mainly due to its trade deficits with most other Asian economies. It is the overall surplus that matters for external balance, rather than the bilateral surplus with any one economy. Accordingly, achieving external balance will not necessarily mean that the US trade deficit with China will be eliminated.

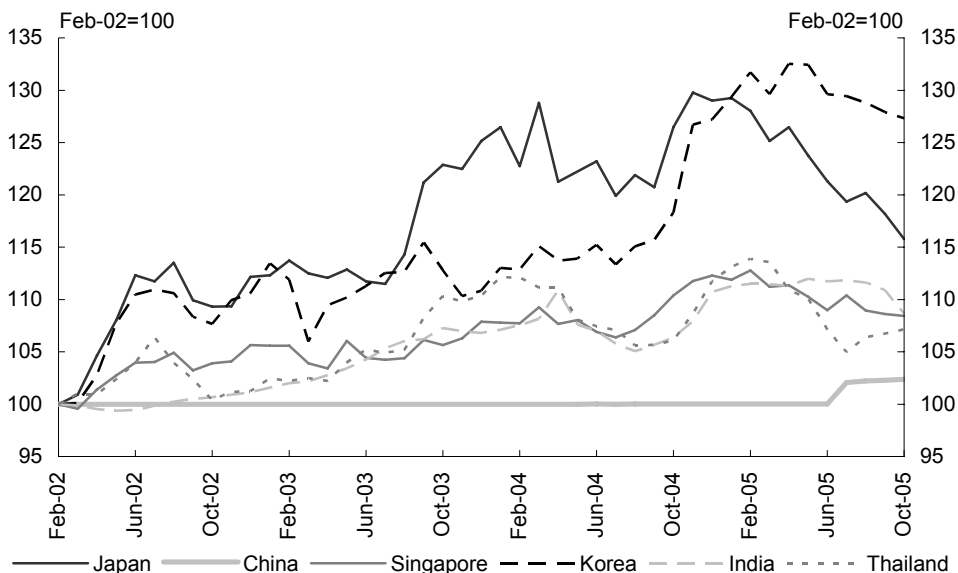
The impact of a RMB appreciation on the US trade deficit is proportional to China's share of US trade, and not to China's share of the US trade deficit. As China accounts for 11 per cent of the US TWI, a 20 per cent appreciation of the RMB against the US dollar would depreciate the US TWI by just over 2 per cent.

The effect may be larger if RMB appreciation were to induce appreciations of other Asian currencies, although the 21 July RMB revaluation has had little evident effect on the values of other Asian currencies against the dollar to date (Chart 11). Moreover, there has been very little foreign reserve accumulation by Asian economies in recent

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months, with the exception of China. Hence, recent exchange rate behaviour cannot be attributed to official intervention.

Chart 11: US dollar exchange rates for key Asian economies



Source: CEIC. Note: An upward movement in the index represents an appreciation of the Asian currency.

Many economists believe that a further US REER depreciation of 15 to 20 per cent may be needed if the US current account deficit is to fall to a sustainable level over the medium term (for example Obstfeld and Rogoff 2005).¹⁵ Even a large RMB appreciation would provide only a fraction of this. In any case, the primary role of the exchange rate is to facilitate adjustment in response to shifts in saving and investment, rather than to drive these shifts itself. If the underlying saving-investment imbalances

¹⁵ This is an estimate of depreciation needed to maintain internal balance if the current account deficit is to fall by half as a share of GDP. Assuming nominal US GDP growth averages 5 to 6 per cent, a deficit of 3 per cent of GDP would stabilise US net external liabilities at around 50 to 60 per cent of GDP. This would still be more than twice the current ratio of US external liabilities to GDP.

remain then exchange rate movements in isolation may do little to reduce external imbalances on a sustained basis. This is a standard outcome from economic modelling work on this issue.¹⁶

Hence, RMB adjustment would need to be combined with measures to expand domestic demand in China in order to have a significant impact on external imbalances. Given that Chinese investment is already very high, this will most likely take the form of measures to address factors contributing to China's high saving rate. These factors include financial underdevelopment, limited social safety nets and corporate governance shortcomings that contribute to high corporate saving. While exchange rate adjustment is important, it should not be overemphasised at the expense of other elements required to address imbalances.

The pace and sequencing of exchange rate adjustment

The rate at which China can move to a more flexible exchange rate regime is constrained by its weak banking system and underdeveloped financial markets. The pace of adjustment and its sequencing with other reforms will need to be carefully managed if the process is to be accomplished without destabilising the Chinese economy.¹⁷

Banks may be exposed to currency risk both directly and through exposures to borrowers adversely affected by currency movements. Chinese banks have a net foreign asset position, so their balance sheets would be adversely affected by RMB appreciation (Prasad et al 2005). Total exposures appear to have been limited, however, as a result of China's capital controls. Exposures on loans to the export sector are an additional source of risk, although exporters are shielded somewhat by the high import content of many exports.

Capacity to manage large currency fluctuations is also limited at this stage.¹⁸ China has taken important preparatory steps in setting up a forward foreign exchange market and introducing new foreign exchange contracts and market makers. But markets are

16 Park (2005), using the Oxford Economic Forecasting model, finds that a 20 per cent RMB appreciation would reduce the US current account deficit by 0.1 per cent of GDP after two years. Lee et al (2004), using the Asia-Pacific G-Cubed Model, find that a 10 per cent appreciation of emerging East Asian currencies would have close to zero effect on the US current account. The IMF (2005a), using its Global Economic Model, finds a larger, but still moderate impact. A 10 per cent appreciation by emerging East Asia would improve the US current account by around $\frac{3}{4}$ of a percentage point of GDP after three years.

17 See Prasad et al (2005) and Eichengreen (2005) for comprehensive discussions of these issues.

18 The RMB has, of course, fluctuated significantly against currencies other than the US dollar. However, China's external trade and financial transactions are primarily denominated in US dollars.

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still thin and Chinese banks and other firms have little experience in managing currency risk.

In these circumstances, there are good arguments for a managed transition that limits currency fluctuations until the Chinese financial system is stronger and more developed. The rate of adjustment should balance precautionary considerations against the need to develop risk management capacity. Currency movements should not be so restricted that firms will have little incentive to hedge currency risk, otherwise efficient and liquid markets for this purpose will not develop.

The appropriate rate of adjustment will also depend on whether the PBoC can continue to sterilise the monetary impacts of reserve accumulation. If monetary control becomes more difficult, there may be an argument for a faster pace of adjustment. Excessive monetary expansion would only aggravate future financial sector problems. One of the problems associated with a gradual approach is that speculative inflows are more likely to persist because the currency is seen as a 'one way bet', which means continued high reserve accumulation.

Getting the sequencing of exchange rate and capital account liberalisation right is also important. While the two are sometimes conflated, they are distinct (though related) issues. Liberalisation of the exchange rate need not imply liberalisation of the capital account. Retaining capital controls during the transition phase can assist a phased introduction of exchange rate flexibility.¹⁹ A cautious approach to capital account liberalisation is the more critical issue for financial system stability, as capital controls protect the banks from capital flight by depositors and restrict their external exposures.

There are also strong arguments for substantially increasing exchange rate flexibility before capital controls are dismantled. Experience indicates that inflexible exchange rate regimes that are seen to be misaligned are vulnerable to large flows of speculative capital that can be highly destabilising for developing economies.

Another factor that the Chinese Government may have to consider in determining the pace of adjustment is the need to keep in check protectionist pressures in the US and elsewhere. The US Administration has responded positively to the changes announced on 21 July and has so far been able to dissuade Congress from further consideration of protectionist measures. The more slowly Chinese authorities move, however, the more likely it is that political pressures for retaliatory action will mount.

19 While capital controls are clearly not watertight, the continued ability of the Chinese authorities to control the exchange rate, domestic interest rates and (to a reasonable degree) the money supply suggests that capital mobility is still relatively restricted. Low levels of external debt also point to some controls being effective. Expectations of RMB appreciation would provide incentives to take on US dollar-denominated debt.

Conclusion

Analysis of internal and external balance for China suggests the RMB is significantly undervalued. On any reasonable basis, China currently has a very large underlying imbalance between capital and current account flows. While the precise figure depends on the equilibrium exchange rate model used, most studies suggest a real RMB appreciation of between 15 and 30 per cent may be required for macroeconomic balance in the medium term. Other approaches that suggest a smaller undervaluation are hard to reconcile with the requirements for external balance.

Maintaining an undervalued RMB entails costs for China, including foregone purchasing power over imports, opportunity costs of reserve accumulation in excess of prudent requirements, exposure to currency losses and reduced monetary policy autonomy. These costs have not been prohibitive to date. Importantly, China has been able to limit potential inflationary effects of large-scale foreign reserve accumulation through sterilisation. It is unclear how long this can continue, however, as sterilisation at recent levels is not indefinitely sustainable. Moderation of speculative capital inflows would help, but this is unlikely while the RMB is seen as a 'one way bet'.

The contribution of an undervalued RMB to the US external imbalance is not as large as sometimes suggested. Even a large RMB appreciation would only contribute a fraction of the dollar depreciation that may be needed if the US current account is to be reduced to a sustainable level. Moreover, RMB appreciation may have little sustained impact on external imbalances unless supported by measures to reduce saving in China and increase saving in the US. This is not to deny the need for exchange rate adjustment, but this should be seen as a necessary, not sufficient, condition for external adjustment.

Given China's weak banking system and underdeveloped financial markets, the pace of adjustment and its sequencing with other reforms need to be carefully managed. That said, China should be able to move further in increasing flexibility than it has done to date without putting financial stability at risk. A wider range of RMB movement against the US dollar would help develop the capacity and markets to manage currency risk. In terms of financial stability, the more critical imperative is a cautious approach to liberalising the capital account. Experience in other emerging market economies suggests that strengthening the financial system and increasing exchange rate flexibility are both important pre-conditions for capital account liberalisation.

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Recent developments in Australian bond yields

Benjamin Ford and Karen Taylor¹

The yield curve typically slopes upwards as bond investors require higher interest rates to hold bonds of longer maturities. For most of 2005, the Australian yield curve has been close to flat, or negatively sloped. The traditional interpretation of such a development is that the bond market expects lower future short-term interest rates and weaker future economic activity. However, this conclusion is at odds with the recent performance of the Australian economy and the outlook for 2005-06. The paper argues that a combination of domestic and international developments have suppressed long-term bond yields.

1 The authors are from Macroeconomic Policy Division, the Australian Treasury. This article has benefited from comments and suggestions provided by Adam McKissack, Paul O'Mara, David Parker, Martin Parkinson, Craig Thorburn and David Turvey. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

Introduction

The Australian yield curve has been close to flat or negative for most of 2005, with the spread of the 10-year Government bond yield over the cash rate averaging minus 13 basis points and reaching a low of minus 44 basis points in August 2005.

In contrast to previous episodes of a flat or negatively sloped yield curve, the movements in the spread have been driven by a fall in long bond rates rather than rises in short-term interest rates resulting from monetary tightening. As movements in Australian long-term bond yields are strongly correlated with those in the United States (US) and globally, it may be difficult to isolate the relative contributions of domestic and international factors. In particular, it is possible that there may be a speculative element in global bond prices for some of this period. In this case, current long-term bond yields may not be an accurate reflection of market expectations about future real economic activity and bond prices would be expected to adjust downwards (that is, yields rise) as the speculative element moderates.

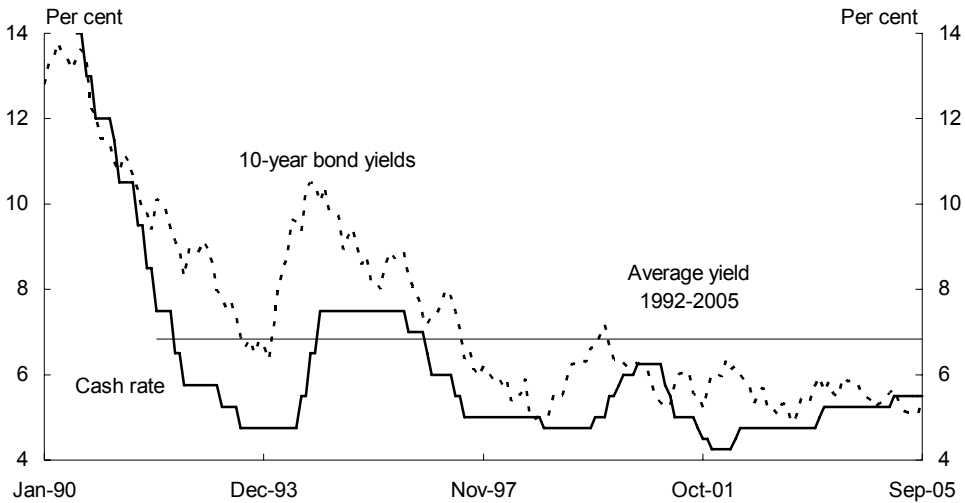
On the other hand, economic commentators have identified a range of longer term factors which suggest current low bond yields may be a rational reflection of longer term factors being taken into account by bond markets. Such factors include a structural decline in inflation and inflation expectations, excess global savings placing pressure on bond yields (the 'global savings glut' hypothesis) and a change in the portfolio preferences of investors, represented by a shift away from equities and shorter maturity bonds to 10-year government bonds.

The purpose of this paper is to provide an overview of recent developments in Australian bond yields and to describe some of the major factors which have driven these developments.

Recent developments in long-term bond yields

Over the last decade, long-term bond yields have declined in Australia (Chart 1). This decline, in part, reflects the presence of more stable economic conditions and the structural decline in both inflation and inflation expectations since the early 1990s.

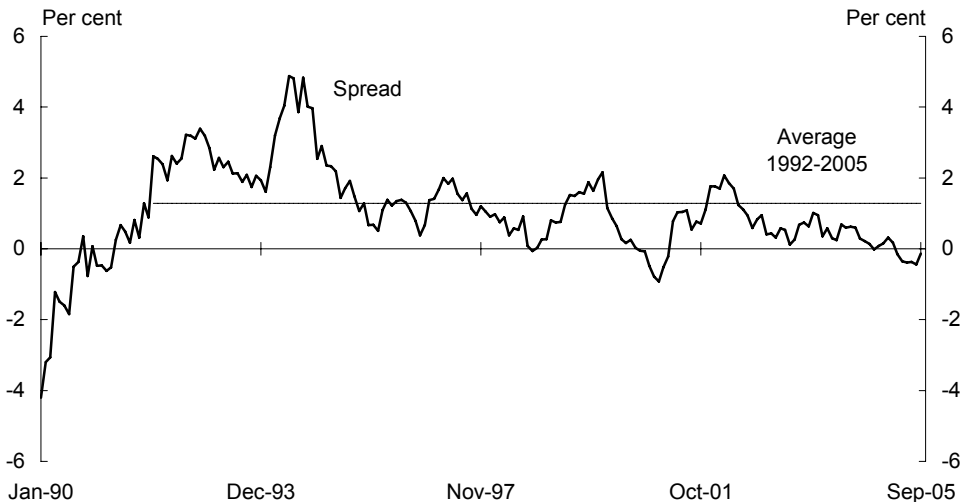
Chart 1: Australian long-term bond yields



Source: RBA Bulletin Database.

Since mid-2004, long-term bond yields in Australia have declined further, with Australian yields well below their average since 1992. Over this time, the narrowing in the yield spread has primarily resulted from a fall in the long-term bond rate. This is because the fall in the long-term bond yield has been larger than the fall in the cash rate (Chart 2).

Chart 2: Australian yield spread^(a)



(a) Spread between 10-year bond yield and monetary policy rate.

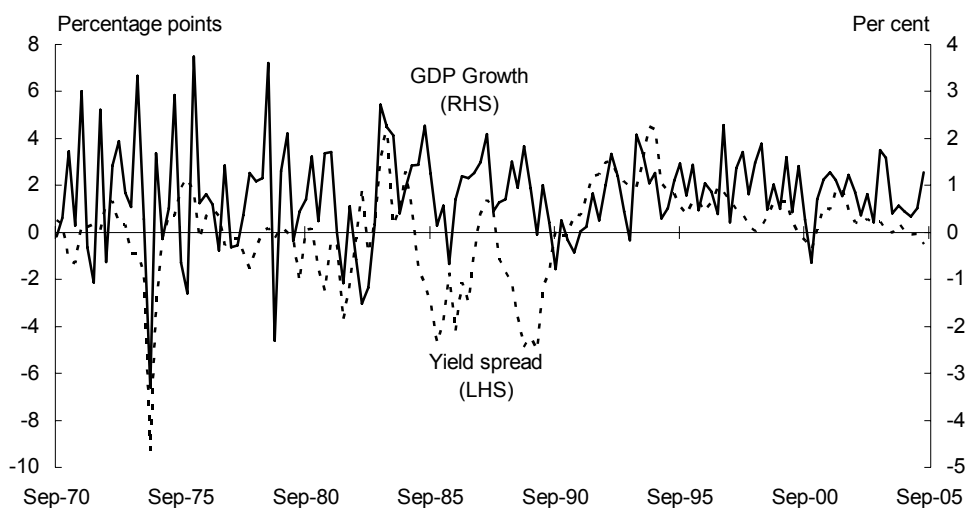
Source: RBA Bulletin Database; OECD Main Economic Indicators Database.

The information content of bond yields

The yield curve typically slopes upwards as bond investors require higher interest rates to hold bonds of longer maturities. This is known as the liquidity or term premium. However, bond yields may also provide information about financial market expectations of future real economic activity.

Historically, there has been a correlation between the slope of the yield curve (measured by the spread) and expectations of future inflation and economic activity, with an upward-sloping (flat or inverted) yield curve interpreted as signalling stronger (weaker) real economic activity and inflation in the future (Chart 3). This correlation has been supported empirically, with various studies finding a significant relationship in OECD countries between the yield spread and measures of future real economic activity such as real GDP, industrial production and consumption (for a comprehensive review of these studies see Stock and Watson 2003).

Chart 3: Yield spread and GDP growth^(a)



(a) Yield spread is the difference between the yields on 10-year government bonds and 90-day bank bills. GDP data is quarterly and the yield spread is a quarterly average of monthly data. Source: ABS cat. no. 5206.0; RBA Bulletin Database.

A standard economic explanation for the relationship between the yield spread and future economic growth is that, when the economy is strong, there will be an expectation of higher average short-term interest rates in the future. Expectations of higher average short-term rates will lead to bond yields being higher than present short-term rates and thus to a higher yield spread. Conversely, when the economy is weak there will be an expectation of lower average short-term interest rates in the future, leading to a lower (and possibly negative) yield spread.

The traditional interpretation of a narrowing spread preceding a decline in future real economic activity would suggest that financial markets are expecting weakness in the Australian economy. However, such a view is at odds with the performance of the Australian economy, which has achieved solid real GDP growth and strong employment growth. The outlook is also positive, with solid real economic growth expected in 2005-06. In addition, the narrowing spread over the last few years has primarily been driven by a fall in long-term bond yields, rather than monetary tightening. This contrasts with previous episodes of narrowing yield spreads, such as in the late 1980s, which were primarily driven by rising short-term rates due to monetary policy tightening.

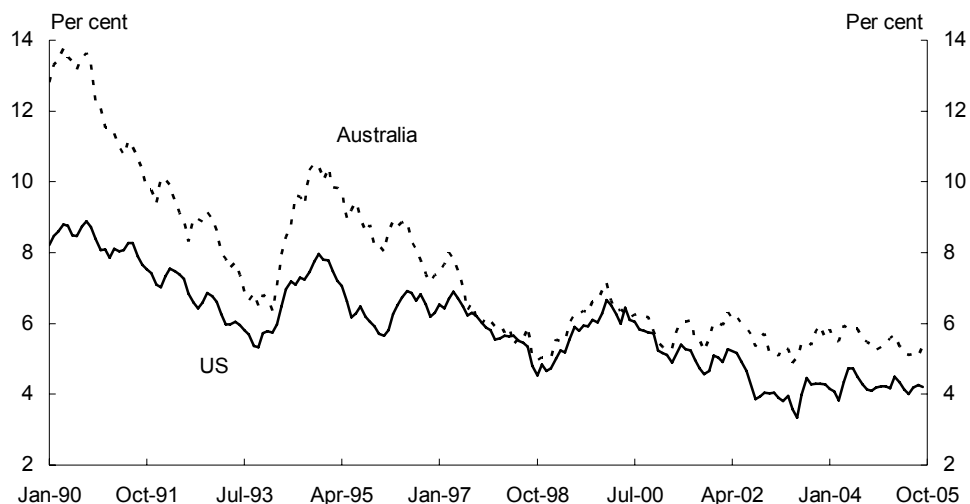
Given the recent performance of the Australian economy and the positive outlook for 2005-06, the fall in the Australian yield spread may well be a rational response by bond market participants to improved economic conditions. That is, the fall in long-term bond yields will have been driven, in part, by a structural decline in inflation and inflation expectations due to more credible monetary policy and more stable economic conditions. This would decrease the spread as long-term bond investors are willing to bear risk at a lower level of nominal return. This suggests that some flattening of the slope of the yield curve may well be consistent with a market view that the economy is expected to grow at, or around, its trend rate and is not facing significant inflationary pressures.

That said, portfolio preference considerations would continue to suggest, other factors unchanged, some upward slope to the yield curve. This is because higher interest rates are generally required for bond investors to hold bonds of longer maturities. This suggests that factors other than expectations about future conditions in the Australian economy have been influencing long-term bond yields.

Economic and financial developments

Movements in the long end of the Australian yield curve are strongly correlated with movements in the long end of the US yield curve (Chart 4). Consequently, the influences which are affecting bond yields in the US most likely explain some of the movements in Australian bond yields.

Chart 4: Australian and US long-term bond yields



Source: RBA Bulletin Database.

Similar to Australia's experience, there has been a structural decline in both inflation and inflation expectations in the US and elsewhere. This has occurred as a result of increased central bank credibility in combating inflation, which has been supported by enhanced global competition and additions to world production and trade, most prominently from China and India, which have put downward pressure on the prices of some traded goods. This may explain, in part, the fall in bond yields in the US, but as in the case of Australia, not all of the fall. As in Australia, there are concerns in the US that long-term bond yields are low relative to the economy's fundamentals and future growth prospects. This is what the current Chairman of the US Federal Reserve, Alan Greenspan, referred to in Congressional testimony in February 2005, as the 'conundrum' of the current behaviour of world bond markets, noting that movements in bond prices may well be a short-term aberration.

A possible explanation for current US and global bond rates is the 'global savings glut' hypothesis. The hypothesis proposes that global imbalances in saving and investment are largely due to the supply of saving being significantly higher over the past decade compared to desired investment in Asia and other parts of the world. A prominent proponent of this view is US Federal Reserve Chair nominee Ben Bernanke, who argues that a global savings glut helps to explain the increase in the US current account deficit and the relatively low levels of long-term real interest rates around the world. In particular, according to the Bernanke thesis, the current account deficits in the US and other industrialised nations are being funded by the current account surpluses of Asia and increasingly the Middle East.

A global savings glut relative to investment is likely, however, to be just one part of the story. As the International Monetary Fund (IMF) explains, global saving and investment rates have been falling in recent years. According to the IMF's recent *Global Financial Stability Report* (GFSR), the decline in global saving has been largely due to the decline in public saving in the US, increases in asset prices, and demographic changes in Japan and Europe; while changes in investment have been due to the investment slump in Asian economies (excluding China). The global nature of these factors means that the unwinding of imbalances will require policy responses across many countries.

The IMF's GFSR highlights another potential structural influence on the low levels of bond yields at the long end of the curve across mature markets: a possible shift in the portfolio preferences of investors, particularly large overseas pension funds and insurance companies. These pension funds and insurance companies are showing signs of increasing their holdings of long-term fixed-income securities and reducing the share of equities in their portfolios. While evidence of a substantial preference shift is far from conclusive at present, it has emerged that there exists a duration mismatch between assets and liabilities.

The IMF notes that defined benefit pension funds and life insurance companies have increased their level of interest in longer dated fixed-income assets. This increased interest has been influenced by growing awareness among pension fund administrators and regulators that there is a mismatch between the underlying assets and liabilities of many defined benefit pension funds. Financial market commentary (see, for example, a recent Goldman Sachs report entitled *The Impact of Pension Reform on the Capital Markets*) has identified three drivers of this mismatch.

First, some overseas pension funds are underfunded, meaning that the present value of their assets is less than their obligations. Underfunding has arisen because lower returns from traditional equity classes have reduced the value of underlying assets and because of historically low fund cash contributions, which were a response to previously high asset returns and optimistic expectations about future returns. Second, the asset mix of these pension funds tends to be of short duration relative to the length of liabilities. As a result, lower interest rates increase the present value of liabilities faster than the fund's underlying assets. Third, increased life expectancy has increased the average length of time over which benefits must be paid, further raising the present value of liabilities.

The extent to which the response of pension funds to this asset-liability mismatch has influenced bond yields is difficult to separate from the effect of more general pension fund activity across all asset classes. That said, ageing populations in many OECD countries will likely increase the total assets of pension funds and life insurance companies. Given these funds still face significant duration gaps, there may be an

ongoing shift in favour of fixed income securities which could influence long-dated yields over the medium to long term.

Conclusions

The flatness of the yield curve in Australia, the US, and elsewhere reflects, in part, the benefits of credible monetary policy frameworks which have kept inflation low and output more stable. However, the current flatness of the Australian curve is difficult to explain by domestic factors alone. There are reasons to believe that the global factors holding down long rates may persist for some time and will, most likely, unwind in an orderly fashion. That said, were there to be a disorderly shift in global markets, it would impact on all countries, including Australia.

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2004-05 in review: strong labour market outcomes and continuing growth

The Australian economy grew by 2.3 per cent in 2004-05, following strong growth in the previous year. This outcome was weaker than the 2004-05 Budget and MYEFO forecasts.¹

Notwithstanding modest output growth, employment increased by a strong 3.0 per cent in 2004-05, reducing the unemployment rate to a 28-year low of 5.0 per cent by the end of the year. In addition, the participation rate rose to a then record high of 64.6 per cent by June 2005. Nominal wages growth was contained, with significant wage pressures confined to a small number of industries. Inflation remained around the middle of the RBA target band, with little evidence of any substantial second-round price effects from the 34 per cent increase in oil prices over the year.

Household consumption growth moderated in line with a mild downturn in the dwellings sector, with household wealth accumulation slowing as house prices flattened. The decision by the Reserve Bank to increase the cash rate by 25 basis points in March 2005 may have also impacted upon growth in both of these sectors. Business investment grew strongly in 2004-05, supported by solid growth in corporate profits and high rates of capacity utilisation across a broad range of industries.

Although the world economy grew at its fastest pace in close to 30 years, led by China and the United States, this was not reflected in Australia's export volumes — due largely to lingering effects of the rapid appreciation of the exchange rate in 2003-04 and a variety of constraints in the resources sector. Import volumes, on the other hand, grew strongly, supported by solid domestic demand. However, strong world growth did generate surging commodity prices, pushing the terms of trade to 30-year highs. The current account deficit widened to 6.4 per cent of GDP in 2004-05 from 5.6 per cent in the previous year.

1 This article is based on the annual national accounts, and was completed prior to release of the September quarter accounts.

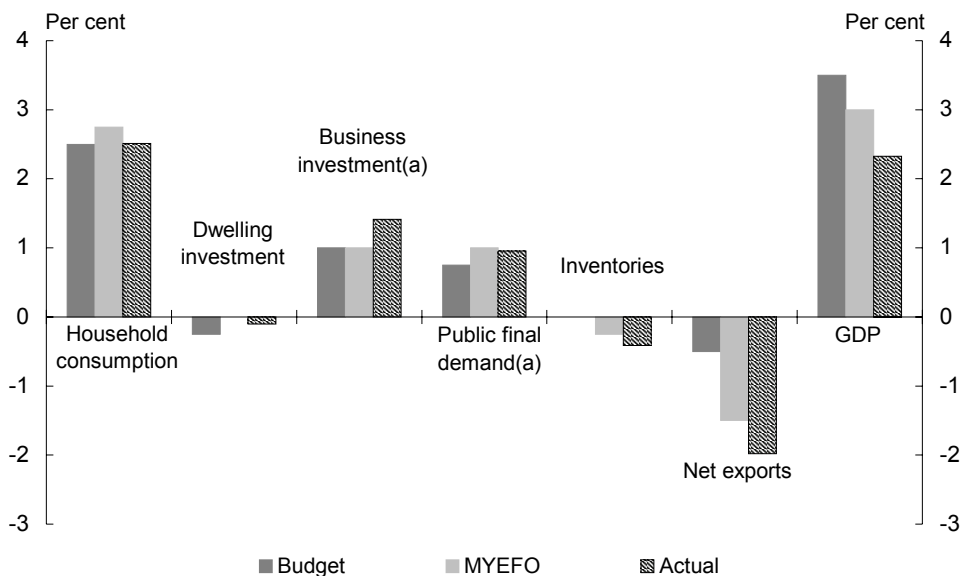
The domestic economy – forecasts and outcome

Real GDP growth in 2004-05 was weaker than in the preceding year, and less than forecast at Budget (in May 2004) and MYEFO (in December 2004). Table 1 provides details.

At the time of the 2004-05 Budget, the Australian economy was forecast to continue to grow solidly, with the sources of growth expected to rebalance from the domestic to the external sector. Household consumption growth was expected to moderate in line with a modest fall in dwelling investment, while exports were expected to rebound as the recovery in the world economy gained strength and rural production increased.

At MYEFO the forecast for GDP was revised down, largely reflecting expectations of weaker export growth. This was primarily due to prospects of lower yields from grain harvests and lower production in the resources sector. A stronger forecast for domestic final demand provided a partial offset, with consumption expected to respond to a number of Budget initiatives (including tax cuts and increases in the Family Tax Benefit).

Chart 1: Contributions to GDP growth in 2004-05



Source: ABS cat. no. 5204.0 and Treasury.

(a) Excludes second-hand asset sales between business investment and public final demand.

GDP growth in 2004-05 was below both the Budget and MYEFO forecasts, with the anticipated rebalancing of growth not unfolding to the degree that was expected (Chart 1). As forecast, growth in domestic demand moderated in 2004-05, although the composition of growth differed somewhat from the forecasts. Consumption growth

was slightly weaker than expected at MYEFO (as households appeared to save a more substantial proportion of the proceeds from the Budget initiatives than anticipated), while business investment growth was considerably stronger than forecast at Budget and MYEFO.

Table 1: Domestic economy forecasts^(a)

| | Outcomes(b) 2003-04 | 2004-05 Budget forecasts | 2004-05 MYEFO forecasts | Outcomes(b) 2004-05 |
|---|------------------------|--------------------------------|-------------------------------|------------------------|
| Panel A - Demand and output(c) | | | | |
| Household consumption | 5.5 | 4 1/4 | 4 1/2 | 4.3 |
| Private investment | | | | |
| Dwellings | 4.0 | -3 | 0 | -1.5 |
| Total business investment(d) | 13.2 | 7 | 7 | 11.1 |
| Non-dwelling construction(d) | 8.2 | 6 | 2 | 6.8 |
| Machinery and equipment(d) | 14.8 | 8 | 10 | 15.0 |
| Private final demand(d) | 6.4 | 4 | 4 1/4 | 4.3 |
| Public final demand(d) | 3.7 | 3 1/2 | 5 | 4.4 |
| Total final demand | 5.8 | 4 | 4 1/2 | 4.4 |
| Change in inventories(e) | | | | |
| Private non-farm | 0.2 | 0 | 0 | -0.3 |
| Farm and public authorities(f) | 0.4 | - 1/4 | 0 | -0.1 |
| Gross national expenditure | 6.3 | 3 3/4 | 4 1/4 | 3.9 |
| Exports of goods and services | 1.4 | 8 | 4 | 2.7 |
| Imports of goods and services | 12.7 | 9 | 10 | 12.2 |
| Net exports(e) | -2.1 | - 1/2 | -1 1/2 | -2.0 |
| Gross domestic product | 4.0 | 3 1/2 | 3 | 2.3 |
| Non-farm product | 3.5 | 3 1/2 | 3 | 2.6 |
| Farm product | 34.4 | 4 | -2 | -6.1 |
| Panel B - Other selected economic measures | | | | |
| External accounts | | | | |
| Terms of trade | 7.1 | 4 1/2 | 7 1/4 | 9.7 |
| Current account balance | | | | |
| \$billion | -47.0 | -43 1/2 | -51 | -56.9 |
| Percentage of GDP | -5.6 | -5 | -6 | -6.4 |
| Labour market | | | | |
| Employment (labour force survey basis) | 1.8 | 1 3/4 | 2 | 3.0 |
| Unemployment rate (per cent) | 5.8 | 5 3/4 | 5 1/2 | 5.3 |
| Participation rate (per cent) | 63.5 | 63 1/2 | 63 1/2 | 64.0 |
| Prices and wages | | | | |
| Consumer Price Index | 2.4 | 2 | 2 1/4 | 2.4 |
| Gross non-farm product deflator | 3.1 | 2 1/2 | 3 1/4 | 3.8 |
| Wage Price Index | 3.6 | 3 3/4 | 3 1/2 | 3.8 |

(a) Percentage change on preceding year unless otherwise indicated.

(b) Calculated using original data.

(c) Chain volume measure.

(d) Excluding second-hand asset sales between the business and public sector.

(e) Percentage point contribution to growth in GDP.

(f) For presentation purposes, changes in inventories held by privatised marketing authorities are included with the inventories of the farm sector and public marketing authorities.

Source: ABS cat. no. 5204.0, 5302.0, 6202.0, 6345.0, 6401.0, unpublished ABS data and Treasury.

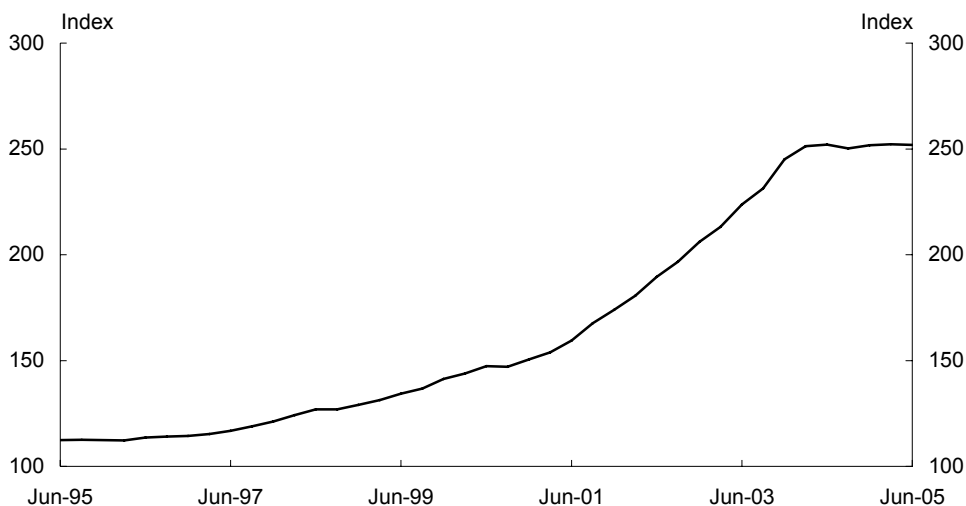
However, Australia's net export position did not improve in 2004-05. Export growth was weaker than expected, largely reflecting constraints in the resources sector and a fall in farm production, while imports were stronger than expected. The anticipated rebalancing of growth from the domestic to the external sector nevertheless began to emerge in the second half of 2004-05.

Household consumption

Household consumption increased by 4.3 per cent in 2004-05, following 5.5 per cent growth in the previous year, in line with the Budget forecast.

As anticipated at Budget, consumption growth moderated as household wealth accumulation slowed, reflecting the long-anticipated easing in the housing cycle. Nominal house prices were flat in 2004-05, with falls in Sydney and Melbourne balanced by modest rises in Brisbane and Perth (Chart 2). Growth in real household wealth eased as a result, increasing by 9.5 per cent in 2004-05 (compared to 17.9 per cent growth in the previous year), with the strong rise in the stock market in 2004-05 contributing to this increase.

Chart 2: ABS established house prices



Source: ABS cat. no. 6416.0.

With household income continuing to grow strongly in 2004-05, the slowing in consumption growth was associated with a modest improvement in household saving. This development was neither unexpected nor unwelcome, as consumption had been growing ahead of income for a number of years, supported by strong increases in household wealth and facilitated by increased access for consumers to their housing equity and other forms of credit.

Dwelling investment

Dwelling investment decreased by 1.5 per cent in 2004-05, a very mild downturn relative to previous dwelling investment cycles.

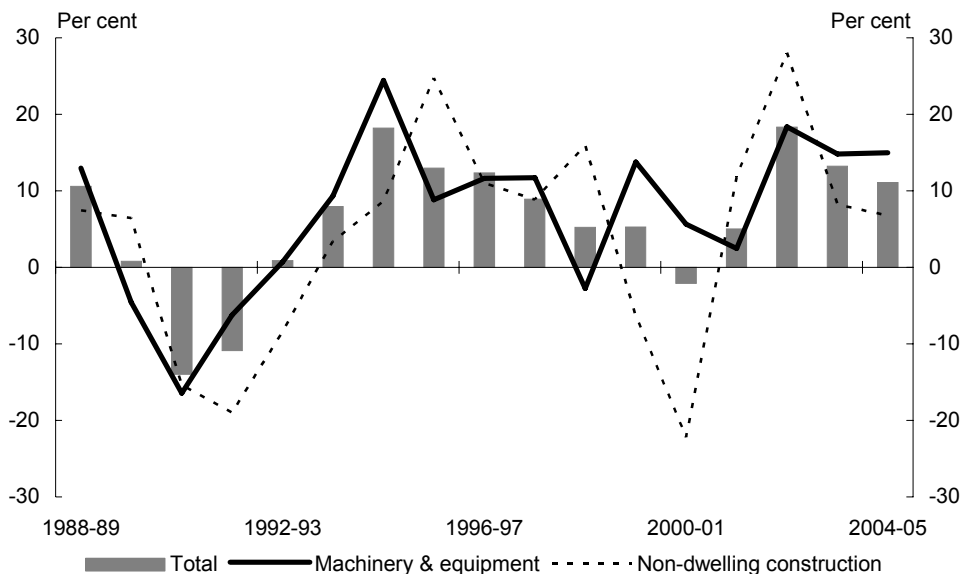
The downturn was smaller than forecast at Budget, when the lagged effects of previous interest rate increases and an apparent weakness in underlying demand for dwellings were expected to lead to a modest fall in detached housing construction. Medium-density construction was also expected to fall at Budget amid concerns of oversupply in the Sydney and Melbourne inner-city apartment markets.

The mild nature of the downturn reflected the absence of the usual triggers for a downturn, such as sharp increases in interest rates or the unemployment rate. It also reflected strong growth in household incomes through 2004-05, underpinned by strong employment growth and solid wages growth.

Business investment

Business investment grew strongly in 2004-05, supported by a solid increase in corporate profits, strong corporate balance sheets and a low cost of capital (Chart 3). The 11.1 per cent increase was greater than the Budget and MYEFO forecasts.

Chart 3: Business investment
Annual percentage change



Source: ABS cat. no. 5204.0 and Treasury. Excluding second-hand asset sales from the public sector.

2004-05 in review: strong labour market outcomes and continuing growth

Investment in machinery and equipment increased by a very strong 15.0 per cent in 2004-05, well above forecasts. Growth was strong across a broad range of industries, consistent with sustained high rates of capacity utilisation in most sectors and ongoing solid profit growth.

Investment in non-dwelling construction increased by 6.8 per cent in 2004-05. Engineering construction investment grew strongly, following three years of very strong activity – driven largely by investment in road infrastructure, particularly ongoing investment by the private sector in public infrastructure. Non-residential building investment increased solidly, underpinned by investment in the retail sector. The MYEFO forecast for non-dwelling construction investment was downgraded from Budget amid concerns that some of the larger proposed engineering construction projects, particularly in the resources sector, could be delayed due to firms having difficulty in finding appropriately skilled labour.

Public sector

Public final demand increased by 4.4 per cent in 2004-05, stronger than the Budget forecast (but weaker than the MYEFO forecast), with both Commonwealth and State and local final demand growing above trend.

Public sector consumption growth was solid, with all levels of government increasing spending at around trend rates of growth. However, public sector investment increased strongly at all levels of government. In particular, Commonwealth defence investment rebounded very strongly after a substantial fall in 2003-04. Investment by State and local public corporations also increased strongly after a small decrease in the previous year.

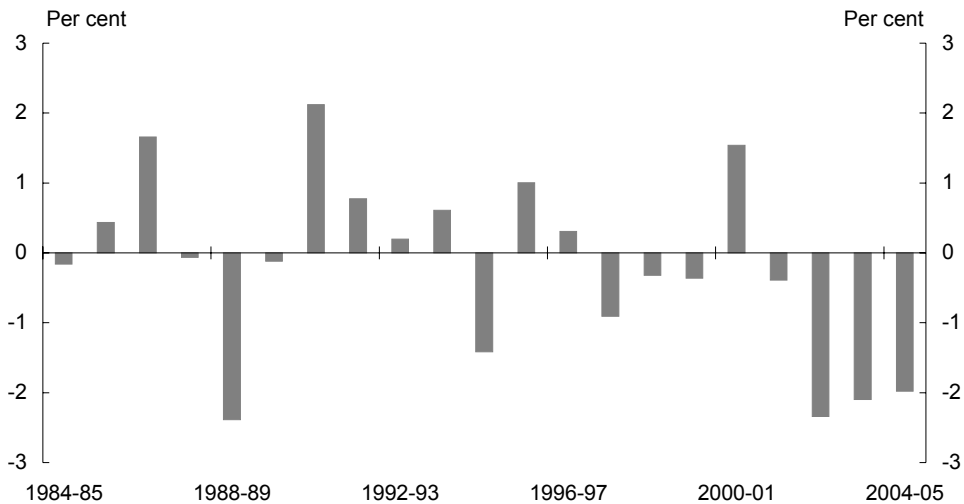
External sector

Net exports subtracted 2.0 percentage points from output growth in 2004-05, as the anticipated rebalancing of growth failed to unfold as expected (Chart 4). This outcome was substantially weaker than forecast, with stronger-than-expected growth in import volumes and the anticipated boost in commodity export volumes taking longer than expected to materialise. Nevertheless, the anticipated rebalancing did begin to emerge in the second half of 2004-05.

Export volumes increased by 2.7 per cent in 2004-05, well below forecasts. All categories of goods exports recorded subdued growth, while service exports were flat.

Despite a stronger-than-anticipated increase in world growth, non-rural commodity exports were weaker than expected.² There has been significant investment undertaken in the resource sector in recent years in response to burgeoning global demand for commodities. However, as the lead times associated with some projects have been longer than anticipated, production has taken longer to come on-line. Although strong, coal export volumes were hampered by a variety of constraints in coal supply chains, while declining productivity in some oil fields and a number of unexpected gold mine closures curbed production in these sectors.

Chart 4: Net exports
Contribution to annual percentage change in real GDP



Source: ABS cat. no. 5204.0.

Rural exports were also weaker than expected, reflecting a fall in rural production (following a record winter grains harvest in 2003-04). Rural production was hampered by unfavourable rainfall distribution and timing in several crop-growing regions in late 2004 and early 2005.

Exports of manufactures were again weak in 2004-05, although in line with expectations. The ongoing poor performance of this export category reflects increased competition as low-cost economies increase the complexity of their exports, the maturation of the sector within Australia and a relatively high exchange rate.

Service exports were much weaker than expected, following three years of poor outcomes, with both tourism and education-orientated service exports posting weak

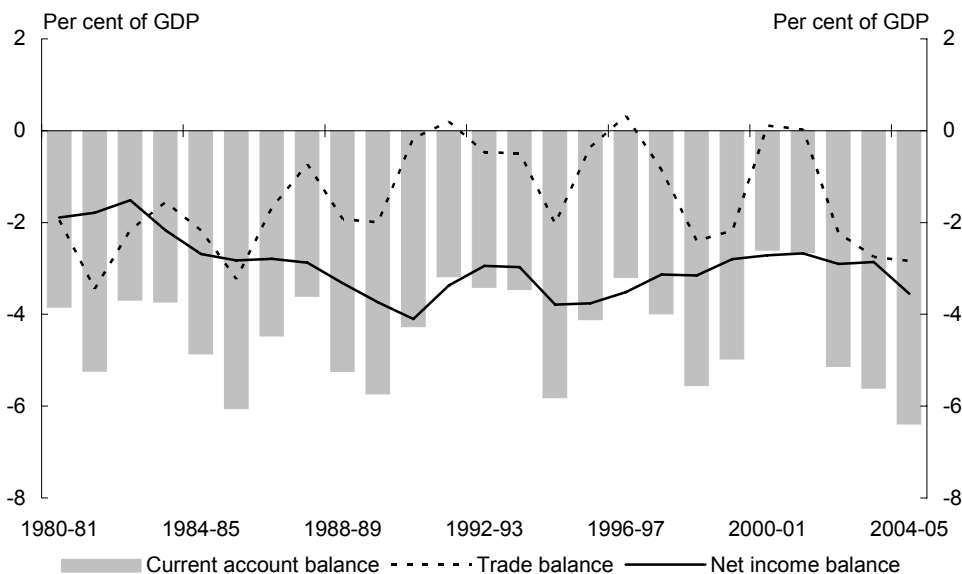
² Mining commodity exports are discussed further in another article in this issue of the Economic Roundup, see pages 1 to 15.

results. The impact of increased security concerns and a relatively high exchange rate are important factors in explaining this trend.

Imports increased by 12.2 per cent in 2004-05.³ This result was stronger than the Budget forecast, in part reflecting a greater-than-expected increase in gross national expenditure. The strong outcome was led by very strong growth in capital goods imports, particularly machinery and industrial equipment, reflecting the strong outcome for business investment. Growth in consumption goods imports was also strong.

Although the expected growth in export volumes failed to materialise, the price of exports increased strongly in 2004-05, most notably for iron ore and metallurgical coal. This is reflected in the terms of trade, which increased by almost 10 per cent in 2004-05, significantly greater than was forecast.

Chart 5: Current account balance and components
Per cent to GDP



Source: ABS cat. no. 5204.0.

The CAD widened from 5.6 per cent of GDP in 2003-04 to 6.4 per cent in 2004-05, well above forecasts (Chart 5). Despite the large increase in the terms of trade, the nominal trade deficit remained relatively unchanged, with growth in import volumes exceeding growth in export volumes. At the same time, the net income deficit widened from 2.9 per cent of GDP to 3.5 per cent, reflecting increased income flows overseas

3 Imports were discussed in an article in the Summer 2004-05 issue of the Roundup.

(largely a consequence of the level of foreign ownership of Australian mining companies).

Labour market

Employment growth was significantly stronger than expected in 2004-05. At Budget, employment growth was expected to ease in 2004-05, in line with the forecast moderation in economic growth, particularly given that much of the expected growth in 2004-05 was anticipated to be in capital-intensive industries, such as mining. While economic growth moderated in 2004-05, employment did not follow (see Box 1: Perplexing labour market trends).

The strong employment outcomes recorded throughout 2004-05 reduced the unemployment rate from 5.6 per cent in June 2004 to a 28-year low of 5.0 per cent by June 2005.

Wages

Wage increases were solid but contained in 2004-05, with the Wage Price Index (WPI) increasing by 3.8 per cent in year-average terms, in line with Budget expectations.

Despite the stronger-than-expected increases in employment in 2004-05, and a low unemployment rate, strong wage increases remained confined to particular occupations and industries. This can be attributed, in part, to Australia's more flexible labour market. Within the private sector, the most significant increases in wages were in the fast-growing construction and mining industries. In contrast, the most subdued outcomes were recorded for the accommodation, cafes and restaurants sector and the transport and storage sector.

Public sector wages continued to increase at a greater rate than private sector wages in 2004-05, with the WPI for public sector employees rising by 4.3 per cent compared to 3.7 per cent growth for private sector employees.

Prices

Inflation was moderate in 2004-05, with the Consumer Price Index (CPI) increasing by 2.4 per cent in year-average terms. This outcome was greater than forecast, primarily due to the larger-than-expected increase in oil prices.

Automotive fuel was a major contributor to inflation in 2004-05. Oil prices increased substantially over the year, from \$54.8 per barrel (WTI) in the month of June 2004 to \$73.4 per barrel in June 2005 (an increase of 34.0 per cent). Abstracting from the direct

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effect of oil prices, inflation was subdued, with the CPI excluding automotive fuel increasing by 2.0 per cent in 2004-05. This suggests that the increase in oil prices did not result in any significant second-round price effects.

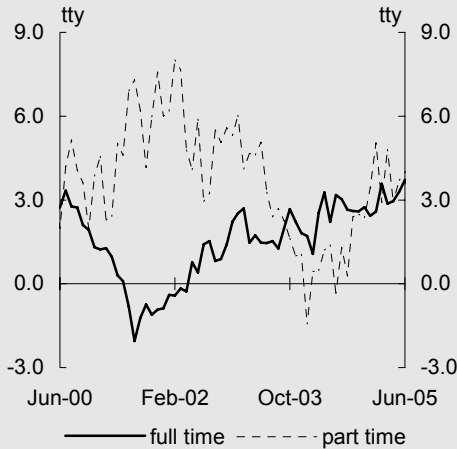
House purchase prices were also a major contributor to inflation, reflecting ongoing increases in material and labour costs in the construction industry. Other significant contributors to inflation included food, health services and education.

Box 1: Perplexing labour market trends

The labour market surpassed all expectations in 2004-05. The unemployment rate reached a 28-year low, a record 10 million people were in employment at the end of the year and the participation rate reached a record high.

Strong employment growth in 2004-05 was recorded in both full-time and part-time jobs (Chart A).

Chart A: Full-time and part-time employment growth



Source: ABS cat. no. 6202.0.

Trend rates of growth in economic output generally produce around trend rates of employment growth with a lag of around two quarters.

However, employment grew by 3.0 per cent in 2004-05, well above the

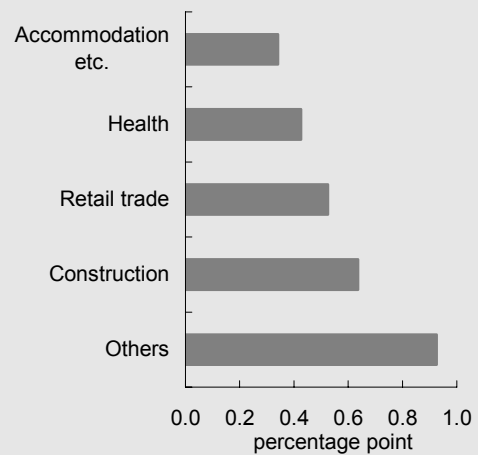
10-year average of around 2 per cent, despite the non-farm economy growing slightly below trend.

Part of the underestimation can be explained by a disjoint that developed between growth in the non-farm economy and growth in employment.

That said, the exceptionally strong employment growth was driven by strong growth in some key sectors of the economy.

The construction sector grew strongly through the year to June 2005 which led to very strong employment growth. While domestic consumption eased slightly from the very strong growth rates in the previous two years, employment growth in the retail sector remained strong (Chart B).

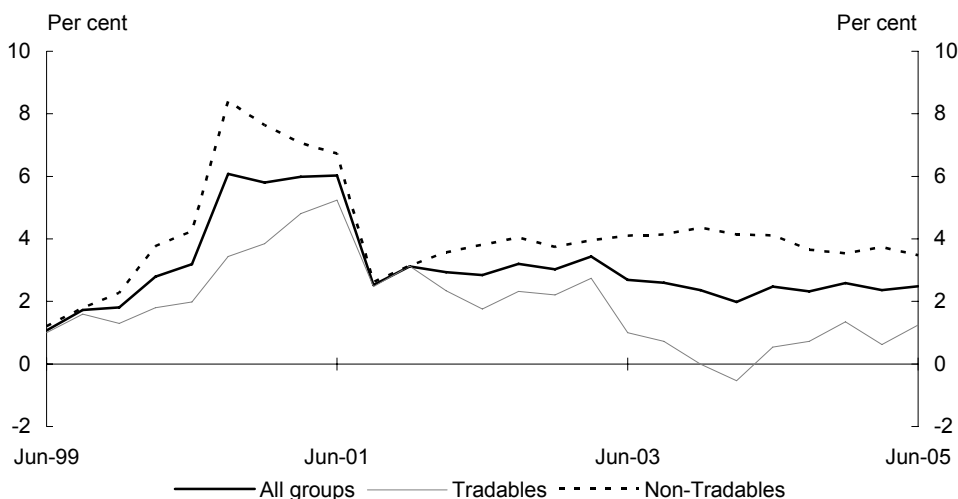
Chart B: Industry contribution to employment growth



Source: ABS cat. no. 6291.55.001.

The difference between non-tradable and tradable inflation diminished in 2004-05 relative to the previous year (Chart 6). Non-tradable inflation decreased from 4.2 per cent to 3.6 per cent (in through-the-year terms), consistent with easing domestic demand, while tradable inflation increased from 0.2 per cent to 1.0 per cent, largely reflecting the increase in oil prices.

Chart 6: Consumer price inflation
Percentage change through the year



Source: ABS cat. no. 6401.0.

The world economy

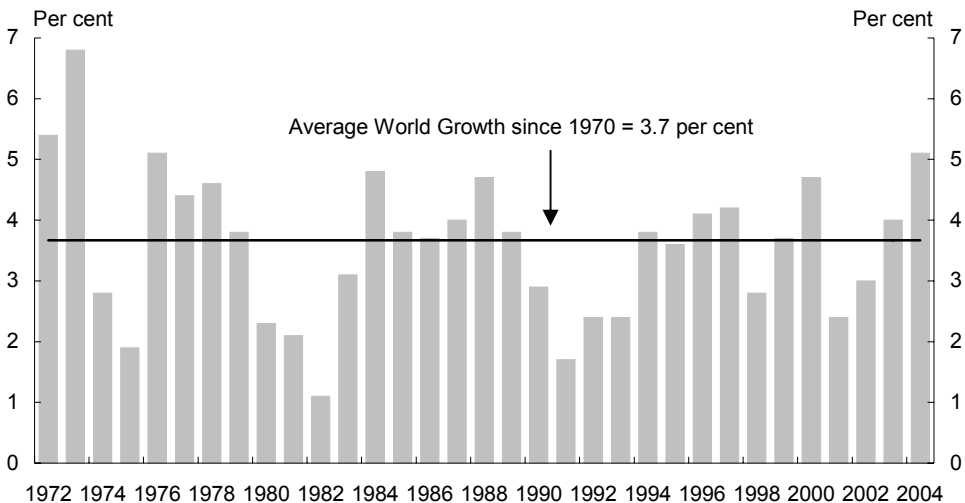
The world economy grew by 5.1 per cent in 2004, its fastest pace in close to 30 years, after expanding by 4 per cent in 2003. This outcome exceeded both the Budget and MYEFO forecasts of 4½ per cent. Growth was strong across most regions, but emerging market and developing economies in particular recorded surprisingly strong growth.

Global growth moderated over the latter part of 2004, as the effects of high oil prices and tighter policy, particularly in the United States and China, took hold. Growth in Japan and the euro area was much weaker; indeed, the Japanese economy recorded two quarters of negative growth in the middle of 2004.

The impact on growth from higher oil prices was not as significant over 2004 as had been widely predicted. The common ‘rules of thumb’ relating oil price rises to output slowdowns were largely based on episodes of supply contractions rather than the current experience of strong increases in demand.

One channel through which high oil prices affect the global economy is the response by monetary policy authorities to higher energy prices and, potentially, broader inflation and inflation expectations. Whilst the impacts of higher oil prices raised headline inflation in some countries, measures of core inflation remained contained, with little evidence of a systemic increase in inflationary pressure. Consequently, monetary authorities did not respond to higher oil prices with interest rate rises as they had in previous episodes, as credible policy frameworks served as an anchor for inflation expectations in many developed economies.

Chart 7: World growth^(a)



(a) World GDP growth rates are calculated using GDP weights based on purchasing power parity.
Source: International Monetary Fund.

Global growth picked up in early 2005, with a number of countries, such as China, the US and Japan, recording strong outcomes. During the second quarter of 2005, signs of potential weakness emerged, but leading indicators remained consistent with continuing expansion in the global economy.

Developments in key regions

In the United States, GDP grew by 3.7 per cent in 2004-05. Private consumption and business investment were the major drivers of growth. Net exports detracted from growth, as the US trade deficit expanded further. Employment growth was strong over 2004-05, with the US economy adding 2.1 million jobs. Strong corporate profits resulted in unexpectedly high corporate taxes, helping the US fiscal deficit to contract slightly in 2004-05.

An interesting, and significant, feature of the global economic landscape over the course of 2004-05 has been the response of financial markets to the removal of monetary stimulus by the US Federal Reserve. Over the course of 2004-05 the

US Federal Reserve increased the benchmark federal funds rate by 225 basis points to 3.25 per cent. Over that time, the yield on long-term US Treasury bonds fell by nearly 70 basis points to be 3.94 per cent at the end of June 2005, with the spread over cash rates falling by around 300 basis points.

An excess of saving over investment in a number of regions, including emerging Asian economies and oil exporters, flowed into US asset markets, resulting in low long-term US bond yields.⁴ Low bond yields resulted in US consumers enjoying a sustained run of low mortgage interest rates.⁵ The consequent increase in borrowing activity by US households has resulted in US house prices rising at their fastest pace in more than 25 years in 2004-05.

As a result of significant borrowing by the US public sector and US households, the US current account deficit increased over the course of 2004-05, reaching a record US\$750 billion, or 6.2 per cent of GDP.

China's GDP grew by 9.4 per cent in 2004-05. Policy tightening, such as industry specific investment restrictions, undertaken by the Chinese authorities over 2003 and 2004 was successful in dampening investment. Investment growth remained the main component of GDP growth in 2004-05, though net exports made an increasingly important contribution. Whilst investment in the sectors targeted by the Chinese authorities moderated, investment levels remained elevated. Increasingly, funds have flowed into some of the bottleneck sectors of the Chinese economy, such as rail and power infrastructure.

The Japanese economy began 2004-05 in recession, though the contraction was not apparent until another of the frequent and large revisions to national accounts data had occurred. The economy recovered over the course of 2004-05 to expand by 1.7 per cent. Economic fundamentals have improved in recent years, and structural reforms have lifted business sentiment and corporate profits. The labour market picked up, with the unemployment rate reaching near seven year lows in June 2005.

The rest of East Asia⁶ grew by 4.7 per cent in 2004-05. Domestic demand has remained solid across East Asia, although some weakness remained in Korea, as the economy continued to recover from the unwinding of the household credit bubble in 2003. Growth in East Asia's large export sector eased, due to a slowing in the global information and communication technology cycle, and, more generally, moderating

4 A further discussion of low bond yields in the US and Australia appears in the article on this topic in this issue of the Economic Roundup.

5 Only around a third of US household mortgages are on variable interest rates. The majority are fixed, often over the life of the mortgage, and are driven by long-term bond yields.

6 Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand.

world demand. Weaker import demand from China affected exports from Korea and Taiwan in particular.

Euro area growth remained subdued, with the expected recovery faltering, as GDP expanded by 1.5 per cent in 2004-05. Net exports were the major contributor to growth with weakness in domestic demand continuing. Monetary policy remained accommodative, but inflation has been around the target band of close to, but below, 2 per cent. Euro area fiscal policy remained loose, with the major economies exceeding the euro area's Stability and Growth Pact limit of budget deficits of 3 per cent of GDP, in some cases by significant amounts.

Whilst the United Kingdom economy outperformed that of the euro area in 2004-05, GDP growth of 2.2 per cent was weaker than expected at Budget. Higher interest rates and a cooling housing market caused consumption to slow sharply in early 2005.

Higher oil and commodity prices were a significant factor in the exceptionally strong performance of many developing and emerging market economies in 2004. Favourable financial market conditions also supported activity.

Growth in Latin America exceeded expectations, with the region recording its highest rate of growth since 1980. In particular, Mexico, Venezuela and Argentina benefited from strong prices and robust demand for oil and other commodities. Oil revenues and increased agricultural production facilitated sub-Saharan Africa growing at its fastest rate in almost a decade. The economies of emerging Europe also performed strongly, particularly Turkey.

Key themes from the Treasury Business Liaison Programme — October 2005

Treasury officers met with over 40 companies and organisations in Sydney, Melbourne, Hobart and Launceston through the Business Liaison Programme in October 2005.¹

Retailers mostly report slower sales in the September quarter, particularly for discretionary items and especially at the lower end of the market. They suggested that this year's tax cuts have been mostly saved and attributed most of the slowdown to the recent increase in petrol prices.

Mining companies spoke of how they are expanding production and those manufacturers supplying the mining sector describe business conditions as very good.

Most businesses indicated that they plan to hire more workers. They still refer to widespread skill shortages, especially in regional and remote areas, but they say that shortages are not getting any worse. Despite the reports of skill shortages, businesses said that they are facing only a marginal acceleration in overall wages. Businesses continue to say that they have little pricing power. Wage increases are being variously met by productivity improvements, cuts in other costs, and modest reductions in profitability.

Treasury greatly appreciates the commitment of time and effort made by the Australian businesses and associations 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 a slowing in sales, which became more pronounced from around mid-August. In contrast to the stimulus provided in 2004, this year's tax cuts appear to have been mostly saved. Accounts of a slowdown were not uniform. Food sales, and sales of essentials more generally, did not slow as much as more discretionary purchases. Smaller stores spoke of more difficulties than large stores.

The slowdown in retail sales is generally attributed to higher petrol prices. The volume of petrol bought has only contracted marginally, so this leaves fewer funds for other purchases. Furthermore, as petrol prices are highly visible, they were regarded as having a disproportionately large impact on consumer sentiment.

Retailers report that consumers seem to have concluded that high petrol prices were here to stay and preferences were moving towards smaller, more fuel-efficient cars. This was evident in orders for both sales and rentals of cars.

Some retailers again referred to the mild winter in much of the country, which reduced sales of some household appliances and seasonal clothing.

Production and investment

Manufacturing

Manufacturers supplying the mining industry were more confident than other manufacturers. Suppliers to the construction industry in Western Australia continue to report very strong conditions. Global demand for food is strong, leading to good conditions for Australian food manufacturers.

A number of manufacturers described their difficulty in competing with imports. A response of some companies was to move some of their own production facilities overseas. Some manufacturers related how they were increasing the proportion of components they source from overseas. Some manufacturers also told how they had successfully found niches in specialised goods where they have a technology lead.

Housing and construction

House prices are reported as having plateaued in most of the country, but to have fallen significantly in Sydney.

Housing construction has eased across the country, but the decline is only mild. Prospects are regarded as better in Melbourne than in Sydney as expansion in the

latter is hitting geographical restraints. There were reports of more homes being built at the upper end of the market.

Some contacts refer to a slowing in commercial construction. However, others cite falling office vacancy rates and changing preferences for types of offices as likely to support activity. Other building remains strong, most notably infrastructure projects such as expressways.

Mining

Mining companies continue to aspire to increase production. Accordingly, mining investment is strong. In some cases, companies regret that supply constraints are limiting their ability to expand production as much as they want. Shortages of large vehicles were mentioned, and even more commonly of the tyres required for them.

Tourism and education

Tourism operators described how cheaper airfares (and increasingly nationwide football competitions) had led to an upsurge in domestic tourism in recent years, but this effect has nearly run its course. Travel was expected to stay around the new high level (so long as petrol prices did not rise further) but not increase at previous rates. The immediate outlook for international tourism is clouded by concerns about security and health issues. In the medium term, administrative changes in China offer further scope to attract tourists from that market.

Universities report a tougher environment for attracting overseas students as Asian universities improve the quality of their faculties and facilities.

Employment

Most businesses interviewed expect at least to maintain employment around current levels. Reports continue of labour shortages for at least some categories of labour. The occupations most frequently mentioned as being in short supply include nurses, accountants, electricians, some kinds of engineers, professionals in the mining industry and truck drivers. There are also some accounts of semi-skilled or experienced unskilled labour being hard to find, particularly in more remote areas. Some businesses warn that large numbers of skilled and experienced workers were approaching retirement.

Companies, especially those with international operations, referred to bringing in workers from overseas to meet labour demands. Some large mining and construction companies are staggering projects so as to move teams from one site to another,

although as it is hard to do this smoothly, it often involves some delays to projects or temporary hoarding of labour.

Labour costs

Business contacts mentioned upward pressure on labour costs for occupations where labour is in short supply. But even in these areas, businesses were reluctant to raise wages, fearing it will just lead to matching offers by other employers. Overall, wages growth is steady with wage increases running at around 4 per cent. Many businesses reported that non-wage labour costs are rising faster than wages, especially in remote areas where better conditions are needed to attract workers.

Costs, prices and profits

Higher global oil prices have raised costs for many businesses, not just for transport but for other inputs such as packaging. Some companies have contracts allowing oil prices to be passed on, but most said they were likely to try to absorb the cost. Many retailers report much higher rents in large shopping malls. Many businesses say they had to match international product prices, regardless of domestic cost pressures.

Many contacts described how productivity increases from more efficient productive processes were sufficient to cover the increases in labour and other costs. Businesses which face volatile demand reported 'hoarding' labour during a temporary lull in sales for fear that when demand picks up they will not be able to rehire sufficient workers.

Regional economic conditions

As has been the case for some time, activity is particularly strong in south-east Queensland, driven by strong population growth. The strength of the resources sector is boosting Western Australia. New South Wales is weaker, which is generally attributed to the earlier and larger fall in house prices there, and ongoing problems with transport.

This business liaison round included meetings with Tasmanian businesses and organisations. After a period of slow growth in the 1990s, the Tasmanian economy has performed well in recent years. The boost to domestic tourism from cheaper airfares has been particularly helpful. As a result, there are a lot of investment projects aimed at expanding the capacity of the tourism industry. It has been noticed, however, that the week-long or longer tours that used to be the mainstay of Tasmanian tourism are being replaced by shorter breaks. There is some restructuring in the agricultural sector, such as away from wool and towards wine.

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 |
|---|---------------------|

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 |
|--|---|

Past editions of Economic Roundup

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

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Health promotion

Net tax thresholds for Australian families

Tax system complexity and compliance costs – some theoretical considerations

Key themes from the Treasury Business Liaison Programme – July and August 2005

Autumn 2005

Economic forecasting: history and procedures

Forecasting the macroeconomy

Comparing Australian and United States productivity

Possible links between household debt, demand for imported goods and Australia's current account deficit

Structural fiscal indicators: an overview

The coherent principles approach to tax law design

Key themes from the Treasury Business Liaison Program – February and April 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>.

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