

Bulletin

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The Recent Economic Performance of the States

Kathryn Davis, Kevin Lane and David Orsmond*

Spending has grown strongly in the resource-rich states in recent years, primarily reflecting very high levels of investment in the mining industry. However, the pace of growth in state production and developments in other economic indicators have been more uniform across the states. This reflects the high import content of mining investment as well as the flow-through of spending and income from the resource-rich states to the other states.

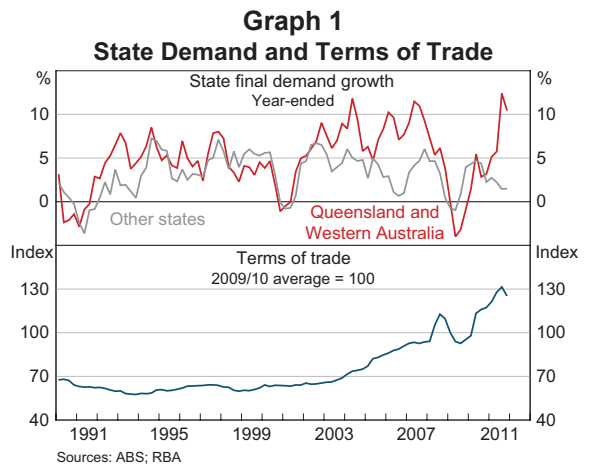
Introduction

The large increase in global commodity prices since the mid 2000s has resulted in significant growth in Australia's investment spending and export values. This has been most pronounced in Western Australia and Queensland, which are the states with the highest concentration of mining resources. This article discusses recent differences in economic conditions across the states. It shows that while mining investment has led to quite divergent patterns in spending across states, the growth in state production has been more similar, the dispersion between state unemployment rates has been low by historical standards over recent years, and state inflation rates have tracked each other closely.

Recent Trends in State Spending Patterns

A timely measure of state economic performance is the growth of state final demand, which measures the growth in consumption and investment spending by the household, business and government sectors combined. Since the onset of the mining boom in the mid 2000s, the pace of growth in total spending in the resource-rich states has exceeded that of the other states, with the exception of the years immediately surrounding the global financial crisis

(Graph 1). Recently, growth has been especially rapid in Western Australia and Queensland, with spending increasing by 11 and 10 per cent, respectively, over 2011, compared with an average of around 1½ per cent in the other states.

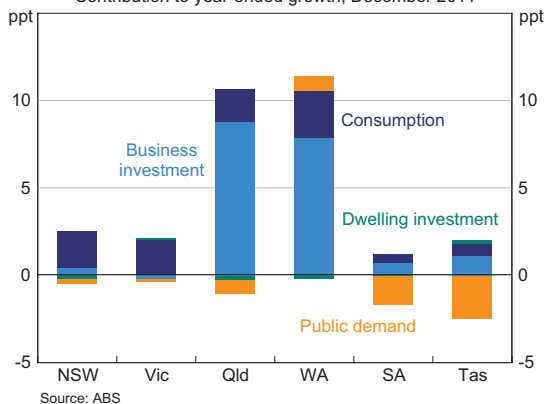


Investment spending by the business sector has made a large contribution to growth in total spending in the resource-rich states (Graph 2). Strong growth in global energy demand and high commodity prices have driven a sharp increase in Australia's terms of trade (the ratio of export prices to import prices). This has resulted in an increase in resource investment, especially in the liquefied natural gas (LNG), iron ore and coal industries. In

* The authors are from Economic Analysis Department.

Graph 2
State Final Demand Growth

Contribution to year-ended growth, December 2011



2011, business investment in the resource-rich states was exceptionally strong, increasing by 28 per cent in Western Australia and 58 per cent in Queensland.

However, not all of this investment spending was used to purchase goods and services produced in the resource-rich states themselves. Mining investment is import intensive, especially for LNG projects, which have accounted for a large share of the value of recent project commencements. As a consequence, for several years capital imports have been rising at a pace roughly in line with the increase in mining investment (Graph 3).¹ In addition, the Bank’s business liaison confirms that part of the mining investment (and operational) spending undertaken in Western Australia and Queensland is met by production in other states, not just for inputs such as parts but also for a range of professional services, such as accounting and consulting services. As a consequence, up until now at least, the differences in the growth of production across states has been narrower than the differences in the growth of total spending.²

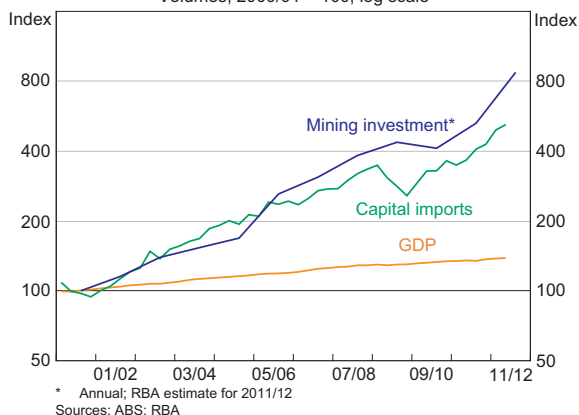
1 While the import share varies significantly project by project, the available data suggest that roughly half of current mining investment spending is imported (Connolly and Orsmond 2011).

2 Production is defined here as gross state product and is equal to the sum of spending by the household, business and government sectors, plus inventories and interstate and overseas exports, minus interstate and overseas imports. Therefore, production is a comprehensive measure of the economic activity occurring within a state.

Relative to mining-related investment, the growth in non-mining investment spending has been more similar across states in recent years. Private non-residential building investment in almost all states has been relatively subdued compared with the period before the global financial crisis (Graph 4). In the office sector, the Bank’s liaison suggests that construction has been constrained by the reluctance of tenants to commit to new office space and tight credit conditions for developers. Vacancy rates – a key indicator of future office investment activity – increased in all capital cities during the recent downturn, as new supply came online and tenant demand eased (Graph 5). More recently,

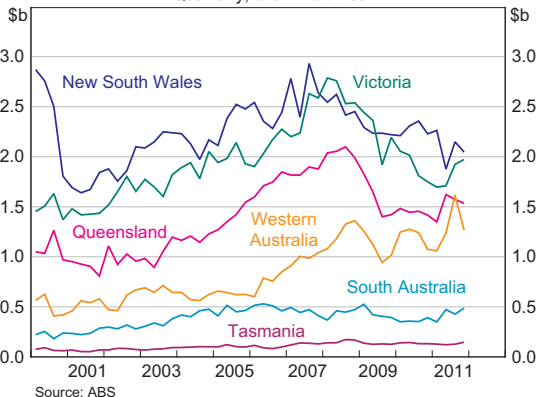
Graph 3
Mining Investment and Capital Imports

Volumes, 2000/01 = 100, log scale



Graph 4
Building Investment

Quarterly, chain volumes



tenant demand has increased in Perth, Brisbane and Melbourne and vacancy rates have fallen somewhat in these cities, though the vacancy rate remains relatively high in Sydney. More broadly, the recent weakness in non-mining investment reflects subdued business conditions for a range of trade-exposed firms, especially in the manufacturing, tourism and education industries. Although these industries are facing challenging conditions in all states, differences in state industry composition mean that South Australia, Tasmania and Victoria are more exposed to the weakness in the manufacturing sector, while Queensland is most affected by the softness in tourism demand (see Appendix A for the industry composition of each state).³

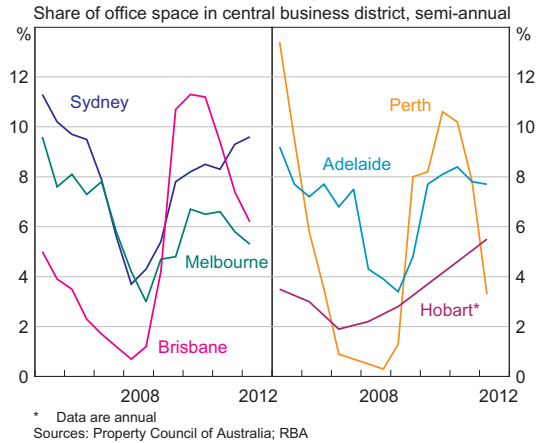
Housing market conditions have been weak in all states recently, as demonstrated by falling approvals for new dwellings and house prices (Graph 6). However, the extent of the weakness varies across states. The Queensland housing market has faced the sharpest change in conditions, with dwelling investment in 2011 around 25 per cent below its peak in 2008. Housing market conditions in Western Australia and South Australia have also softened noticeably in recent years. While dwelling construction in Victoria has been strong over recent years, particularly for inner-city apartments, recent data on approvals suggest that dwelling construction is likely to ease in the period ahead. A number of common factors are weighing on housing investment spending in all states, including the earlier pull-forward of demand from the temporary increase in first home buyer grants, slower population growth, tight access to credit for developers, lower expectations of capital gains and general household caution.

There are some differences in the recent pace of household consumption spending across states. Consumption growth in Western Australia has outpaced that in other states (Graph 7). This was

³ For details on the recent performance of the tourism industry, see Hooper and van Zyl (2011), and for a discussion of the relationship between industry composition and regional economic performance, see Cunningham and Davis (2011).

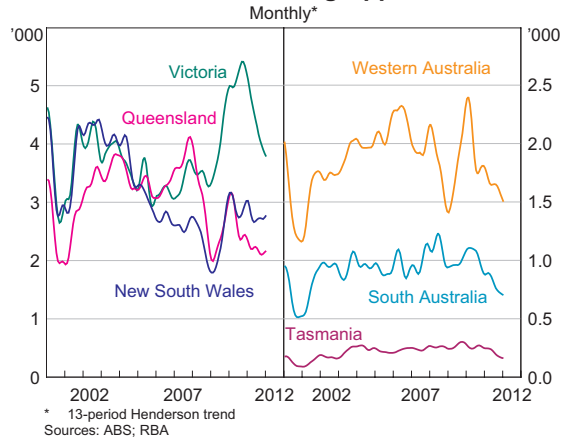
Graph 5

Office Vacancy Rates



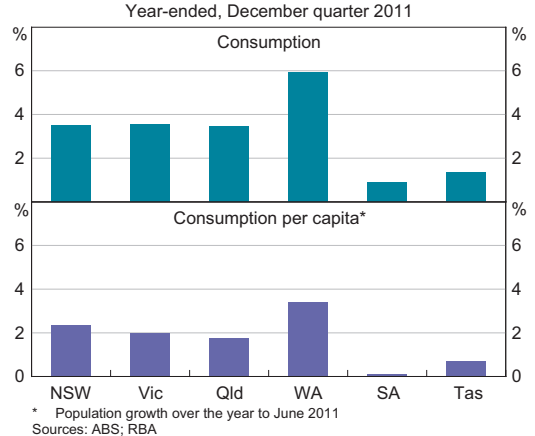
Graph 6

Residential Building Approvals

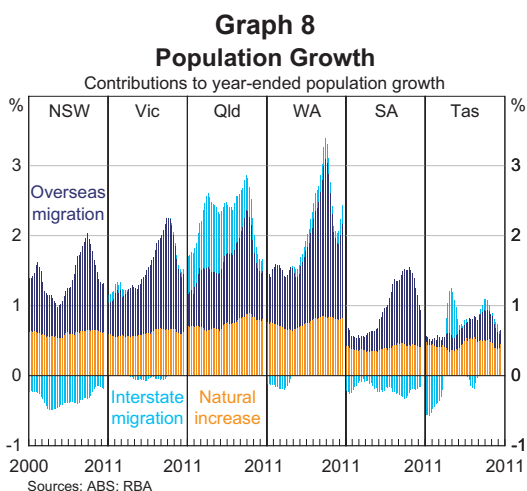


Graph 7

Real Consumption Growth



partly due to stronger population growth in Western Australia than in other states, driven by a pick-up in both overseas and interstate migration in response to firmer labour market conditions (Graph 8). Nonetheless, the stronger labour market and associated income growth in Western Australia has contributed to solid growth in consumption even in per capita terms. In the eastern states, consumer spending grew at an around trend pace over the past year; consumption growth was noticeably weaker in South Australia and Tasmania.

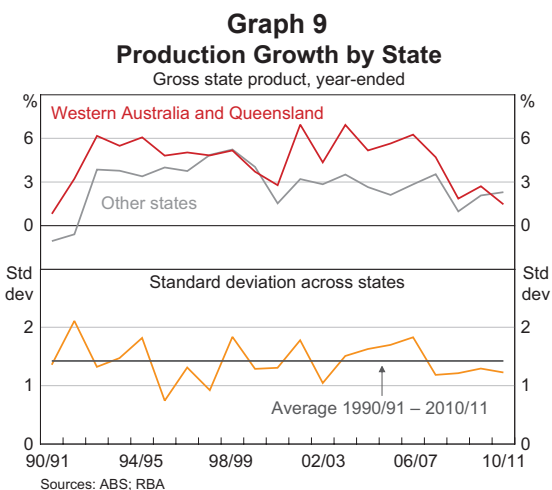


Measures of Overall State Economic Activity

There are a number of different indicators that provide a comprehensive picture of economic activity at a state level. Gross state product (GSP) measures the level of state production by adjusting spending for both interstate and overseas trade. However, GSP is published only annually; the most recent data are for 2010/11, which is before the surge in mining investment in the second half of 2011. Nevertheless, the GSP data indicate that while production in Western Australia and Queensland has grown faster than in the other states since the onset of the resources boom in the mid 2000s, the differences have narrowed markedly in recent years (Graph 9).⁴ As noted earlier, dispersion in state production is

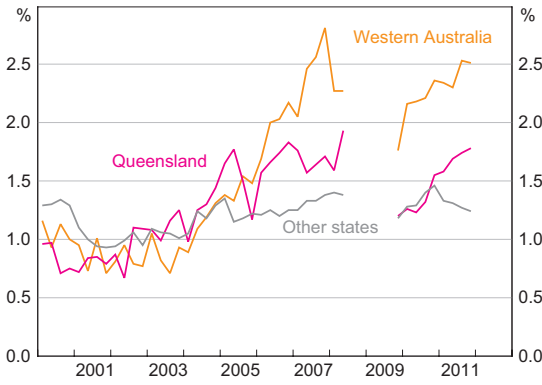
⁴ Production was particularly weak in Queensland in 2010/11 due to the impact of flooding on coal exports.

much less pronounced than in state spending, since much of the inputs used in mining investment in the resource-rich states are drawn from overseas and from the other states. It is also likely to reflect income transfers across the country, through, for instance, tax payments, dividend distributions and wages paid to fly-in fly-out workers from other states (for more details, see Stevens (2010) and Connolly and Orsmond (2011)).



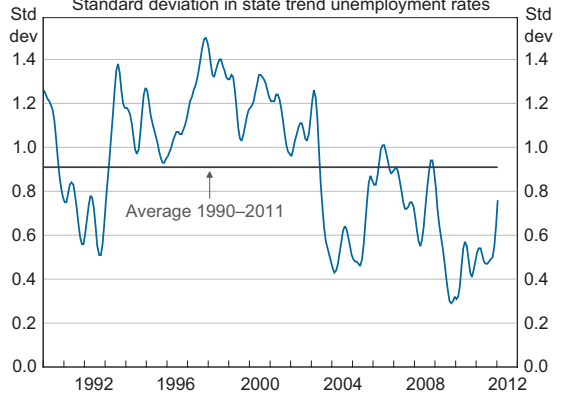
Although the strength of employment growth differs across states, the variation between state unemployment rates has been low by historical standards over recent years. In terms of labour demand, the job vacancy rate in both Western Australia and Queensland has continued to rise over recent years, while it has remained broadly stable in the other states (Graph 10). In part, this reflects rapid growth in vacancies in the mining industry and in firms servicing the mining industry. Western Australia has the tightest labour market – as it has for much of the past decade – and it currently has a trend unemployment rate of around 4¼ per cent. Queensland has the second highest unemployment rate among the states at around 5½ per cent in trend terms (Graph 11). Tasmania has the highest trend unemployment rate at around 6½ per cent, having increased sharply over the past year. Despite these differences, the divergence between state

Graph 10
Job Vacancies
Per cent of labour force*



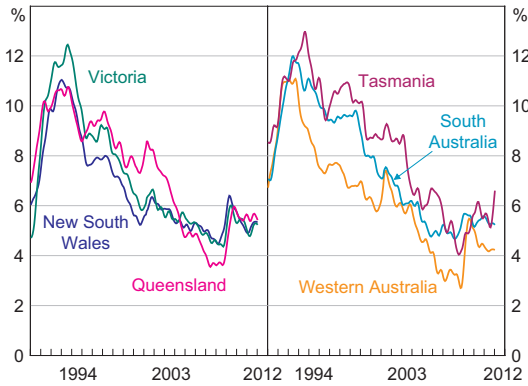
* Seasonally adjusted by the RBA; this survey was suspended between May 2008 and November 2009
Sources: ABS; RBA

Graph 12
Variation in State Unemployment Rates
Standard deviation in state trend unemployment rates



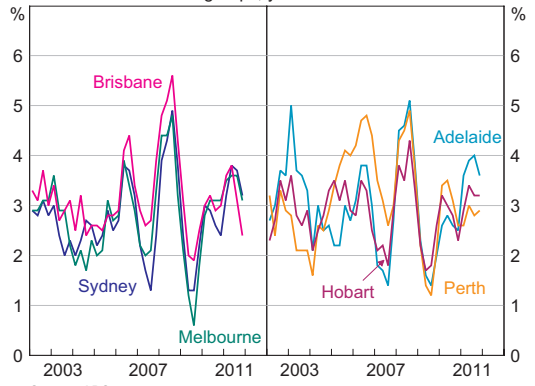
Sources: ABS; RBA

Graph 11
Unemployment Rates
Trend



Source: ABS

Graph 13
Consumer Price Inflation
All groups, year-ended



Source: ABS

unemployment rates has been below its long-run average (Graph 12).

Notwithstanding significant differences in the pace of spending across states, developments in consumer price inflation remain highly correlated across capital cities. This is not surprising given the common effect of the exchange rate appreciation on prices in all states and the fact that goods and labour can move across state borders in response to any significant differences in relative prices or wages. In most capital cities, consumer price inflation eased in the past year, although inflation was broadly stable in Perth (Graph 13). In 2011, inflation was highest in

Adelaide and softest in Perth and Brisbane; however, the range between the highest and lowest inflation rates was only 1.2 percentage points.

Conclusion

Strong growth in mining investment in the resource-rich states is largely responsible for recent differences in the pace of growth of spending across states. This investment is helping to support employment and household incomes, which has helped to underpin growth in household spending, especially in Western Australia. In Queensland the overall impact of the growth in mining investment is

less than in Western Australia, as its economy is less resource intensive and more exposed to weakness in the tourism and housing construction sectors. The pace of activity in the non-mining industries has been more uniform across states, and the dispersion between states in terms of production growth, unemployment rates and inflation has been relatively low. In part, this reflects that, over time, the benefits of mining investment and exports flow across the country through spending by mining-related firms and workers on goods and services in other states, dividend payments to shareholders, and the tax and transfer system. ✎

Appendix A: Indicators of State Size, Growth and Industry Composition

New South Wales currently accounts for almost one-third of national production, population and employment, and Victoria accounts for

around one-quarter of these variables (Table A1). Consequently, economic conditions in the two largest state economies have a significant influence on national averages. Average annual rates of growth in real production have been higher in Queensland and Western Australia over the past two decades, and as a consequence the relative size of these states has increased significantly (Table A2).

In addition to variation in their size and growth rates, states vary in their industry structure (Table A3). New South Wales and Victoria have a disproportionate share of business services activity, reflecting the positions of Sydney and Melbourne as large business and financial centres. Victoria is also characterised by an above-average share of manufacturing. Western Australia and Queensland have the largest mining industries. In South Australia and Tasmania, agriculture and manufacturing account for higher shares of production than the national average.

Table A1: Relative Size of States
Share of Australia, 2010/11, per cent

	NSW	Vic	Qld	WA	SA	Tas
GSP share	31.3	22.6	19.0	15.5	6.4	1.8
Population share ^(a)	32.3	24.9	20.3	10.4	7.3	2.3
Employment share ^(a)	31.3	25.4	20.4	10.8	7.2	2.1
Exports share ^(b)	20.6	11.4	19.6	40.1	4.5	1.2

(a) At end June 2011

(b) Includes goods and services exports

Source: ABS

Table A2: GSP Growth
Average annual growth rate, chain volumes, per cent

	NSW	Vic	Qld	WA	SA	Tas	Australia
Since 1989/90	2.6	3.0	4.2	4.3	2.4	2.1	3.1
1989/90–2000/01	3.1	2.9	4.2	4.0	2.2	1.8	3.2
2000/01–2010/11	2.0	3.1	4.2	4.6	2.7	2.5	3.1
Per capita							
Since 1989/90	1.5	1.8	1.9	2.5	1.7	1.6	1.8
1989/90–2000/01	2.0	2.0	2.1	2.5	1.7	1.5	2.0
2000/01–2010/11	1.0	1.5	1.7	2.5	1.8	1.7	1.5

Source: ABS

Table A3: Industry Share of State Production^(a)
2010/11, per cent

	NSW	Vic	Qld	WA	SA	Tas	Australia
Agriculture, forestry and fishing	2	3	3	2	6	8	3
Mining	3	2	9	33	4	1	9
Manufacturing	8	9	8	5	9	9	8
Electricity, gas, water and waste services	2	2	2	2	3	4	2
Construction	5	6	8	12	7	6	7
Wholesale trade	4	4	5	3	4	3	4
Retail trade	4	5	5	3	5	5	4
Transport, postal and warehousing	5	5	6	5	5	6	5
Public administration and safety	4	4	5	3	5	6	5
Business services	30	28	18	14	19	17	23
Information media and telecommunications	4	3	2	1	3	2	3
Financial and insurance services	14	12	6	4	8	8	10
Rental, hiring and real estate services	2	2	2	1	2	1	2
Professional, scientific and technical services	7	7	5	5	5	3	6
Administrative and support services	3	3	2	2	2	2	2
Household services	16	16	15	9	16	20	15
Accommodation and food services	3	2	2	1	2	3	2
Education and training	4	5	4	3	5	6	4
Health care and social assistance	6	6	6	4	7	8	6
Arts and recreation services	1	1	1	0	1	1	1
Other services	2	2	2	1	2	2	2
Other ^(b)	17	17	15	10	16	15	15

(a) Nominal industry gross valued added as a share of gross state product

(b) Ownership of dwellings, taxes less subsidies on products and the statistical discrepancy

Source: ABS

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Trends in National Saving and Investment

James Bishop and Natasha Cassidy*

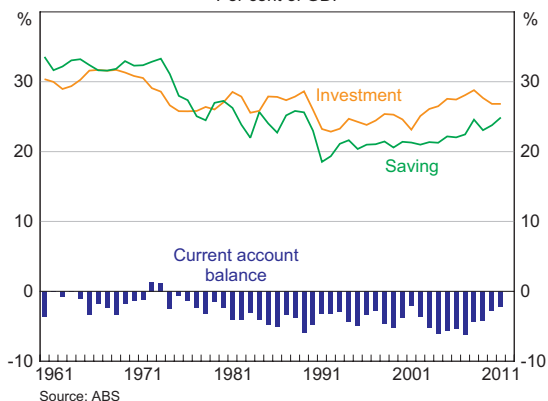
Both saving and investment have tended to be high as a share of GDP in Australia relative to other advanced economies. But because investment has tended to exceed savings, Australia has traditionally had a sizeable current account deficit. This deficit has, however, narrowed over the past few years as the national saving rate has trended higher. This article looks at the recent sectoral trends in national saving and investment and puts them in historical perspective.

Introduction

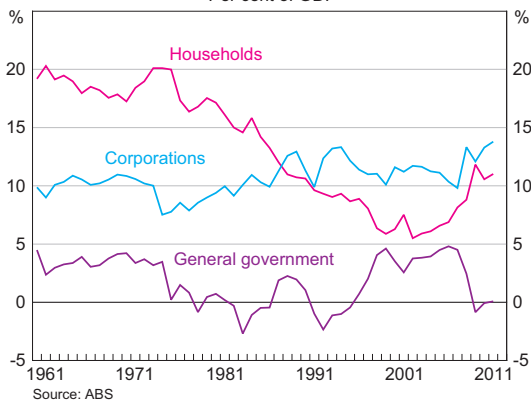
National saving is the difference between a nation's income and what it spends on the consumption of goods and services, and comprises household, corporate and government saving. The level of national saving has important implications for the economy; it provides a source of funds available for domestic investment, which in turn is a key driver of labour productivity and higher future living standards. In an economy open to trade and capital flows, the difference between the level of investment and saving in the economy is equal to the current account balance. Over a long period of time, Australia's investment has tended to exceed saving, leading to sizeable current account deficits (Graph 1).¹

National saving fell as a share of GDP over the 1970s and 1980s, largely reflecting a decline in household and government saving (Graph 2). The investment share of GDP fell only slightly over this period, and so by the end of the 1980s there had been a widening in Australia's current account deficit, from an average of 1.8 per cent of GDP in the 1960s to 4 per cent of GDP in the 1980s. After remaining steady at a little over 20 per cent of GDP over the 1990s, the national saving rate started to trend higher over

Graph 1
Saving and Investment
Per cent of GDP



Graph 2
Gross National Saving by Sector
Per cent of GDP



* The authors are from Economic Analysis Department.

1 The implications for an economy running a persistent current account deficit have been much debated and are not pursued in this article. See Belkar, Cockerell and Kent (2007) and Debelle (2011) for a discussion.

the second half of the 2000s, as a step-up in saving by households and corporations more than offset a decline in saving by governments. Investment also declined as a share of GDP from around 2008 following the global financial crisis. The increase in saving and decline in investment saw the current account deficit narrow to around 2¼ per cent of GDP in 2011 from an average of 4¼ per cent of GDP over the previous two decades.

As a share of GDP, Australia's national saving has tended to be higher than the average of that in other advanced economies, reflecting a higher level of government sector saving and, more recently, an increase in saving by the private sector (Graph 3). Part of the explanation for Australia's relatively high and increasing level of national saving is the gradual growth of compulsory superannuation (Connolly 2007; Gruen and Soding 2011). In their analysis, Gruen and Soding (2011) estimate that the boost to national saving over recent years from compulsory superannuation to be about 1½ per cent of GDP, up from around ½ per cent of GDP in 1992.²

Australia's level of investment as a share of GDP has also tended to be higher than that in other

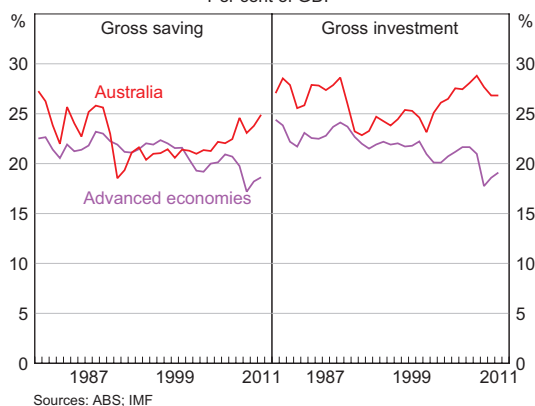
advanced economies, with this gap widening recently. In 2011, Australia's national investment was around 27 per cent of GDP as large-scale mining projects commenced. This compares with an average of 19 per cent of GDP for advanced economies, which are still suffering from weak economic activity following the global financial crisis.

National Saving

Household saving

Household saving – or the amount of household disposable income not spent on the consumption of goods and services – trended lower as a ratio to GDP up until the mid 2000s.³ The trend decline in household saving, and possible explanations for this change in household behaviour, has been widely documented (Edey and Gower 2000; Hiebert 2006). One factor that contributed to the decline in household saving during the 1980s and 1990s was the deregulation of the financial sector in the 1980s, which removed restrictions on households' access to finance, allowing them to increase their borrowing. Households used this debt to finance house purchases and (to a lesser extent) financial assets. Hiebert (2006) notes that the relaxation of credit constraints and subsequent run-up in debt allowed households to smooth consumption and reduce saving. This effect is only present while households make the transition to higher levels of debt.⁴ The run-up in debt also boosted housing prices, and the subsequent increase in net wealth increased household spending via the 'wealth effect' (Graph 4). In the national accounts, capital gains are not counted as income but can be used

Graph 3
National Saving and Investment
Per cent of GDP



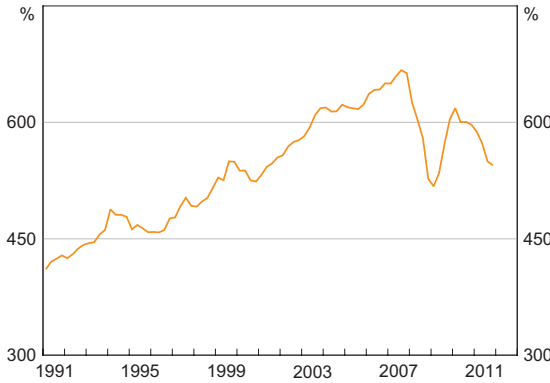
2 Compulsory superannuation increases the level of national saving if it is not offset by reductions in other forms of saving. This might be the case if compulsory superannuation makes households more aware of the need to save for retirement, and thereby boosts voluntary saving. Connolly (2007) estimated that for every dollar contributed to superannuation, other saving falls by around 30 cents.

3 Household saving tends to be reported on a net basis, which adjusts household income for depreciation of the capital assets of the household sector. However, gross measures of saving have generally been preferred for sectoral analysis and in international comparisons due to uncertainties in the estimation of depreciation (Edey and Gower 2000).

4 A transition to higher indebtedness following an easing in credit constraints can take some years and reduce aggregate saving rates during the process. Older generations tend to not borrow but can still increase consumption if asset prices rise (e.g. housing prices) and they choose not to bequeath all of this extra wealth to younger generations.

Graph 4
Household Net Worth

Per cent of annual household disposable income*



* Household sector includes unincorporated enterprises; disposable income is after tax and before the deduction of interest payments; RBA estimate for December quarter 2011
Sources: ABS; RBA; RP Data-Rismark

by households to fund consumption, thereby putting downward pressure on the saving ratio. In addition, the sustained decline in unemployment over the 1990s and 2000s is likely to have reduced households' precautionary saving as a buffer against future adverse shocks.

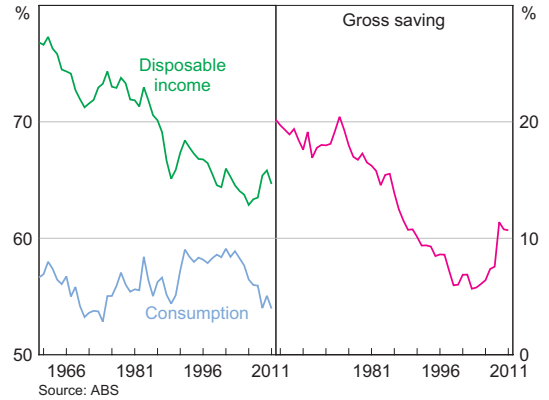
The trend decline in the saving ratio reversed in the mid 2000s, and the ratio is currently around its level in the late 1980s. There are a number of factors that could explain this change in household behaviour (as outlined in Lowe (2011) and Stevens (2011)). It may reflect households returning to more 'normal' patterns of spending and saving following the period in which households transitioned to higher levels of debt. The rise in the saving ratio could also be a response to the large negative wealth shock and volatility of asset prices since 2008: households may expect their income to grow more slowly in the future, or they may expect that lower returns on assets will provide fewer resources for future consumption.

Trends in household income and consumption can also be examined to analyse changes in the household saving ratio. Graph 5 shows that the decline in the saving ratio up until the mid 2000s coincided with a fall in households' share of national income; according to the national accounts,

Graph 5

Household Sector

Per cent of GDP, financial year



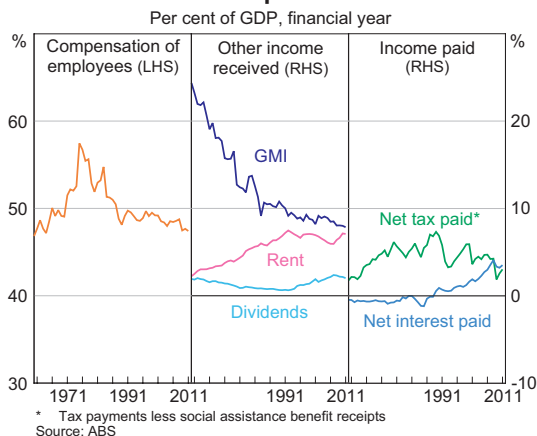
Source: ABS

household disposable income steadily fell from 75 per cent of GDP in the 1960s to below 65 per cent of GDP in the 2000s. Over the same period, household spending on goods and services as a share of GDP oscillated within a band of between 53 per cent and 59 per cent up until the mid 2000s. Since the mid 2000s, however, the household disposable income-to-GDP ratio has risen. At the same time, the consumption share of GDP has declined to its pre-1990s average share of GDP, leading the household saving ratio to rise to its highest level in over two decades.

The step down in household disposable income as a share of GDP since the 1960s can largely be explained by a shift of income from the household to the corporate sector,⁵ higher net interest payments, and an increase in income taxes (Graph 6). The sharp fall in gross mixed income (GMI) of unincorporated enterprises (which are classified as 'household sector' in the national accounts) mainly reflects the general trend towards incorporation which, in national accounting terms, has shifted profits from the household sector (GMI) to the corporate

⁵ This article distinguishes between household and corporate income because they can be influenced by different factors. It should be noted, however, that the household sector (along with foreign owners) owns the private corporate sector, and hence the income of the household sector ultimately includes the profits of businesses, whether they are retained within the company or paid out as dividends.

Graph 6
Household Disposable Income



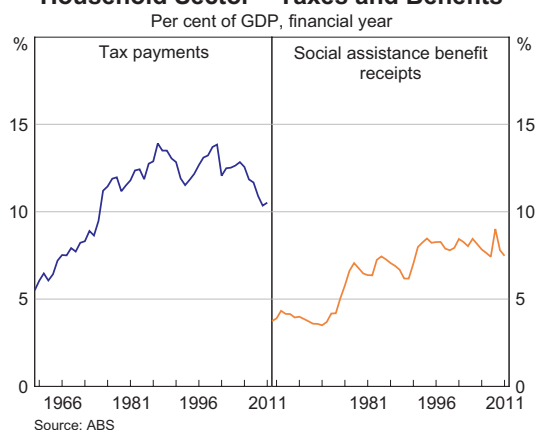
sector (gross operating surplus).⁶ In addition, since the 1990s, the compensation of employees (wages and employer superannuation contributions) has declined slightly as a share of GDP.

Another factor explaining the downward trend in household disposable income is that households are now paying out more of their income in interest payments and in taxes. Household net interest payments became positive for the first time in the late 1980s and continued to trend higher as a share of GDP before levelling out in 2007/08 (Graph 6). The upward trend reflected two developments. First, households' interest receipts declined in the late 1980s and have remained broadly steady as a share of GDP since then, reflecting both a decline in real interest rates and as household portfolios became more diversified (to hold a lower share of assets in deposits and higher shares in equities and housing). Second, the rise in household debt has meant that households have been paying more out of their income to service this debt. Net interest payments have fallen slightly since 2007/08 due to softer demand for credit and lower borrowing rates.

⁶ GMI includes both the returns on labour inputs (compensation of employees) and the return on capital inputs (operating surplus). The decline in GMI as a share of GDP is also partly due to a fall in the size of the farm sector, relative to other sectors in Australia. Gross operating surplus is measured as profits before interest, tax, depreciation and amortisation.

Tax payments rose as a share of GDP up until the late 1970s, were flat in trend terms until the mid 2000s and have since declined (Graph 7). This decline reflects sizeable income tax cuts and, more recently, the impact of the global financial crisis. While household income growth and employment growth slowed during the global financial crisis by less than during the early 1990s recession, the extent of capital losses on household assets was larger in the recent episode, reducing tax payments on capital gains.

Graph 7
Household Sector – Taxes and Benefits



The increase in average household tax rates since the 1960s has been partly offset by an increase in transfer payments from the government sector. Social assistance benefits rose sharply relative to GDP during the early 1990s recession and have remained at around 8 per cent of GDP since then (abstracting from the sharp rise during 2008/09, reflecting one-off stimulus payments to households). The upward trend in the level of social assistance payments over time reflects both an increase in the share of the population receiving transfer payments and an increase in real levels of assistance (Harmer 2008). Alongside an increase in transfer payments, households have also received more rental income.

Although national income accruing to the household sector has fallen, household consumption was broadly unchanged as a share of GDP up until the mid 2000s (Graph 5). This was partly due to

increases in the size of household balance sheets. Households increased their borrowing through the 1990s and early 2000s, and partly used this to fund consumption. However, as noted above, households have changed their spending behaviour since the mid 2000s, which has seen consumption fall as a share of GDP and the saving ratio rise.

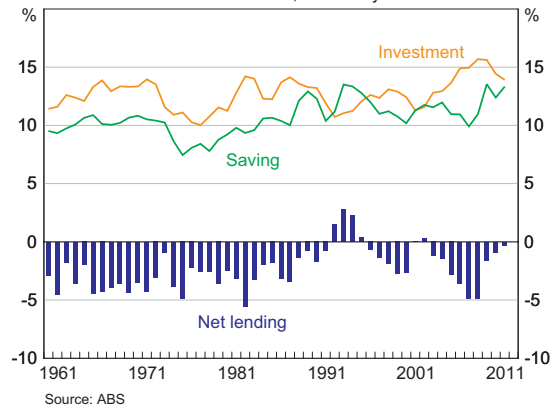
Corporate saving

Corporate saving can be broadly described as the after-tax profits that are not distributed to shareholders, and can be used to fund investment or purchase assets.⁷ There has been a small upward trend in the corporate saving rate since the mid 1970s, but it has generally remained below the level of business investment, and so corporations have tended to be net borrowers from households and overseas investors (Graph 8). There was a noticeable increase in the corporate saving rate following the early 1990s recession and the global financial crisis of 2008/09, preceded by high levels of investment, funded mainly by debt in each case. In both periods, corporates increased their saving to repay debts and reduce their gearing ratios. More recently, there has been an increase in the saving rate largely due to the strong growth in mining profits associated with record high commodity prices, while the level of investment has remained at high levels due to a surge in mining investment.

The high level of corporate saving in recent years has meant that for a given level of investment, there has been less funding raised externally than in previous years. This flow of external funding, from banks, bond markets and equity markets, has slowed since 2007/08. Consistent with this, business debt has declined by almost 10 percentage points of GDP and gearing ratios have returned to around decade averages.

Movements in the corporate saving rate can also be analysed by looking at trends in income received and paid. The bulk of corporate disposable

Graph 8
Corporate Saving and Investment
Per cent of GDP, financial year



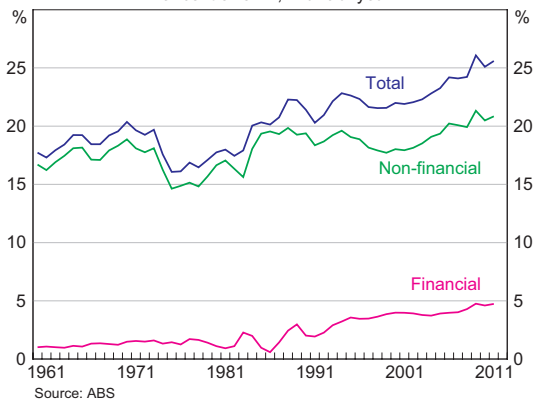
income received accrues to private non-financial corporations, although the income of private financial corporations (namely banks, insurance companies and the superannuation sector) has also increased steadily. This has more than offset the downward trend in public corporations' income, as privatisation activity in the past two decades has shifted income from the public sector to the private sector.

Corporate gross income received has steadily increased as a share of GDP since the 1960s, notwithstanding cyclical declines during economic slowdowns and recessions. This is related to the increase in profits, which have steadily risen as a share of GDP (Graph 9). As noted in the previous section, profits have shifted from the household sector (GMI) to the corporate sector (gross operating surplus). Following the financial liberalisation of the 1980s and 1990s, the financial sector has increased its share of the output in the economy. This has seen its gross operating surplus increase to be nearly 5 per cent of GDP. More broadly, the upward trend in profits (and consequent decline in the share of income going to labour) has also been seen in a range of countries.⁸ The recent increase in profits has been driven by mining profits associated with the strong rise in commodity prices.

⁷ Public corporations are included in this analysis because separate data on private corporations are not available prior to 1989/90.

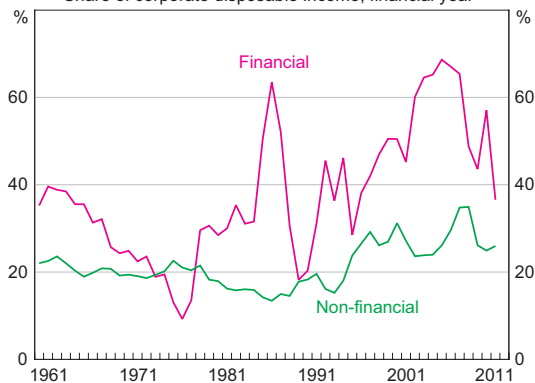
⁸ See Ellis and Smith (2007) for a discussion of this trend.

Graph 9
Corporate Gross Operating Surplus
Per cent of GDP, financial year



The increase in profits has been partly offset by an increase in the income paid out by corporations in the form of dividends and taxation. Dividend payments to households, the government and overseas investors have increased as a share of income, which may partly reflect the introduction of dividend imputation in Australia in 1987 that encouraged a higher dividend payout ratio (Graph 10). More recently corporations have chosen to retain more of their income on their balance sheet rather than paying it out in the form of dividends. Corporate tax has increased as a share of GDP, largely reflecting the increase in profits over recent decades (see 'Government saving' below).

Graph 10
Corporate Dividend Payments
Share of corporate disposable income, financial year*

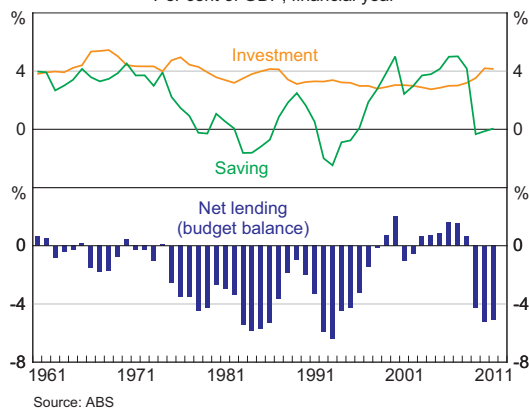


* Corporate disposable income is income received less interest, dividend and tax payments
Source: ABS

Government saving

Gross saving by the general government sector – which does not include public corporations – is measured in the national accounts as revenue net of spending on social assistance payments, interest, subsidies and government consumption (including services such as education and health and public sector wages).⁹ Prior to the mid 1970s, government saving was fairly stable at 3½ per cent of GDP. It then fell steadily, to be negative for much of the decade from 1975 to 1985, and began to exhibit larger cyclical fluctuations; saving rose strongly during the economic expansions of the 1980s, 1990s and 2000s, but fell sharply as a share of GDP during the early 1990s recession and the economic slowdown of 2008/09 (Graph 11).

Graph 11
General Government Sector
Per cent of GDP, financial year



Government investment – such as infrastructure – has been little changed as a share of GDP, though it should be noted there has been a trend

⁹ It should be noted that inflation distorts the measurement of saving since, in effect, the national accounting aggregates count interest payments and receipts on a nominal rather than a real basis. Edey and Gower (2000) adjusted saving measures to account for this effect in the high-inflation period, when real interest rates were relatively low. While the inflation adjustment to total national saving is quite small, the adjustment substantially boosts government saving in the 1970s and early 1980s. Inflation adjustment has the reverse impact on private saving, reducing the level of saving in earlier periods and flattening out the longer-run trend.

decline in public investment if investment by public corporations is included. As government investment has on average exceeded saving over the past 50 years, governments have tended to run budget deficits.¹⁰ On average over the past 50 years, however, Australian budget deficits have been lower than the average of other advanced economies.

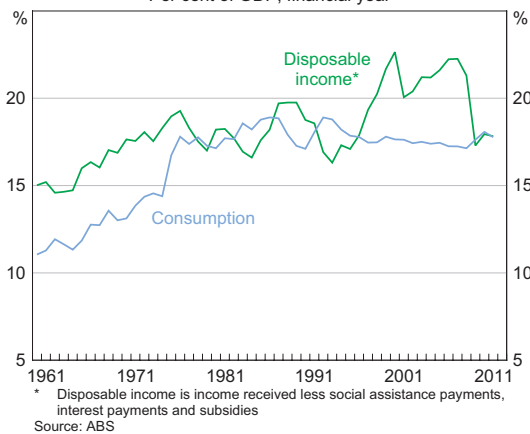
Government disposable income – comprising revenue less social assistance benefit payments and interest on government debt – has tended to be more cyclical than government consumption expenditure (Graph 12). In the decade prior to the 2008/09 economic slowdown, the share of national income accruing to the general government was high relative to previous decades. This reflected the better-than-expected economic conditions and the fall in interest payments on government debt (discussed below). With government consumption remaining broadly unchanged over that period, governments used this saving to pay down debt. Since 2008/09, government disposable income has fallen sharply in response to the global financial crisis, largely reflecting a fall in tax revenue.

As government debt was reduced over the 1990s – due to fiscal consolidation and the sale of

government-owned enterprises – government interest payments fell from more than 4 per cent of GDP to less than 2 per cent, boosting government disposable income and saving (Graph 13).¹¹ This was partly offset by the rise in social assistance payments as a share of GDP. Government revenue from corporate taxes has increased relative to GDP over recent decades, consistent with the trend rise in the profit share of GDP. Until very recently, growth in corporate income taxes was driven by a significant rise in profits of financial corporations (Graph 14). The rising importance of the finance and insurance industry for revenue collections has also been observed in some other advanced economies, and reflects the relatively high average tax rate, income and profits of the industry.¹²

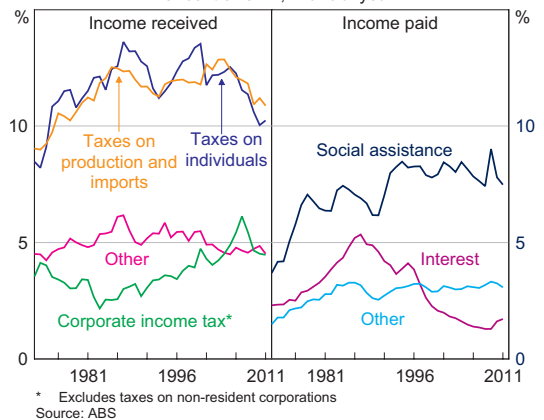
While general government disposable income was at elevated levels from the late 1990s to 2008, public spending on goods and services was trending lower as a share of GDP. Consumption expenditure on education, defence and general public services (such as outlays on administration and operation of general public services) all declined relative to GDP over this period. In contrast, spending on health, social security and welfare, and public order and

Graph 12
General Government Sector
Per cent of GDP, financial year



10 The general government budget balance is government saving (and net capital transfers) minus public investment.

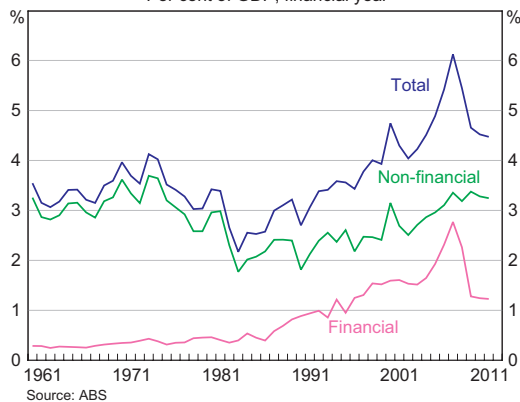
Graph 13
General Government Disposable Income
Per cent of GDP, financial year



11 Interest payments include the imputed interest accrued during the period on unfunded superannuation liabilities. These 'payments' accounted for half the value of interest payments in 2010/11.

12 See Greagg, Parham and Stojanovski (2010).

Graph 14
Corporate Income Tax Revenue
 Per cent of GDP, financial year



safety trended higher as a share of GDP. With income remaining elevated and consumption declining, the level of gross saving by the government sector increased to around 5 per cent of GDP. This meant that the general government was able to deliver budget surpluses of around 1 per cent of GDP, given that general government investment spending remained broadly steady at around 3 per cent of GDP. In addition to being used to pay down government debt, these budget surpluses were deposited into the independently managed Future Fund to help cater for the increased fiscal pressures in the future arising from an ageing of the population.

Government saving has fallen since the economic slowdown of 2008/09. Government disposable income declined particularly sharply, due to a fall in tax collections. At the same time, public investment, particularly by the state governments, has risen relative to GDP (see 'Investment' below). This led to an increase in public net debt to around 6½ per cent of GDP in 2010/11, although debt levels remain relatively low by international standards.¹³ The Australian Government has committed to a significant fiscal consolidation over the next few years, assuming modest increases in expenses, and a recovery in tax revenues.

¹³ For a comparison of the Australian Government's net debt to the G7 economies, see Australian Government (2011).

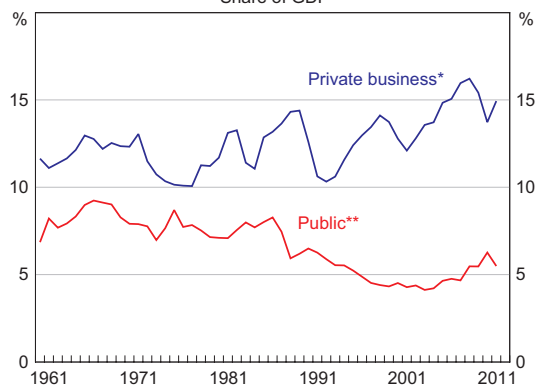
Investment

Australia has a relatively high level of investment as a share of GDP compared with other advanced economies (Graph 3). Private business investment accounts for over half of national investment on average and as a share of GDP private business investment has increased to close to 50-year highs (Graph 15). Over the next few years, investment growth is expected to be driven by the mining sector, with around \$180 billion of liquefied natural gas (LNG) projects approved or under construction, as well as expansions in the capacity of the coal and iron ore sectors. This is expected to see mining investment reach a record of close to 8 per cent of GDP, which is more than double its share in previous mining booms.

In contrast, non-mining investment has fallen sharply as a share of GDP in recent years, which may be due to the impact of the high exchange rate on profitability in trade-exposed industries. However, the sharp appreciation of the Australian dollar over recent years also reduces the price of investment relative to prices paid for other goods and services (Lowe 2011).

Public investment – which covers a broad range of spending, including on transport infrastructure, hospitals, educational facilities and state-owned

Graph 15
Investment
 Share of GDP



* Excludes cultivated biological resources

** Includes public corporations

Source: ABS

utilities – declined significantly as a share of GDP through the 1990s. This partly reflected fiscal consolidation, as well as the private provision of services previously provided by the public sector (such as transport infrastructure projects) and the privatisation of public enterprises. This decline reversed in the 2000s, with public investment rising from 4½ per cent of GDP in 2000 to 6 per cent of GDP in 2010. Initially this recovery was underpinned by infrastructure spending by state governments, although in more recent years it has been driven by stimulus spending by the Australian Government on school buildings and public housing.

The increase in investment in infrastructure-related industries (which include utilities, transport and communications) over the 2000s has been unwound more recently (Graph 16). While investment in utilities has fallen as a share of GDP, it remains at elevated levels, as firms update ageing infrastructure and expand capacity to meet demand (following under-investment during much of the 1990s).¹⁴ Investment in the finance, property and business services industries has also fallen relative to GDP, while investment in the manufacturing industry continues to trend lower as a share of GDP consistent with the industry's longer-run structural decline as a

share of the economy and, more recently, the impact of the high exchange rate.

Investment by households is predominantly on residential dwellings, which includes spending on newly constructed homes and renovations to existing dwellings.¹⁵ Private dwelling investment has fluctuated in a fairly narrow band of 4–6 per cent of GDP but has fallen in more recent years, following the strong housing cycle in the early 2000s (Graph 16). The public sector also invests in dwellings. After peaking at 1 per cent of GDP in the years following the Second World War (to accommodate the housing needs of returned servicemen), public investment in housing has remained at relatively low levels.

Conclusion

Australia tends to have higher rates of national saving and investment than other advanced economies. The national saving rate has been trending higher in recent years, as households and the corporate sector have increased their saving, more than offsetting the decline in government saving over this period. The higher rate of national saving has funded much of the recent mining-led increase in investment, with the current account deficit currently around historically low levels. ❖

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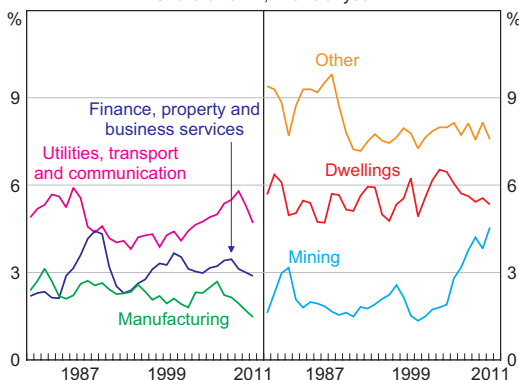
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Graph 16
Investment*

Share of GDP, financial year



* Includes private and public investment
Source: ABS

¹⁴ For further discussion of investment in utilities, and the impact on utilities prices, see Plumb and Davis (2010).

¹⁵ Households also invest in durable goods like cars and household appliances, but in the national accounts this expenditure is treated as consumption rather than investment.

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The Distribution of Household Wealth in Australia: Evidence from the 2010 HILDA Survey

Richard Finlay*

This article uses the Household, Income and Labour Dynamics in Australia (HILDA) Survey to analyse the distribution of household assets, liabilities and wealth across a number of household groups. The analysis shows that wealth is more unequally distributed across households than is the case for income. While the growth of wealth over the past few years has slowed, it has been faster for households with lower wealth than for households with higher wealth. This implies that wealth inequality has lessened slightly in recent years.

Introduction¹

The HILDA Survey is a panel survey of around 7 000 households conducted annually since 2001, the latest being in 2010. Every four years the survey includes a wealth module that asks respondents detailed questions about their holdings of assets and liabilities; the wealth module was included in the survey in 2002, 2006 and 2010. These data are especially interesting because they can shed light on the composition and distribution of households' assets and liabilities.

This article describes household assets, liabilities and wealth (assets less liabilities) across a number of dimensions, including income, wealth, age and housing status (additional data are available on the Reserve Bank's website).² Most analysis in

the article is cross-sectional – that is, for each year sampled, household groups are formed based on the characteristics of households in that year. These groups can then be compared across time. Hence, the groups compared contain households with the same characteristics, but not necessarily the same households, as the composition of the sample changes over time. (For example, a household head aged 30 years in 2002 will be in the 25 to 34 year old age group in 2002, but in the 35 to 44 year old age group in 2010.) As the survey is longitudinal – that is, it tracks many of the same households each period – it can also show how particular households' assets and liabilities have evolved over time.³

Household Wealth

To understand the evolution of household wealth over time, and as a cross-check on the HILDA Survey data, aggregate data on wealth compiled by the RBA using inputs from the Australian Bureau of Statistics (ABS) and RP Data-Rismark are also examined. The aggregate data indicate that real (inflation-adjusted) wealth per household was relatively flat from the late

* The author is from Economic Analysis Department; he would like to thank Luis Uzeda for help with some of the analysis contained in this article.

1 This article updates previous work done by the Bank. See Kohler, Connolly and Smith (2004) and Bloxham and Betts (2009). All graphs in this article show cross-sectional data. Growth rates presented in graphs compare cross-sections from each period.

2 See B22 Distribution of Household Balance Sheets, B23 Distribution of Household Gearing, B24 Distribution of Household Financial Assets, B25 Distribution of Household Non-Financial Assets and B26 Distribution of Household Debt, available at <<http://www.rba.gov.au/statistics/tables/index.html>>. Data are weighted to be representative of the population as a whole. To enable comparison across time, an adjustment is also made for the change in purchasing power between periods by converting the values in earlier surveys to September 2010 dollars using the consumer price index.

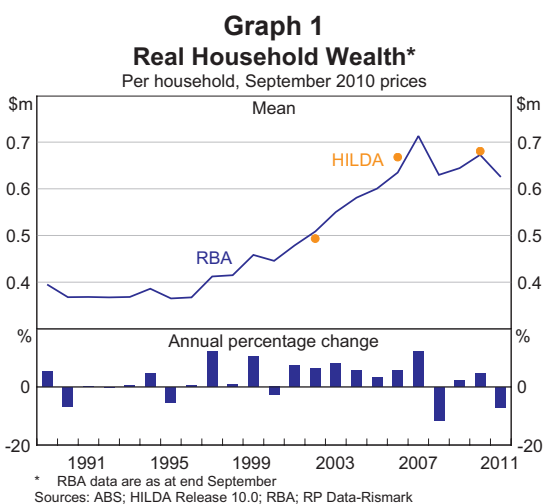
3 Households can drop out of the HILDA Survey due to death, a move overseas, loss of contact with the survey, or a refusal to remain in the survey; the newly formed households created by the split of an existing household remain in the survey. For more information on the HILDA Survey, see <<http://www.melbourneinstitute.com/hilda>>.

1980s to around 1996. Real asset values were broadly stable over the period and increases in total wealth due to saving were largely offset by an increase in the number of households. Real wealth started to increase around 1997, driven by higher asset valuations; annual compound growth was 6 per cent over the following decade (Graph 1). In 2008, with the onset of the global financial crisis, household wealth fell substantially as the prices of dwellings and financial assets fell. Wealth recovered somewhat in 2009 and 2010 but has fallen more recently with declines in asset prices.

was stronger within HILDA, although this was offset somewhat by weaker financial asset growth. Over the 2006 to 2010 period, both the HILDA measure of average real wealth per household and the aggregate measure grew by an annual compound rate of around 1 per cent.

Turning to the distributional aspects of wealth, Graph 2 shows median real wealth for all households in the left most panel. The other panels show median wealth for different wealth and income quintiles, different age groups, housing status and the states in which households reside.⁵

Median wealth in Australia in 2010 was a little less than \$400 000, compared with mean wealth of almost \$700 000. The gap between these two measures indicates that wealth is not equally distributed; a disproportionate share of wealth is held by the most wealthy households so that the distribution of wealth is positively skewed. For example, in 2010 households in the highest wealth quintile (the wealthiest one-fifth of households) held 62 per cent of total wealth. Indeed, the median wealth of this quintile was \$1.5 million, around four times the median wealth of the middle quintile, at \$400 000, and 10 times that of the second lowest quintile at \$150 000. Part, but not all, of this skew is due to age, since older households are typically wealthier than younger households.⁶ Wealth is distributed less equally than income; that is, the distribution of wealth is more skewed than that of income. This can be illustrated by the Lorenz curve, which shows the share of wealth (or income) held by households ranked by wealth (or income); the further the curve is below the 45 degree line, the less equal the distribution (Graph 3).⁷



The first snapshot of household wealth from HILDA in 2002 recorded average wealth per household of almost \$500 000 in September 2010 dollars, consistent with estimates compiled by the RBA from aggregate data. The HILDA Survey implies slightly stronger annual compound growth in average real wealth per household between 2002 and 2006 than the aggregate data (8 per cent versus 6 per cent). These differences reflect a number of measurement issues, including differences in the scope of the HILDA Survey.⁴ For example, real estate asset growth

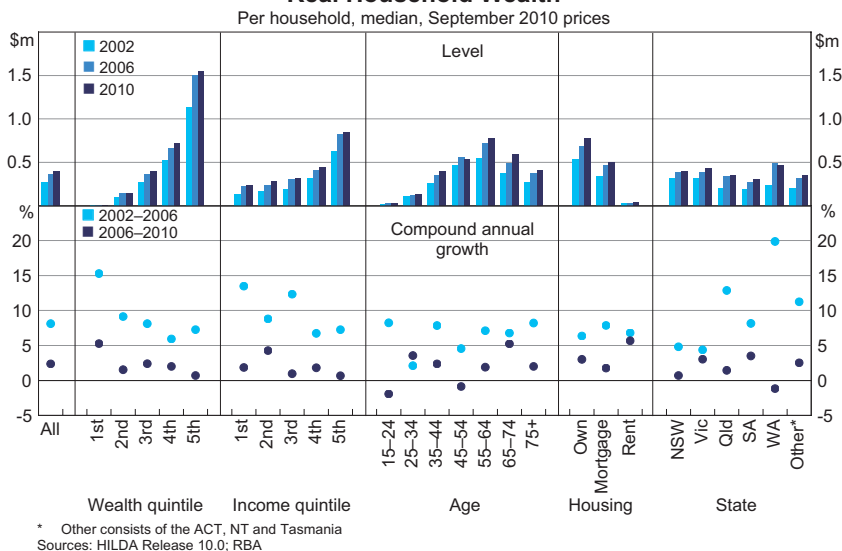
4 Dwelling prices in HILDA are based on households' judgements about the value of their property, while the RBA data use recorded sales prices. Similarly, debt and financial assets within HILDA are based on household responses, while the RBA data are based on information obtained from financial institutions. The RBA data also include not-for-profit institutions serving households in the household sector, while HILDA does not.

5 Each quintile represents 20 per cent of households, so that the first wealth quintile represents the poorest 20 per cent of households, while the fifth wealth quintile represents the richest 20 per cent of households.

6 For example, looking *within* age groups, the ratio of the wealth of the richest 20 per cent to the second lowest 20 per cent is around 7 times, compared with 10 times for the sample as a whole.

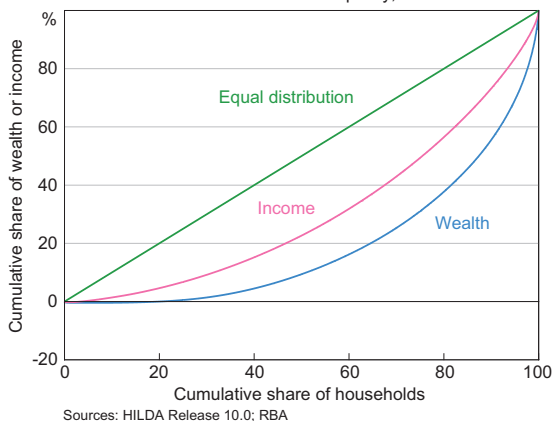
7 For example, the value on the y axis of the Lorenz curve for wealth at 80 on the x axis gives the proportion of total wealth held by households in the bottom four wealth quintiles, in this case around 40 per cent.

Graph 2
Real Household Wealth



Graph 3
Lorenz Curves

Income and wealth inequality, 2010



The degree of skewness in the wealth distribution appears to have fallen over the past four years. Median wealth in the lowest wealth quintile grew at an annual rate of 5 per cent between 2006 and 2010, a larger increase than that seen by the middle three wealth quintiles (around 2 per cent), or the wealthiest quintile (a little less than 1 per cent). The same conclusion applies if we examine the longitudinal aspect of the data: tracking the same households through time, median real wealth growth was generally higher for those households

that had low wealth in 2006 and lower for those households that had high wealth in 2006.⁸

The distribution of wealth across other dimensions such as household income, age and housing status generally accords with intuition: households with higher incomes generally also have higher wealth than households with lower incomes. Consistent with the standard life-cycle theory of saving, median wealth increases with age up until retirement, after which it falls. It is also clear that the median mortgage-free owner-occupier household is wealthier than the median household with a mortgage, which in turn is wealthier than the median renting household. Of course this need not be the case, as wealthy households could choose to rent and invest their wealth in non-housing assets such as shares and bonds, but in Australia this tends not to be the norm, with housing an important vehicle for household saving.

⁸ This result is potentially influenced by measurement error: if a high wealth household is incorrectly recorded as having low wealth in 2006 but this error is corrected in 2010, it will incorrectly appear as if a poor household has experienced strong growth in wealth. Similarly if a low wealth household is incorrectly recorded as having high wealth in 2006 but this error is corrected in 2010, it will incorrectly appear as if a rich household has experienced weak growth in wealth. However, the use of medians, which are robust to outliers, should serve to alleviate this problem.

Unlike the 2002 to 2006 period, when Western Australia and Queensland experienced exceptionally strong rates of growth in real wealth, between 2006 and 2010 growth was more uniform across states and territories, with all recording growth in median real wealth of between roughly –1 to 3 per cent per annum. In part, this reflects more uniform dwelling price growth – between 2002 and 2006 real dwelling prices more than doubled in Perth and rose by almost 50 per cent in Brisbane, while they were broadly unchanged in the other state capitals. In contrast, between 2006 and 2010, real dwelling prices were broadly unchanged in Perth, while prices in Brisbane rose by the same amount as prices nationally (around 20 per cent).

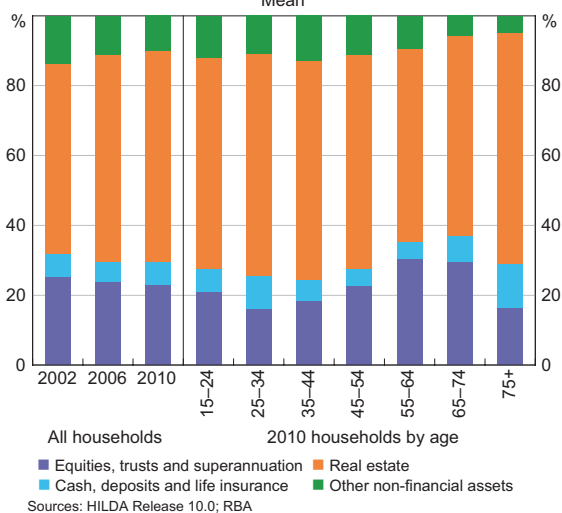
In addition to changes in the valuations of assets that a household owns, wealth can change because of a net accumulation or decumulation of assets. While these flows are not recorded in HILDA, an estimate of these flows is provided by the change in each household’s wealth that cannot be explained by asset price movements. While these estimates are not precise, they suggest that between the 2002–2006 and 2006–2010 periods, higher income households increased their saving relative to lower income households, that younger households increased their saving relative to older households, and that households with less wealth increased their saving relative to wealthier households. This is consistent with the analysis of Lowe (2011).

Turning to changes in the composition of household assets over the eight years to 2010, there has been a small fall in the share of riskier financial assets held (taken here as equities, trusts and superannuation) (Graph 4). This is entirely accounted for by a shift away from direct equity holdings, which fell from 6½ per cent of the average household’s assets in 2002 to 4½ per cent in 2010; over the same period the proportion of households owning equities directly fell from 39 per cent to 34 per cent. Most of the fall occurred between 2006 and 2010 and was driven by both withdrawals and valuation effects. By contrast, the average shares of assets in

trusts and superannuation were little changed over the period, although the share of households with superannuation holdings rose from 76 per cent to 82 per cent, indicating that the average share in superannuation for households with existing superannuation holdings declined slightly. This shift away from equities has been broad based, with all age groups reducing their exposure between 2002 and 2010. It accords with a number of other sources that suggest a reduction in the appetite for risk, and is also likely to reflect relatively low returns to equities, especially between 2006 and 2010. Conversely, real estate has increased in importance, with its share of asset holdings rising from 54 per cent to 60 per cent.

Focusing on the most recent data, it is clear that those households approaching retirement and in the early stages of retirement had the greatest exposure to movements in financial market prices. In particular, those aged 55 to 74 years held around 30 per cent of their assets in equities, trusts or superannuation, relative to around 20 per cent for most other age groups. Younger and older households tended to hold more of their assets in the form of cash and real estate, and so in aggregate would have been less exposed to falls in equity markets.

Graph 4
Composition of Assets
Mean



Household Financial Assets

The growth rate of household financial assets from 2006 to 2010 was much slower than it was from 2002 to 2006 (Table 1). Aggregate data suggest that this slowdown was largely due to valuation effects: valuation effects lifted financial assets by 2 per cent per annum between 2002 and 2006, but subtracted 5 per cent per annum from financial assets over the following four years, while new inflows lifted real financial assets per household by 5 to 6 per cent per annum over both the 2002–2006 and 2006–2010 periods. Growth of financial assets between 2006 and 2010 tended to be higher for groups with lower holdings of financial assets in 2006, and lower for groups with higher holdings. In part, this can be explained by the fact that wealthier households hold a greater share of their financial assets in the more risky asset classes, and so would have been more exposed to the negative valuation effects recorded between 2006 and 2010. Furthermore, new inflows, in the form of compulsory superannuation contributions, can have a proportionally larger effect on the *growth rate* of small financial asset holdings than on the growth rate of large financial asset holdings.

As discussed above, the HILDA Survey suggests that wealthier households hold a higher than average proportion of their financial wealth in the form of direct equity holdings and trusts, whereas poorer households hold more in cash and superannuation (Graph 5). Investing via equities or trusts requires time and entails set-up and transactions costs, and so is likely to be less attractive to those with a relatively small amount to invest. In addition, households with less wealth may also be more cautious investors,

as a loss is likely to have a greater impact on their standard of living. Wealthy households are also likely to have more disposable income and so be able to save part of their income beyond their compulsory superannuation contributions, thereby reducing the importance of superannuation assets relative to other asset holdings.

According to HILDA, superannuation constitutes a growing share of financial assets. This is especially true for older age groups. Since 2002, the HILDA Survey suggests that the average share of financial assets held in superannuation has risen by around 15 percentage points for 55 to 74 year olds, driven by younger households with more exposure to superannuation entering this age group and older households with less exposure leaving the age group. Other age groups collectively saw little change in the relative importance of their superannuation holdings.

Graph 5
Composition of Financial Assets

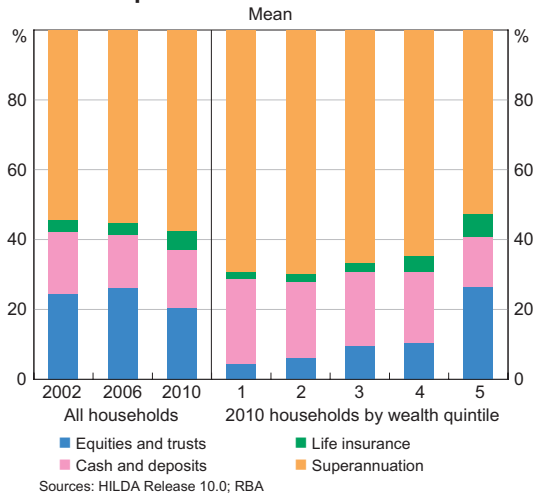


Table 1: Real Financial Assets
Compound annual growth, per cent

	2002–2006	2006–2010
HILDA Survey – median	7½	4
HILDA Survey – mean	6	1½
Aggregate data – mean	7½	1

Sources: ABS; HILDA Release 10.0; RBA; RP Data-Rismark

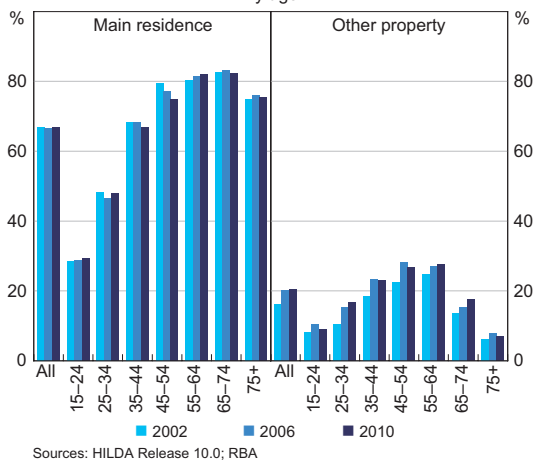
Household Non-financial Assets

Average growth in non-financial assets moderated significantly from 2002–2006 to 2006–2010, from 10 per cent to 3 per cent per annum. The estimated median real value of households’ non-financial assets was \$410 000 in 2010, up from \$360 000 in 2006. Non-financial assets in the HILDA Survey are comprised of holdings of real estate, business assets and durable goods such as motor vehicles and collectibles. Overall, these assets accounted for 70 per cent of households’ total assets in 2010, broadly in line with the share implied by the aggregate measure (64 per cent). Given the large share of total assets accounted for by non-financial assets, the distributional aspects of the non-financial assets data are similar to those of household wealth. In particular, cross-sectional comparisons between the 2006 and 2010 HILDA Surveys suggest that the slowdown in non-financial asset growth observed at the aggregate level was broad based across income, wealth and age groups, and states.

Holdings of real estate (both primary and other residential properties) represent the largest share of non-financial assets, at around 85 per cent for households in the 2010 HILDA Survey. Hence, slower growth in property prices over 2006 to 2010 compared with the earlier period is the main reason for the slower growth of non-financial assets; business assets, vehicles and collectibles, which account for the remaining 15 per cent of non-financial assets, contracted by 4 per cent over the four years to 2010.

According to HILDA, the home-ownership rate was stable between the 2006 and 2010 survey periods, at around 67 per cent of households in both years, of which around half owned their home outright. Home ownership increases with age up until retirement, after which it falls slightly, with around 30 per cent of 15 to 24 year old household heads owning their own home, rising to a little over 80 per cent for those aged between 55 and 74, before dropping slightly for those aged 75 years and older (Graph 6). Home-ownership rates within age groups

Graph 6
Real Estate Ownership Rates
By age



appear to have been broadly stable over the eight years to 2010. Ownership rates for other residential property, by contrast, increased from 16 per cent in 2002 to 20 per cent in 2006 and remained stable at this rate in 2010. This earlier increase in ownership was seen in all age groups, although it was most pronounced for the 25 to 54 year old group. Since 2006, the pattern has been more mixed, with ownership rates increasing for those approaching, or just past, retirement age, as well as for 25 to 34 year olds, and falling or remaining stable for most other groups.

Unsurprisingly, of those households who own their own home, the proportion that do so mortgage-free tends to increase with age, from around 20 per cent for young households to over 90 per cent for older households. Home ownership, and other property ownership, also increases with income, as would be expected, although the proportion of households that own their home mortgage-free actually falls with rising income (Graph 7). This result is mainly due to the age profile of the income quintiles, with the bottom income quintile dominated by retirees who tend to own their own home outright and the top income quintile dominated by households of an intermediate age, which tend to have mortgages.

Graph 7

Real Estate Ownership Rates

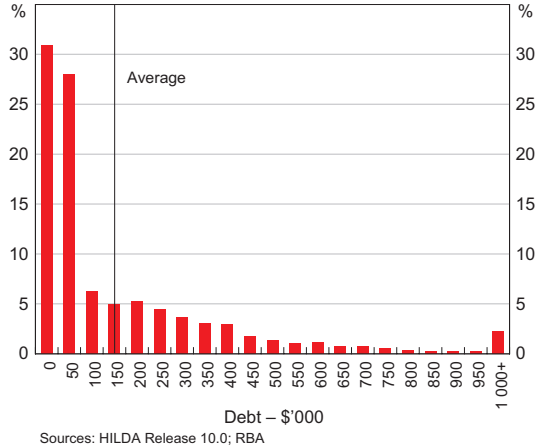
By income quintile, 2010



Graph 8

Histogram of Debt Owed

Per household, September 2010 prices



Household Debt

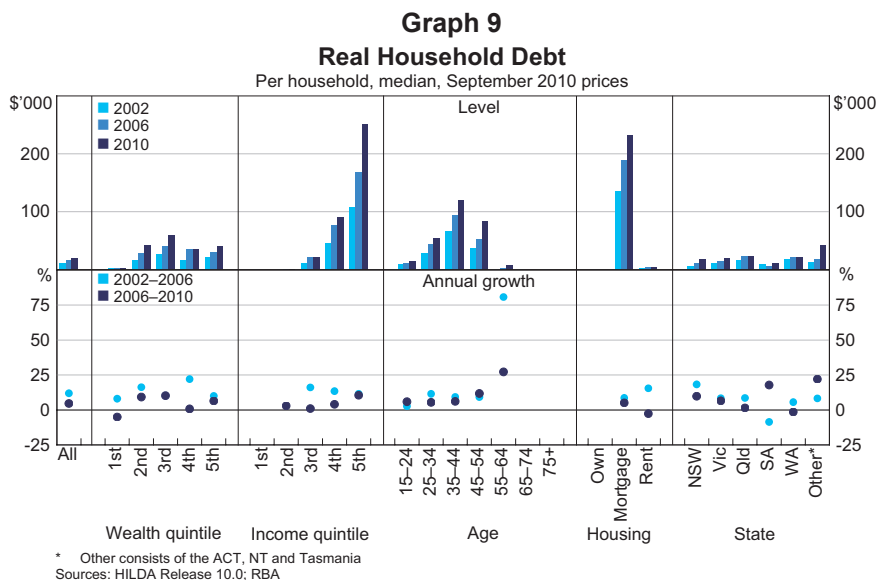
According to the HILDA Survey, average debt per household increased by 5 per cent per annum in real terms between 2006 and 2010, a step down from the 11 per cent per annum increase seen over the 2002 to 2006 period (aggregate data are broadly similar, suggesting increases in real per household debt of 3 and 11 per cent per annum over the two periods).

The distribution of debt is highly skewed: 31 per cent of households had no debt in 2010 (unchanged from 2006 but lower than the 35 per cent recorded in 2002) and a further 28 per cent had debts of \$50 000 or less, while 2 per cent of households had debts in excess of \$1 000 000 (Graph 8). Within this, property debt accounted for 80 per cent of total debt in 2010 (with main residence debt making up 57 per cent of total debt and other property debt making up 23 per cent). Business debt accounted for 6½ per cent of total debt, and the remainder was comprised of credit card, HECS and other personal debt. Tracking the same households through time, roughly one-third increased their nominal debts between 2006 and 2010, one-third reduced their debts, and one-third maintained the same level of debt, which was no debt for almost all. This is in contrast to the earlier period where

more households had increased their debt (40 per cent) and less households had reduced their debt (28 per cent).

Those households with the highest incomes also have the highest levels of debt. Indeed, in 2010 the top income quintile accounted for almost half of total debt, while the top two quintiles accounted for over 70 per cent of debt. However, the distribution of debt by wealth quintile is more equal, with median debt over the top four quintiles being broadly similar at between roughly \$40 000 to \$60 000 (Graph 9). By age, median debt peaks for 35 to 44 year olds then falls to zero for those aged 65 years or older. This accords with intuition, with young households taking on debt to fund their education and purchase property, before paying down the debt over their working lives. Unsurprisingly, those who own their home with a mortgage are far more indebted than those who own their home outright or those who rent.

For most of the cross-sectional groups considered, debt increased at a slower pace between 2006 and 2010 than over the previous four-year period. In line with their high share of debt outstanding, high-income households contributed most to the slowdown – debt growth in the top income quintile slowed from 12½ per cent per annum to 5½ per cent,



accounting for around half of the 6 percentage point slowdown in the rate of total debt accumulation. For the sample as a whole, the slowing in debt accumulation tied to main residences and tied to other property each accounted for around 40 per cent of the overall slowdown in debt accumulation, although other property debt slowed much more sharply.⁹ The slowdown in the growth of other property debt appears to have been most pronounced among low-income earners, households from Queensland, and households with household heads aged less than 25 years or greater than 64 years.

The ratios of debt to income and debt to assets (gearing) provide an indication of the ability of households to service their debts. The HILDA data suggest that the median debt-to-income ratio for households with debt was 150 per cent in 2010, up from 130 per cent in 2006 and 110 per cent in 2002

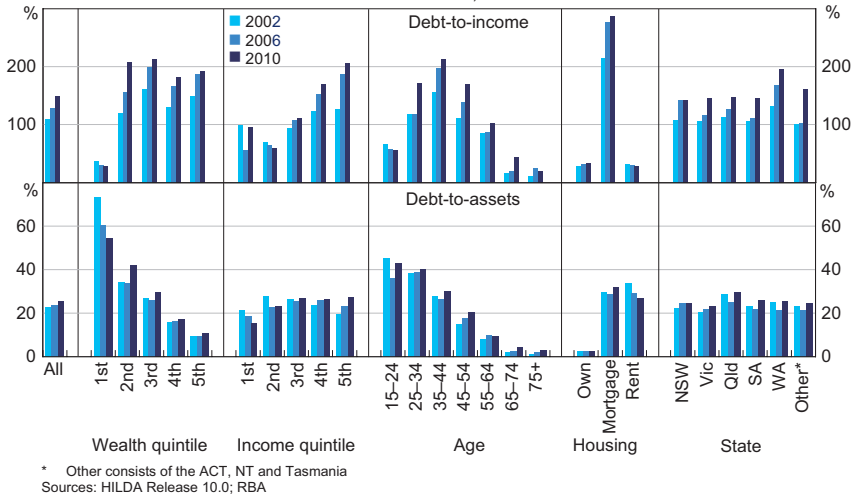
(Graph 10).¹⁰ High-income households generally have higher debt-to-income ratios than lower-income households; median debt-to-income ratios increase from 60 per cent for those households in the second income quintile to over 200 per cent for the highest earners. This reflects the fact that high-income earners can devote a larger share of their income to servicing their debts while still maintaining a given standard of living, and so can sustain a larger debt burden. Similarly, middle-aged households are likely to be in the prime of their working lives and so be able to sustain larger debt burdens than the young or old.

The median gearing ratio of those with debt has also been rising – from 23 per cent in 2002 to 24 per

9 The stock of debt tied to main residences is larger than the stock of debt tied to second homes and investment properties, so a larger slowdown in other property debt is needed to cause the same contribution to slowing in total debt.

10 Aggregate data suggests that the average debt-to-income ratio (including those households with no debt) was 154 per cent in 2010; the comparable ratio from HILDA was much higher at 214 per cent, although if we adjust the HILDA data to take account of a number of differences with the aggregate data, the nationwide HILDA debt-to-income ratio falls to around 150 per cent. The discrepancy is due to a number of conceptual and technical differences between aggregate income as measured by the ABS and income as reported within HILDA. In particular, income in HILDA is predominantly defined as cash received in the reporting period that is regular and recurring, whereas aggregate income as defined by the ABS includes non-cash income (such as imputed rent) as well as income accrued during the period but not received (for example, employer contributions to superannuation on behalf of employees).

Graph 10
Household Debt Metrics
Indebted household; median



cent in 2006 and 25½ per cent in 2010. The gearing ratio falls as wealth increases, suggesting that less wealthy households who owe debt are more highly geared than richer households who owe debt. This is due to relatively low asset holdings of less wealthy households, rather than high debt levels. Gearing also falls with age, as would be expected.

Conclusion

While aggregate data can give an indication of average household wealth in Australia, household level data are needed to examine the distributional aspects of wealth. The HILDA Survey provides one such source of data. It confirms that wealth is unevenly distributed, but to a lesser extent in 2010 than it was in 2006 (over the four years to 2010, wealth grew faster for households with lower wealth than for households with higher wealth). The distribution of debt is also highly skewed: the top 20 per cent of income earners owe almost half of all debt outstanding, while one-third of households owe no debt and over half owe less than \$50 000. ✕

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India's Steel Industry

Markus Hyvonen and Sean Langcake*

Indian steel production has grown strongly in recent decades and India is now the world's fourth-largest steel producer. Nevertheless, India's consumption of steel relative to the size of its economy is very low by international standards. As the economy develops further, steel consumption is likely to increase. Indeed, Indian steelmakers have plans to expand capacity substantially in order to meet the anticipated increase in demand. While India has relatively large reserves of iron ore, its steelmakers import most of the coking coal they require. As Australia is a major supplier of coking coal to India, these exports from Australia are likely to expand further.

Introduction

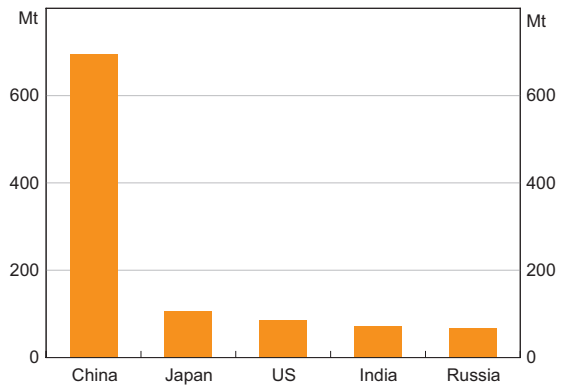
Steel production in India has expanded rapidly in recent decades and, as a result, India has become the world's fourth-largest producer of crude steel (having been the 10th largest in 1995; Graph 1). Relative to the size of its economy, India's steel consumption, however, remains low; with large additions to steelmaking capacity planned to meet expected growth in steel demand, the nation's steel industry is expected to expand as India develops further.

While India has large reserves of relatively high-quality iron ore, its reserves of coking coal are limited and mostly unsuitable for steelmaking; accordingly, Indian steelmakers import much of the coal required for producing steel. Australia is a major source of India's coking coal imports, and given its proximity to India, these exports are likely to grow as Indian steel production expands. This article discusses the Indian steel industry, focusing on its structure, the production technologies used and the sources of its steelmaking commodities.

History and Structure

Prior to independence in 1947, India had a small steel industry comprised entirely of private sector

Graph 1
Global Crude Steel Production
2011



Source: World Steel Association (worldsteel)

firms. India's first Five Year Plan, introduced in 1952, imposed a number of restrictions and effectively placed the sector under state control. Large-scale expansions in steelmaking capacity were reserved for public sector enterprises, the Indian Government set the price of steel sold by large producers and quantitative restrictions and tariffs were imposed on imports of inputs and finished steel. Sizeable public sector investment in steelmaking capacity since the first Five Year Plan helped steel production grow strongly in the decades following independence, with average annual growth exceeding 8 per cent between 1950 and 1970 (Joint Plant Committee nd).

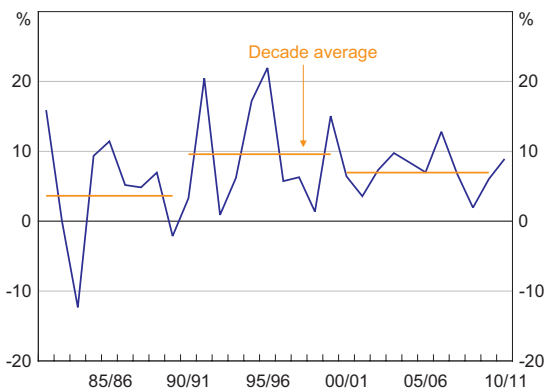
* The authors are from Economic Group.

INDIA'S STEEL INDUSTRY

Steel production continued to expand during the 1970s and 1980s, though slowed somewhat from the pace of the preceding decades, consistent with lower rates of growth in per capita incomes over this period (Baker and Cagliarini 2010). A new industrial policy introduced in the wake of the early 1990s balance of payments crisis removed many of the restrictions on the steel industry and tariff barriers were reduced; furthermore, foreign investment in the sector was permitted, with the steel industry included on the list of 'high priority' industries for automatic approval of up to 51 per cent foreign equity investment. Private sector firms, in particular, took advantage of their ability to expand, and steel production accelerated. Growth in steel production in the 1990s averaged around 10 per cent (Graph 2).

Graph 2

India – Steel Production Growth*



* Refers to Indian fiscal years (1 April to 31 March)
Sources: CEIC; RBA

The sector continued to expand at a relatively rapid pace in the early 2000s, and the government announced India's first National Steel Policy in November 2005 to guide the future development and growth of the sector. The policy's stated long-term goal was that 'India should have a modern and efficient steel industry of world standard, catering to diversified steel demand' (Ministry of Steel 2005). The policy projected that India's domestic steel production would grow in line with GDP to reach 100 million tonnes by 2019/20.¹

¹ All mentions of fiscal years in this article refer to Indian fiscal years, which run from 1 April to 31 March.

However, more recent estimates suggest that India's steelmaking *capacity* will exceed 100 million tonnes by as early as 2013 (Ministry of Steel 2011).

The legacy of earlier public sector involvement is reflected in the current structure of the Indian steel industry, with the state-owned Steel Authority of India Limited and Rashtriya Ispat Nigam Limited still accounting for around a quarter of total crude steel production in 2009/10 (Ministry of Steel 2011). Including the two largest private steelmakers, TATA Steel and JSW Steel, these producers operate a handful of integrated steel plants that account for the majority of steel made in India using the blast furnace/basic oxygen converter method (Table 1). This method of steelmaking uses coking coal and iron ore as primary inputs, though scrap steel can be substituted for iron ore.

Private firms dominate the production of steel using the two electric furnace methods; three large producers account for roughly half of all electric arc furnace steelmaking, while electric induction furnace steelmaking is very decentralised, with over a thousand plants operating in 2009/10 (Table 1). Electric furnace steelmaking can utilise both scrap steel and direct-reduced iron – made from iron ore – as inputs, without requiring the addition of coking coal.²

Strong growth in private sector steelmaking, which tends to use smaller capacity plants, together with broadly stable public sector capacity means that the electric furnace methods now account for the majority of India's steel production. As a result, steelmaking in India is less commodity intensive than elsewhere; the share of crude steel produced using the blast furnace/basic oxygen converter method in India is half that of China and the lowest among the major steel-producing countries (World Steel Association 2011). Even so, much of the steel produced by electric furnaces in India uses direct-reduced iron rather than scrap metal, so iron ore

² Direct-reduced iron is made by reducing iron ore to iron by heating it in the presence of gas containing hydrogen and carbon monoxide. It is also known as sponge iron.

Table 1: India – Crude Steel Production by Process
2009/10

Process	Number of plants	Production Megatonnes	Production Share of total (%)
Blast furnace/basic oxygen converter	13 ^(a)	29	45
Electric arc furnace	39	16	24
Electric induction furnace	1 114	20	31
Total	na	65	100

(a) Refers to the number of integrated steel plants with at least one blast furnace; some plants have multiple blast furnaces or a combination of both blast and electric furnaces

Sources: Ministry of Steel (2011); authors' calculations; company websites

is still used as an input for most of the crude steel produced in India.³

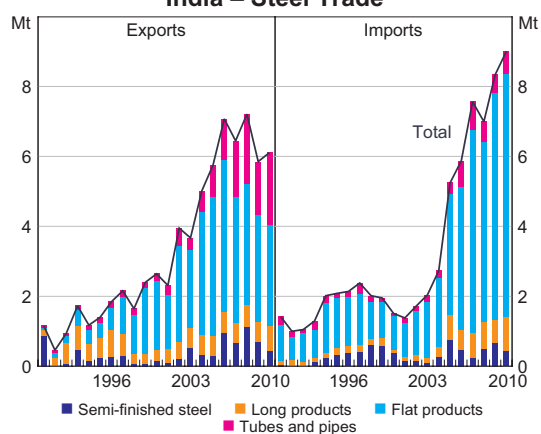
Steel Demand and Trade

The production of finished steel in India is fairly evenly split between 'long products' (bars, rods, wires, etc), which are typically used in construction, and 'flat products' (steel strips, plates, sheets, etc), which are used in manufacturing. Construction and infrastructure are estimated to account for roughly 40 per cent of steel consumption, and manufacturing (including automobile production) for around 30 per cent of consumption (Indicus Analytics 2009).

While domestic steel production has historically been sufficient to satisfy domestic demand, India has recently become a net importer of steel, reflecting strong growth in Indian steel consumption (Graph 3). Imports of flat products have grown particularly strongly in recent years, as manufacturing production grew strongly in the years leading up to the global financial crisis and has recovered strongly subsequently. At the same time, India's steel exports have fallen (with the exception of shipments of pipes

³ The Ministry of Steel (2011) estimates that steel generated from ship recycling accounts for 1 to 2 per cent of total Indian steel demand. Furthermore, imports of steel scrap were equal to around 7 per cent of the production of finished steel in 2009/10. These figures suggest that scrap is used as an input for at least 8 per cent of the finished steel produced in India, though the actual figure is likely to be higher once other sources of scrap, such as the recycling of durable goods, are taken into account.

Graph 3
India – Steel Trade



Sources: RBA; United Nations COMTRADE database; World Steel Association (worldsteel)

and tubes). Nonetheless, steel remains an important source of export revenue, accounting for around 4 per cent of the total value of India's exports in 2010.

Most of India's imports of steel come from other large steel-producing countries. Imports from China have grown strongly over the past five years or so, with China now accounting for around one-third of the value of India's steel imports (Table 2). Sizeable steel imports from advanced economies suggest that there are certain types of products that are either not produced in India or for which domestic capacity is insufficient to meet demand; for example, Indian automakers import much of the high-grade steel used for manufacturing outer panels of cars

Table 2: India's Trade in Steel
Per cent

Exports				Imports			
2010		2000		2010		2000	
Destination	Share of total ^(a)	Destination	Share of total ^(a)	Origin	Share of total ^(b)	Origin	Share of total ^(b)
United States	14.0	United States	28.3	China	29.8	Japan	15.8
Saudi Arabia	9.4	United Arab Emirates	6.6	South Korea	13.9	Russia	13.9
United Arab Emirates	7.9	Italy	5.8	Japan	11.7	Germany	9.4
Belgium	7.7	Canada	5.6	Russia	5.3	South Korea	8.9
Iran	7.0	Sri Lanka	4.2	Germany	4.9	Ukraine	7.2

(a) Share of the total value of India's steel exports

(b) Share of the total value of India's steel imports

Source: United Nations COMTRADE database

(Mazumdar 2010). While the United States is the largest destination for Indian steel exports, around one-third of exports go to oil-producing countries in the Middle East (Table 2). Detailed export data reveal that a large share of the shipments to the Middle East consists of steel pipes suitable for oil and gas pipelines. India was the world's largest exporter of steel pipes for oil and gas pipelines in 2010, and lower shipping costs (owing to the relative proximity of India to the Middle East) are reflected in the region's oil-producing countries sourcing the majority of their imports of pipelines from India.

Consistent with India's low income per capita, its steel consumption per capita is currently very low relative to other large economies. In 2010, India's consumption of steel (in crude steel equivalent terms) was 49 kg per capita, compared with 539 kg in Japan, 445 kg in China, 292 kg in the United States and a world average of around 220 kg (World Steel Association 2011). India's low steel consumption partly reflects its relatively limited urbanisation to date; in 2010, only 30 per cent of India's population lived in urban areas (compared with an average of 42 per cent across Asia) having risen from under 20 per cent in 1970 (United Nations 2010). The pattern of development in other major economies

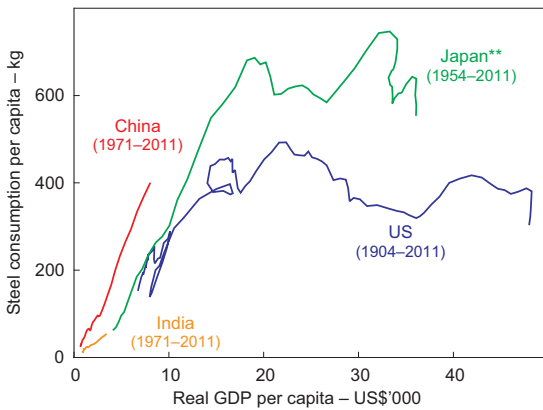
suggests that India's steel consumption per capita will continue to grow, although the speed of this increase will largely be determined by the rate at which India urbanises and industrialises (Graph 4).

To cater for increases in domestic steel demand, the Indian steel industry has expansion plans which, if fully realised, would see capacity expand to over 275 million tonnes – a more than threefold increase in capacity (Ministry of Steel 2011). As much as 30 million tonnes of additional capacity is expected to come online during 2011/12 and 2012/13, which should see productive capacity increase by roughly 40 per cent. The Indian authorities are also optimistic about the medium-term prospects for steel production, with the Ministry of Steel (2011) expecting that India will overtake Japan and the United States to become the world's second-largest producer of crude steel by 2015/16.

Demand for Iron Ore and Coking Coal

India's demand for iron ore is currently met largely through extraction of high-quality hematite reserves located in the eastern states of Odisha, Jharkhand and Chhattisgarh and the south-western states of

Graph 4
Steel Consumption and Economic Development*



* 2011 prices using 2005 PPP exchange rates; 5-year moving averages
 ** Japanese fiscal years prior to 2009
 Sources: Bureau of Resource and Energy Economics; CEIC; Conference Board; IMF; Japan Iron and Steel Federation; Maddison (2009); Thomson Reuters; US Geological Survey; World Steel Association (worldsteel)

Karnataka and Goa. Extraction and crushing of the iron ore processed from these reserves leaves it in the form of lumps (56 per cent of iron ore), fines (21 per cent), and a mix of lumps and fines (13 per cent).⁴ Lumps are ready for use in steel production, whereas fines are smaller in size and are required to go through an agglomeration process (typically either sintering or pelletisation) before they can be used in steel production.⁵ Additional domestic demand is met by the country's deposits of lower grade magnetite reserves, extracted as fines (Indian Bureau of Mines 2011a).

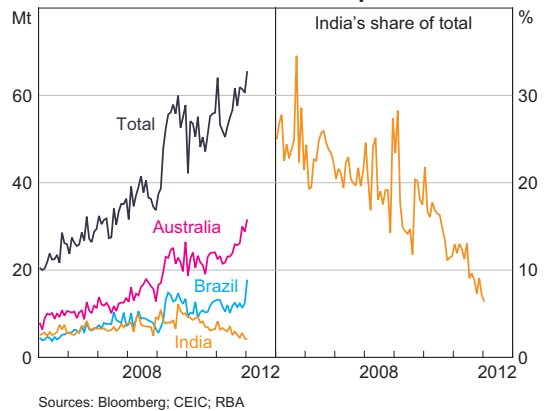
India is currently the world's third-largest exporter of iron ore behind Australia and Brazil. In recent years, however, India's exports as a share of total production have been declining (World Steel Association 2011). Shipments to China, which account for over 85 per cent of Indian exports of iron ore, have fallen over the past few years, even as China's demand for imported

4 The remaining 10 per cent are processed as black iron ore, other or unknown grades.

5 Iron ore fines cannot be used directly in blast furnaces as they block the flow of air around the raw materials. Agglomeration is the process of converting fines into lumpier aggregates, either with or without additives such as limestone or dolomite. Sinters are made of coarser iron ore fines and are the preferred input in blast furnaces, whereas pellets are made from very fine iron ore.

iron ore has grown (Graph 5). Part of this decline in exports is attributable to the desire of policymakers to make more use of India's iron reserves for domestic steel production, which has been actively pursued through the use of export duties on iron ore. Through 2009 and 2010, export duties were raised from 0 to 5 per cent on fines, and from 5 to 15 per cent on lumps. Duties for both were raised to 20 per cent in the 2011/12 budget, and then again to 30 per cent at the beginning of 2012. These higher duties are reducing India's contribution to the seaborne iron ore market and shifting demand for iron ore to other major exporters such as Australia and Brazil.

Graph 5
China – Iron Ore Imports



Sources: Bloomberg; CEIC; RBA

Indian policymakers are also seeking to increase domestic agglomeration of iron ore fines, which will further limit India's contribution to the seaborne market. In 2009/10, 90 per cent of Indian iron ore exports were in the form of fines (equivalent to over 70 per cent of total fines production). As agglomeration procedures are capital intensive to start up, the bulk of these facilities in India are operated by integrated steel plants. India's iron ore industry has many participants (319 reported mines in 2009/10), but is highly concentrated, with 18 per cent of mines producing 72 per cent of total output (Indian Bureau of Mines 2011a). The National Steel Policy has recognised the need to increase agglomeration capacity and encourage the formation of consortiums among smaller mines

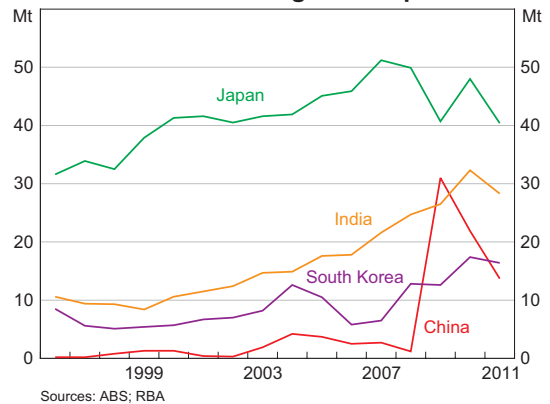
in order to pool their fines and make greater use of this resource domestically (Indian Bureau of Mines 2011b).

Over the next 15 to 20 years, existing high-grade hematite reserves are expected to be depleted (Indian Bureau of Mines 2011b). However, India expects to remain self-sufficient in its supply of iron ore for the foreseeable future. Advances in drilling technology are expected to allow access to more reserves beyond the current attainable depth in iron ore mining areas. Additionally, exploration in some known hematite-bearing regions has not been exhaustive; as this exploration continues, estimates of hematite reserves are expected to increase. Furthermore, greater domestic consumption of fines and the restriction of supply to the global market will help to ensure a sufficient supply of local resources.

By contrast, Indian coking coal reserves are quite small and tend to be of low quality, needing to be blended with higher-grade imported coal for use in steel production. To meet rising demand from steel production, India has become an increasingly large purchaser in the global coking coal market. India is now the third-largest importer of coking coal in the world (World Coal Association 2011). Since the early 2000s, Australia's coking coal exports to India have risen steadily, and India is now the second most important destination of these exports behind Japan (Graph 6). Coal now comprises around one-third of the value of Australian exports to India, with almost all of coal exports made up of coking coal.

India's National Steel Policy has identified the need to further develop non-coking coal methods of steel production, such as the use of electric arc furnaces (Ministry of Steel 2005). However, given existing blast furnace production capacity, this technology is likely to continue to play a role in the development of the local steel industry and drive further demand for Australian coking coal in the future.

Graph 6
Australia – Coking Coal Exports



Conclusion

Indian steel production has grown strongly in recent decades and is likely to continue to expand as domestic producers increase their capacity to meet anticipated demand. Given its relatively large reserves of iron ore, India is likely to remain self-sufficient in its supply of iron ore for the foreseeable future. In contrast, Indian steelmakers rely heavily on imports for their coking coal needs. As Australia is a major supplier of coking coal to India, growth in Indian steel production is likely to see these exports from Australia expand further. ❏

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Banks' Funding Costs and Lending Rates

Cameron Deans and Chris Stewart*

Over the past year, lending rates and funding costs have both fallen in absolute terms but have risen relative to the cash rate. The rise in funding costs, relative to the cash rate, reflects strong competition for deposits, particularly term deposits, and higher spreads on wholesale debt reflecting an increase in investors' concerns about the global banking industry. While spreads have narrowed recently, they are still noticeably higher than they have been over the past couple of years. Over the past six months, lending rates have generally fallen by more than funding costs.

Introduction

There are a number of factors that influence the lending rates banks set. The most important is the cost of funding, which is a function of the composition of liabilities and the costs of raising the different liabilities. Beyond this, banks also consider a number of other factors including pricing for different types of risk – such as the credit risk associated with the loan and the liquidity risk involved in funding long-term assets with short-term liabilities – and choices about growth strategies in different markets.

The level of the cash rate set by the Reserve Bank is a primary determinant of the level of intermediaries' funding costs and hence the level of lending rates. It is the short-term interest rate benchmark that anchors the broader interest rate structure for the domestic financial system. However, there are other significant influences on intermediaries' funding costs, such as risk premia and competitive pressures, which are not affected by the cash rate. At various points in time, changes in these factors can result in changes in funding costs and lending rates that are not the result of movements in the cash rate. The Reserve Bank Board takes these developments into account in its setting of the cash rate to ensure that the structure of interest rates in the economy is consistent with the desired stance of monetary policy.

In this article, we update previous Reserve Bank research that has documented how changes in the composition and pricing of funding have affected the cost to banks of funding their aggregate loan books, and how banks have responded to these cost developments in setting their lending rates (Fabbro and Hack 2011).¹ The article notes that while deposit rates and yields on bank debt have generally declined since mid 2011, the declines have not matched the reduction in the cash rate over this period. The increase in the relative cost of term deposits and wholesale debt has led to an increase in the weighted-average cost of funds for banks, relative to the cash rate, since mid 2011. This increase is in addition to the increase that occurred between mid 2007 and 2010. The article also documents the decline in bank lending rates since mid 2011, and discusses the effect on banks' margins of the movement in funding costs and lending rates.

Composition of Banks' Funding

Banks operating in Australia have diverse funding bases, with most funding sourced from deposits, and short-term and long-term wholesale debt. The

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¹ This article estimates, at an aggregate level, the cost to the banks of funding their aggregate loan books and, in turn, their lending rates. The funding structure of individual banks can differ quite markedly from the aggregate. The Reserve Bank uses a wide range of information to make these estimates. It supplements the analysis with detailed discussions with financial institutions.

BANKS' FUNDING COSTS AND LENDING RATES

relative importance of these funding sources has undergone significant change over recent years in response to a reassessment of funding risks by banks globally, as well as regulatory and market pressures (Graph 1). In particular, an increasing share of funding has been sourced from deposits. There has also been a shift away from short-term wholesale funding towards long-term wholesale funding, as banks have sought to reduce their rollover risk (that is, the risk associated with replacing maturing wholesale debt). These trends are consistent with the objectives of the Basel III global liquidity standards.

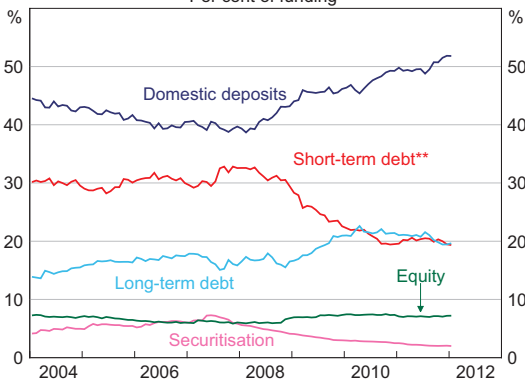
The marked changes in the composition of funding at the aggregate level are reflective of significant shifts in the composition of funding for different sectors within the banking industry. The major banks have increased their use of deposits and reduced their use of short-term debt while the regional banks have significantly decreased their use of securitisation and increased their use of deposits. There has also been a marked reduction in foreign banks' use of short-term wholesale debt. Credit unions and building societies continue to raise the vast majority of their funds via deposits.

Within banks' deposit funding, there has been a marked shift towards term deposits, which pay higher interest rates than other forms of deposits. Indeed, term deposits have accounted for most of

the growth in bank deposits since the onset of the financial crisis and now account for about 45 per cent of banks' deposits, up from 30 per cent in the middle of 2007 (Graph 2). The increase in the share of deposits, particularly term deposits, reflects a number of interrelated factors. First, banks have offered relatively attractive rates to depositors (discussed below). Second, strong business profits and business caution have resulted in larger corporate cash holdings, which have been increasingly invested in deposits rather than other financial instruments, particularly short-term bank paper. Third, households have significantly increased their term deposits placed directly with banks instead of investing in other financial assets. There has also been a rise in deposits placed via superannuation and managed funds.

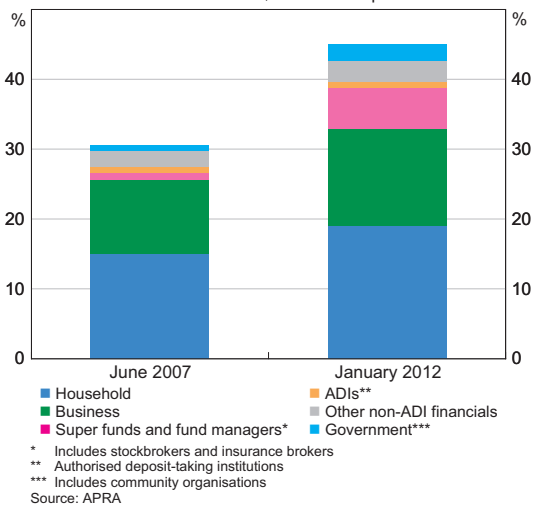
For banks, term deposits have the advantage of generally being a relatively stable funding source: while the average maturity of term deposits is fairly short, at somewhere between four and seven months, these deposits are typically rolled over a number of times. The rates on new term deposits can also be adjusted quickly to influence the growth in this source of funding.

Graph 1
Funding Composition of Banks in Australia*
Per cent of funding



* Adjusted for movements in foreign exchange rates
** Includes deposits and intragroup funding from non-residents
Sources: APRA; RBA; Standard & Poor's

Graph 2
Term Deposits with Banks in Australia
Per cent of total A\$ domestic deposits



* Includes stockbrokers and insurance brokers
** Authorised deposit-taking institutions
*** Includes community organisations
Source: APRA

While most of the competition among banks has been for term deposits, banks have also offered more attractive transaction and savings accounts, particularly through paying higher interest rates on these accounts. The increase in the value of funds invested in these deposits has largely been placed in online saver accounts and accounts with introductory bonuses and/or bonuses for regular deposits. Banks have reported little growth in the value of low-interest transaction-style deposit accounts.

In wholesale markets, the major banks have raised a sizeable amount of funding through covered bonds in recent months. In total, the major banks have issued more than \$22 billion of covered bonds following the passage of enabling legislation in October 2011. While this has had little effect on the composition of banks' funding at this stage, given the large stock of existing funding, it has allowed the major banks to achieve funding at longer tenors than is usually available with unsecured bonds. Covered bonds have generally been issued for terms of 5 to 10 years, whereas unsecured bank bonds are generally issued with maturities of 3 to 5 years. In addition to the issuance of covered bonds, the major banks issued about \$10 billion of residential mortgage-backed securities (RMBS) during the past year. While this was their largest annual issuance since mid 2007, securitisation remains a small share of the banks' total funding. In contrast, there was a slight decline in regional banks issuance of RMBS in 2011.

Cost of Funding

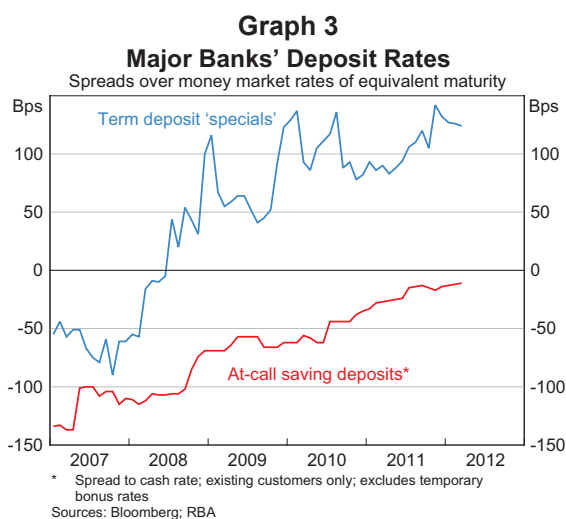
The absolute level of banks' funding costs fell over the second half of 2011, but by less than the reduction in the cash rate. There were particularly pronounced increases in the cost of term deposits and long-term wholesale debt relative to the cash rate as financial market conditions deteriorated in late 2011.

Deposits

Competition for deposits, which had moderated somewhat in early 2011, intensified in late 2011. Consequently, while the cash rate has fallen by 50 basis points since mid 2011, the major banks' average cost of deposits is estimated to have declined by about 25 basis points.

The average spread above market rates on the major banks' advertised term deposit 'specials' – the most relevant benchmark rate for term deposit pricing – has increased by about 35 basis points over the past year (Graph 3). Furthermore, an increase in the share of deposits written at rates higher than the 'carded' rates advertised by banks has meant that the average rate on outstanding term deposits has not fallen as quickly as benchmark rates as term deposits have been rolled over.

The average advertised rate on at-call savings deposits – including bonus saver, cash management and online savings accounts – rose by around 20 basis points relative to the cash rate over 2011 (although again the interest rate declined in absolute terms). Taking into account an increase in the proportion of savings deposits earning bonus rates, the average effective rate on these deposits is estimated to have increased by between 35 and 50 basis points relative to the cash rate. Interest rates on transaction



accounts have not fallen in line with the cash rate as many only pay very low nominal interest rates.

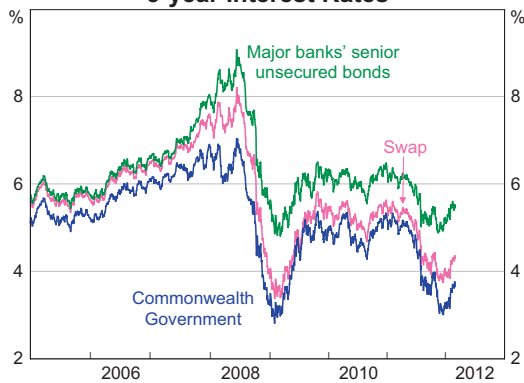
Wholesale debt

The absolute cost of issuing new unsecured wholesale debt fell during 2011 (Graph 4). Relative to risk-free benchmarks, however, the cost of issuing wholesale debt has increased materially since mid 2011 (Graph 5). This increase was particularly pronounced at longer maturities.² While spreads on banks' new wholesale debt have declined again

following the European Central Bank's first three-year longer-term refinancing operation at the end of 2011, they remain higher than in mid 2011. The increase in spreads on banks' wholesale funding reflects global investors demanding more compensation for taking on bank credit risk, although the rise for Australian banks has been less marked than it has been for other banks globally. The decisions by Standard & Poor's and Fitch to downgrade the Australian major banks' credit ratings by one notch, from AA to AA-, have had no discernible effect on these banks' borrowing costs. There has also been an increase in the costs associated with hedging the foreign exchange risk on new foreign-currency denominated bonds.

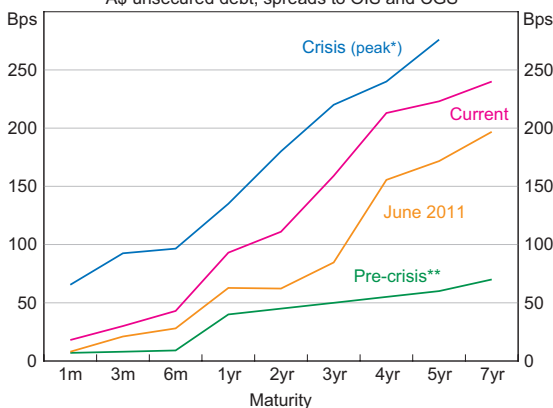
While the relative cost of new long-term wholesale funds is currently higher than that of maturing funds, this has had only a moderate effect on the major banks' average bond funding costs relative to the cash rate to date (Graph 6). This reflects the fact that it takes at least 3 to 4 years for the major banks' existing bond funding to be rolled over. Since spreads began to rise sharply in August 2011, the major banks' issuance of new bonds amounts to about 12 per cent of their outstanding bonds. As a result, the cost of the major banks' outstanding long-term wholesale debt is likely to have risen by about 25 basis points relative to the cash rate over the past year. The increase is smaller at around 10 basis

Graph 4
3-year Interest Rates



Sources: RBA; UBS AG, Australia Branch

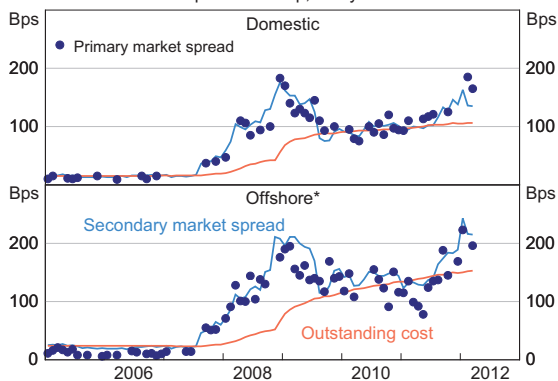
Graph 5
Major Banks' Wholesale Funding Spreads
A\$ unsecured debt, spreads to OIS and CGS



* Late 2008
** Average from 2005 to 2007
Sources: Bloomberg; RBA; Tullet Prebon (Australia) Pty Ltd; UBS AG, Australia Branch

2 There is a very small amount of credit risk in overnight index swap (OIS) rates. For more information, see Boge and Wilson (2011).

Graph 6
Major Banks' Bond Funding Costs
Spread to swap; 3-5 year



* Secondary market spreads are assumed to equal domestic spreads plus an estimate of foreign exchange hedging costs
Sources: APRA; Bloomberg; RBA; UBS AG, Australia Branch

points if fixed-rate wholesale debt is assumed to be swapped back into variable-rate obligations. The extent of the rise in relative costs for individual banks varies according to each bank's use of interest rate derivatives. If the cash rate, bond spreads and hedging costs remain at their current levels, the average cost of banks' long-term wholesale debt will increase by a further 5 to 10 basis points, relative to the cash rate, by the end of 2012 as maturing bonds and hedges are rolled over.

Short-term wholesale debt is mainly priced off 1- and 3-month bank bill rates. While these rates generally fell over the latter half of 2011 due to the sharp fall in the expected cash rate over this period, there was an increase in the cost of short-term debt relative to the expected cash rate as measured by the bank bill to OIS spread over the same period (Graph 7). The increase in this spread also contributed to a higher average cost of long-term wholesale debt, relative to the cash rate, given that most of this debt is benchmarked to short-term bank bill swap rates.³ These pricing conventions ensure that changes in the cash rate, and expectations about its future level, have a direct effect on both short- and long-term wholesale funding costs. Since the beginning of 2012, the spread between bank bills and OIS has

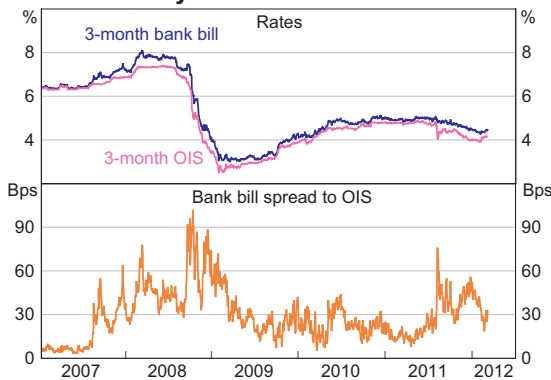
narrowed noticeably which, if maintained, should alleviate some of the upwards pressure, relative to the cash rate, on the cost of funding banks' aggregate loan books.

Overall cost of funding

Taking the costs of individual funding sources noted above, and weighting them by their share of total bank funding, provides an estimate of the overall change in the cost of funding banks' aggregate loan books. Compared with mid 2007, the average cost of the major banks' funding is estimated to be about 120–130 basis points higher relative to the cash rate (Graph 8). Most of the increase occurred during 2008 and early 2009 when the financial crisis was at its most intense. Since the middle of 2011, however, there has been a further increase in banks' funding costs relative to the cash rate of the order of 20–25 basis points.

The increase in funding costs, relative to the cash rate, differs across institutions given differences in their funding compositions and the pricing of different liabilities. The available evidence suggests, for example, that the overall increase in the regional banks' funding costs since the onset of the financial crisis has been larger than that experienced, on average, by the major banks. This mainly reflects

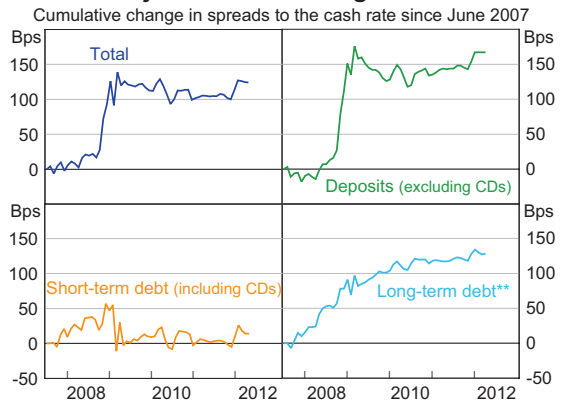
Graph 7
Money Market Interest Rates



Sources: AFMA; RBA; Tullett Prebon (Australia) Pty Ltd

3 Variable-rate bonds are generally benchmarked to the 3-month bank bill swap rate, while fixed-rate bonds are generally swapped back into variable-rate obligations that also reference the 3-month bank bill swap rate.

Graph 8
Major Banks' Funding Costs*



* RBA estimates
** Weighted-average spread to cash rate and CGS for long-term variable rate and fixed-rate debt, respectively. Includes foreign currency hedging costs.
Sources: Bloomberg; RBA; UBS AG, Australia Branch

the larger increase in the cost of the regional banks' deposits and a more significant shift in their funding mix.

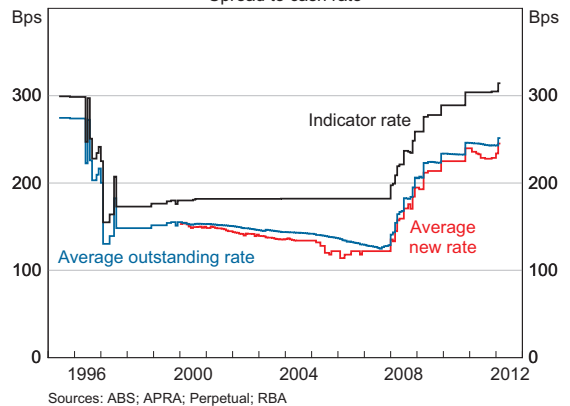
Banks' Lending Rates

For close to a decade prior to the global financial crisis, banks' overall cost of funds followed the cash rate closely, as risk premia in markets were low and stable. There was also little change in the relative importance of equity capital that, together with debt, provides funds used to make loans and on which banks seek a return. Likewise, there was little change in the risk margins banks used to determine loan rates. Accordingly, interest rates on business and housing variable-rate loans tended to adjust in line with the cash rate. Nevertheless, over this period there was a gradual decline in the spread between average interest rates paid on housing loans and the cash rate, as the discount to the indicator rate offered to new borrowers was increased. Indeed, the spread between the average mortgage rate paid and the cash rate declined from 275 basis points in 1996 to around 125 basis points in 2007.

Since the onset of the financial crisis, banks have increased the spread between lending rates and the cash rate for all loan types. The increases have, however, varied across the different types of loans, partly reflecting differences in the reassessment of the riskiness of those loans and expectations regarding loss rates.

Over 2011, the average interest rate on new variable-rate housing loans decreased by about 10 basis points relative to the cash rate as banks increased the size of the discounts on new mortgages amidst stronger competition for mortgage lending (Graph 9). In the latter stages of 2011 and early 2012 there was, however, a small reduction in these discounts. Furthermore, in early 2012, most banks increased their standard variable rates by an average of about 10 basis points. Consequently, between early 2011 and early 2012,

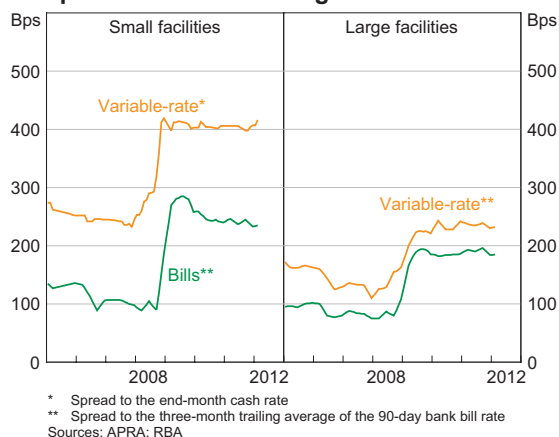
Graph 9
Variable Housing Rates
Spread to cash rate



the spread between new variable-rate loans and the cash rate has increased by about 5 basis points. The spread between the average interest rate on outstanding variable-rate housing loans and the cash rate has risen by a similar amount.

Around two-thirds of business loan rates are tied to the bank bill swap rate rather than the cash rate. The level of interest rates on loans to large and small businesses has fallen broadly in line with the declines in benchmark rates over the past year, although this resulted in some increase in these rates relative to the cash rate since mid 2011. Risk margins on business lending have been little changed over the past couple of years, although in the case of large business lending some of the recent stability in margins on outstanding loans is likely to reflect the gradual repricing of facilities (Graph 10). This follows a period in which there was a noticeable increase in business lending rates relative to benchmark rates, reflecting a combination of higher relative funding costs and a reassessment of risk margins (RBA 2011). Higher risk margins resulted in both an increase in average spreads as well as a noticeable increase in the range of spreads paid on the stock of business lending. As a result of the former, small business rates, even those secured against residential property, are above the interest rates on housing loans.

Graph 10
Spreads on Outstanding Business Loans



Net Interest Margins

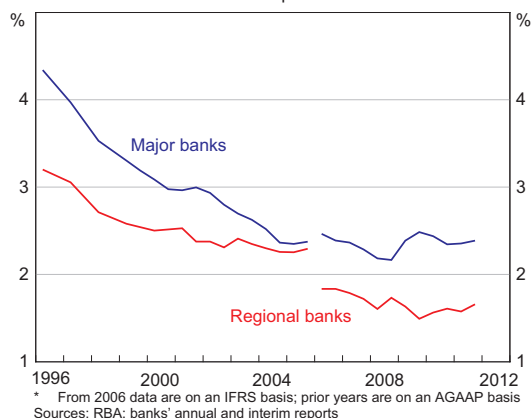
Over the past year, lending rates and funding costs have both fallen in absolute terms but have risen relative to the cash rate. Lending rates have generally fallen by more than funding costs which, all else being equal, would imply that the major banks' net interest margins have contracted a little. However, while lending rates and funding costs are important determinants, banks' net interest margins are also influenced by a number of other factors including:

- changes in the composition of banks' assets;
- changes in banks' use of equity funding (given that equity does not incur interest payments but banks seek a return on this source of funding when setting their lending rates);
- changes in the interest income lost because of impaired loans; and
- the use of derivatives to hedge the interest rate risk on their assets and liabilities.

The contribution from these other factors varies from year to year.

Recent movements in margins reported by the major banks in their statutory results – to end September 2011 for three of the banks and end December for the other – are relatively small compared with the decline in margins experienced over the

Graph 11
Banks' Net Interest Margin*
Domestic operations



preceding decade (Graph 11). The final observations in Graph 11 do not include the full effect of the increase in funding costs relative to the cash rate since mid 2011. December quarter trading updates provided by three of the banks report a narrowing in margins of around 5 to 10 basis points, consistent with the above analysis.

The regional banks' net interest margins continue to be lower than those of the major banks, primarily reflecting more expensive deposit and long-term wholesale debt funding costs, and a larger share of lower-margin housing lending. ❖

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Extracting Information from Financial Market Instruments

Richard Finlay and David Olivan*

Financial market prices contain information about market expectations for economic variables, such as inflation or the cash rate, that are of interest to policymakers. This article describes four financial market instruments that are particularly useful for this, and documents how market expectations and other useful information can be derived from them. In particular, it describes how overnight indexed swap rates and government bond yields can be used to estimate a zero-coupon yield curve and infer market expectations for risk-free interest rates, and how inflation swap rates and inflation-indexed government bond yields can be used to infer market expectations for the inflation rate.

Introduction

Financial market data are often used to extract information of interest to policymakers, such as market expectations for economic variables. The prices of interest rate securities are particularly useful for obtaining information about expectations of future risk-free interest rates and future inflation rates, as well as for estimating risk-free zero-coupon yield curves.

The first part of this article discusses how data from the overnight indexed swap (OIS) market and the government bond market can be used to estimate risk-free zero-coupon yield curves and obtain information about market expectations of the path of risk-free rates. OIS contracts directly reference the cash rate, making it relatively easy to extract market expectations from them, but they are only liquid out to around one year in maturity. To obtain estimates of zero-coupon risk-free interest rates beyond one year, models can be used to estimate a zero-coupon yield or forward curve from the yields on Commonwealth Government securities (CGS). The yield curve gives the interest rate agreed today for borrowing until a

date in the future, while the forward curve gives the interest rate agreed today for overnight borrowing at a date in the future. The forward curve can be used as an indicator of the path of expected future cash rates, but importantly it becomes less reliable as the tenor lengthens because of the existence of various risk premia, for example term premia. No attempt is made in this article to adjust for these risk premia and so they will affect the estimated zero-coupon curves.¹

The second part of this article discusses how data from inflation swaps and the inflation-indexed Treasury capital indexed bond (CIB) market can be used to obtain estimates of inflation expectations. Conceptually, inflation swaps can be used in a similar way to OIS contracts, and CIBs can be used in a similar way to CGS, to extract information on expected inflation. In practice, inflation swaps tend to be the more useful source of information as there are very few inflation-indexed bonds on issue and the CIB market is somewhat less liquid than CGS. Inflation swaps are also traded at a larger number of tenors and have maturities extending from

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¹ The zero-coupon yield, forward and discount curves presented in this article are available at <http://www.rba.gov.au/statistics/index.html>.

1 to 30 years. Again risk premia, including liquidity and term premia, are present in the CIB and inflation swap markets, and so will affect the estimates.

Extracting Information on Cash Rate Expectations

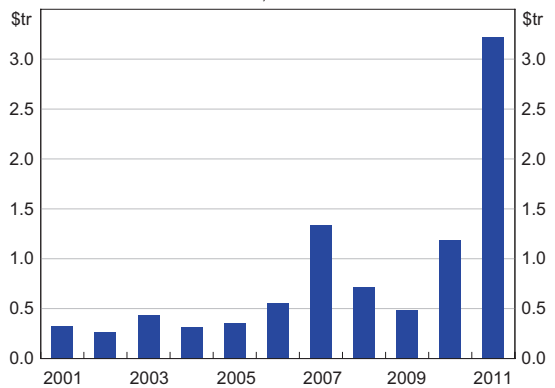
Overnight indexed swaps are frequently traded derivative instruments where one party pays another a fixed interest rate on some notional amount in exchange for receiving the average cash rate on the notional amount over the term of the swap. The cash rate is the rate on unsecured loans in the overnight interbank market, which is the Reserve Bank’s (RBA) operational target for monetary policy. Banks and other market participants use trades in OIS to manage their exposure to interest rate risk. For example, a market participant expecting a reduction in the cash rate may choose to trade on this expectation by entering an OIS contract where they receive a fixed rate and pay the actual cash rate over the period of the swap; a party with a lower expectation of a reduction in the cash rate may enter the opposite transaction. OIS rates therefore provide direct information on market expectations of monetary policy.

The OIS market has grown considerably since its inception in 1999. As at June 2011 there were \$3.2 trillion of OIS contracts outstanding, and turnover in the year to June 2011 was around \$6.6 trillion (Graph 1). Since OIS rates reflect the return from investing cash overnight over the term of the swap, and there is only an exchange of interest – not notional principal amounts – these transactions involve very little term or counterparty credit risk. An important point, however, is that these risks in OIS are not zero, as is often assumed, and are likely to increase, along with the associated risk premia, in times of stress.² Generally though, OIS rates tend to be lower and less volatile than other money market

rates of similar maturity. For example, bank bill futures contracts, which reference the 90-day bank bill swap (BBSW) reference rate, are liquid but are less useful for extracting unbiased cash rate expectations because they incorporate a greater degree of credit risk which can change, and has changed, over time.

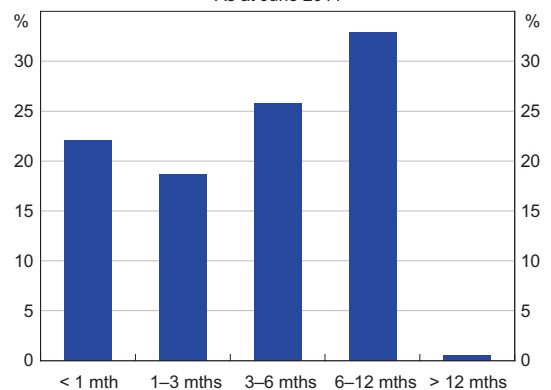
OIS contracts trade for relatively short terms, generally of less than one year. Of the total amount of OIS contracts outstanding in June 2011, around 40 per cent was for contracts with a term of less than 3 months, 26 per cent was for contracts with terms of between 3 and 6 months and 33 per cent was for terms of between 6 and 12 months (Graph 2).

Graph 1
OIS Outstanding
Annual, as at June



Source: Australian Financial Markets Association

Graph 2
OIS Outstanding by Tenor
As at June 2011



Source: Australian Financial Markets Association

2 To earn the OIS rate over the term of the swap, the investor that receives the fixed rate of the swap will invest an amount equal to the swap’s principal in the overnight interbank market. In doing so, the investor is exposed to the overnight credit risk of a bank counterparty, which can vary significantly in times of acute market stress.

OIS have advantages over the 30-day interbank cash rate futures contracts trading on the ASX. These contracts are similar in concept to OIS, but they are exchange-traded and have fixed maturity dates as opposed to fixed tenors. Also, less trading occurs in these contracts than in OIS, especially for contracts of over three months. The relatively high level of liquidity that usually exists in OIS markets means that they are typically quoted with small bid-offer spreads, which helps users to derive more accurate measures of market expectations of the cash rate. Another theoretical advantage of OIS is that, being a derivative instrument, the supply of OIS contracts is not fixed; supply factors can influence the pricing of physical securities, such as bank bills and certificates of deposit.

The use of the OIS market to gauge cash rate expectations does, however, present some challenges. OIS rates can sometimes be distorted by a lack of liquidity as well as positioning from market participants, for example those wishing to trade on the basis of views about the likelihood of large and unexpected 'tail events' adversely affecting economic conditions. They also incorporate some term and counterparty credit risk as discussed earlier. These distorting factors are more likely to be relevant during times of heightened uncertainty about the economic and financial outlook, as has been the case recently.

OIS rates nonetheless provide a useful and simple source of data for estimating cash rate expectations out to one year. If, for example, the fixed rate in an OIS is trading below the current cash rate, this would indicate that, on average, market participants are expecting the RBA to ease monetary policy over the term of the swap. By comparing the fixed rates for swaps of different maturities, it is possible to assess both the magnitude of the expected change in the cash rate and the timing of these changes. As a simplified example, assume that the day before an RBA Board meeting:

- the current cash rate is 4.25 per cent;
- the 30-day OIS rate (i.e. the fixed rate) is 4.00 per cent; and
- the 60-day OIS rate is 3.875 per cent.

The 30-day OIS rate of 4.00 per cent suggests that market participants are, on balance, expecting the cash rate over the next 30 days to average that rate. If for the sake of simplicity it is assumed that the Board will only move the cash rate in 25 basis point increments – whereas the market can often expect larger adjustments – then it follows that financial market participants expect the RBA to cut the cash rate by 25 basis points at the next day's Board meeting.³ Comparing the 30-day and 60-day OIS rates also indicates what markets are expecting to happen to the cash rate at the subsequent RBA meeting. If the market is expecting that the cash rate will average 4.00 per cent for the next 30 days and 3.875 per cent for the next 60 days, then the market must be expecting the cash rate during the second 30-day period to average 3.75 per cent (that is, $(4.00 + 3.75) / 2 = 3.875$).

Market expectations of the cash rate can vary substantially over time. At the time of writing this article, expectations of the cash rate for the middle of 2012 were around 4 per cent, up from around 3 per cent late last year when concerns stemming from the European sovereign debt crisis weighed heavily on sentiment about the economic outlook (Graph 3).

While OIS rates provide information about the short end of the yield curve, they are less useful for the longer end, as they cease to be regularly traded for maturities beyond around one year. At longer maturities, the natural risk-free interest rates to consider are those on CGS (other 'risk-free' bonds exist, such as government-guaranteed bank bonds, but such bonds typically trade with a significant liquidity premium relative to CGS so they are not considered here). There are currently 18 CGS lines on

³ If this assumption is not made then the data would also be consistent with many different possibilities, such as a 50 per cent chance of a 50 basis point cut, a 25 per cent chance of a 100 basis point cut, etc.

Graph 3
Forward Cash Rates
 Implied from OIS rates



Sources: RBA; Tullet Prebon (Australia) Pty Ltd

issue, with remaining terms to maturity ranging from less than 1 year to a little over 15 years.

There are a number of factors to consider when using CGS yields to calculate longer-term risk-free interest rates. First, investors in a 10-year bond with coupons receive a cash payment not only in 10 years time, when the bond matures, but every 6 months leading up to maturity. This in turn means that the interest rate associated with the bond – the yield to maturity – is not the risk-free interest rate for borrowing for 10 years, but rather a combination of the 10-year interest rate, which applies to the principal payment, as well as the various interest rates applying to the coupons paid over the life of the bond. Second, the limited number of CGS on issue also means that one can only look at interest rates to certain dates in the future. Estimating zero-coupon yield and forward curves resolves these problems: the impact of coupons on bond prices is explicitly modelled and removed, and the estimated curves allow the gaps in between bond maturities to be 'filled in'.

Details of the estimation method are provided in Appendix A. For data, prior to 2001 Treasury notes for maturities extending up to one year into the future are used, and from 2001 onwards OIS rates for maturities extending up to one year are used (the OIS market became liquid enough to provide reliable

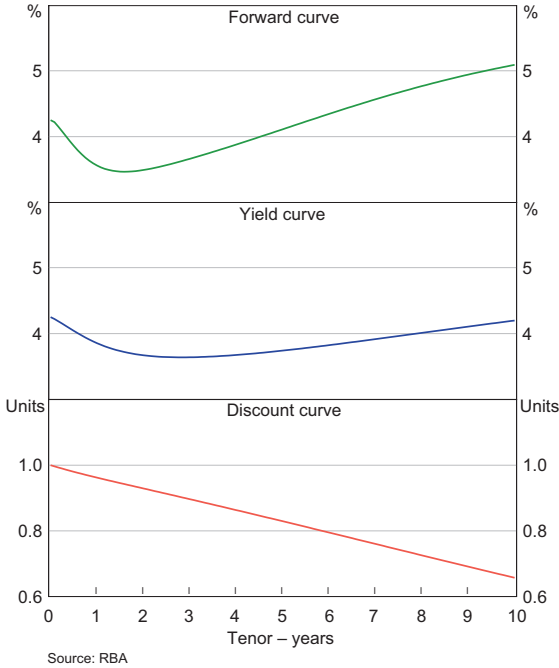
pricing around this time, while Treasury notes were not issued between mid 2002 and early 2009). CGS yields are used for maturities greater than 18 months into the future (bonds with short maturities can be relatively illiquid in comparison with longer-dated CGS).

As such, the yield curves that are estimated combine data from both the OIS and CGS markets, with the implicit assumption that the interest rates attached to all instruments in both markets are largely free of credit and liquidity risk premia, and therefore comparable. To the extent that this does not hold, it will flow through to the estimated curves. The existence of term premia, being the extra compensation demanded for investing for a longer period of time, is another complicating factor. Again no attempt is made to account for term premia and so any term premia in OIS rates or bond prices will be incorporated in the estimated curves.

Notwithstanding these caveats, estimated zero-coupon forward, yield and discount curves as at 21 February 2012 are given in Graph 4. The discount curve gives the value today of receiving one dollar in the future; it starts at one (one dollar today is worth one dollar) and slopes down (one dollar today is worth more than one dollar in the future). Although the discount curve looks linear at this scale, it is not. The forward and yield curves start at the prevailing cash rate. As discussed earlier, abstracting from the existence of risk premia, the forward rate can be read as giving a rough indication of the market-implied expectation for the cash rate. On this basis, as at 21 February 2012, OIS rates and CGS prices implied that market participants expected the cash rate to fall over the year ahead before rising again over subsequent years. The yield curve is essentially an average of the forward curve and so looks broadly similar to, but is generally smoother than, the forward curve.

Graph 5 provides a longer perspective on the data, showing zero-coupon forwards since 1993 at the 1-, 3- and 5-year horizons. These discount, yield and

Graph 4
Zero-coupon Curves
As at 21 February 2012



Source: RBA

Graph 5
Zero-coupon Forwards



Source: RBA

forward curves are available to the public on the RBA website.

Zero-coupon discount, yield and forward curves can be used in a number of applications. A common way to use this kind of data is as an input for discounting future cash flows, be they cash flows from real assets such as toll roads or power stations, or cash

flows from financial assets such as shares or bonds. This discounting essentially assigns a current dollar value to future payments or receipts and is most easily achieved using a discount curve, although to discount risky cash flows a discount curve that incorporates an appropriate risk premium should be used.

Zero-coupon yield curves are also useful for analysing the government bond market itself; for example, the deviation of traded bond prices from prices implied by the fitted zero-coupon yield curve (that is, the pricing error made in fitting the model) may indicate that certain bonds are cheap or dear relative to other bonds with similar maturities.

Another use is in economic modelling. Economists are interested in the interaction of financial markets and the real economy, including the effect that interest rates have on the real economy. To study these relationships zero-coupon yields should be used, not yields to maturity (see, for example, Spencer and Liu (2010) for a recent study of economic and financial linkages).

There is also a large amount of literature on the estimation of the term premia present in government bonds. This literature attempts to decompose zero-coupon yields into pure cash rate expectations and a term premia component, and thereby derive better estimates of expectations (this article does not attempt to adjust for term premia). Term premia are also of interest in their own right, as they give an indication of the excess return an investor can expect from investing for a longer time period. Term premia estimation requires zero-coupon yields as the basic input into estimation (see, for example, Duffee (2002) for a US study on term premia, or Finlay and Chambers (2008) for an Australian study).

Extracting Information on Inflation Expectations

Reliable and accurate estimates of inflation expectations are important to central banks given the role of these expectations in influencing future

inflation and economic activity. These expectations are also important for organisations that manage inflation-linked assets or liabilities. Although surveys provide some guidance on the expected path of inflation, inflation-linked securities have the advantage of providing more timely and frequently updated information on market expectations of inflation.

A widely used market-based measure of inflation expectations is a break-even inflation (BEI) rate calculated as the difference between the yields of nominal CGS and CIBs.⁴ The current BEI rate at the 10-year horizon is around 2¾ per cent, suggesting that the market expects average inflation over the next 10 years to be within the RBA’s 2–3 per cent inflation target (Graph 6). For shorter maturities, markets currently expect inflation to be closer to 2½ per cent.

One limitation with using the bond market to gauge inflation expectations is the small number of CIBs on issue; there are only five bonds currently on issue, with maturities around every five years from 2015 to 2030. In comparison, there are 18 CGS lines on issue with maturities spanning 2012 to 2027. Hence, the bond market offers a limited number of pricing points from which to extract measures of inflation

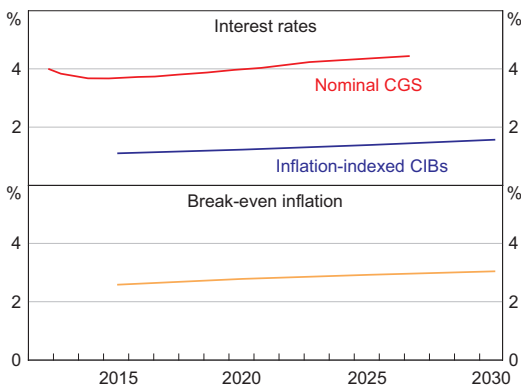
expectations for a broad range of tenors. This lack of pricing points also makes it more difficult to derive forward measures of expected inflation, which measure expectations of inflation at some point in the future.⁵

In addition, there are maturity mismatches between CGS and CIBs. For example, the current 10-year CGS matures in July 2022 whereas the closest CIB matures in February 2022. As a result, a 10-year BEI rate must be derived by interpolation. Further adjustments must also be made to account for compounding effects on yields since CGS pay semi-annual coupons while CIBs pay quarterly coupons.

However, the most serious shortcoming of the BEI rate derived from bonds is that it captures investors’ liquidity preferences for different types of bonds. With outstanding CIB issuance 13 times smaller than CGS, CIBs can be less liquid than CGS, and investors who wish to hold highly liquid assets will have a stronger preference for CGS. This liquidity preference effect can be very pronounced during periods of heightened uncertainty such as in 2008 where ‘flight-to-safety’ bids put significant downward pressure on nominal bond yields (as noted earlier, any such distortion will also be incorporated in the estimated nominal zero-coupon curves) (Graph 7). More broadly, with CGS yields trading with a liquidity premium relative to CIBs, BEI rates can be artificially compressed and so give a distorted measure of inflation expectations. The low BEI rates in 2008 and 2009 were not all driven by liquidity effects, however, since the financial crisis had led market participants to become more pessimistic about future economic conditions.

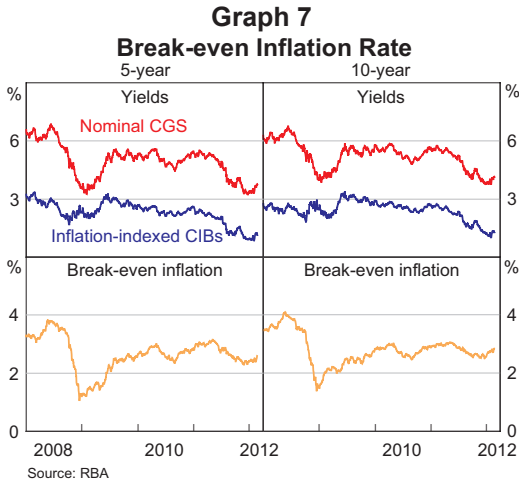
Because of these limitations, inflation swaps have become an increasingly popular alternative source of information on inflation expectations. Their key advantage is that they provide direct and readily available measures of inflation expectations with no

Graph 6
Break-even Inflation Rate



4 CIBs pay quarterly coupons that are fixed in real terms; both the dollar value of coupons and principal payable at maturity increase in line with movements in the consumer price index.

5 Zero-coupon forward curves can be estimated for CIBs in a similar manner to that described in the previous section. With only five bonds on issue, however, such curves are not likely to provide an accurate description of market expectations.



need for interpolation, since swaps are traded at the main tenors of interest such as 3-, 5- and 10-years. Also, as derivatives, the supply of inflation swaps is not constrained, meaning that in theory, inflation swap rates are generally not distorted by liquidity preference effects.

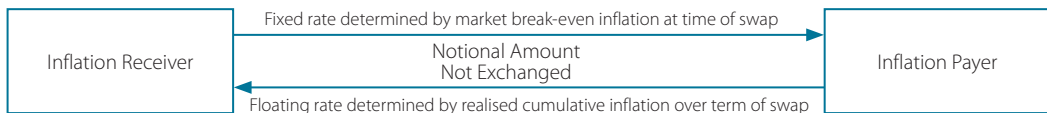
An inflation swap is a transaction whereby the inflation payer pays the actual inflation rate in exchange for receiving a fixed payment (Figure 1). The actual inflation payment is based on the most recently available quarterly consumer price index at the maturity of the swap. The fixed payment approximates the expected value of inflation over the term of the swap and is analogous to the BEI rate derived from bond prices. In this sense, inflation swaps operate in a similar fashion to OIS contracts, but with a different reference rate (CPI inflation instead of the overnight cash rate) and longer terms to maturity. Fixed rates for inflation swaps are readily available for terms out to 30 years.

The most common form of inflation swap in the market is the zero-coupon inflation swap. Here only one cash payment is made at the maturity of the swap, representing the difference between the fixed rate and actual inflation over the term of the swap. This means that counterparty credit risk is minimal and inflation swap rates are not affected by periodic coupon payments. Zero-coupon inflation swaps have become more popular over recent years, especially between 2003 and 2009 when CIB issuance ceased.

In terms of hedging flows, the main receivers of inflation in the inflation swap market are pension funds that use swaps to match their long-term inflation-linked liabilities. Liability matching has had a significant impact on making the inflation swap market in Australia a more recognised alternative to inflation-indexed bonds. Demand to pay inflation in swaps (and receive a fixed rate) mainly stems from infrastructure project providers that want to hedge their inflation-linked assets or revenue streams. This can be done by issuing a nominal bond and entering into an inflation swap with an investment bank. This has boosted the size of the inflation swap market, which is an over-the-counter market where intermediaries such as prime brokers play an important market-making role.

Investors can also trade inflation swaps based on their views about future inflation. For example, if an investor expects a higher rate of inflation than that implied by the fixed rate of a swap, the investor would enter a swap contract, receive actual inflation and pay the fixed rate. This is achieved through a single transaction instead of separate trades in nominal and inflation-indexed bonds, which bear

Figure 1
Example of Cash Flows of a Zero-coupon Inflation Swap



Source: RBA

funding costs and suffer from maturity mismatches. Inflation swaps are also used in conjunction with nominal bonds to replicate an inflation-indexed bond. This allows investors to overcome bond maturity mismatches as well as any potential shortage of inflation-indexed bonds.

Despite the recent growth in inflation swaps, the market remains small compared with those for other derivatives such as interest rate swaps. There are no official data to measure the total size and activity levels in the inflation swap market accurately, although a survey by the Australian Financial Markets Association (AFMA) estimated that as at May 2011 there were \$24 billion of inflation swaps outstanding, and turnover over the year to June 2011 was \$11.6 billion (AFMA 2011).

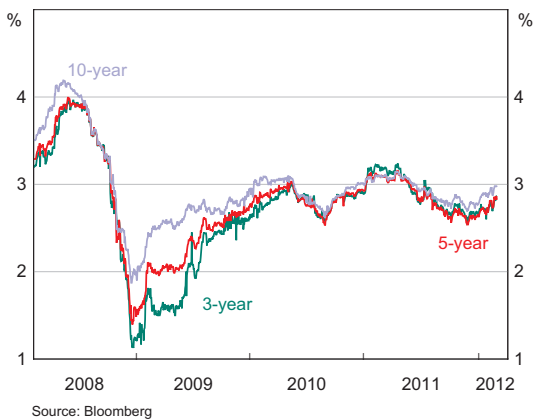
Since 2008, measures of implied inflation captured by 3-, 5- and 10-year inflation swaps have ranged between 1¼ per cent and 4 per cent (Graph 8). Mimicking the pattern observed for the BEI rate from the bond market, inflation swap rates over 2008 also fell to low levels, suggesting that market participants were moderating their inflation expectations. Over recent years, however, these inflation expectations have reverted to around 2–3 per cent.

Since inflation swap rates are zero-coupon, it is simple to use the framework in the previous section to derive forward inflation rates, which measure

expectations of inflation at some point in the future (Graph 9). Forward inflation rates derived from swaps at the 3-, 5- and 10-year horizons have also fluctuated in a wide range over recent years; as these forward rates represent expected inflation at a point in the future, they are generally more volatile than the (zero-coupon yield) measures shown in Graph 8, which represent expected inflation over a period up until a point in the future. Overall, current forward measures of inflation are also around 2 to 3 per cent, albeit slightly above 3 per cent at the 10-year horizon.

Inflation expectations in the swap market broadly track the BEI rate in the bond market, but current 5- and 10-year measures appear to show that inflation expectations in the swap market are somewhat higher than those in the bond market; over the first half of 2009 the divergence of the swap market from the bond market was even greater, with inflation swap rates being up to 50–70 basis points higher than BEI rates implied by bonds (Graph 10). One reason for this lower BEI rate from the bond market is the liquidity preference effect discussed earlier. This effect was particularly pronounced over the first quarter of 2009 when inflation swap rates normalised faster in the aftermath of the financial crisis than bond yields, which retained a large liquidity premium.

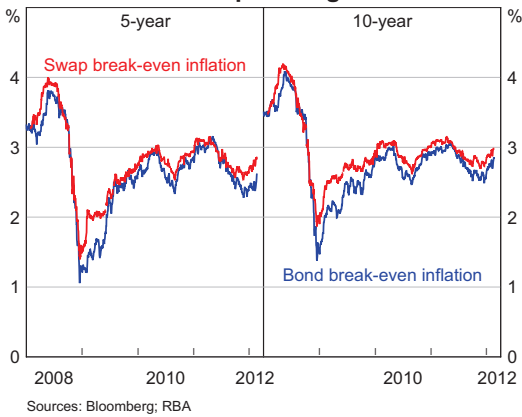
Graph 8
Inflation Swap Rates



Graph 9
Forward Inflation Swap Rates



Graph 10
Break-even Inflation from Bond and Swap Pricing



Another reason swap rates could be higher relates to hedging. Intermediaries in the swap market, who play an important market-making role, sometimes hedge their positions in the inflation-indexed bond market. This market can be relatively less liquid and compensation for this hedging risk may bias up inflation swap rates.

Term premia also tend to cause structurally higher inflation swap rates because the fixed-rate payer will demand compensation for the inherent uncertainty about the expected amount of inflation over the term of the swap. This premium can change for a variety of reasons including an increase in uncertainty about the inflation rate or changes in investors' inflation tolerance (term premia can also affect CIBs).

Conclusion

Financial markets provide a significant amount of information about expectations of the cash rate, risk-free rates and inflation. Extracting expectations from market measures is not always straightforward, however, and results should be viewed with some caution. Measures derived from the government bond market can contain liquidity preference effects that are particularly problematic in times of heightened uncertainty. Some measures, such

as zero-coupon interest rates, are not directly observable and must be estimated from bond yields using a variety of assumptions. Nonetheless, as well as providing some information on risk-free rates, estimates of zero-coupon rates are useful in economic modelling, in estimating risk premia and for discounting cash flows. The RBA will be publishing a constructed series of zero-coupon yield, forward and discount curves on its website. While derivative instruments such as OIS and inflation swaps provide more straightforward measures of market expectations, and are regularly updated as these markets are actively traded, the prices of these instruments contain various risk premia, which tend to bias implied expectations. ❖

Appendix A

There are a number of established methods for estimating zero-coupon curves, which all give broadly similar results (see, for example, Bolder and Gusba (2002)). The method used in this article – the Merrill Lynch Exponential Spline model – does not estimate the yield or forward curve directly, but instead estimates the discount curve, from which the zero-coupon yield and forward curves can be recovered.⁶ The discount curve is modelled as a linear combination of a number of underlying curves, called basis functions, which are fixed functions of time. That is, it is assumed that the discount curve can be written as:

$$d(t) = \sum_j a_j * b_j(t) \quad (A1)$$

where $b_j(t)$ are basis functions, and a_j are the (to be estimated) coefficients that, when multiplied with the basis functions, give the discount curve. The price of a bond, which can be observed, is simply each cash flow (consisting of coupon payments and principal) multiplied by the appropriate discount

⁶ The yield curve, $z(t)$, which gives the interest rate agreed today for borrowing from today until a time t in the future, is related to the discount curve, $d(t)$, by $z(t) = -\log(d(t))/t$, while the forward curve, $f(t)$, is related to the yield curve by $f(t) = z(t) + tz'(t)$.

curve value. For example, if the cash flows of a bond are denoted by c_t then the bond price, P , can be written as:

$$P = \sum_t c_t * d(t). \quad (\text{A2})$$

Taking the two equations above together, the cash flows c_t are known, and the basis functions $b_j(t)$ are fixed functions of time, so the only unknowns are the coefficients attached to the basis functions, a_j . The same discount curve is used to price all bonds in the market, which allows the coefficients to be estimated. The model allows this estimation to be done within a standard regression framework, which is simple and fast (see Appendix A of Finlay and Chambers (2008) for further details).

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The Personal Credit Card Market in Australia: Pricing over the Past Decade

Iris Chan, Sophia Chong and Stephen Mitchell*

There have been significant changes in the personal credit card market over the past decade, partly reflecting the Reserve Bank's reforms from the early 2000s, which were aimed at improving efficiency and competition in the payments system. One of the effects of the reforms has been an improvement in price signals about the costs of different payment methods. For example, over the past decade the effective price to cardholders for using a credit card has increased, encouraging the use of lower-cost payment methods. At the same time, the cost to merchants of accepting credit cards has declined, with the benefit likely to have been passed on to all consumers, not just those who pay by credit card. Recently, though, there have been changes to the structure of rewards programs, which have the potential to increase pressure on merchant costs. New strategies adopted by issuers include: the introduction of 'companion' American Express cards; a substantial increase in the number of platinum card products offered to consumers; and the introduction of 'super-premium' cards.

Introduction

In the early 2000s, the Reserve Bank became concerned that credit card holders were effectively being subsidised to use their credit cards through arrangements that added to merchants' costs. Specifically, it concluded that 'interchange fees' were contributing to this subsidisation. These are 'transfer' fees set by the card schemes and are paid by the merchant's financial institution (known as the card acquirer) to the cardholder's financial institution (known as the card issuer) each time a credit card transaction is made. Interchange fee revenue allowed card issuers to support generous credit card rewards programs and, as a result, many credit card holders were facing a *negative* effective price for credit card transactions, even though those cards had positive costs for the system as a whole. This distorted price signals to cardholders about the relative costs of using different payment instruments.

The Reserve Bank therefore introduced a number of reforms to the credit card market from 2003, with the aim of improving efficiency and competition in the Australian card payments system. Among other things, the reforms reduced interchange fees, which had been used by card issuers to support attractive rewards programs on credit card products. Reflecting these reforms, card issuers have made significant changes to their product offerings and pricing to cardholders over the past decade. Overall, reward points and other benefits earned from spending on credit cards have become less generous while annual fees to cardholders have increased. At the same time, merchant service fees – the fees charged to a merchant by its acquirer – have declined, with the benefit likely to have been passed on to all consumers, not just those who pay by credit card.

In more recent years, however, the structure of credit card pricing and product offerings have changed somewhat. Card schemes have found ways, within the bounds of the Reserve Bank's regulation, to

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increase incentives for card issuers to promote particular products within their suite of offerings; card issuers have responded, particularly through new strategies focusing on the premium segment of the market. Some of these new pricing strategies have focused on upgrading existing cardholders – offering platinum cards with additional benefits or more generous rewards for no additional annual fee – which has the effect of generating increased interchange revenue for the issuer every time a customer uses their card. There have also been a number of merchant-branded platinum cards that have entered the market in recent years. Separately, American Express has modified its product offerings, entering into arrangements with major banks to issue ‘companion’ American Express cards with MasterCard or Visa products.

Some of these recent developments have changed the effective price to some cardholders of a credit card transaction, and correspondingly added to costs on the acquiring side of the market. Merchant service fees have remained relatively stable in the past few years, though these recent developments could put upward pressure on some fees if they continue.

Background

The structure of credit card markets: the four-party and three-party scheme models

In the credit card market, competition among both credit card issuers and card schemes primarily focuses on attracting cardholders and encouraging cardholder spending through the generosity of rewards programs.

In four-party card schemes (such as MasterCard and Visa), rewards programs are, for the most part, funded by interchange fees.¹ The card acquirer passes this fee (plus some margin) on to the merchant by

charging a merchant service fee. Hence, a credit card system with high interchange fees may result in merchants effectively subsidising cardholders who use that system, unless merchants are able to pass these costs on to cardholders.

Given that issuers of four-party scheme cards receive interchange income from which they may fund rewards programs, they have an incentive to issue and promote cards that attract a higher interchange fee for each transaction. In line with this, the four-party card schemes have an incentive to put in place an interchange fee pricing structure that encourages financial institutions to issue and promote their cards; while the card scheme does not directly generate revenue from interchange fees, it charges fees to card issuers and acquirers based on the volume of credit card transactions.

In contrast to four-party card schemes, there are no interchange fees in three-party card schemes (such as American Express and Diners Club) because the card scheme itself is the sole acquirer for transactions on its cards, and typically also the sole issuer. Instead, rewards programs in this model are funded directly through fees paid by the merchant. Hence, the higher the average merchant service fee for a three-party scheme, the more generous the rewards that scheme is able to offer. At the same time, a high merchant service fee tends to discourage acceptance of a card by merchants. To some extent this acts as a competitive discipline on merchant service fees, although some merchants may feel that declining to accept a particular card is not a realistic option.

Regardless of the model, the costs of funding rewards for cardholders are borne by merchants in the first instance through higher merchant service fees – either through the pass-through of higher interchange fees (for four-party schemes) or directly (for three-party schemes). Moreover, card schemes in many credit card markets have rules in place that prevent merchants from passing their card acceptance costs directly through to cardholders in

¹ Four-party schemes are so called because four parties are typically involved in the payment process: the cardholder; the issuer; the acquirer; and the merchant. By contrast, three-party schemes generally act as sole issuers and acquirers, resulting in three parties being involved in the payment process: the cardholder; the merchant; and the scheme.

the form of a credit card surcharge; these rules have, however, been removed in Australia (see below).

The Reserve Bank of Australia's card payment reforms²

The Reserve Bank became concerned in the early 2000s about the competitive forces acting on interchange fees in the four-party schemes, as well as the fact that surcharging restrictions imposed by both the three-party and four-party schemes were masking price signals to cardholders about relative costs of different payment methods. It has therefore progressively introduced a number of reforms to the credit card system, with the aim of improving efficiency and competition in the Australian payments system.

Specifically, the Reserve Bank imposed interchange fee Standards (which came into effect in 2003) that placed a cap on weighted-average interchange fees for the MasterCard and Visa credit card schemes. The effect of this cap, currently set at 0.5 per cent of transaction value, has been to lower the weighted-average interchange fees in these schemes by around 45 basis points. Each scheme must formally comply with the cap on specified dates every three years, or whenever the scheme makes a change to its interchange fee schedule.

Around the same time, the Bank also removed prohibitions on surcharging that had been placed on merchants by card schemes. The effect has been to allow merchants to pass their cost of accepting credit cards directly on to consumers and to use the threat of surcharging to negotiate lower merchant service fees from their acquirer.

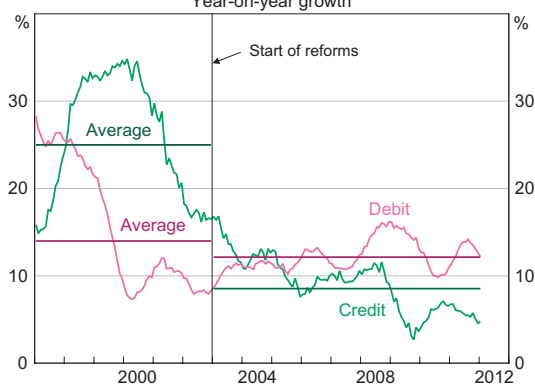
Developments over the Past Decade

The Reserve Bank's reforms have contributed to shaping developments in the Australian credit card

market over the past decade in three major ways.³ First, the reduction in interchange fee revenue flowing to card issuers has reduced the subsidisation of credit card holders and improved price signals regarding the relative costs of different payment instruments. In particular, since the introduction of the reforms, the overall value of credit card rewards programs has declined and there has been an increase in annual (and other) fees.⁴ For instance, in 2003 the average spending required to earn a \$100 shopping voucher was \$12 400, whereas by 2004 this had risen to \$14 400, and has gradually increased since then, to \$18 400 in 2011 (Table 1).

Second, in addition to the change in pricing by card issuers, the introduction of surcharging by some merchants has also increased the effective price faced by cardholders for credit card transactions. Consequently, partly reflecting the relative increase in price, credit card use has not grown by the same extent as debit card use over recent years (Graph 1).

Graph 1
Value of Card Payments*
Year-on-year growth



* RBA credit card data prior to March 2008 adjusted to remove BPAY transactions
Sources: BPAY; RBA

2 See Bullock (2010) for a more detailed summary of the Reserve Bank's reforms to the card payments system. Additional information about the Reserve Bank's reforms to the payments system can be found in RBA (2008b, 2008c).

3 The Reserve Bank monitors the effects of its reforms and developments in the payments system more generally using a number of data sources, including: data submitted by participants in the credit card schemes as part of the Bank's regular Retail Payments Statistics collection; a database of credit card features collected from issuer websites; data from two surveys on consumer payment behaviour commissioned by the Reserve Bank and conducted by Roy Morgan Research; and a third-party proprietary credit card database.

4 See RBA (2008a, 2011a) for further detail on annual and other fees.

Table 1: Credit Card Rewards Programs^(a)
Four largest banks, end June

	Average spending required for \$100 shopping voucher	Benefit to cardholder as a proportion of spending ^(b)
	\$	Per cent
2003	12 400	0.81
2004	14 400	0.69
2005	15 100	0.66
2006	16 000	0.63
2007	16 300	0.61
2008	16 700	0.60
2009	17 000	0.59
2010	18 300	0.55
2011	18 400	0.54

(a) For selected cards (or their equivalent for earlier periods): ANZ Rewards Visa; Commonwealth Bank MasterCard Awards; National Australia Bank Velocity Rewards; and Westpac Altitude MasterCard

(b) Does not include spending on companion cards that may accompany these card products

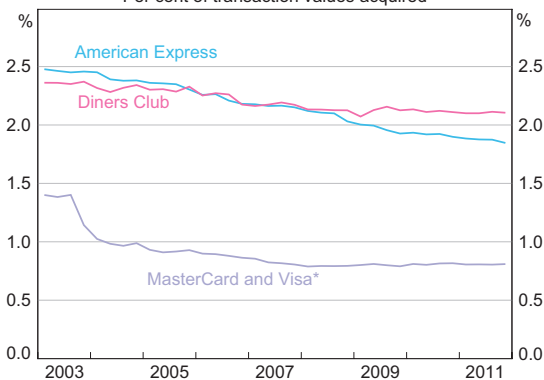
Sources: CANSTAR; banks' websites

Third, the subsidisation of credit card holders by merchants accepting these cards has also fallen because the decline in interchange fees has been passed through to merchants via lower merchant service fees for MasterCard and Visa transactions (Graph 2). Average merchant service fees for the American Express and Diners Club schemes have also gradually come under downward pressure. This possibly reflects the fact that since the reforms merchants have reviewed their acceptance of these

cards, given the increase in the relative costs of three-party cards compared with MasterCard and Visa cards, and have been able to use the threat of surcharging in their negotiations with acquirers.

As well as changing the pricing behaviour of card acquirers and issuers, the reforms have had an effect on the types of credit card products offered by issuers and the way these products are promoted. This has been brought about through changes to the interchange fee schedules set by MasterCard and Visa, within the bounds of the Reserve Bank's interchange fee Standards. Specifically, as noted above, the *weighted-average* of interchange fees within the MasterCard and Visa credit card schemes must comply with a cap on specified dates and whenever interchange fees are altered. Card schemes, however, still have the flexibility to set different interchange fees for different types of transactions, including some that are above the level of the cap. Not surprisingly, the card schemes have used this flexibility in a way that maximises revenue within the regulatory framework. One strategy has been to increase or introduce high interchange fees for some categories (such as platinum/premium card transactions), and decrease or introduce low

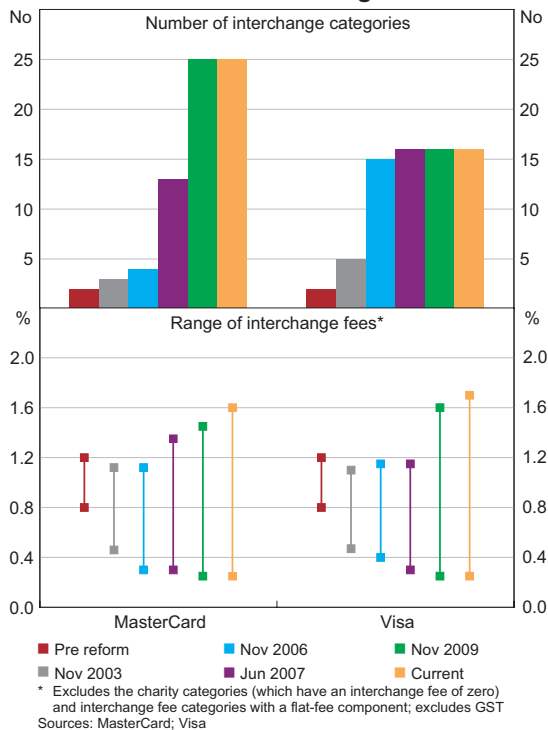
Graph 2
Merchant Service Fees
Per cent of transaction values acquired



* Includes Bankcard prior to 2007
Source: RBA

interchange fees for some other categories (such as transactions at 'strategic merchants').⁵ In line with this, there has been an increase in the number of interchange fee categories and in the variability of interchange fees since the reforms were first introduced (Graph 3).⁶

Graph 3
Credit Card Interchange Fees



A number of the interchange fee categories set by the card schemes are directly related to the card type.⁷ For instance, in late 2006 MasterCard and Visa introduced an interchange category specifically for platinum/premium cards that, as noted above, has a significantly higher interchange fee than for standard cards. In late 2009 both schemes also introduced a new super-premium category with an even higher

interchange fee. The difference between interchange fees applying to different card types can be as high as 1.3 percentage points (the difference in revenue per transaction that the cardholder's financial institution earns for a standard card transaction, compared with a super-premium card transaction).⁸ The difference between interchange fees is even higher when merchant categories are taken into account.⁹ In the short term (that is, until the next compliance date), card issuers can generate considerably more interchange revenue per transaction by issuing and encouraging cardholders to use platinum and super-premium cards rather than standard or gold cards. And, as discussed below, they have been doing so in a range of ways. While providing an incentive to issuers, however, these trends in interchange arrangements add correspondingly to costs on the acquiring (merchant) side of the market.

Recent Developments in Credit Card Pricing and Products to Cardholders

The introduction of relatively high interchange fee categories, whereby schemes have made some card types more attractive for financial institutions to issue than others, has had a noticeable effect on the credit card market in recent years. This has played out in two ways: an increase in the issuance of cards attracting higher interchange fees for the four-party schemes; and the issuance of 'companion' American Express cards. These new strategies are explained in turn below.

Increased issuance of four-party cards attracting higher interchange fees

As the four-party schemes have adjusted their interchange fee schedules, issuers have responded to the incentives by issuing and promoting cards

5 Strategic merchants are those that meet performance requirements or thresholds determined by each scheme.

6 For a table of selected interchange categories and fees set by MasterCard and Visa as at June 2011, see RBA (2011b, p 15).

7 Other interchange fee categories include those related to the type of merchant (e.g. strategic merchant, government/utility) or the type of transaction (e.g. card present/card not present).

8 Standard card transactions refer to those in the consumer electronic interchange categories.

9 For example, while a MasterCard or Visa transaction made at some strategic merchants may attract an interchange fee of 0.25 per cent of the transaction value, a transaction made with a super-premium card at some other merchants will attract an interchange fee of 1.60 per cent (MasterCard) or 1.70 per cent (Visa).

that attract higher interchange fees. Issuers can do this by offering cardholders either some increase in reward points, an increase in other benefits, and/or a reduction in fees, funded by some of the increased interchange revenue that an issuer earns from the card. This has played out in three recent developments in the credit card market: automatic upgrades for existing cardholders to the premium segment of the card market; new merchant-branded platinum credit cards; and the introduction of super-premium cards.

During the second half of 2010, several major banks began a process of upgrading their gold cardholders to platinum card products, providing the clearest example of card issuers altering their card portfolios to take advantage of price differentials in interchange fees. Effectively, the cardholder receives a new platinum card product (or card product offer) in the mail to replace their existing gold credit card for no additional cost or annual fee. Although these cards attract a greater number of premium benefits (such as complimentary travel insurance or extended warranties), some cardholders continue to earn reward points at the same rate as for their gold card – that is, overall, the rewards package for some platinum products is less attractive to the cardholder than a ‘traditional’ platinum card.¹⁰ In some cases, upgrades have been automatic in that the cardholder receives a new platinum card through an *unsolicited* mail-out; in at least one case, the new platinum card products are intended to replace the institution’s gold card products. As a consequence, this strategy has resulted in a blurring between the gold and platinum credit card products now on offer by the banks. Furthermore, following these upgrades, some card issuers also began to provide similar upgrade offers to standard cardholders.

The move to upgrade cards in this way allows issuers to increase interchange revenue received on those cards, which may more than offset the cost of offering

any additional reward points or other benefits. For both the MasterCard and Visa schemes, transactions on platinum cards currently attract an interchange fee of 1 per cent of the value of the transaction. This compares with interchange fees on standard credit cards of 0.40 per cent of the value of the transaction for Visa and 0.35 per cent for MasterCard.

A second similar development in recent years has been the introduction of a number of merchant-branded platinum credit card products (for instance, the Woolworths Everyday Rewards (Qantas) and the Jetstar Platinum cards). For some merchants, these platinum card products are issued instead of, rather than in addition to, a gold card product. This has further contributed to the displacement of gold cards by platinum credit cards. These merchant-branded cards typically have relatively generous rewards programs with reward structures not seen for traditional merchant-branded cards; for example, a number of significantly discounted flights per year irrespective of reward points earned. Like many merchant-branded cards, cardholders also earn more reward points for spending at the merchant in question. However, these cards typically do not offer additional benefits, such as concierge services, that are usually associated with the more traditional platinum cards.

Another development related to changes in the schemes’ interchange fee schedules has been the introduction of a new credit card product: super-premium cards. There are currently only a few super-premium cards available in the Australian market – for example: the Citibank Select card with an annual fee of \$700; the Citibank Signature card with an annual fee of \$395; and the Commonwealth Bank Diamond Awards card with an annual fee of \$425. These cards attract the highest interchange fee in the interchange schedules of both MasterCard and Visa, of 1.60 per cent and 1.70 per cent of the value of the transaction, respectively. Not surprisingly, given the very high annual fees paid by cardholders and the high interchange fees these cards attract, these cards have relatively high reward

¹⁰ Besides relatively generous reward points, benefits associated with ‘traditional’ platinum cards include overseas travel and medical insurance, extended warranties, and car rental cover.

points per dollar spent. They also tend to offer other benefits beyond those associated with traditional platinum cards, including discounted travel offers and exclusive experiences (e.g. both of Citibank's super-premium cards offer access to cooking classes with celebrity chefs). Super-premium cards tend to be targeted at high-income earners and/or consumers who spend above a certain amount on their credit card every year.

Increased issuance of American Express companion cards

Although the three-party schemes have not been directly affected by the Bank's interchange fee reforms, they have nonetheless sought new ways to compete in the evolving credit card market. As discussed above, the three-party schemes have traditionally issued their own cards, but they have also entered into commercial arrangements with selected issuers to offer companion three-party cards as part of a package with cardholders' primary MasterCard/Visa cards.

There has been increased promotion of American Express companion cards since late 2009, following the introduction of these cards by two major banks. Over time, credit card products with companion cards attached have increasingly replaced traditional single-card rewards programs in the product lines of all major banks. Under these arrangements, cardholders typically earn more reward points for spending on the American Express card than for spending on the MasterCard or Visa card. Cardholders pay no additional annual fee for the companion card and have a single account recording transactions for both cards.

While there are no interchange fees in the three-party schemes, there are nonetheless commercial arrangements in place that give financial institutions an incentive to issue companion cards. In addition, three-party scheme cards tend to be more expensive for merchants to accept; these schemes can use their

merchant service fee income to fund more generous rewards programs to attract cardholders.¹¹

Effect of Recent Developments on Annual Fees, Reward Points and Other Benefits

Analysis of the card product offerings of selected large card issuers confirms there has been significant growth in recent years in the premium segment of the market. In particular, as a result of the platinum upgrades by banks and the new merchant-branded platinum card products on offer, the number of platinum card products offered by the top 10 credit card issuers and selected major merchants increased from 18 to 24 between June 2010 and December 2011.¹² By contrast, the number of gold credit card products offered to new customers declined from 21 to 18 over the same period. At the same time, the issuance of companion cards has increased: all but three credit card products linked to a rewards program at the four major banks were offering an American Express companion card as of December 2011.

Notwithstanding recent developments, total rewards – reward points earned as well as additional platinum benefits – appear to have changed very little for the four-party (MasterCard and Visa) platinum card products in recent years. One useful measure for comparing the value of reward points over time is average spending required to obtain a \$100 shopping voucher. As a proportion of spending, the value of rewards points on bank-branded platinum cards has increased only marginally between June 2010 and December 2011, to be 0.53 per cent of the value of spending (Table 2).¹³ This is considerably less generous than the reward points on offer for

11 As shown in Graph 2, the average merchant service fee for transactions on American Express cards is around double that for transactions on MasterCard or Visa credit cards.

12 The data quoted here are for all platinum cards: scheme-issued; bank-branded; and merchant-branded. In Table 2, only bank-branded and merchant-branded platinum cards are shown.

13 Of course, the benefit to each cardholder as a proportion of spending varies across rewards cards.

Table 2: Typical Features of Personal Credit Cards Offered to New Cardholders^(a)

Card type	Card products on issue	Card products with a reward points program ^(b)	Card products with other benefits ^(c)	Average annual fee	Average spending for \$100 voucher ^(d) (spending when companion card also used) ^(e)	Rewards as proportion of spending ^(d) (rewards when companion card also used) ^(e)
	Number	Number	Number	\$	\$	Per cent
Standard rewards						
June 2010	20	20	1	66	18 500 (16 300)	0.54 (0.61)
December 2011	18	18	0	62	21 900 (19 300)	0.46 (0.52)
Gold						
June 2010	21	14	16	113	22 600 (18 800)	0.44 (0.53)
December 2011	18	12	17	118	22 900 (19 800)	0.44 (0.50)
Platinum						
<i>Bank-branded</i>						
June 2010	14	9	14	198	19 400 (12 000)	0.52 (0.83)
December 2011	16	10	16	185	18 800 (11 700)	0.53 (0.85)
<i>Merchant-branded</i>						
June 2010	1	1	1	149	na	na
December 2011	4	4	4	147	12 600	0.79
Super-premium						
June 2010	0	0	0	na	na	na
December 2011	3	3	3	507	11 300 (9 400)	0.88 (1.06)

(a) Includes information from the top 10 credit card issuers and selected major merchants in Australia only; the top 10 credit card issuers are based on issuing market shares calculated from the Reserve Bank's Retail Payments Statistics; reported averages are calculated as simple averages of relevant products' features; data are not directly comparable to historical data on rewards presented in Table 1

(b) For the purposes of this table, a reward points program involves the cardholder having the ability to accumulate a store of points, which may be redeemed for goods or services; other rewards programs, such as instant cash-back rewards or point-of-sale discounts, are not included

(c) Other benefits may include, but are not limited to: overseas travel insurance; extended warranty insurance; car rental cover; and concierge services

(d) Only those card products that offer a reward points program where points may be redeemed for a \$100 shopping voucher are included; figures do not take into account the ability to earn additional reward points at selected merchants

(e) The figures in parentheses indicate the equivalent figure if spending is evenly split between MasterCard/Visa and the companion American Express card where a companion card is available to the cardholder

Sources: RBA; credit card issuers' websites

standard/gold rewards cards prior to the reforms, of 0.81 per cent.¹⁴ Some issuers have also introduced a cap on reward points for spending above a certain amount. As described above, though, there has been some increase for cardholders in other (less easily quantifiable) premium benefits for these cards and the average annual fee for these cards has declined somewhat, from \$198 in June 2010 to \$185 in December 2011.

Reward points for merchant-branded four-party platinum cards are more generous than the bank-branded platinum cards: the cardholder needs to spend around \$12 600 to earn a \$100 shopping voucher, compared with \$18 800 for bank-branded platinum cards (not taking into account extra points that some cards offer for spending at certain merchants). This is similar to the level of generosity of reward points prior to the reforms. The annual fee is also lower on these merchant-branded cards than bank-issued platinum cards, at \$147 on average in December 2011. However, these cards lack other platinum benefits that are typically associated with traditional platinum products.

Overall, recent developments have resulted in a substantial change in the nature of credit card products available. Platinum cards, in the traditional sense, were originally designed to attract high-spending customers; these cards were previously few in number and offered both relatively generous reward points and other benefits. However, as noted above, some platinum products have emerged in recent years that do not offer this traditional platinum package. Indeed, to obtain (at least) the reward points and other benefits package associated with traditional platinum cards, a cardholder may need a super-premium card. While the latter has reward points of 0.88 per cent of spending on average, it also carries an annual fee of around \$500.

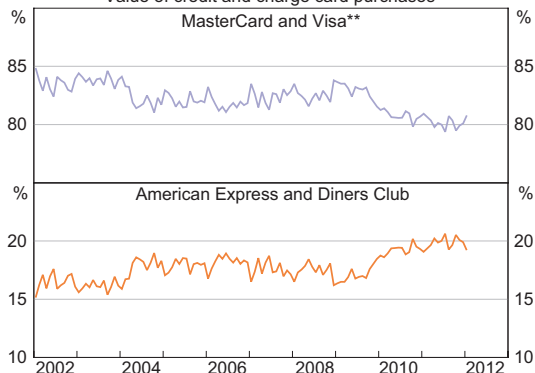
The overall effect of the four-party platinum card developments on pricing, therefore, appears to be the incomplete pass-through of issuers' higher interchange fee revenue to some platinum cardholders (in terms of reward points and/or other platinum benefits); at the same time, higher interchange fees have added to costs on the acquiring side of the market.

The discussion above, however, has abstracted from the effect of the introduction of companion American Express cards to the market. These companion cards are included on an optional basis on most card packages of major banks for all segments of the market – from standard to super-premium cards. For example, if equal spending on companion and primary cards is assumed for bank-branded platinum products, the average spending required to earn a \$100 shopping voucher is \$11 700 (compared with \$18 800 without a companion card), making these slightly more competitive than the merchant-branded cards. In other words, the amount that cardholders must spend to obtain the same \$100 shopping voucher reward is considerably lower if they divide their spending between their primary MasterCard/Visa card and companion American Express card, rather than making all their transactions on the primary card.

Cardholders appear to be responding to the incentive provided by companion cards: there has been a noticeable increase in the combined market share of the American Express and Diners Club schemes since two major banks began issuing companion cards in late 2009. In the year prior to the introduction of these companion cards, the combined market share of the American Express and Diners Club card schemes averaged 17.1 per cent; this has subsequently increased, reaching an average of 19.9 per cent over the past year. Merchants largely bear the cost of these more generous rewards cards through the higher merchant service fees for American Express products, on average, unless they choose to pass that cost back through to cardholders in the form of a surcharge.

¹⁴ The sample of cards used for historical analysis, as reported in Table 1, is much smaller and therefore not strictly comparable with the sample used in Table 2.

Graph 4
Market Shares of Card Schemes*
 Value of credit and charge card purchases



* Excludes scheme debit from March 2008; back data adjusted for break
 ** Includes Bankcard before 2007
 Source: RBA

Conclusion

The personal credit card market has evolved substantially since the early 2000s, reflecting, in part, the Reserve Bank’s reforms to improve competition and efficiency in the payments system. In particular, over the past decade it has become increasingly expensive for cardholders to earn reward points and other benefits by using their cards, while merchant service fees have fallen.

More recently, card schemes have provided card issuers with incentives to promote cards associated with higher costs (whether interchange or merchant service fees), albeit within the bounds of the rules set by the Reserve Bank. For instance, all four major banks now offer companion American Express cards – which typically attract a higher merchant service fee and offer higher rewards per dollar spent than the MasterCard or Visa cards with which they are paired – as a standard feature. There has also been a substantial increase in the number of platinum card products on offer to cardholders, with some banks replacing their existing gold cards with platinum cards and a number of merchant-branded platinum cards also introduced. In addition, now that the distinction between gold and platinum cards is diminishing, some banks have introduced new super-premium cards that offer more generous rewards.

These recent developments have increased the interchange and other revenue received by credit card issuers, which they may use to fund more generous rewards programs for cardholders without a need to increase annual fees. That is, some cards have become more attractive to use since recent changes have lowered, albeit slightly, the effective price paid by some credit card holders relative to other payment instruments. At the same time, these trends add to costs on the acquiring side of the market and, if sustained, could put upward pressure on some merchant service fees over time. Notwithstanding these developments, average merchant service fees have been relatively stable in recent years and they remain well below levels which prevailed prior to the reforms. ❖

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Commodity Market Financialisation: A Closer Look at the Evidence

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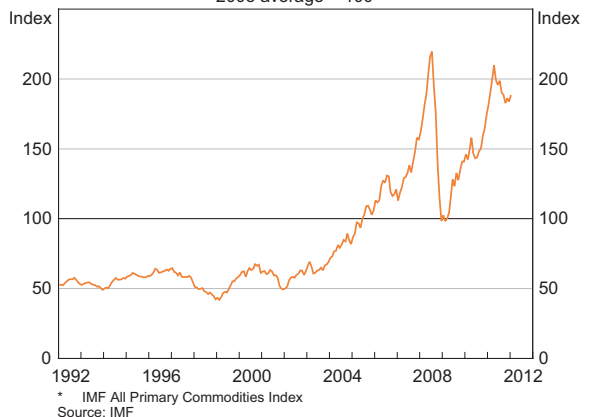
There is some debate about whether financial investors have caused excessive increases in the level and volatility of commodity prices. These investors are viewed by some as being less concerned with fundamentals than traditional market participants and hence impeding the price discovery process – that is, they are destabilising speculators or ‘noise traders’. This article discusses the relationship between the futures markets for commodities (where financial investors are most active), and the spot markets. It then argues that the evidence does not support the hypothesis that financialisation has been the main driver of commodity price developments in the 2000s.

Introduction

The past decade has seen a sharp increase in the level and volatility of commodity prices (Graph 1). This has occurred alongside a sharp increase in commodity demand from emerging market economies, but also in parallel with a rapid increase in both commodity derivatives trading and financial investor activity in commodity markets (Domanski and Heath 2007; Dwyer, Gardner and Williams 2011). That is, commodity markets have also become somewhat more like financial markets. This has given rise to considerable interest in the factors driving commodity prices – in particular the extent to which they have reflected ‘fundamental’ determinants of demand and supply versus the growing financialisation of commodity markets.¹

If the decisions of financial speculators reflect informed views about fundamentals, financialisation can play a beneficial price discovery role. However, if financial speculators base their decisions on expectations of future price changes in the absence of ‘fundamental’ reasons to do so – such as ‘noise’ or ‘momentum’ trading behaviour – speculation

Graph 1
Commodity Prices*
2005 average = 100



could be destabilising (see, for example, Frankel and Rose (2009)).

Financial investors are generally most active in futures markets, rather than spot markets, as they do not want to take delivery of the physical commodity, which is expensive to store and to finance. Instead, the role of financial investors is to act on informed views on the prospects for supply and demand as well as to be paid to take on the commodity price risk that producers, and to a lesser degree consumers, wish to hedge. There are two broad channels

* The authors are from International Department.

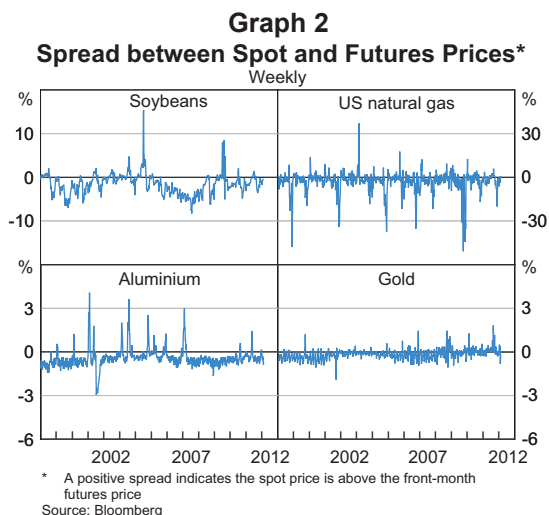
¹ For a summary, see G20 Study Group on Commodities (2011, pp 32–33).

through which commodity futures markets can affect the production and consumption decisions of participants in spot markets: (i) they allow firms to hedge their exposures to movements in spot prices, thereby smoothing their consumption expenditure and/or production cash flows over time and lowering the cost of capital; and (ii) they provide a potential source of influence over spot prices. If the sole function of futures markets was to provide hedging services to producers and consumers, the welfare implications would be unambiguously positive. But if speculation in futures markets causes futures prices to diverge from physical supply and demand fundamentals, this could have a distortionary effect on spot prices.

In considering this issue, we start by discussing the relationship between spot and futures prices from a theoretical perspective, before considering some of the empirical evidence. Overall, we conclude that there is no clear evidence that the financialisation of commodity markets has had a pervasive effect on commodity prices; instead, the evidence is consistent with fundamental supply and demand factors remaining the key determinants of commodity prices.

The Relationship between Futures and Spot Prices in Theory

The 'spot price' is the cash price paid for the immediate delivery of a physical commodity, whereas the 'futures price' is the price of a standardised exchange-traded contract to purchase/sell a specific quantity of a commodity for delivery at a specified future date. In contrast to spot markets, investors in futures markets generally do not actually participate in the physical delivery of the commodity; instead they 'roll over' their contracts to the next futures contract if they wish to maintain their exposure. This is because physical delivery of the commodity gives rise to storage and financing costs, with little offsetting benefit to a financial investor from actually having a physical holding of, for example, soybeans or natural gas. Graph 2 shows the relationship between



spot and (front-month) futures contract prices over time for soybeans, US natural gas, aluminium and gold, each of which have reasonably large and active futures markets.²

The theoretical relationship between futures prices and spot prices is based on a no-arbitrage condition.³ This says that consumers and producers should remain indifferent between buying and selling the physical commodity at today's spot price, and entering into a futures contract that would allow them to buy and sell the commodity at a specified later date at today's futures price. In practice, financing constraints could limit this process to some extent. Assuming that the commodity is storable and that (well-informed) participants are able to freely access both the spot and futures markets (i.e. there are no financing or institutional constraints), then an unexpected increase in the futures price would, all else equal, allow agents to profit from buying the commodity today at the (relatively low) spot price, and selling it in the future at the (relatively high) futures price. This would then place upward pressure

2 The 'front-month' contract for a given commodity refers to the futures contract with the nearest expiry date; it is generally the most liquid futures contract and has the smallest spread to the spot price.

3 Also, institutional factors may create a close relationship between futures and spot prices in some markets, independently of any direct arbitrage relationship. For example, spot or contract prices may be set mechanically with respect to futures prices.

on the spot price and/or downward pressure on the futures price until the no-arbitrage condition was restored.

Importantly, however, the no-arbitrage condition does not imply that the futures price should equal the spot price, or that a given change in the futures price will be accommodated by a proportionate change in the spot price. This is because the arbitrage relationship also takes into account some underlying differences between physical commodities and futures contracts, which may themselves vary over time.

- First, there is an opportunity cost associated with buying and holding the physical commodity, as opposed to entering into a contract to purchase the commodity at a future date and earning interest on the funds set aside for this future purchase in the meantime. This opportunity cost, which is captured by the foregone interest rate, acts to reduce (increase) the return from buying (selling) the physical commodity at the spot price relative to entering into a futures contract.
- Second, holdings of physical commodities incur storage costs whereas futures contracts do not. Storage costs act to reduce (increase) the return from buying (selling) the physical commodity at the spot price relative to entering into a futures contract.
- Third, there is a 'convenience yield' from holding the physical commodity, which is the benefit of having assured access to the commodity in the event of a supply disruption. This acts to increase (reduce) the return from buying (selling) the physical commodity at the spot price relative to entering into a futures contract.

The no-arbitrage condition describing the relationship between futures and spot prices can be represented by the following equation:⁴

$$F_t = S_t e^{(r+c-y)(T-t)} \tag{1}$$

⁴ This equation is a variant of Hotelling's rule, which states that in a competitive market, the price of a non-renewable resource (net of marginal costs) will increase in line with the interest rate.

Where: F_t and S_t are the futures and spot prices at time t ; r is the risk-free annual interest rate; c is the cost of storing the physical commodity; y is the convenience yield earned from holding the physical commodity; and T is the maturity date for the futures contract.⁵ This basic model captures the cost of freely available finance, but can be extended to account for financing constraints and/or risk aversion by incorporating a risk premium.⁶ It can be seen from this equation that the futures price will only be close to the spot price if the net impact of the interest rate, storage costs and convenience yield ($r+c-y$) is very small, or the futures contract relates to a very near delivery date (so that $(T-t)$ is very small).

Similarly, changes in futures and spot prices need not be proportionate, depending on how these other variables change. For example, if an increase in the futures price encourages a build-up of inventories, storage costs may also rise (as warehouse space becomes scarce) and the convenience yield may fall (as the benefits of physically holding a more abundant commodity diminish). The observed increase in the spot price in response to the higher futures price would then be smaller than otherwise.

The no-arbitrage condition also does not specify whether the spot or futures price adjusts in response to an unanticipated change in one of the variables in the equation. If, for example, there is an unexpected increase in the futures price, the no-arbitrage condition could be restored by: the futures price subsequently falling again; the spot price rising; or some combination of the two. In practice, this will depend on the extent to which the unexpected change in the futures price is perceived to reflect

⁵ In Equation (1), c and y are expressed as proportions of the spot price for illustrative purposes.

⁶ A risk premium would be expected to drive a wedge between futures and spot prices, particularly if investors are highly risk averse. Intuitively, this risk premium can be thought of as the compensation required by financial speculators to participate in the futures market, since their participation is not derived from a need to hedge an exposure in the physical market. Adding this risk premium term (which can be positive or negative depending on whether the desired net position of commodity producers and consumers in the futures market is short or long) would alter the form of Equation (1) to: $F_t = S_t e^{(r+c+p-y)(T-t)}$, where p is the risk premium.

a genuine change in fundamentals, as well as the time horizons of participants in the spot and futures markets.

If an increase in the futures price is viewed as revealing genuinely new information about fundamentals, firms that supply the physical commodity to the spot market will have an incentive to build inventories, while firms that demand the physical commodity will have an incentive to stockpile purchases for future use. This should create excess demand for the commodity in the spot market at the current price, thereby pushing the spot price up until the no-arbitrage condition is restored. In this scenario, futures prices would only distort spot prices if there are information failures – that is, if participants in the spot market mistake speculative price developments for genuine price discovery.

However, if an increase in the futures price is not considered to reveal any genuinely new information about fundamentals, the response of firms in the spot market (and well-informed investors in the futures market) will depend on their views about how long the apparent ‘bubble-like’ conditions will be sustained, and how long they are willing to hold their positions.⁷ Such a situation could arise, for example, due to the influence of so-called ‘noise’ or ‘momentum’ traders, who are either less well-informed than other market participants, or who actively choose to ignore fundamentals (Shleifer and Summers 1990; Reichsfeld and Roache 2011). If the deviation from fundamentals is considered temporary, firms that supply the physical commodity to the spot market will have an incentive to increase their short positions in the futures market (i.e. enter into agreements to sell the commodity at a future date at the relatively high futures price, rather than at the (lower) expected spot price). At

the same time, firms that demand the commodity in the futures market will have an incentive to reduce their long positions in the futures market. This should place downward pressure on the futures price, to the point where the no-arbitrage condition is restored.

Alternatively, participants in the spot market may suspect that a rise in the futures price which is not justified by fundamentals could be sustained – for example, due to herding behaviour among ‘noise traders’. In this case, producing firms may be tempted to withhold supply to the spot market (in expectation that the higher futures prices will translate into higher spot prices) and reduce their short futures positions (which provide insurance against falls in the spot price). At the same time, consuming firms will have an incentive to stockpile the spot commodity for future use and increase their long futures positions (which provide insurance against increases in the spot price). Other, better-informed, financial speculators may also be encouraged to bet on future price increases in order to book short-term profits. This process could simultaneously drive spot and futures prices higher, and even further from the price implied by fundamentals. While it may be reasonable to expect fundamentals to eventually reassert themselves, so-called ‘rational bubbles’ could nevertheless act to distort spot and futures prices for some time.

The Relationship between Futures and Spot Prices in Practice

With that background in mind, it is useful to examine how these relationships play out in practice. To this end, we perform Granger causality tests to examine the empirical relationship between daily changes in spot and (front-month) futures prices – that is, whether changes in one price systematically precede changes in the other – for a range of individual

⁷ Speculative price movements could also occur in spot markets. However, such instances are likely to be relatively isolated, as uninformed financial investors (who have no underlying physical demand for commodities) are, in general, less likely to participate in spot markets (where they will incur storage and financing costs without an offsetting convenience yield). While market manipulation by informed participants in spot markets may also be possible, this is unrelated to the financialisation of commodity markets.

commodities.⁸ In the context of asking how financial speculators could influence prices, there are four possible outcomes of these tests, each with different implications:

- If changes in futures prices are found to Granger-cause changes in spot prices, this suggests that price discovery is occurring in the futures market. This could indicate that the futures market tends to absorb news about changes to fundamentals more quickly than the spot market. A less benign interpretation could be that speculative developments in futures prices are distorting spot prices (at least temporarily).
- If changes in spot prices are found to Granger-cause changes in futures prices, this suggests that price discovery is occurring in the spot market. In this case, any speculation-driven changes in futures prices are unlikely to distort spot prices.
- If we find evidence of bi-directional Granger causality (i.e. changes in futures prices Granger-cause changes in spot prices *and* changes in spot prices Granger-cause changes in futures prices) this indicates that spot and futures prices are jointly determined. This could indicate either that there are a large number of participants with access to both markets (such that perceived news is simultaneously reflected in both the futures and spot markets) or that there are institutional factors which enforce a close mechanical relationship between the two markets.
- Lastly, if no Granger-causal relationships are detected, this may suggest that spot and futures markets are sufficiently segmented to prevent

arbitrage from occurring, and therefore that developments in one market are unlikely to affect the other. Alternatively, arbitrage may still hold, with the Granger-causal relationships existing only on an intraday basis or adjustment occurring primarily through changes in other variables (e.g. through storage costs or the convenience yield).

Granger causality tests are estimated for 10 commodities, covering four commodity classes – base metals, agriculture, energy, and precious metals – over a sample period from 1997 to 2011. Details of the price measures used are shown in Appendix A. We also perform the tests over two sub-periods – 1997 to 2002 and 2003 to 2011 – to determine if the relationships between spot and futures prices have changed as commodity futures markets have become much larger. The tests are conducted using a standard GARCH (1,1) model for lag lengths ranging from 1 to 10 days.⁹ Table 1 presents the results of the Granger causality tests for lag lengths of 1, 5 and 10 days (which are generally representative of the results obtained using other lag lengths).

The results for base metals (aluminium, copper, nickel and zinc) are mixed, but there is little evidence of a consistent one-way Granger-causal relationship from futures prices to spot prices (i.e. that changes in futures prices systematically precede changes in spot prices). Instead, we find evidence of a bi-directional Granger-causal relationship for copper and nickel, but almost no evidence of a Granger-causal relationship in either direction for zinc or aluminium. The bi-directional Granger-causal relationships between futures and spot prices for copper and nickel suggest that these prices are typically jointly determined and are therefore likely to be anchored

⁸ More formally, the percentage change in the spot price is regressed on lagged changes in both the spot price and the futures price. If the estimated coefficients on the lagged changes in the futures price are found to be jointly statistically significant (using a Wald test) then changes in the futures price will be said to Granger-cause changes in the spot price. A similar regression is then run for the percentage change in the futures price. Bi-directional Granger causality occurs when both variables are found to Granger-cause each other (i.e. they are jointly determined). If a variable does not help predict the other, no Granger causality is said to exist.

⁹ A GARCH model is used because high-frequency financial time series typically exhibit 'volatility clustering', whereby large changes in a variable tend to be followed by other large changes and small changes tend to be followed by other small changes. GARCH models explicitly estimate this relationship and in so doing are able to estimate more accurate standard errors than an ordinary least squares approach. The (1,1) specification for the model was selected based on the evidence in Hansen and Lunde (2005) and the Akaike and Schwarz Bayesian Information Criteria.

Table 1: Test Results for Granger Causality between Spot and Futures Prices^(a)

	1997–2011 ^(b)		
	1 day	5 days	10 days
Aluminium	None	None	None
Copper	Both	Both	Both
Nickel	Both	Both	None
Zinc	None	None	None
Corn	Futures → Spot	Futures → Spot	Futures → Spot
Soybeans	Futures → Spot	Futures → Spot	Futures → Spot
Wheat	Futures → Spot	Futures → Spot	Futures → Spot
US natural gas	Futures → Spot	Futures → Spot	Futures → Spot
Gold	Spot → Futures	Spot → Futures	Spot → Futures
Silver	Both	Both	Spot → Futures ^(c)
	2003–2011		
	1 day	5 days	10 days
Aluminium	None	None	None
Copper	Both	Both	Both
Nickel	Both	Both	Futures → Spot ^(d)
Zinc	None	None	None
Corn	Both	Futures → Spot ^(c)	None
Soybeans	Futures → Spot	Futures → Spot	Futures → Spot
Wheat	Futures → Spot	Futures → Spot	None
US natural gas	Futures → Spot	Futures → Spot	Futures → Spot
Gold	Spot → Futures	Spot → Futures	Both
Silver	Spot → Futures	Spot → Futures	Spot → Futures

(a) Results are statistically significant at the 5 per cent level, except where otherwise indicated; London Metal Exchange (LME) prices are used for base metals, Chicago Board of Trade (CBOT) prices are used for agricultural commodities

(b) July 1997 to December 2011

(c) Bi-directional Granger-causal relationship at the 10 per cent level of significance

(d) Bi-directional Granger-causal relationship at the 10 per cent level of significance for lags up to and including nine days

Sources: Bloomberg; authors' calculations

to a common set of fundamentals. On the other hand, while the absence of any Granger-causal relationship between changes in spot and futures prices for aluminium and zinc could suggest that there are barriers to arbitrage between the two markets, it is arguably more likely that futures and spot price adjustments are occurring on an intraday basis, which is not captured by the daily frequency of our data. It is also possible that some adjustment occurs through other factors, such as storage and/or financing costs.

The results for the agricultural commodities (corn, soybeans and wheat) are much more uniform, with strong evidence that daily changes in futures prices Granger-cause daily changes in spot prices. This is not surprising, as spot markets for agricultural commodities tend to be relatively fragmented (i.e. they consist of a relatively large number of producers with specialist local knowledge). These results also hold in the 2003–2011 sub-sample, except at longer lag lengths for corn and wheat where there no longer appears to be a Granger-causal relationship in either direction. These findings indicate that, for

these agricultural commodities, developments in futures prices have a bearing on spot prices.

For US natural gas, we also find strong evidence that daily changes in futures prices Granger-cause daily changes in spot prices. Oil prices are deliberately excluded from the Granger causality analysis as there are certain institutional features of the oil market which complicate the relationship between spot and futures prices. In particular, there is arguably no independent benchmark spot market for oil (see Fattouh (2011) for a more detailed discussion of the features of the oil market). So, for example, for West Texas Intermediate (WTI) oil, the benchmark (Cushing crude oil) spot price trades at parity to the front-month futures price for all but a 3-day delivery scheduling period that commences when the current front-month futures contract expires.

For precious metals (gold and silver) we find some evidence that spot prices Granger-cause futures prices, particularly over the most recent period. Gold spot prices Granger-cause gold futures prices (although with some evidence of bi-directionality at longer lag lengths in the more recent period). For silver, there is a largely bi-directional Granger-causal relationship over the full sample period, but over the 2003–2011 period, spot prices are found to Granger-cause futures prices. There does, however, appear to be some weak evidence of a return to bi-directional Granger-causality during the rapid run-up in silver prices between mid 2010 and end 2011, suggesting that developments in silver futures prices did have an effect on spot prices during this so-called ‘bubble’ episode. More generally, the apparent influence of precious metals spot prices on futures prices is likely to be related to the relatively large and liquid nature of spot markets for these commodities, which in turn reflects their unique status as financial assets with relatively low storage costs. Related to this, the growth in physically backed commodity exchange-traded products for precious metals may also be a factor, as these products require investment in the underlying physical commodity at the spot price (Kosev and Williams 2011).

Pulling all this together then, it seems the relationship between spot and futures prices is a complex one, varying across commodities, sometimes within commodity classes, and also over time. There is evidence for agricultural commodities and US natural gas that changes in futures prices lead those in spot markets. If futures prices for these commodities reflect fundamentals, these markets can be viewed as being welfare enhancing, with the participation of financial speculators adding to the liquidity of these markets and improving price discovery. However, if there is evidence of speculation in these futures markets by ‘noise’ or ‘momentum’ traders, this has the potential to distort the corresponding spot prices, with adverse consequences for the real economy. Consequently, to distinguish between these competing views on the role of financial speculators, it is important to evaluate the evidence on the relationship between futures prices and macroeconomic fundamentals.

Are Futures Price Developments Consistent with Fundamentals?

Previous Reserve Bank work has found that, in general, the large increase in the number of financial investors in commodity markets over the past decade has not significantly altered price dynamics (see Dwyer *et al* (2011)). The main pieces of evidence in support of this view are that:

- (i) price increases have been just as large (if not larger) for some key commodities that do not have well-developed financial markets as for those that do (Graph 3);
- (ii) there has been substantial variation in the price behaviour of individual commodities, even among those that have large, active derivatives markets (such as natural gas and oil);
- (iii) the recent increase in the correlation between commodity prices and other financial prices, such as equities – which is commonly cited as evidence that financial speculators are affecting prices – is in fact not that unusual by longer-run historical standards, with previous

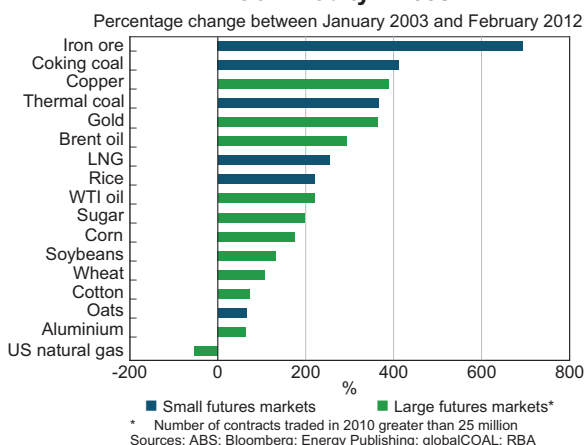
episodes of increased correlation occurring prior to the recent influx of financial investors into commodity markets (Graph 4); and

- (iv) there does not appear to have been the large increase in commodity inventories that we would expect to accompany speculation-driven price rises (as discussed in the earlier section on the theoretical relationship between futures and spot prices).

In this article, we present two further pieces of analysis which suggest that, in general, developments in futures prices have been

consistent with fundamentals. First, we show that the relationship between commodity prices and the global output gap over the past decade is broadly in line with that seen over a longer time horizon (although the omission of supply-side factors makes it difficult to draw any firm conclusions about the relationship between commodity prices and fundamentals based on the output gap alone). Second, we use principal component analysis to show that since 2003, individual commodity prices have been driven primarily by a single common factor, which appears to be related to macroeconomic fundamentals.

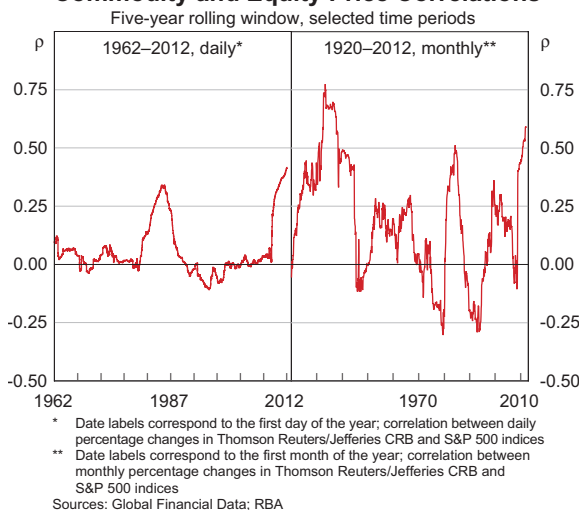
Graph 3
Commodity Prices



Commodity prices and the global output gap

It has been argued that the global output gap is an important determinant of the cyclical behaviour of commodity prices, since commodities are used as an input to production (and typically it takes some time for commodity supply to respond to changes in demand). As shown in Inamura *et al* (2011), there appears to be some evidence of this, with a broad co-movement over time between the global output gap (measured as the difference between actual and potential global GDP)¹⁰ and various commodity price indices (reproduced in Graph 5).¹¹

Graph 4
Commodity and Equity Price Correlations

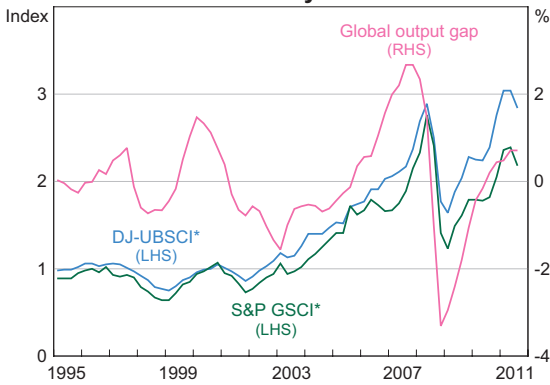


Proponents of this view suggest that increased financial investment in commodity markets over the past decade has resulted in an upward shift in the relationship between commodity prices and the global output gap. Abstracting from supply factors, the intuition here is that financialisation constitutes a source of increased demand for commodities which is unrelated to macroeconomic ‘fundamentals’ (as captured by the output gap). Graph 6 plots the relationship between real commodity prices and the global output gap from 1971. There does

10 While industrial production may be a more relevant measure of global activity for this purpose, we use GDP in order to assess the claims made in previous research. Global GDP is measured using purchasing power parity exchange rates and potential output is calculated using the Hodrick Prescott filter ($\lambda = 1\ 600$).

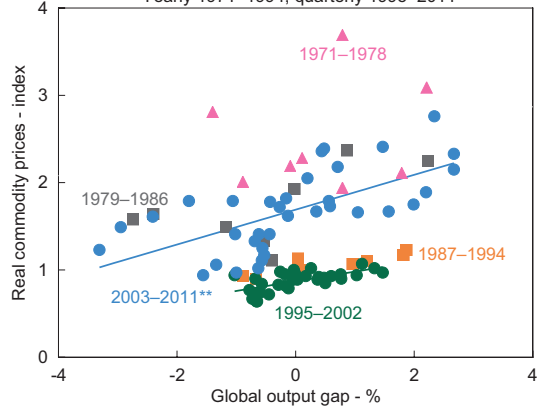
11 For information on the differences between selected commodity futures price indices, refer to RBA (2011).

Graph 5
The Global Output Gap and Commodity Prices



* Spot returns measures of the S&P Goldman Sachs Commodity Index (GSCI) and the Dow Jones-UBS Commodity Index (DJ-UBSCI) deflated by the US CPI; 2000 average = 1
 Sources: Bloomberg; Global Financial Data; IMF; RBA

Graph 6
Commodity Prices* and the Global Output Gap
 Yearly 1971–1994, quarterly 1995–2011



* Spot returns measure of the S&P GSCI deflated by the US CPI; 2000 average = 1
 ** Data to September quarter 2011
 Sources: Global Financial Data; IMF; RBA

indeed appear to have been an upward shift in the relationship between real commodity prices and the global output gap between 1995–2002 and 2003–2011, consistent with the financialisation hypothesis. However, taking a longer-run historical perspective, it is evident that the relationship observed over the 2003–2011 period is around average, whereas it is the relationship from 1995–2002 (and also 1987–1994) that looks unusual. That is, it is the period of low and falling real commodity prices during the latter part of the 1980s and the 1990s that looks more unusual, rather than the most recent period.

As noted above, however, this analysis omits supply-side factors, which are also important determinants of commodity prices. In particular, supply conditions were tight in the 1970s – associated with the oil price shocks – but eased in the 1980s in response to the earlier increase in prices. So, from a longer-run perspective, the relationship between commodity prices and the global output gap in recent years does not look unusual. In any event, the omission of supply-side factors means that any change in this relationship cannot, of itself, be attributed to the financialisation of commodity markets in recent years.

Principal component analysis

An alternative way to examine the extent to which developments in commodity futures prices have been consistent with macroeconomic fundamentals is through principal component analysis. This statistical technique identifies whether there are common factors driving movements in an underlying set of observed variables, and how important they are, without having to specify what those factors might be. Drawing on this analysis, together with broader evidence on the drivers of commodity prices (see, for example, Connolly and Orsmond (2011); Dwyer *et al* (2011)), we can infer the extent to which these common factors are related to macroeconomic fundamentals.

This analysis was conducted on quarterly price changes for a broader set of 20 commodities over two sample periods: the September quarter 1990 to the December quarter 2002 and the March quarter 2003 to the December quarter 2011.¹² By comparing the results from these two periods, we can gain

¹² The analysis for the latter period was also performed over a slightly longer time period (March quarter 2000 to the December quarter 2011) to test the sensitivity of the results to the use of a relatively short time period. The results from this exercise were very similar to those obtained over the shorter period.

Table 2: Principal Component Analysis of Changes in Commodity Prices

Principal component	Share of variation explained (per cent)	
	2003:Q1–2011:Q4	1990:Q3–2002:Q4
1	40	23
2	12	14
3	9	11
4	7	8
5	6	7
6	5	7
7	4	6
8	3	5
9	3	4
10	3	3
...		
20	0	0

Source: authors' calculations

some insights into the effect of financial investment in commodity markets.

The results suggest that, since 2003, one common factor (i.e. the first principal component) has explained 40 per cent of the total variation in our set of 20 commodity prices in change terms (Table 2), with the next most important factor accounting for only 12 per cent.¹³ In levels terms, the first principal component explains almost 70 per cent of the variation since 2003. A number of statistical tests indicate that there is only one significant common factor.¹⁴ The results show that the first principal component has become more important over the past decade compared with the 1990s, when it only explained 23 per cent of the variation in commodity prices in change terms (and just under

40 per cent in levels terms). Moreover, across the various commodities, the first factor loadings (i.e. the correlations between changes in the commodity's price and the first principal component) are reasonably uniform within the recent sub-period (Table 3). US natural gas prices are one notable exception, consistent with the large (idiosyncratic) increase in supply associated with the shale gas 'revolution' together with the fact that US natural gas is restricted to the domestic market due to a lack of international transportation infrastructure. Agricultural prices also tend to have somewhat lower loadings on the common factor. This seems likely to reflect the importance of idiosyncratic – particularly weather-related – supply factors in driving futures prices for agricultural commodities.

The dominance of the first principal component shows that there has been one major common driver of developments in commodity prices, particularly in the post-2003 period. This appears likely to be related to known macroeconomic developments over this period – in particular, the combination of an unexpectedly large increase in demand for commodities and sluggish supply growth. For example, the pair-wise correlation between the

¹³ The principal component analysis is performed using percentage changes in quarterly (daily average) front-month futures prices. The exception to this is the use of LME spot prices for base metals from the start of the sample period to July 1997 due to the unavailability of LME futures prices up until this time. The results of the principal component analysis also hold for a (smaller) sample of spot, rather than futures, prices.

¹⁴ The standard Scree test and the criterion developed by Otter, Jacobs and den Reijer (2011) show that there is one significant common factor, while the Bai-Ng Panel Information Criteria suggest one or two common factors, depending on which statistic is used (Bai and Ng 2002).

Table 3: First Factor Loadings for Individual Commodity Prices

	Correlation between price change and first principal component	
	2003:Q1–2011:Q4	1990:Q3–2002:Q4
Aluminium	0.82	0.61
Copper	0.79	0.56
Oats	0.77	-0.48
Silver	0.76	-0.12
Brent oil	0.75	0.89
WTI oil	0.72	0.87
Heating oil	0.71	0.82
Corn	0.66	-0.48
Cotton	0.64	0.11
Zinc	0.63	0.31
Soybeans	0.62	-0.21
Lead	0.61	0.24
Coffee	0.55	0.12
Nickel	0.54	0.48
Cocoa	0.51	-0.23
Gold	0.51	0.15
Wheat	0.50	-0.43
Rice	0.46	-0.32
Sugar	0.39	0.09
US natural gas	0.38	0.33

Source: authors' calculations

first principal component and quarterly growth in global industrial production is 0.7 over the recent period. While this does not control for other relevant variables, such as supply factors, it is nevertheless broadly consistent with the results obtained from a more fully specified model in Arbatli and Vasishtha (2012). The alternative hypothesis, which is that financialisation has been by far the most important influence on commodity prices, is a much less plausible explanation, in large part because there is no reason to suspect that this has an element to it that is common across a rather disparate set of commodities, a number of which are not even included in the major commodity indices used by financial investors.

Conclusion

Overall, while financial speculation at times may have exerted some influence on some commodity prices beyond fundamentals, the available evidence does not support the hypothesis that financialisation has been the main driver of commodity price developments in the 2000s. More generally, the theoretical relationship between commodity futures and spot prices does not imply that changes in futures prices need necessarily lead to changes in spot prices. In practice, this is supported by the results of Granger causality tests, which point to substantial variation across individual commodities. ❖

Appendix A

Table A1: Spot and Futures Prices Used in Granger Causality Tests and Principal Component Analysis

Commodity	Spot price	Futures price
Agricultural		
Cocoa ^(a)	na	Intercontinental Exchange US
Coffee ^(a)	na	Intercontinental Exchange US
Corn	United States Department of Agriculture Grain Export Chicago Yellow Number 2	Chicago Board of Trade
Cotton ^(a)	na	Intercontinental Exchange US
Oats ^(a)	na	Chicago Board of Trade
Rice ^(a)	na	Chicago Board of Trade
Soybeans	United States Department of Agriculture Yellow Number 1	Chicago Board of Trade
Sugar ^(a)	na	Intercontinental Exchange US
Wheat	United States Department of Agriculture Soft Red Winter Number 2	Chicago Board of Trade
Base metals		
Aluminium	London Metal Exchange – Primary Aluminium – Cash	London Metal Exchange – Primary Aluminium
Copper	London Metal Exchange – Cash	London Metal Exchange
Lead ^(a)	na	London Metal Exchange
Nickel	London Metal Exchange – Cash	London Metal Exchange
Zinc	London Metal Exchange – Cash	London Metal Exchange
Energy		
Brent oil ^(a)	na	Intercontinental Exchange Europe
Heating oil ^(a)	na	New York Mercantile Exchange
US natural gas	Henry Hub	New York Mercantile Exchange
WTI oil ^(a)	na	New York Mercantile Exchange
Precious metals		
Gold	Bloomberg gold spot price	COMEX
Silver	Bloomberg silver spot price	COMEX

(a) No spot prices are reported as these commodities were not used in the Granger causality tests
Source: Bloomberg

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The Changing Structure of the Australian Economy and Monetary Policy

Philip Lowe, Deputy Governor

Address to the Australian Industry Group 12th Annual Economic Forum
Sydney, 7 March 2012

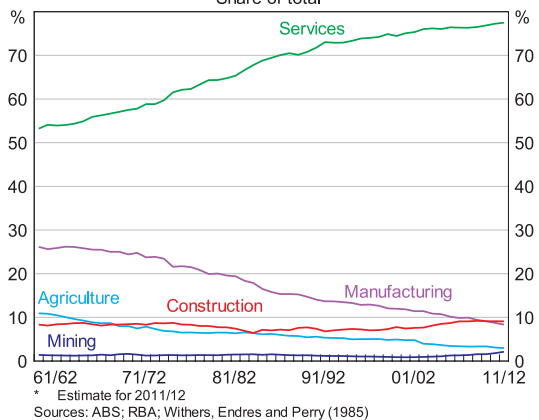
I would like to begin by thanking the AiGroup for the invitation to once again speak at the annual Economic Forum. When I spoke at last year's Forum, the title of my remarks was 'Changing Relative Prices and the Structure of the Australian Economy'. Today, I would like to revisit this topic of structural change, first talking about some of the adjustments that are taking place within the Australian economy and then, second, discussing some of the implications of these adjustments for monetary policy.

Structural Change in the Australian Economy

Structural change is, of course, something that is not new. It is one of the ongoing features of all economies. Over the past half a century, one of the most obvious changes has been the growth of the services sector, which has accounted for a steadily increasing share of both output and employment. In 1960, for example, a little over 50 per cent of the workforce in Australia was employed in the services sector. Today, the figure is over 75 per cent (Graph 1). Conversely, the shares of manufacturing and agriculture have steadily declined.

These trends have been driven by a range of factors, but three stand out. The first is that the demand for services has increased faster than the demand for goods as average incomes have risen. The second is that most services are produced domestically rather than imported. And the third is that the rate of labour productivity growth in the production of services

Graph 1
Employment by Industry
Share of total*



is lower than that in the production of goods. Not surprisingly, these same general influences have also been at work in all other advanced economies.

Beyond these long-term influences, the structure of the Australian economy is currently also being affected by a number of other factors that are more unusual in nature. I would like to take a few minutes to talk about two of these.

The mining boom and the exchange rate

The first is the mining boom and the high exchange rate.

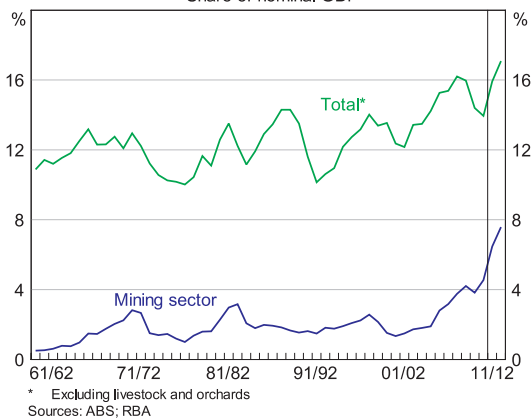
As is well known, Australia is currently experiencing, on the one hand, a once-in-a-century terms of trade and investment boom and, on the other, a very high exchange rate. These events are, of course, related

to one another and are really different sides of the same coin.

It is worth noting that these developments have not led to unusually large shifts in the industry structure of employment, and they are unlikely to do so. While employment in the mining sector has increased by around 70 000 people, or 40 per cent, over the past couple of years, its share of total employment is still low and the mining boom will not change the fact that the vast bulk of Australians work in the services sector. Instead, due to the capital-intensive nature of mining, it is in the investment figures where the evidence of structural change is clearest. Over the next few years, mining-sector investment will reach new highs as a share of GDP, and is likely to account for around 40 per cent of total business investment (Graph 2). Structural change is also clearly evident in the export numbers, with resources now accounting for around 60 per cent of total exports, up from 35 per cent a decade ago.

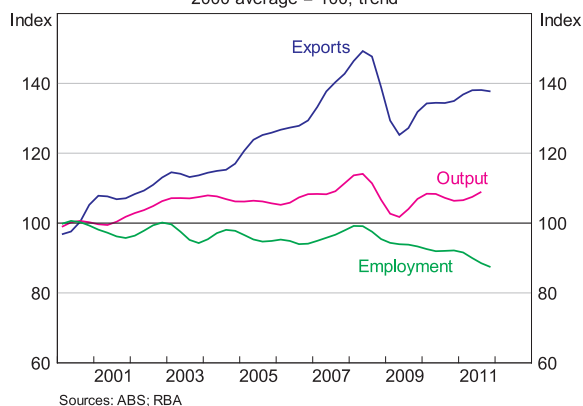
This boom in the mining sector and the terms of trade is having positive spillover effects to a number of areas of the economy, including parts of the services sector. It has delivered a very substantial increase in Australia's real income and this increase has boosted spending. But the accompanying high exchange rate is also having a contractionary effect on a number of sectors of the economy.

Graph 2
Business Investment
Share of nominal GDP



The manufacturing sector is clearly one of these. Over the past decade there has been little growth in manufacturing output and the level of employment has declined, particularly over the past couple of years (Graph 3). Exports of manufactured goods also remain below the level reached in 2008. This stands in contrast to the volume of global trade which has regained its earlier peak.

Graph 3
Manufacturing Industry
2000 average = 100, trend

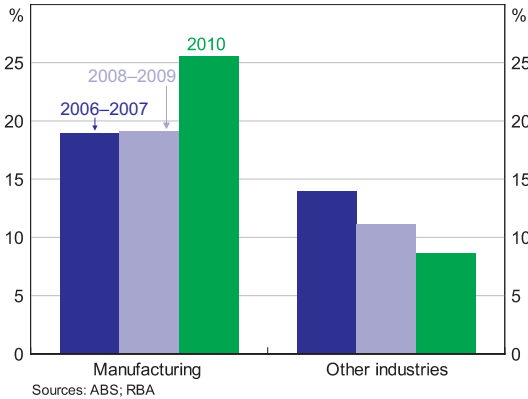


Notwithstanding these trends, manufacturing still has an important role to play in the Australian economy. It employs around 950 000 people and accounts for 9 per cent of output. This role is, however, changing. Realistically, Australia cannot hope to be a large-scale producer of relatively standardised, plain-vanilla manufactured goods for the world market. But what we can be is a supplier of manufactured goods that build on our comparative advantages: our educated workforce; our ability to design and manufacture specialised equipment; our reputation for high-quality food; our research and development skills; and our expertise in mining-related equipment.

Inevitably, the high exchange rate means that the manufacturing industry has little choice but to move up the value-added chain in order to compete. This is, of course, a lot easier to say than to do. It means difficult changes for many firms and those who work for them. It also means ongoing investment in human

capital and the latest machinery and equipment and constant attention to improving productivity. One piece of evidence that things are moving in this direction is in the ABS business characteristics survey, which asks firms a series of questions about innovation. In this survey the manufacturing sector clearly stands out as one where firms are actively reviewing their business practices and, over recent times, they have been doing this more frequently (Graph 4). No doubt, more of this will be required over the years ahead.

Graph 4
New Operational Processes
 Share of firms

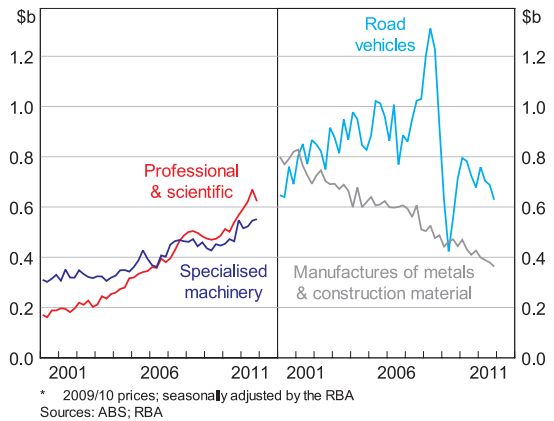


The changes within manufacturing are also evident in the export figures. While, in aggregate, exports of manufactured goods are little changed from their level in 2007, there has been strong growth in some categories including specialised industrial machinery and professional and scientific instruments (Graph 5). These are both areas where human capital and specialised skills are important. In contrast, exports of motor vehicles and construction materials are well down on their earlier levels.

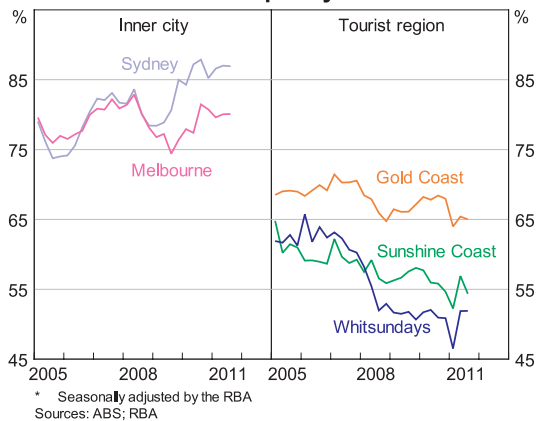
Another area of the economy where the high exchange rate is having a noticeable effect is the tourism sector. As is the case in the manufacturing sector though, the story is not uniform across the industry. Indeed, the structural change that is occurring in the economy is taking place not just across industries, but within industries as well.

The boost to real incomes from the mining boom has clearly increased Australians' ability to travel. However, the high dollar has contributed to a decline in travel to the traditional domestic holiday destinations, with Australians travelling overseas in ever increasing numbers. This has created quite difficult conditions for parts of the industry with, for example, room occupancy rates along the Queensland coast having fallen over recent years (Graph 6). In contrast, conditions are noticeably stronger in the accommodation sectors in some of the large cities which are benefiting from an increase in business travel and an apparent shift in preferences by overseas tourists for city-based experiences. In Sydney, for example, room occupancy rates are at quite high levels.

Graph 5
Manufactured Export Volumes*



Graph 6
Room Occupancy Rates*

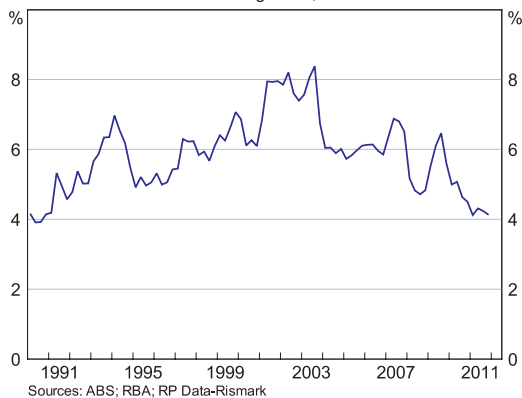


Household spending and borrowing

A second general factor that has been driving changes in the structure of our economy is the adjustment in household borrowing and spending behaviour. The RBA has talked frequently about this issue over recent years, and the flow-on effects are evident in various parts of the economy.

One of these is the property market. In the early 2000s, when the property boom was in full swing and investors were busy buying properties to rent out, around 1 in 12 dwellings in Australia was changing hands each year (Graph 7). Today, the rate of turnover is only about half of this, with around 1 in 25 dwellings changing hands last year. This lower rate of turnover has contributed to weak employment growth in the real estate sector over recent years, after many years of strong growth.

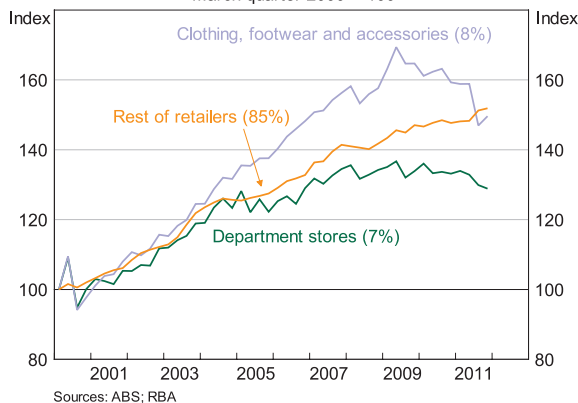
Graph 7
National Dwelling Turnover Rate
Share of dwelling stock, annualised



The change in household behaviour is also affecting the financial sector. Financial institutions are having to learn to live with much lower growth in their balance sheets than was the case over recent decades. This is leading to changes in business practices, and there has been a slight decline in employment in the banking sector over recent years. Conversely, there has been strong growth in employment in the provision of financial advice, partly due to the steady inflows into superannuation funds.

A third area where the change in household behaviour is having a structural effect is in the retail industry. While I talked earlier about the increase in the consumption of services, there are also significant changes taking place within the retail industry. Perhaps the most striking of these is the decline in sales at department stores and clothing and footwear retailers (Graph 8). Indeed, since early 2009, the volume of sales in these stores has declined by around 6 per cent. This stands in contrast to relatively steady growth in the volume of sales in the rest of the retail industry.

Graph 8
Retail Sales Volumes
March quarter 2000 = 100



There are a variety of explanations for these divergent trends, but there is no doubt that the greater price transparency brought about by the internet is part of the story. Many Australians have worked out that the prices charged by domestic retailers for certain goods are higher than those charged by overseas online retailers. Whether this price difference is because of higher domestic costs or because foreign manufacturers and wholesalers are selling into the Australian market at higher prices, Australian consumers have responded by increasingly going online. As in the other areas of the economy that I have talked about, this is causing a rethinking of business models and retailers are having to make changes to the way they run their businesses.

So, putting all this together, the overall picture is a pretty complicated one. How you view the economy depends very much on your perspective. Even within specific industries, experience can vary widely from firm to firm. To date though, while there are obviously large effects on individual businesses and people, the various cross currents have balanced out reasonably well from a macroeconomic perspective: GDP growth is close to trend, inflation is consistent with the target, interest rates are around average and unemployment is low.

These macroeconomic outcomes are much better than those being recorded in other advanced economies. However, the various cross currents are having an unsettling effect on parts of the community, with many people focusing on the costs of structural change. These costs are undoubtedly real and they are not borne evenly across the country. However, the benefits of structural change are also real and, over time, as we have seen in the past, these benefits do get spread widely across the population. If Australia is to take advantage of the opportunities that lie ahead, the structure of the economy must continue to evolve and we need to ensure that our labour and capital are used where the returns are highest.

Implications for Monetary Policy

I would now like to turn to some of the implications of the ongoing structural change for monetary policy. There are four closely related observations that I would like to make.

The first is that structural change adds to the difficulty of assessing the balance between supply and demand in the economy. Given the historically unusual nature of the forces affecting the economy, history provides only limited guidance as to the magnitude of their ultimate effects. This is one reason why the Reserve Bank is devoting considerable resources to understanding these forces, including by frequently talking to businesses at the forefront of this structural adjustment.

The second observation is that the main role for monetary policy is to keep inflation low and stable. The current list of economic uncertainties is long enough without adding uncertainty about the general level of prices to the list. The task for monetary policy is to ensure stability in the overall economy so that difficult decisions at the firm and industry level are not further complicated by macroeconomic instability.

In undertaking this task, the Bank needs to understand the forces driving structural change, and we are working hard on this. But it is important to recognise that the RBA can do little to affect these forces. As I said at last year's Forum, the emergence of Asia as a major force in the global economy has shifted world relative prices and this underlies many of the changes that are occurring in the Australian economy. This shift in relative prices is not something that monetary policy in Australia can influence. It is driven by global developments and is causing adjustments not just in Australia, but around the world. Monetary policy in Australia can, however, help in our own adjustment process by keeping the overall economy on an even keel.

The third observation is that the flexibility of the economy is important when structural change is taking place. To the extent that there are significant impediments to resources moving between industries and/or parts of the country, these impediments are likely to worsen the short-run trade-off between inflation and unemployment. While the degree of flexibility in the economy is determined by factors other than monetary policy, it can have an important bearing on overall macroeconomic outcomes.

And the final observation is more directly about the link between monetary policy and the exchange rate. It has been argued in some quarters that Australia's high interest rates by current world standards have put upward pressure on the exchange rate, and thus have added to the pressures being experienced in some industries. Some who have argued this see

part of the solution as being a material easing of monetary policy.

The difficulty with this argument is that, at least on the evidence to date, something like the current combination of exchange rates and interest rates appears to be what is needed to maintain overall macroeconomic stability. The high exchange rate and the high interest rates relative to the rest of the world are both being driven by the fact that Australia is a major beneficiary of the change in world relative prices. They are both playing an important role in preserving overall macroeconomic stability, something which has proved very difficult to achieve in previous resources booms, which typically ended in a bout of serious inflation with significant costs to the community.

Of course, it is possible for exchange rates to overshoot. Australia is seen by foreign investors, including central banks and sovereign wealth funds, as an attractive destination for investment, and we need to be alert to the possibility that portfolio flows could push up the exchange rate too far. While the evidence of the past 30 years is that movements in the exchange rate have been an important stabilising force for the Australian economy, the unusual nature of the current forces means that we need to watch things closely. An important indicator here is the labour market with the unemployment rate having been in the 5 to 5¼ per cent range over the past year. If the unemployment rate were to rise persistently, it might suggest that the contractionary effect of the high exchange rate was more than offsetting the expansionary effect of the investment boom and the terms of trade. If this were to turn out to be the case, monetary policy would have the flexibility to respond provided the inflation outlook remained benign.

Conclusion

To summarise, the challenge that we Australians face is to make the best of the fundamental changes that are taking place in the global economy. As a country rich in natural resources, we are well placed to benefit from this change. But if we are to take advantage of this opportunity, the structure of the economy must continue to evolve. Labour and capital will continue to shift to the resources sector. Industries affected by the high exchange rate will need to find ways of moving up the valued-added chain. And parts of the service sector will need to continue their adjustment to the changes in household spending and borrowing.

These adjustments are difficult, but if they are not allowed to occur, as a nation we will have given up the potential benefits that the changes in the world economy are making possible. Public policy can help in the adjustment process by promoting flexibility in the economy and by reducing some of the costs of change for individuals and communities. It can also help manage some of the new risks arising from these global developments. Monetary policy can help the adjustment by keeping inflation under control and maintaining stability in the overall economy. Our judgement is that the current setting of monetary policy is consistent with this, with the Board keeping the cash rate unchanged at 4.25 per cent at its meeting yesterday.

I would like to thank you very much for your time this morning, and I am happy to answer questions. ✨

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The Forces Shaping the Economy over 2012

Philip Lowe, Deputy Governor

Address to the Committee for Economic Development of Australia
Sydney, 16 February 2012

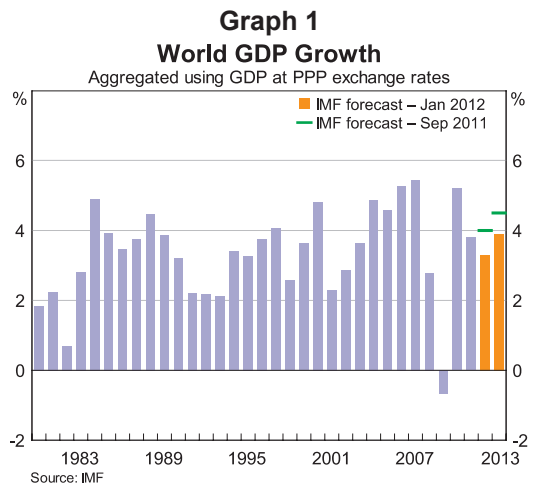
This is the third year that I have had the pleasure of participating in CEDA's annual Economic and Political Overview. Each of these years has brought us yet more economic surprises and challenges. In 2010, the world economy grew surprisingly quickly and commodity prices increased sharply. Then in 2011, global growth fell short of what was widely expected and the sovereign debt problems in Europe came to dominate much of the global economic and financial news.

This morning, I would like to discuss some of the issues that are likely to shape the economic environment over 2012. These issues were also set out in the Reserve Bank's quarterly *Statement on Monetary Policy* that was released last Friday.

The Global Environment

It is appropriate to start off with developments in the global economy, with the troubles in Europe seemingly in our newspapers every day.

As was widely reported in mid January, the IMF recently lowered its forecasts for world growth. It is now expecting global GDP to increase by around 3¼ per cent in 2012, which is nearly ¾ of a percentage point lower than the forecast made in September last year (Graph 1). This rate of growth is below average, although it is well within the normal range of outcomes, and it is nothing like the very weak outcome recorded in 2009.



The downward revision is largely due to developments in Europe, with the European economy now seemingly in recession. What we are seeing there is a fundamental shift in fiscal policies. For more than 30 years, many European governments spent much more than they raised in revenues. And financial markets were prepared to finance the difference at low interest rates, apparently ignoring the steady build-up of debt. This, of course, has now all changed and this change is a wrenching experience for the countries concerned. The sharp economic contraction has led to large increases in budget deficits at a time when the tolerance of public debt has diminished and financial markets, after having ignored risks for many years, can now see risks everywhere.

These changes are also proving very difficult to manage. The task is made more complicated by having a single central bank, but many fiscal authorities. This set of arrangements has opened up issues that normally do not arise. Not least of these is the question of under what conditions is it appropriate for the single central bank to buy the government bonds of just one, or a few, of the members of the currency union. This is an issue that the Federal Reserve in the United States, the Bank of England and the Bank of Japan have not had to confront as they embarked on their own large-scale purchases of government debt in an effort to lower long-term yields.

Working through the various challenges is taking the Europeans time. The process has been frustratingly slow and we have witnessed some missteps along the way. But for all of that, we should not lose sight of the fact that progress is being made. Late last year there was a palpable sense that something might go badly wrong over our summer. Clearly, that has not happened. Instead, government bond yields for some of the troubled countries in Europe have declined a little (Graph 2). Equity markets have picked up and confidence has improved a bit. And significantly, bank debt markets are functioning again, although the cost of issuing bank debt, relative to government yields, is higher than it was in the middle of last year.

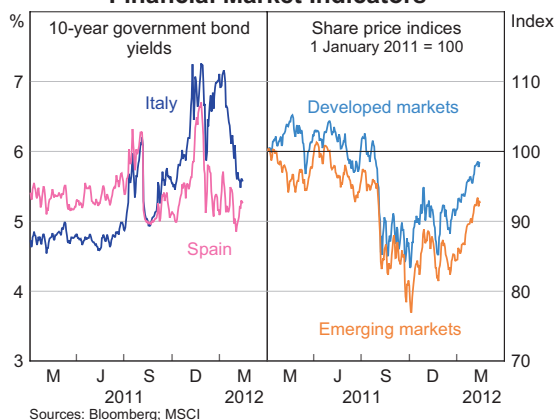
As my colleague, Guy Debelle, discussed earlier this week, an important development over recent months was the ECB's decision to make unlimited funds available (subject to adequate collateral) to the European banking system for three years at an interest rate of just 1 per cent.¹ All up, around ½ trillion euros have been lent and a further operation is scheduled to take place later this month. There has also been progress through the various euro area summits in building political structures that, over time, have the prospect of delivering more disciplined fiscal policy than has been the case in the past.

Clearly, more will need to be done, and there is still the possibility of a very disorderly outcome in Europe. But, at least for the time being, the probability of this seems to have declined a little. Obviously how things play out on this front will have a major bearing on how the world economy evolves over 2012.

A related issue that I suspect will be discussed frequently in 2012 and beyond is the impact of fiscal consolidation on economic growth. Over 2012 and 2013, fiscal policy is set to be quite contractionary in both Europe and the United States as governments attempt to put their public finances on a sounder footing. Indeed, the aggregate fiscal contraction across the advanced economies is likely to be the largest seen for many decades. This is not because the size of the fiscal consolidations in individual countries is unprecedented, but rather because the consolidations are occurring simultaneously in a large number of countries. Unusually, they are also taking place in an environment where output in the affected countries is considerably below potential.

The economic literature is mixed on the effects of fiscal consolidation on growth. There are certainly some examples where consolidation has been associated with fairly strong GDP growth. But in most of these examples, the countries undertaking the fiscal consolidation have benefited from some combination of robust growth in their trading

Graph 2
Financial Market Indicators



¹ Debelle G (2012), 'On Europe's Effects on Australian Financial Markets', Address to Bloomberg Seminar, Sydney, 14 February.

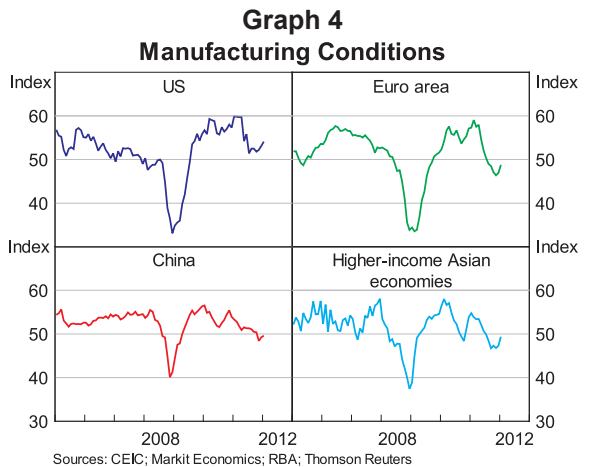
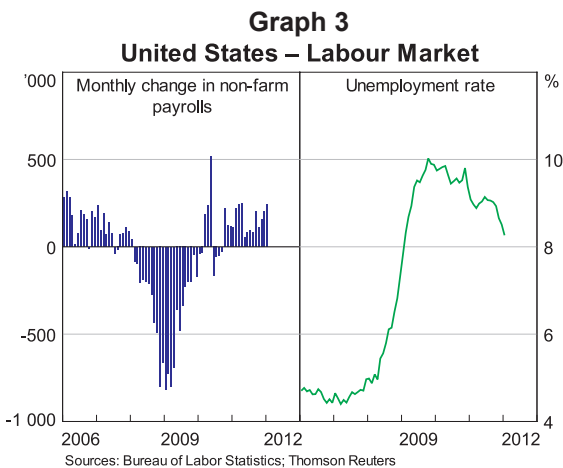
partners, an easing of monetary policy and a depreciation of their exchange rate. Given the nature of the current situation, it is unlikely that the advanced economies, as a whole, can benefit from these factors. There is therefore a material risk that fiscal consolidation weakens growth in the short run, which leads to more fiscal consolidation in order to meet previously announced targets and, in turn, yet weaker growth. We are currently seeing this dynamic play out in a couple of the countries in southern Europe. If it is not to be repeated on a wider scale, the fiscal consolidation in the North Atlantic economies will need to be accompanied by reforms to the supply side that lift the underlying rate of growth of these economies.

As interesting as the developments in Europe are, it is important that we do not lose sight of what is going on elsewhere in the world. In the United States, the recent data, particularly on the labour market, have been better than was widely expected (Graph 3). There are also some tentative signs of improvement in the housing market. Corporate balance sheets are generally in good shape and borrowing costs are low. While, undoubtedly, the US economy still faces many challenges, it does seem to have emerged from the soft patch in the middle of 2011 with some momentum.

The Chinese economy is also continuing to grow solidly. The pace of growth has slowed, but it has

done so in line with the authorities' intentions. Inflation in China has also moderated. Across the rest of east Asia, the recent data have been mixed. Nevertheless, for the region as a whole, growth in 2012 is expected to be around trend, with domestic demand likely to play a more important role in generating growth than it has for most of the past two decades.

Overall, as the IMF recently noted, the global risks still look to be tilted to the downside. But the better-than-expected US data and signs of some progress in Europe have lifted sentiment a little since the turn of the year. In January, business surveys for the manufacturing sector (the so-called PMIs) were up across the globe – in the United States, China, east Asia and even in the euro area (Graph 4). A similar picture is also evident in the available surveys for the services sector. While it is too early to be confident that this trend will continue, these timely surveys suggest that 2012 started a little better than many had expected.



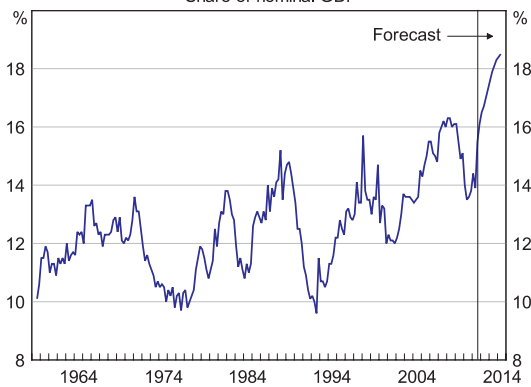
The Australian Economy

I would now like to turn to developments in Australia. At the moment, the economy is being influenced by a large number of factors. These include the sovereign debt problems in Europe, the changes in household spending patterns, and the softness in the housing market. But this morning I would like

to focus on the two factors that are perhaps having the most profound effects. And they are, on the one hand, the investment and terms of trade boom and, on the other, the very high exchange rate. These factors are, of course, interlinked, and in many respects are different sides of the same coin.

The investment boom in the resources sector, which the RBA has been discussing for some time, is clearly well under way. Over the past year, business investment has risen by around 20 per cent and there is more to come. Given the plans that have already been announced, the RBA is expecting double digit increases in business investment in each of the next couple of years. If this occurs, it would take the ratio of investment to GDP to a record level by a considerable margin (Graph 5).

Graph 5
Business Investment*
Share of nominal GDP



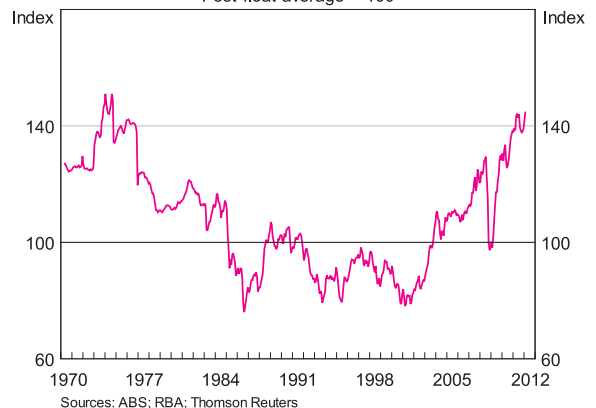
It is not an exaggeration to say that this is a once-in-a-century investment boom. It is, of course, occurring at a time when the terms of trade are also at a very high level, with the industrialisation and urbanisation of Asia supporting commodity prices and putting downward pressure on the prices of manufactured goods. This boom is having positive spillover effects to a number of industries, with some of these effects being direct and others being indirect.

The indirect effects come through a variety of channels. Day to day, they can be hard to see but

they do percolate through the economy. In effect, there is a chain that links the investment boom in the Pilbara and in Queensland to the increase in spending at cafés and restaurants in Melbourne and Sydney. This chain starts with the high terms of trade that has pushed up the Australian dollar. In turn, the high dollar has meant that the prices that Australians pay for many manufactured goods are, on average, no higher than they were a decade ago, despite average household incomes having increased by more than 60 per cent over this period. The stable prices for many goods, combined with strong disposable income growth, means there is more disposable income to be spent on services in the cities and towns far from where the resources boom is taking place. As I said, this chain can be hard to see, but it is real, and it is one of the factors that have had a material effect on the Australian economy over recent years.

At the same time, the high exchange rate is having a contractionary effect on other parts of the economy, as it reduces the international competitiveness of some industries. Over recent months, the Australian dollar has appreciated despite the uncertainty about the global economic outlook and some decline in commodity prices since mid 2011. After adjusting for differences in inflation rates across countries, the exchange rate is currently at around its highest level since the early 1970s (Graph 6).

Graph 6
Real Exchange Rate
Post-float average = 100



The effects of the high exchange rate are evident in the manufacturing, tourism and education sectors, as well as some parts of the agriculture sector and, more recently, in some business services sectors. With the exchange rate having been high for some time now, more businesses are re-evaluating their strategies, as well as their medium-term prospects. In some cases, this is prompting renewed investment to improve firms' international competitiveness. But in other cases, businesses are scaling back their operations in Australia and some are closing down. These changes are obviously very difficult for the firms and individuals involved.

Both the investment boom and the very high level of the exchange rate are historically very unusual events. This makes it difficult to assess their net effect. It seems, however, that over the past year these forces have balanced out reasonably evenly. Abstracting from the weather-related disruptions in early 2011, GDP growth over the year was likely to have been around trend. Underlying inflation was at the midpoint of the medium-term target range. The unemployment rate remained low at 5–5¼ per cent. And most lending rates in the economy were around average by end year.

It is fair to say that very few developed economies could make these same claims.

Looking forward, there are reasonable prospects that these favourable aggregate outcomes can continue for a while yet. The RBA's central forecasts, which were released last week, are for around trend growth in the economy over the next couple of years, and for underlying inflation to remain in the 2–3 per cent range. The unemployment rate is also expected to remain low, although some increase is possible over coming months.

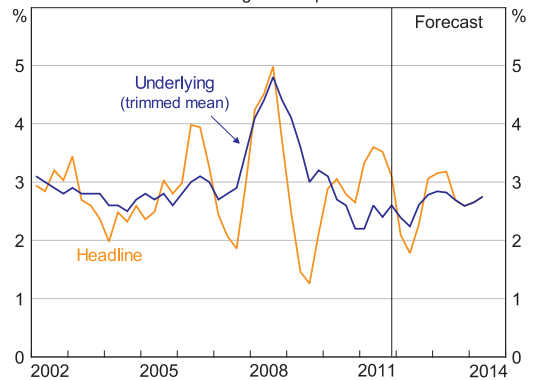
At the industry level, the picture is a lot more complicated. The economy is clearly going through a period of heightened structural change, and this is set to continue. Some industries are expanding in relative importance, while others are contracting. Given this, it is difficult to be sure how

the countervailing expansionary and contractionary forces will balance out. So at the RBA we are carefully examining every piece of data that comes in for insight into the net effect of these forces. We are also frequently talking to businesses and industry groups to better understand what is happening in firms at the forefront of structural change. It is the balance between these various forces that is likely to be a major influence on how the Australian economy evolves over 2012 and beyond.

Before I conclude, I would like to say just a few additional words about the outlook for inflation.

Over recent quarters, headline inflation has come down as expected due to the unwinding of the large rise in fruit and vegetable prices that occurred in early 2011 (Graph 7). Over the next few quarters further declines in the year-ended headline inflation rate are expected as the earlier increases in food prices fall out of the figures. Indeed, it is likely that the headline rate will fall below 2 per cent in the middle of 2012, before increasing again to above 3 per cent. This increase is partly due to the introduction of a price on carbon, which is estimated to add 0.7 percentage points to headline inflation in the 2013 financial year. As was the case with the introduction of the GST more than a decade ago, the Bank will look through this direct effect when setting monetary policy. In underlying terms, inflation is expected to remain

Graph 7
Consumer Price Inflation*
Including carbon price



* Forecasts for June 2014 are the midpoint of the range in the February 2012 SMP

Sources: ABS; RBA

within the 2–3 per cent range over the next couple of years, with the carbon price adding around ¼ percentage point to underlying inflation in the 2013 financial year.

One interesting aspect of the recent inflation data is the divergent trends in the prices of internationally traded items and the prices of goods and services that are not internationally traded (Graph 8). Over recent times, the prices of non-traded goods and services have been increasing at a fairly firm pace, although down markedly from the rates in 2007 and 2008. The overall CPI inflation rate has, however, been held down by a decline in the prices of tradable goods as a result of the exchange rate appreciation. But the prices of these goods are unlikely to continue to fall over the medium term, particularly as the effects of the exchange rate appreciation dissipate. As a result, some slowing in the rate of increase in the prices of non-tradables is likely to be required at some point for overall inflation to remain consistent with the midpoint of the target range.

While we cannot be sure that non-tradables inflation will moderate, there are reasonable prospects that it will do so. The Bank is expecting a modest pick-up in productivity growth over the period ahead from the low rates of recent years, as well as a slight moderation in wage growth. Together, these developments would help lessen cost pressures in the economy and thus see some slowing in the rate of non-tradables inflation. In the event that they did not occur, it is likely that non-tradables inflation would be uncomfortably high.

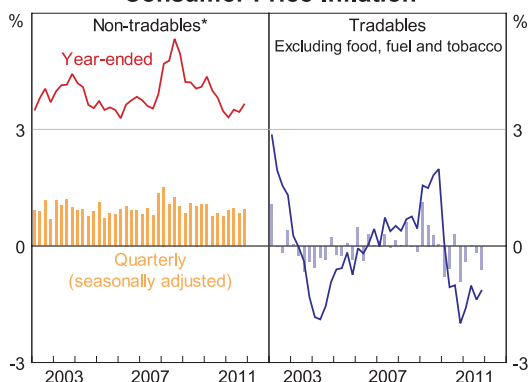
Conclusion

So, to conclude, 2012 will no doubt again contain its fair share of surprises. Globally, we are seeing events that are historically very unusual, including widespread fiscal consolidation in the advanced economies and the rapid development of emerging market economies, with hundreds of millions of people entering the global economy. In Australia too, we are experiencing events that are historically unusual – a huge boom in investment and a very high exchange rate, both of which are related to the very high level of the terms of trade.

In this environment, economic forecasting seems to have more than the usual number of pitfalls. However, we can take some comfort from the fact that despite these powerful forces, the Australian economy started 2012 in relatively good shape. Growth has been around trend and inflation is consistent with the target, and there are reasonable prospects for this to continue. We also have much more flexibility to deal with unfolding events than almost any other developed economy.

I wish each of you success as you navigate your own way through 2012. ✎

Graph 8
Consumer Price Inflation



* Excluding deposit & loan facilities
Sources: ABS; RBA

European Financial Developments

Ric Battellino, Deputy Governor*

Address to 24th Australasian Finance & Banking Conference
Sydney, 14 December 2011

Introduction

Over recent months we have all watched with concern the growing financial problems in Europe. The problems are multi-dimensional, involving excessive government debt, weak banking sectors, slowing economic growth and marked differences in competitiveness across countries within the euro area. They have become the main threat facing the global economy and the international financial system.

It is hard to tell how and when the problems will be resolved. In the meantime, turbulence continues in global financial markets and most forecasters are now predicting a very significant weakening in the European economy over the coming year as government spending is cut back, credit tightens and confidence declines. Given the size of the European economy and financial system, it will be hard to avoid adverse consequences for other parts of the world, though the extent of these spillovers remains an open question. At this stage, most forecasters think that growth in the world economy will be only a little below trend in the coming year, though with the risk of a significantly worse outcome.

Australia, like other countries, will be affected by the events in Europe, but its strong government finances, healthy banking sector and relatively limited direct trade and financial exposures to Europe make it one of the countries best placed to weather the situation. Australia is also fortunate to be subject, simultaneously, to a resources boom that is resulting

in unprecedented investment and therefore helping to sustain economic activity.

I will begin my talk today with a round-up of the European government debt situation. I will be brief as I think we all know the broad facts. I will then focus on the effect that the deterioration in government debt has had on European banks and the role that European banks are playing in spreading the problem to other countries. I will conclude by looking at the channels through which Australia could be affected, including through financial links, trade links and effects on confidence and wealth.

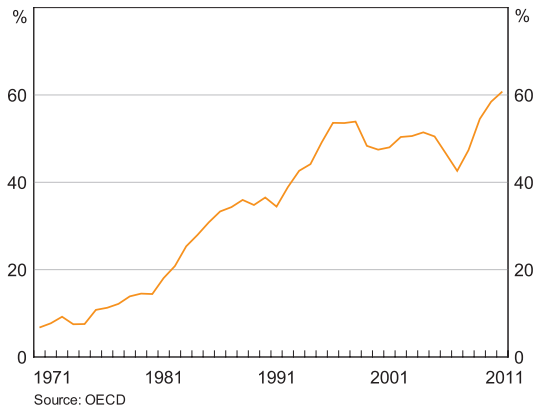
The European Debt Situation

As you know, the trigger for the problems currently being experienced in Europe was the rapid build up in government debt following the global financial crisis. Government budgets deteriorated sharply after 2008, due to the weakening in economic activity, the large fiscal stimulus applied by governments and, in some cases, the cost of bailing out banks.

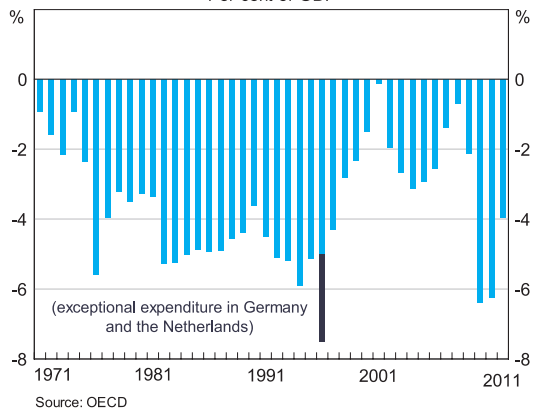
Government debt in the euro area had been rising as a ratio to GDP, however, for much of the period since the 1970s (Graph 1). This occurred because governments loosened fiscal policy during recessions but did not fully reverse those policies during the subsequent cyclical recoveries. In aggregate, budgets in the countries that now form the euro area have been continuously in deficit for the past 40 years (Graph 2). Clearly, there was no fiscal rule that aimed to balance the budget over the economic cycle, as there is in Australia.

* I would like to thank Laura Berger-Thomson, Justin Fabo, Chris Stewart and Grant Turner for their extensive assistance with this talk.

Graph 1
Euro Area – Net Government Debt
 Per cent of GDP



Graph 2
Euro Area – Government Budget Balance
 Per cent of GDP



At the onset of the global financial crisis, the ratio of net government debt to GDP in the euro area was about 45 per cent and it has since risen to around 60 per cent. Within the euro area, Greece has the highest net debt ratio, at about 130 per cent, with Italy next, at about 100 per cent.

Concerns in financial markets about the sustainability of government debt levels in Europe first emerged in late 2009, when the Greek Government revealed that its fiscal position was significantly worse than it had previously led the markets to believe. Greek sovereign debt was downgraded and spreads on the debt widened, despite some fiscal tightening. By April 2010, the situation in Greece had deteriorated

to the point where it was forced to seek external financial assistance from the IMF and other European countries.

As typically happens, market participants quickly began to ask which country might be next, and spreads in some other euro area countries also began to widen sharply. By November 2010, Ireland had been forced to ask for external assistance, and Portugal followed in April 2011. Recently, Italy and Spain have also come under severe financial pressure, though as yet have not needed external assistance.

As the crisis has spread, a succession of measures has been announced to try to contain the problem, the latest being announced last weekend. These have typically provided some short-term respite, but in the past none has managed to provide lasting reassurance to financial markets. It remains to be seen whether the latest measures will be more successful. Most commentators see the long-term solution as involving greater fiscal coordination and discipline. In the short term, it is highly likely that part of the solution will involve substantial financial assistance from outside the region or the purchase of sovereign debt by the ECB, or some combination of both.

A sticking point here is that the ECB's charter precludes it from providing direct financing to governments. The ECB was initially also reluctant to buy government debt in the secondary market, though it has done so in substantial quantities recently. The restriction on the ECB's funding of governments was put in place both to guard against the risk of inflation and to avoid the moral hazard that would arise if national governments had direct access to central bank financing in a situation where there is no central coordination of fiscal policy.

While an arrangement where the central bank is precluded from direct financing of the government guards against the risk of inflation – that is, monetary instability – it increases the risk of financial instability. This is because if the central bank is not prepared to step in as a financial back-stop, a government that

is unable to fund itself in the market is left with no option but to default or seek external assistance. It is highly unusual for a government in a developed economy to be forced to seek funding from an external party such as the IMF.

Concerns about the sustainability of debt levels have resulted in interest rates on government debt rising sharply in some countries, returning to the relativities that prevailed before the formation of the euro (Graph 3). Pre-euro, there was a wide variation in the interest rates paid by European governments, reflecting each country's history of inflation and fiscal discipline. The formation of the euro area brought convergence of interest rates towards the low levels previously enjoyed only by Germany, but pre-euro relativities are now reasserting themselves. This suggests that markets are pricing in the possibility of a break-up of the euro area or a significant risk of default by some governments, or both.

an environment where some governments are seen as having less capacity to support banks financially. This has caused investors and other banks to become reluctant to lend to them, and has pushed up banks' funding costs.

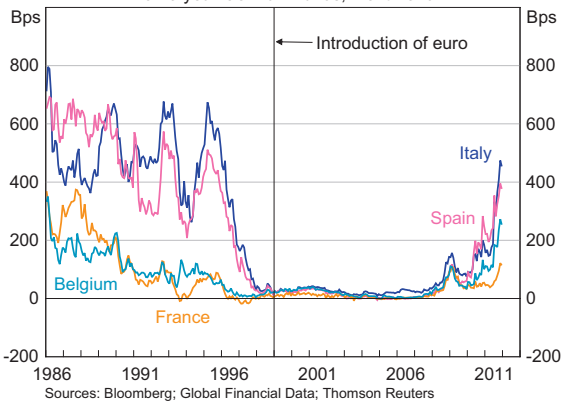
Let me say something about each of these points in turn.

Euro area banks, in total, hold about €2.5 trillion of euro area sovereign debt. This is about one-third of all the euro area sovereign debt on issue. The exposure is quite substantial, being equal to about 8 per cent of these banks' assets and 130 per cent of their Tier 1 capital. The majority of the debt held by banks in each country is home-country debt but, not surprisingly for a common-currency area, there are also large cross-border holdings. This is particularly the case for Italian debt, which is widely held by non-Italian banks.

Given the rise in yields that has occurred in some countries, the market value of the bonds has declined significantly. Greek debt, for example, has fallen in value by around 70 per cent. This means that even though the face value of Greek debt is about €260 billion, the market value of the debt is now only about €75 billion (Graph 4). Italian debt has fallen in value by 10 per cent. Banks have brought some of these losses to account already, but they remain heavily exposed to further losses if the situation continues to deteriorate.

Graph 3

European Government Bond Spreads To 10-year German Bunds, month-end



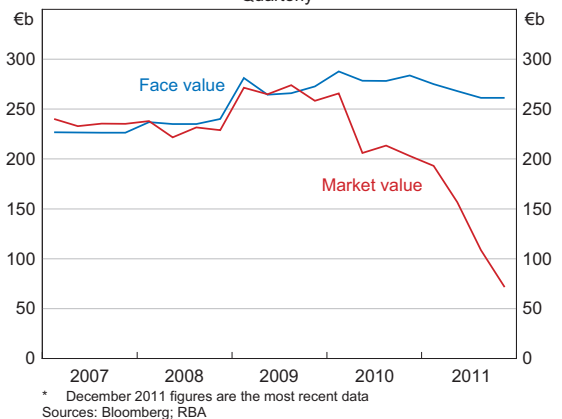
The Effect on European Banks

The problems in European sovereign debt markets have affected European banks through two main channels:

- first, these banks have experienced valuation losses on their sovereign debt holdings; and
- second, these losses have raised concerns about the financial soundness of banks, particularly in

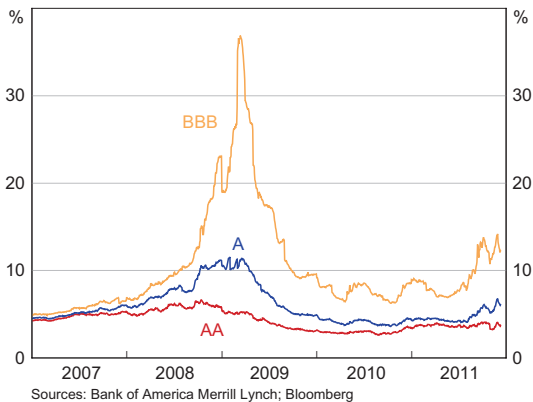
Graph 4

Greek Sovereign Bonds Outstanding Quarterly*

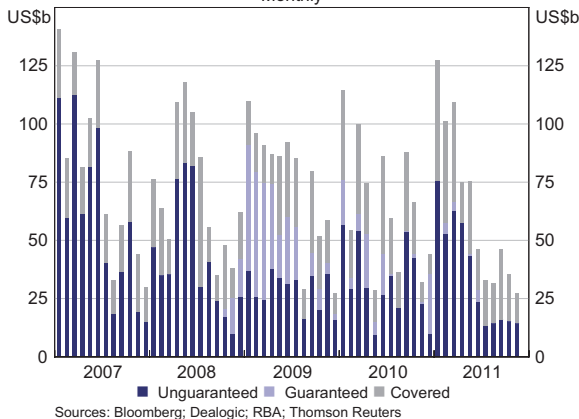


As I mentioned, concerns about these exposures have made investors and depositors more cautious. The cost of long-term funds has risen sharply (though it remains below that reached during the global financial crisis) and, for some euro area banks, bond markets have largely closed. As such, very few bonds have been issued by euro area banks recently (Graphs 5 and 6).

Graph 5
Euro Area Bank Bond Yields

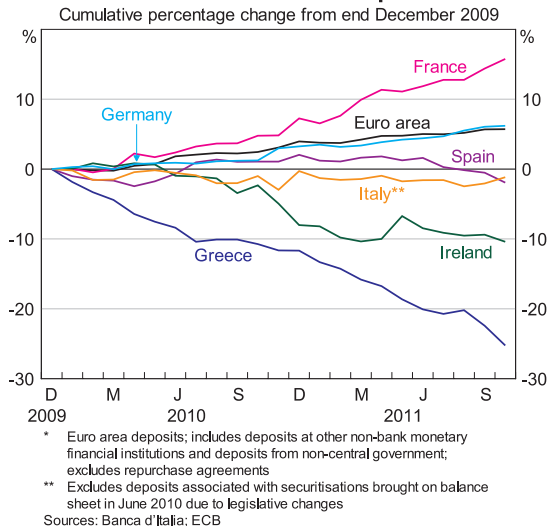


Graph 6
Euro Area Bank Bond Issuance
Monthly



Banks in some euro area countries have also suffered large reductions in deposits. Greek bank deposits have fallen by about 25 per cent over the past couple of years and deposits in Irish banks by 10 per cent. Italian and Spanish banks have experienced a small fall in deposits. Banks in Germany and France, in contrast, have experienced increases (Graph 7).

Graph 7
Banks' Private Sector Deposits*

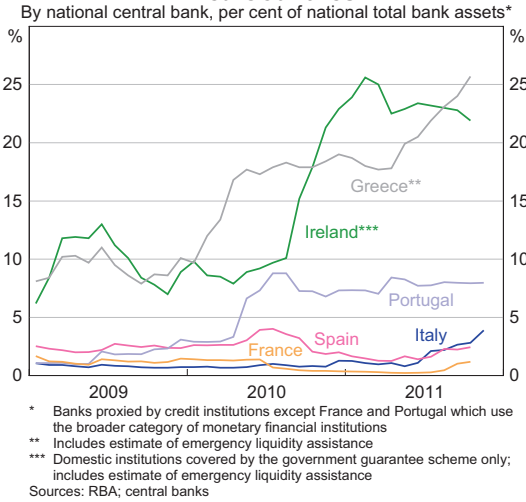


With banks under funding pressure, the ECB has had to increase its lending to banks. Essentially, it currently allows euro area banks to borrow as much as they need (subject to the availability of eligible collateral) at its policy interest rate, for periods up to three years. Some banks have increased their use of ECB funding significantly: Greek banks and Irish banks are financing almost one-quarter of their balance sheets from either the ECB or their national central bank (Graph 8). For the banking system as a whole, however, central bank funding is equivalent to less than 3 per cent of liabilities.

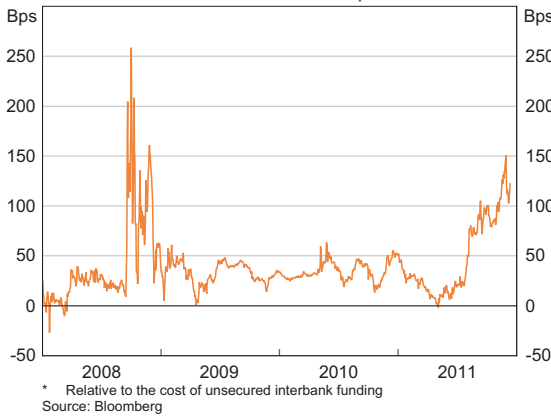
European banks have also found it increasingly difficult to access US dollar funds, which they use to fund US dollar assets, including trade finance. Lending to euro area banks by US money market funds has fallen by 55 per cent this past year. In response, banks have turned to foreign exchange swap markets to source US dollars, pushing up the cost significantly (Graph 9).

To alleviate the shortage of US dollar funds among European banks, the US Federal Reserve has reactivated its US dollar swap lines with a number of other central banks. This is to allow these central banks to lend US dollars to banks in their jurisdiction.

Graph 8
Central Bank Lending in Selected Euro Area Countries



Graph 9
Cost of Swapping Euros into US Dollars*
 3-month EUR/USD FX swap basis

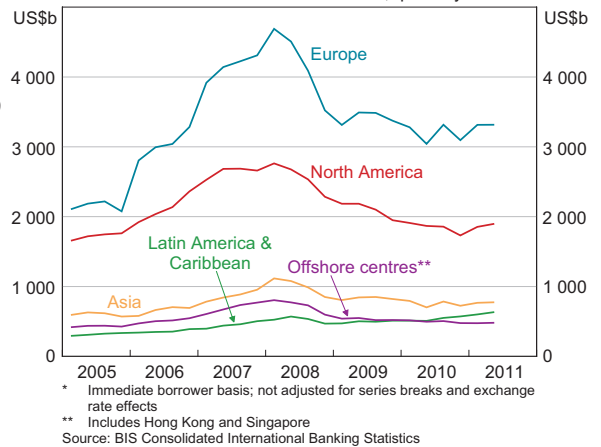


Until recently, however, banks had not made much use of this facility, instead seeking to reduce their need for US dollars by selling US dollar assets and cutting back on cross-border financing. Following the recent reduction in the interest charged on the facility, however, usage has picked up somewhat.

To try to enhance investor confidence, European banking authorities recently announced a requirement for a large number of euro area banks to lift their core Tier 1 capital ratios to 9 per cent by mid 2012.¹ It has been estimated that, other things equal, this would require about €115 billion of new capital. This is not a particularly large amount, being equivalent to about 12 per cent of these banks' current capital. Nonetheless, there is evidence that at least some banks are unwilling or unable to raise equity and are seeking to achieve the higher capital ratio by reducing assets, particularly in offshore markets. This will add to the general tightening of global credit conditions.

Euro area banks are large participants in cross-border lending, though this is mainly oriented towards other European countries and North America (Graph 10). Their role in the Asian region is smaller, though they are thought to play a significant role in trade financing. While no data are available for the recent months during which the European banking problems have escalated, anecdotal evidence suggests that a lack of trade financing is not as significant a problem in Asia as it was in 2008.

Graph 10
Selected Euro Area Banks' Foreign Claims*
 Excludes intra-euro area claims, quarterly



¹ After including a buffer for valuation losses on their sovereign debt exposures.

Australia’s Exposure to European Developments

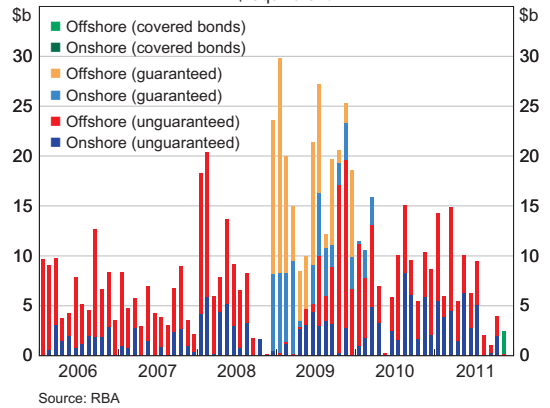
There are various channels through which developments in Europe could affect Australia. These include financial linkages, trade linkages and confidence and wealth effects.

Financial linkages

The direct exposures of Australian banks to the euro area are small. Their claims on euro area countries amount to \$87 billion, or 2.7 per cent of total assets. Moreover, 80 per cent of this exposure is to Germany, France and the Netherlands (Table 1). The main effect of the European crisis on Australian banks is through the increased cost of funds in global markets. As debt has become more expensive, Australian banks have sharply reduced their issues of long-term debt (Graph 11). Short-term debt remains more readily available, particularly in the United States, where money market funds have shifted their investments from European banks to Australian, Canadian and Japanese banks.

Australian banks, overall, remain relatively liquid as they continue to receive strong inflows of deposits. Over the past year, total bank deposits in Australia have risen by 9 per cent, which has been more than sufficient to fund the increase in banks’ lending (Graph 12).

Graph 11
Banks’ Bond Issuance
A\$ equivalent



Graph 12
Bank Credit and Deposits
Year-ended growth

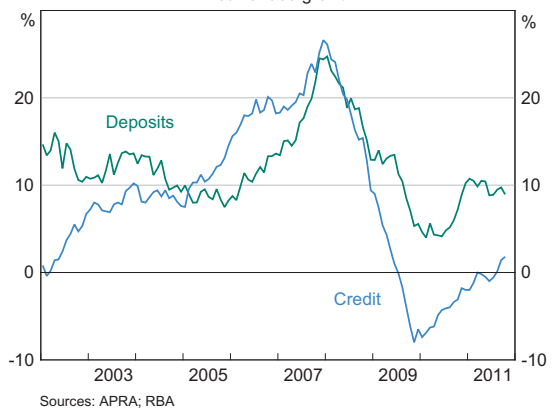


Table 1: Australian-located Bank Claims on Euro Area Countries^(a)
Ultimate risk basis, as at 30 June 2011

	Banks	Public sector	Private sector	Total	Per cent of assets
	\$billion	\$billion	\$billion	\$billion	
Euro area	66.2	4.1	16.9	87.2	2.7
<i>of which:</i>					
Greece, Ireland, Italy, Portugal and Spain	2.2	0.7	3.3	6.1	0.2
France, Germany and the Netherlands	59.2	3.0	12.4	74.6	2.3

(a) Australian-owned banks and subsidiaries and branches of foreign-owned banks; exposures include those to foreign-owned banks booked in Australia

Source: APRA

Trade links

The euro area accounts for only about 4 per cent of Australia's merchandise exports, a low share compared with many other countries (Table 2).

Table 2: Share of Merchandise Exports going to Euro Area 2010

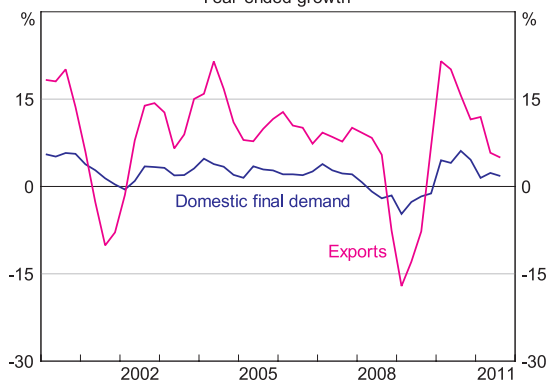
	Per cent
United Kingdom	49
Sweden	39
India	15
China	15
United States	14
East Asia ^(a)	11
Japan	8
Canada	5
Australia	4

(a) Excluding re-exports from Hong Kong and Singapore and oil exports from Singapore

Source: ABS; CEIC; Eurostat; IMF; Office for National Statistics; RBA; Thomson Reuters

While the direct exposure of Australia to a slowing in European demand is low, the indirect exposure, through the effect on some of our important trading partners, could be significant. China and India, for example, both ship a substantial share of their exports to the euro area and these could be expected to decline. Further, history shows that, when exports slow, domestic demand in Asia also slows, albeit to a lesser degree (Graph 13).

Graph 13
East Asia* – Domestic and External Sectors
Year-ended growth



* Excluding China

Sources: CEIC; IMF; RBA; Thomson Reuters

Overall, it would be prudent to assume that, if the European economy were to slow markedly over the next year or so, Australia would be affected, particularly through indirect trade exposures. It is also likely, however, that if that were to eventuate, the exchange rate of the Australian dollar would fall, as it has when global growth has weakened in the past, providing some cushion for the Australian economy.

Confidence and wealth effects

Confidence and wealth effects are difficult to quantify, but ultimately can be very important in transmitting economic shocks.

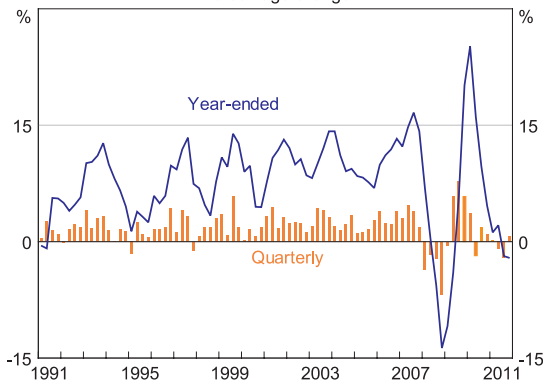
Household confidence in Australia was below average through much of 2011, with households being particularly pessimistic about their financial situation over the coming year. No doubt, these perceptions were being affected by the unsettling financial news coming out of Europe and the associated large declines in share prices. In recent months, however, measures of confidence have improved despite the escalating problems in Europe and the continuing volatility in share prices, suggesting that other factors are providing an offset. The changed picture for interest rates is one of these. However, the continuing solid expansion in household disposable income, which has risen by about 7 per cent over the past year, has no doubt also been important.

Measures of business confidence are a little below average at present, even though business conditions are around average levels. Conditions are weakest in the retail, manufacturing and construction sectors and are noticeably weaker among smaller businesses than among larger businesses. Overall, however, business confidence, like household confidence, has improved in recent months. The gradual spread of the benefits of the resource boom is helping to sustain business confidence in the face of the worsening European situation.

The key drivers of wealth are changes in share prices, house prices and deposits. Share prices are down by 10 per cent over 2011, though a significant part of

this has been offset by higher dividend payments. House prices on average are down by 4 per cent in 2011. On the other hand, deposits have risen strongly and overall household wealth has fallen by a relatively modest 2 per cent in 2011 (Graph 14). This is a much smaller decline than occurred following the global financial crisis in 2008, and has not caused households to respond by sharply raising their rate of saving, as happened on that earlier occasion. This has allowed household spending to grow broadly in line with income.

Graph 14
Household Net Worth*
 Percentage change



* RBA estimates for September and December quarter 2011
 Sources: ABS; RBA; RP Data-Rismark

Conclusion

As the sovereign debt problems in Europe have escalated over recent months, an unfavourable feedback loop has developed between government debt, the banking sector and the economy. The large size of the euro area economy and the significant role played by European banks in global cross-border banking mean that it is inevitable that there will be spillovers to other parts of the global economy, including Australia.

Nonetheless, it is encouraging that, to date, any impact on the US economy has been more than offset by other factors, with recent US economic indicators being better than they were around mid year, despite the recent escalation of the European crisis. The same is also true in Australia. Asian economies have slowed, but it is not clear how much of this is due to earlier policy tightening within Asia (which in some cases is now being reversed as inflation pressures subside) or the effect of the developments in Europe.

The situation is still unfolding, however. The impact on the global economy will ultimately depend on how the European problems are resolved. It is possible that a combination of credible fiscal commitments by governments and short-term support from the ECB and IMF will provide a solution that is relatively benign for the European and world economies. However, other outcomes, including deflation caused by prolonged fiscal austerity, inflation caused by large-scale debt monetisation, or some disruptive event such as a change in the composition of the euro area, cannot be ruled out at this stage.

We therefore need to monitor the situation carefully and remain alert to the risks. Having said that, I remain confident that Australia, with its strong government finances, resilient banking system, relatively low exposures to the troubled countries and strong links to the dynamic Asian region, is well placed to deal with events that may unfold. ✎

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These statements, issued in February, May, August and November, assess current economic conditions and the prospects for inflation and output.

Financial Stability Review

These reviews, issued in March and September, assess the current condition of the financial system and potential risks to financial stability, and survey policy developments designed to improve financial stability.

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- *Reserve Bank of Australia Annual Report*
- *Payments System Board Annual Report*
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The Household, Income and Labour Dynamics in Australia (HILDA) Survey was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA), and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). Findings and views based on these data should not be attributed to either FaHCSIA or the Melbourne Institute.

