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Trends in Labour Supply

Ellis Connolly, Kathryn Davis and Gareth Spence*

The labour force has grown strongly since the mid 2000s due to both a rising participation rate and faster population growth. The increase in participation has been greatest for females and older persons, driven by a range of social and economic factors. At the same time, average hours worked have declined as many of these additional workers are working part time. The rise in population growth has mostly reflected higher immigration, with a larger intake of skilled workers and students adding to the labour supply.

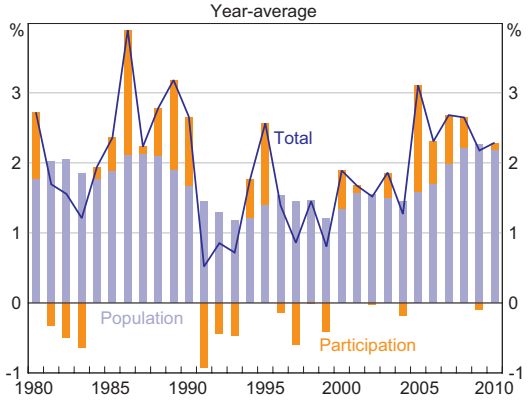
Introduction

The labour force includes all employed persons and those actively looking for work, and has grown at an average annualised rate of 2½ per cent since 2005. This is faster than its average pace over the previous 25 years, and is the result of both strong population growth and a rising participation rate (the labour force as a share of the population aged 15 and over) (Graph 1).

Since 1980, the total participation rate has risen by 5 percentage points, from 61 to 66 per cent (Graph 2). When labour force participation is broken down by age group and gender, it is clear that this has been driven by females and older workers. Since 1980, the participation rate of females aged 25 to 54 has increased by around 20 percentage points, while the participation rate of women aged 55 to 64 has risen by a remarkable 35 percentage points (Graph 3). Male participation declined from 1980 to 2000, but since then the participation rate of males aged 25 to 54 has increased slightly, and the participation rate of males aged 55 to 64 has risen by over 10 percentage points.

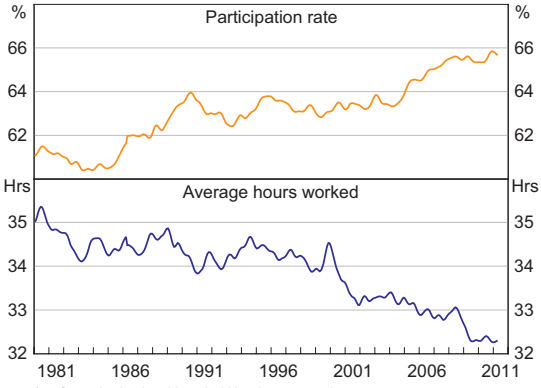
While the participation rate has been rising, average hours worked by employed persons have fallen from 35 hours per week in 1980 to just over 32 hours per week in 2010, with the decline mainly occurring over the past decade (Graph 2). The fall in average

Graph 1
Contributions to Labour Force Growth
Year-average



Sources: ABS; RBA

Graph 2
Participation and Hours Worked*



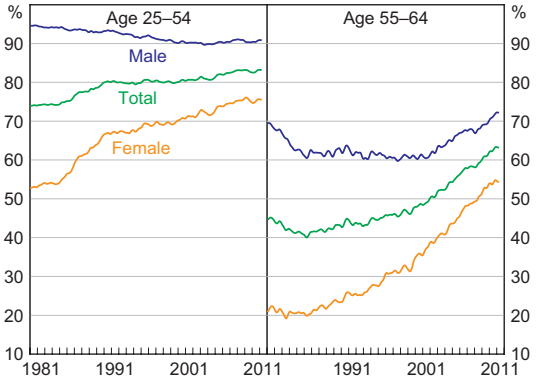
* Smoothed using 13-period Henderson trend
Sources: ABS; RBA

* The authors are from Economic Analysis Department.

hours worked is related to the factors underlying the rise in the participation rate, with women and older workers more likely to work part time. It also reflects a fall in the share of people working long hours over recent years.

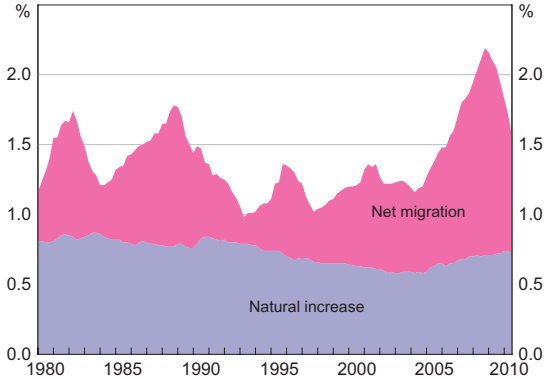
The other important determinant of labour supply is the size of the working age population, which has grown at an annualised rate of 1½ per cent since 1980. Australia's annual population growth picked up markedly from the mid 2000s, peaking at over 2 per cent in 2008. This acceleration was driven by an increase in net overseas migration, although the rate of natural increase also picked up marginally (Graph 4). The increase in net migration between 2004 and 2008 mainly reflected a higher intake of permanent and temporary skilled migrants and a rise in the number of overseas students. Information on visas suggests that the decline in migration since 2008 has also been driven by students and skilled migrants. This decline is likely to reflect a range of factors including the effects of the global economic downturn and policy changes to student visa arrangements.

Graph 3
Participation Rates by Age and Gender*



* Smoothed using 13-period Henderson trend
Sources: ABS; RBA

Graph 4
Contributions to Population Growth
Year-ended



Source: ABS

Participation of Females Aged 25 to 54

The rise in female participation is a long-run trend, with each successive cohort of women having a higher participation rate than the previous cohort over the past 40 years (Betts, Connolly and Orsmond 2007). It is also a global phenomenon, with the participation rate of females aged 25 to 54 rising in almost all advanced economies over the past decade, even in the Scandinavian countries where female participation rates were already relatively high (Graph 5). This development reflects changing social norms as well as the influence of economic factors. Higher rates of female educational attainment have boosted employment outcomes – the proportion of females with post-school qualifications increased from 7 per cent in the early 1980s to over 25 per cent in the mid 2000s, to be higher than the share of males with post-school qualifications. The strong growth of employment in service industries has also resulted in more jobs with flexible working arrangements, while access to paid maternity leave and child care has widened.[1]

Another factor that is linked to higher rates of female participation over the past 15 years or so is the increase in the debt-servicing costs of home owners. Household indebtedness increased strongly over the 1990s through to the mid 2000s at the same time as female labour force participation rose. The causation in the relationship between debt and participation is likely to run in both directions, with higher labour force participation enabling more borrowing, while

1 See Gong, Breunig and King (2010) for evidence on the relationship between child care costs and female labour force participation.

Table 1: Home Loans and Participation of Females Aged 25 to 54
Per cent

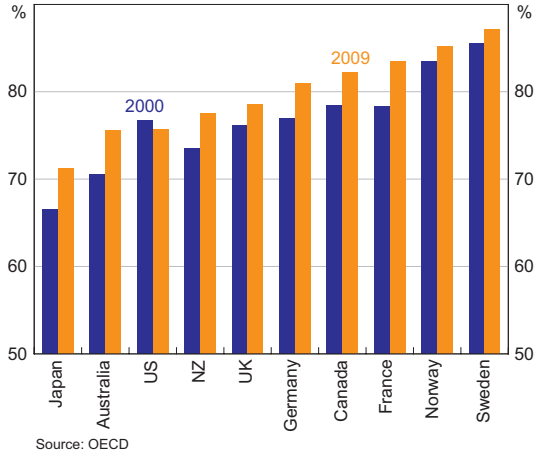
	2001–2003	2007–2009
Participation rate		
– In households with home loans	77	84
– In households without home loans	69	73
Share of females in households with home loans	49	52

Sources: HILDA Release 9.0; RBA

higher debt-servicing costs encourage households to work more.[2]

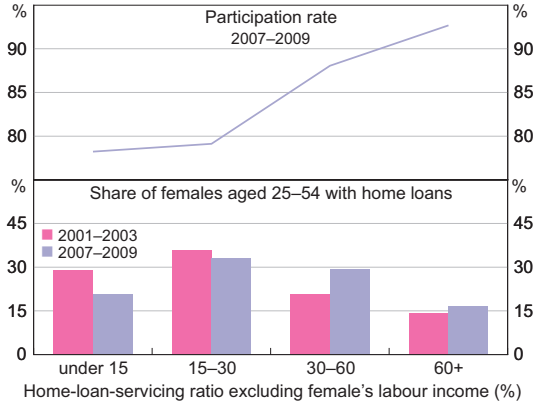
Responses to the HILDA Survey show a clear correlation between housing debt and female labour force participation.[3] Females aged 25 to 54 in households with home loans had a participation rate around 10 percentage points higher than those without home loans in the late 2000s, and this gap has increased since the early 2000s (Table 1). There is also a positive relationship between female participation and debt-servicing costs: women in households with a home-loan-servicing ratio (excluding the female's own labour income[4]) greater than 30 per cent have a participation rate around 10 percentage points higher than those with a lower home-loan-servicing ratio (Graph 6). Furthermore, the share of females in households with home-loan-servicing ratios greater than 30 per cent has increased from around 35 per cent in the early 2000s to around 45 per cent in the late 2000s.

Graph 5
Participation of Females Aged 25–54



Source: OECD

Graph 6
Home-loan-servicing Ratio and Participation
Females aged 25–54 in households with home loans



Sources: HILDA Release 9.0; RBA

2 Belkar, Cockerell and Edwards (2007) model the relationship between debt and participation for persons aged 25 to 54, controlling for the two-way causation between debt and labour supply. They concluded that debt-servicing costs were a significant influence on a female's labour force participation decision. Richards (2009) noted that the rise in hours worked by households aged 25 to 39 over several decades was partly related to the rise in house prices, both as cause and effect.

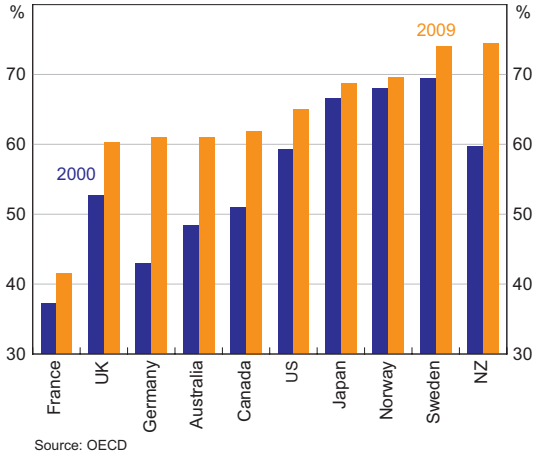
3 The Household, Income and Labour Dynamics in Australia (HILDA) Survey is a panel study of around 7 500 households conducted annually since 2001.

4 The home-loan-servicing ratio is defined as home loan repayments relative to gross household income. By excluding the female's own labour income, the home-loan-servicing ratio of a household where the female earns labour income can then be compared with one for a household where the female does not earn labour income on a consistent basis.

Participation of Persons Aged 55 to 64

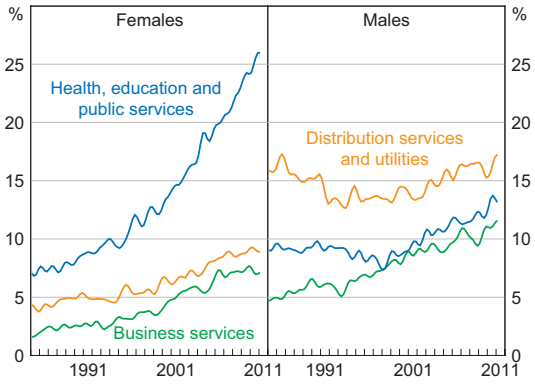
The largest increases in participation over the past decade have occurred for persons aged 55 to 64. The trend in the participation rate of this age group is also common to many advanced economies (Graph 7). A number of factors have encouraged workers to remain in the labour force for longer, including: greater longevity; increases in the qualification age for the Age Pension;[5] more flexible work practices, including the increased availability of part-time work; and the rising share of jobs in the services sector, where employment is typically less physically demanding than in traditional goods-producing industries. Consistent with this, persons aged 55 to 64 have experienced strong growth in services employment over the past 10 years, with the number of older women working in education, health and public services rising rapidly (Graph 8). The relative strength of the labour market over recent years has also made it easier for workers to remain in the labour force for longer.

Graph 7
Participation of Persons Aged 55–64



Source: OECD

Graph 8
Employment in Services*
Per cent of population aged 55–64 by gender



* Smoothed using 7-period Henderson trend
Sources: ABS; RBA

The rise in the participation rate of persons aged 55 to 64 has also been related to developments in household balance sheets. Over the 1990s and 2000s, there has been a trend towards greater indebtedness for these persons, with the proportion in households with owner-occupied home loans rising from around 20 per cent in the early 2000s to around 30 per cent later in the decade (Table 2). Persons aged 55 to 64 with a home loan have a much higher participation rate than those without a home loan: over the 2000s, the gap was around 25 percentage points. These facts are consistent with these workers remaining in the labour force for longer to either pay off existing debts or to borrow against their future income to purchase assets and fund expenditure.

The period of financial market turmoil in 2008 and 2009 also affected the retirement intentions of older workers, with many experiencing declines in the value of their superannuation assets, reducing their future retirement income. In response, some older workers decided to delay their retirement to rebuild their financial assets. Evidence for this can be found in the HILDA Survey, in which all workers aged 45 and over were asked in 2003, and again since 2006, when they expected to retire. From 2003 to 2007, workers reported a gradual shift towards later retirement (Graph 9). In the 2008 survey, mainly

5 The female qualification age has been gradually increasing from 60 to 65 since 1995, to match the male qualification age. The qualification age for both men and women will increase from 65 to 67 between 2017 and 2024, which will further encourage later retirement.

Table 2: Home Loans and Participation of Persons Aged 55 to 64
Per cent

	2001–2003	2007–2009
Participation rate		
– In households with home loans	71	77
– In households without home loans	46	53
Share of persons in households with home loans	20	32

Sources: HILDA Release 9.0; RBA

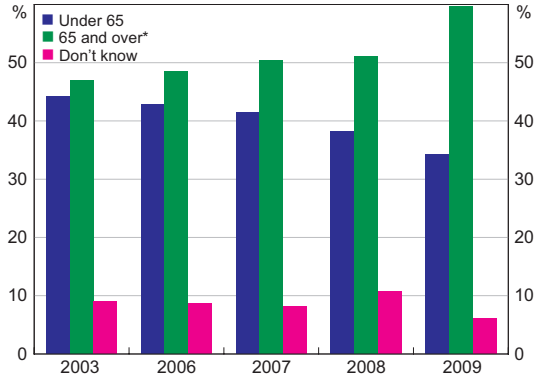
conducted in the second half of the year when the financial market turmoil was particularly acute, the proportion expecting to retire early fell noticeably and uncertainty was relatively high, reflected in an increase in the proportion of respondents who did not know when they would retire. By 2009, this uncertainty had resolved in favour of later retirement, with almost 60 per cent of workers expecting to retire at age 65 or over, up from 50 per cent just two years earlier.

Falling Average Hours Worked

The rise in participation has coincided with a fall in average hours worked, particularly over the past decade. As a result, the total number of hours worked has grown at a slower pace than the number of people employed. The decline in average hours worked has been partly due to the rising participation of women aged 25 to 54 and persons aged 55 to 64; these groups are more likely to work part time (fewer than 35 hours per week), and their share of the labour force has increased from 31 per cent in 1980 to 43 per cent in 2010. However, from 1980 to 2000, this effect was largely offset by a significant increase in the share of persons working long hours (45 or more hours per week; Graph 10). Over the past decade, the share working long hours has declined, particularly for men, accelerating the decline in average hours worked.

The trend away from working long hours over the past decade is consistent with preferences reported in the HILDA Survey, where workers are asked how many hours they work per week, and the number of hours they would prefer to work. On average, those who work long hours would prefer to work fewer

Graph 9
Retirement Intentions
Per cent of persons in labour force aged 45–64



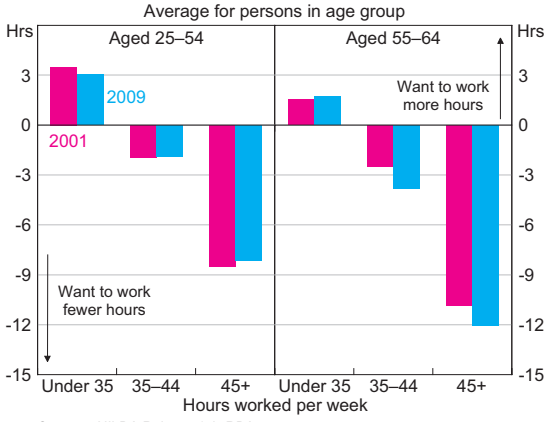
* Includes persons who do not intend to retire
Sources: HILDA Release 9.0; RBA

Graph 10
Hours Worked
Per cent of workers by age and gender

Sources: ABS; RBA

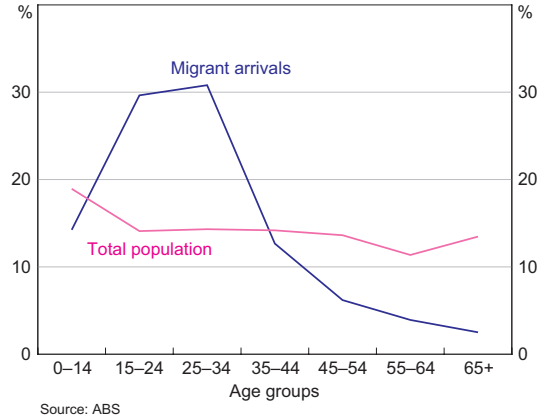
hours (Graph 11). This is particularly the case for workers aged 55 to 64, with the gap between their preferred hours and usual hours widening further over the past decade. So while older workers are intending to retire later, they would also like to reduce the number of hours they are working.

Graph 11
Workers' Preferred Hours
Average for persons in age group



Sources: HILDA Release 9.0; RBA

Graph 12
Age Distribution
Per cent of total, 2009/10



Source: ABS

Migration

Immigration contributes to Australia's labour supply by increasing the working age population. It can also raise labour force participation by attracting people who have a higher propensity to work. Over 80 per cent of the migrants that arrived in 2009/10 were of working age, compared to a little under 70 per cent of the total population (Graph 12). Immigration can also improve the job-skills match in the economy by bringing in workers with skills that are in high demand but where local supply is insufficient.

Data from the ABS labour force survey can be used to examine the labour market performance of immigrants in the first few years after their arrival.[6] The proportion of the labour force that had arrived in Australia in the previous five years rose from under 3 per cent in 1996 to almost 6 per cent in 2011 (Graph 13). This has been accompanied by improved employment outcomes for immigrants, and the number of unemployed immigrants as a share of the labour force has declined. The share of recently arrived immigrants working in part-time jobs has also increased over the past two decades, particularly over the past five years, possibly reflecting an increase in the number of foreign students in Australia.

Reflecting their younger age profile, immigrants have a higher participation rate than the general population, and the participation rate for immigrants has increased steadily over the past couple of decades. For instance, in 2011, the participation rate of immigrants that arrived in the previous five years was 70 per cent, higher than the 66 per cent participation rate for the general population, and well above the participation rate for immigrants that arrived in the five years to 2001, which was 61 per cent at the time.[7]

6 These data on the labour force participation of newly arrived immigrants only include immigrants that are in Australia for more than 12 months. Therefore, some student visa holders and working holiday-makers would not be included.

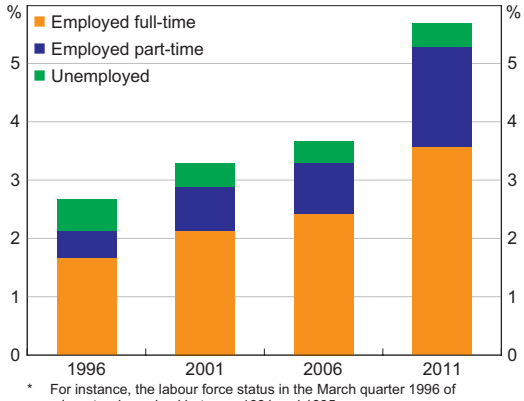
7 Participation rates tend to rise over time as immigrants settle into Australia; Hsieh and Kohler (2007) find that immigrants' participation rates are low in the first few months after arrival, but they tend to increase quite rapidly.

The biggest contribution of immigration to the labour supply has come from changes in the composition of Australia's migration intake. In particular, the increase in permanent visas since the mid 1990s has largely been for skilled migrants, while the number of visas for family reunions has grown more slowly (Graph 14). The labour force participation rate of skilled migrants tends to be significantly higher than for family reunion migrants, and their unemployment rate is noticeably lower (Department of Immigration and Citizenship 2006).

A range of temporary visa holders – temporary skilled workers, students and working holiday-makers – have also added to the labour supply. Temporary skilled working visas, generally known as 457 visas, are employer-sponsored visas limited to specified skilled occupations where domestic labour shortages have been identified. The number of 457 visa holders in Australia has doubled since the mid 2000s (Graph 15). A significant number of 457 visa holders are employed in the business services sector, particularly in firms in the information, media and telecommunications industries (Graph 16). The healthcare and social assistance industries also employ a sizeable share of Australia's 457 visa holders, with a little over a third of this category consisting of medical practitioners and another third comprising registered nurses. Overall, 457 visas are only a small share of total employment, accounting for less than 1 per cent of employment in all industries except mining. Consistent with the higher share of 457 visa holders in the mining industry, 457 visas represent a larger share of the state population in Western Australia and the Northern Territory, where mining jobs are a higher share of employment.

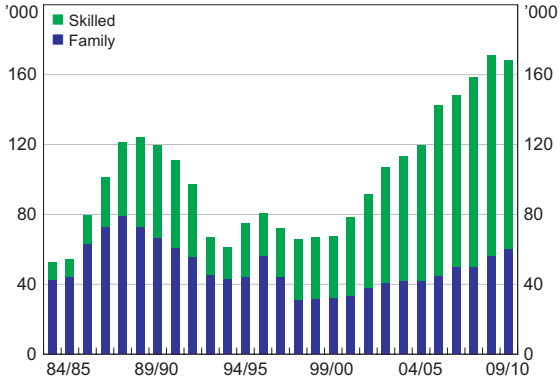
Student visas holders also have the potential to add to the labour supply, as they are permitted to work 20 hours a week while their course is in session and unlimited hours during scheduled course breaks. The number of student visa holders in Australia has tripled over the past decade, by far the largest increase in number of any visa category. A 2010 survey by Universities Australia suggests

Graph 13
Migrants and the Labour Force
Share of total labour force, arrived in previous five years*



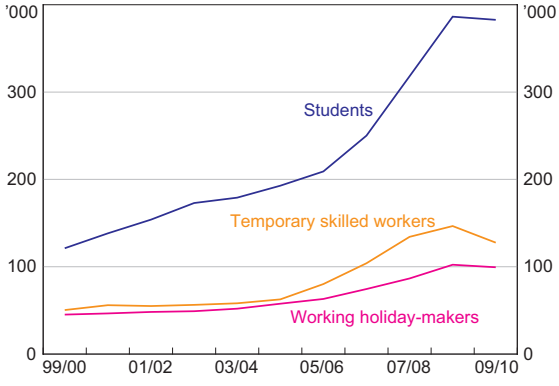
* For instance, the labour force status in the March quarter 1996 of migrants who arrived between 1991 and 1995
Source: ABS

Graph 14
Permanent Skilled and Family Migration
Visas per financial year



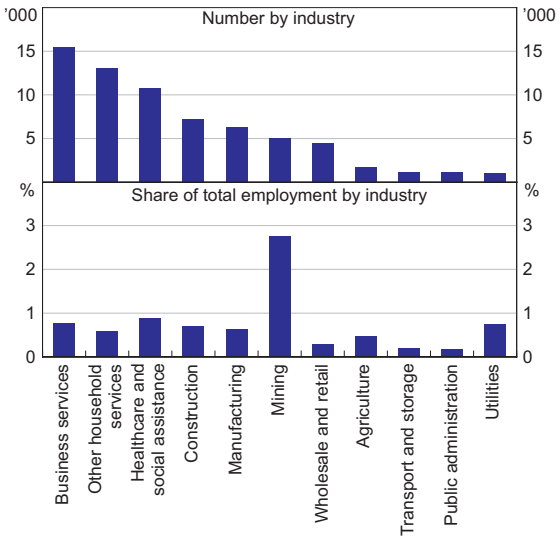
Sources: Department of Immigration and Citizenship; Phillips, Klapdor and Simon-Davies (2010)

Graph 15
Temporary Entrants in Australia
At end of financial year by visa category



Source: Department of Immigration and Citizenship

Graph 16
Primary 457 Visa Holders in Australia
June 2010



Source: Department of Immigration and Citizenship

that in the first half of first semester more than 40 per cent of overseas students had a part-time job; the share is likely to be higher later in the year when commencing students become more established (Varghese and Brett 2011).

Working holiday-makers add to the labour supply for both part-time and full-time jobs. The number of working holiday visa holders in Australia has almost doubled since the mid 2000s, although it remains relatively small compared to the number of temporary skilled workers and students. Working holiday visas also add to the labour supply in regional areas, as holiday-makers can be eligible for a second working visa if they undertake seasonal work in a regional area (such as in the rural or tourism industries).

Conclusion

Over recent decades, strong growth in the demand for labour has been accompanied by a large expansion of the labour force, particularly since the mid 2000s. Labour force growth has reflected increased participation as well as population growth. The increase in participation has been most pronounced for females and older persons, driven by a range of social and economic factors. Higher participation for these groups has also been associated with a decline in average hours worked. The acceleration in population growth has been largely due to higher immigration, with a larger intake of skilled workers and students a major contributor to the rise in the labour supply.

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Destinations and Uses of East Asian Merchandise Exports

Ashley Craig, Stephen Elias and Clare Noone*

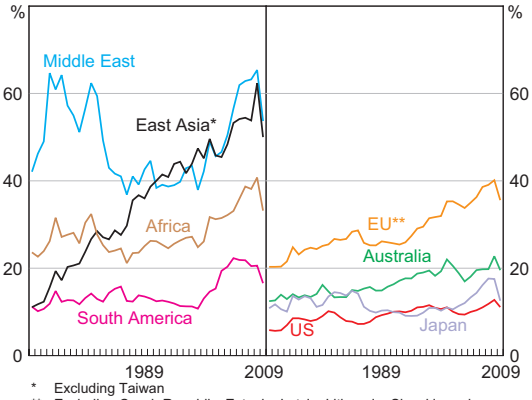
Over recent decades, Australia's trade has become increasingly oriented toward east Asia (excluding Japan). Rapid growth in economies from this region is often attributed to their export-oriented policies, with the volume of east Asian exports having increased six-fold over the past 20 years. Using information on the destinations and uses of east Asian exports, this article examines the characteristics of both intra-regional trade and exports to economies outside the region.

Introduction

East Asian[1] exports have risen rapidly over the past two decades. Excluding Japan, export volumes for the region grew at an average annual pace of above 10 per cent between 1990 and 2009, considerably faster than the 6 per cent growth in world export volumes. Growth in east Asian exports has also outpaced production growth across the region, in both volume and value terms. As a result, the ratio of exports to GDP is now higher than equivalent ratios in most other areas of the world, and more than twice that in Australia (Graph 1).

The rapid increase in exports has occurred for both intra-regional trade and trade with the rest of the world (Table 1). Growth in intra-regional trade of both intermediate and capital goods has been particularly strong. Exports of capital goods to countries outside the region have also grown solidly, although consumption goods still make up a larger share of total extra-regional exports. Despite the strong growth in intra-regional trade, the bulk of the region's exports of final goods (both consumption and capital goods) still go to major advanced economies, such as the United States, the European Union and Japan, although there has been some diversification over the past decade to emerging markets. This article uses data on merchandise export values to examine these trends in more detail, focusing on trends in intermediate goods trade and exports of capital and consumption goods to destinations both within and outside the region.

Graph 1
Export Values
Per cent of nominal GDP



* Excluding Taiwan
** Excluding Czech Republic, Estonia, Latvia, Lithuania, Slovakia and Slovenia
Sources: RBA; United Nations

* The authors are from Economic Group.

1 Unless otherwise specified, east Asia refers to the economies of China, South Korea, Taiwan, Hong Kong, Singapore, Indonesia, Thailand, Malaysia, the Philippines and Vietnam.

Table 1: East Asian Exports – Growth and Composition

	Share of total merchandise exports		Annual average growth	
	Per cent		Per cent	
	2002	2009	2001–2005	2006–2009
Intra-regional	40	40	14	6
of which: [(a)]				
Intermediate	67	64	18	7
Capital	16	22	27	13
Consumption	14	10	10	6
Major trading partners [(b)]	44	36	10	3
of which: [(a)]				
Intermediate	33	33	11	1
Capital	21	28	20	3
Consumption	40	32	9	–1
Rest of the world	16	24	17	11
of which: [(a)]				
Intermediate	53	47	14	16
Capital	17	25	19	27
Consumption	25	25	14	21

(a) Component shares exclude exports from or to Singapore, Taiwan and Vietnam
(b) United States, European Union and Japan
Sources: CEIC; IMF; RBA; Thomson Reuters; UN Comtrade

Integration of Production Processes

An important factor contributing to the strong growth in east Asian exports over the past two decades has been the integration of production processes across the region. In particular, technological advancements and the reduction of trade barriers have allowed multinational firms, particularly in the information & communication technology and automotive sectors, to establish cross-country production networks – whereby a company in one country completes part of the production process, before exporting the component to another country in the region where another stage of production takes place.

One example of the role of regional supply chains in stimulating intra-regional trade in intermediate goods is the production of microprocessors and their installation in computers. As detailed in Tweeney (2007), the initial stages of microprocessor production (starting with quartz and coal, and ending with the testing of silicon wafers) take place primarily in the United States and Japan, although other countries are often involved. The wafers (intermediate goods) are then shipped to countries such as Malaysia and the Philippines where they are separated, retested and classified according to their performance. The wafers, along with other components, are then exported to China for assembly onto a motherboard (with the transportation of the wafers recorded as an intra-regional intermediate good export). The motherboard later becomes part of a computer, which is sold to a final consumer; this may involve further component trade as well as the export of the final good.

Regionally integrated production networks were first established in east Asia by Japanese firms in the 1980s. In common with the experience of other east Asian economies a decade later, Japanese firms began by moving parts of their production processes offshore. As components were exported between production facilities in Japan and other east Asian economies, the share of Japan's trade with east Asia rose markedly (Graph 2).

Graph 2
Japan – Merchandise Trade with East Asia
Share of total

Sources: CEIC; RBA

Japanese firms initially began to use regional production networks in an effort to maintain competitiveness. Japan had developed an export-focused production sector in the decades following World War II, when it provided outsourcing facilities to Western multinationals. However, by the mid 1980s, trade barriers facing Japanese exporters had increased and Japan's competitiveness had declined due to a strong yen and labour shortages (Belderbos 1997). Looking to reduce costs, Japanese firms (particularly in the electronics sector) invested heavily in east Asian economies – most notably in Hong Kong, Singapore, South Korea and Taiwan – where labour costs were not as high. As producers in these economies moved up the value-added chain in the late 1990s and became competitors, Japanese firms turned to establishing production networks in the lower-income economies in the region, including China and the ASEAN-5.[2] Competitor firms from Hong Kong, Singapore, South Korea and Taiwan also began establishing production networks in these lower-cost economies.

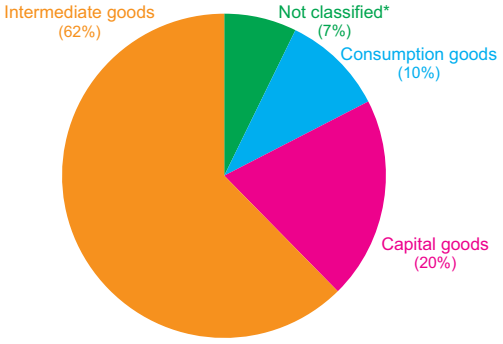
By March 2010, one in six Japanese companies had at least one subsidiary overseas (METI 2010). For manufacturers, this share was substantially higher – at one in four – and each of the parent manufacturing companies had, on average, seven subsidiaries overseas. Reflecting the development of production networks within the region, almost 60 per cent of Japanese manufacturing subsidiaries are in Asia, with just under half of these in China or Hong Kong. Moreover, in 2010, east Asian economies imported almost 60 per cent of Japan's exports of intermediate goods and supplied over one-third of Japan's imports of these products.

The integration of production across the region has underpinned growth of east Asian intra-regional trade in intermediate goods at an annual average pace of around 12 per cent over the past decade. As a result, intermediate goods constitute the largest share of total intra-regional trade; in 2009, intra-regional trade in these goods made up about one-quarter of all east Asian merchandise exports and around two-thirds of intra-regional trade (Graph 3). In contrast, just 40 per cent of extra-regional east Asian exports are intermediate goods. The share of intermediate goods in east Asian trade is considerably higher than in other highly integrated regions such as the European Union, where intermediate goods make up only one-eighth of intra-regional trade and one-fifth of total European Union exports outside the region.

Although increased integration of production is an important driver of intra-regional trade in east Asia, the pattern of trade suggests much of this trade is ultimately driven by demand from the rest of the world. Fluctuations in intra-regional trade tend to precede fluctuations in extra-regional exports

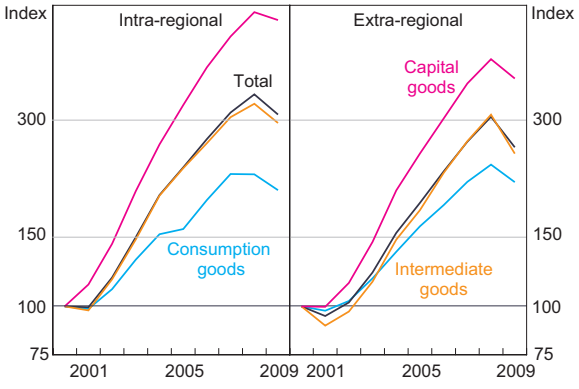
2 We follow the IMF in defining the ASEAN-5 as Indonesia, Malaysia, the Philippines, Thailand and Vietnam.

Graph 3
East Asia – Intra-regional Trade
US$, 2009 share of total



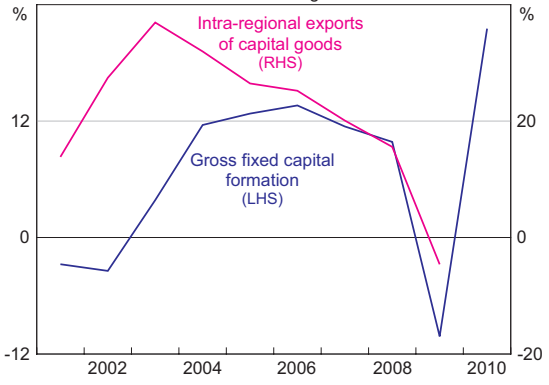
* Contains passenger vehicles, processed fuels and some other unclassified goods including defence goods
Sources: RBA; UN Comtrade

Graph 4
East Asia* – Merchandise Exports
US$, 2000 = 100, log scale



* Excluding the Philippines, Singapore, Taiwan and Vietnam
Sources: RBA; UN Comtrade

Graph 5
East Asia* – Investment and Trade Growth
Year-average



* Excluding the Philippines, Singapore, Taiwan and Vietnam
Sources: CEIC; IMF; Thomson Reuters; UN Comtrade

as intra-regional production chains produce final goods for export to economies outside of east Asia.

Exports of Final Goods

Exports of final capital goods from east Asia have also grown very rapidly over the past decade. Although capital goods are a much smaller share of total exports than intermediate goods, they have grown at a significantly faster pace, with their share of total exports increasing by 9 percentage points to 25 per cent between 2000 and 2009. The rapid increase in capital goods exports has occurred both in intra-regional and extra-regional exports (Graph 4). The share of capital goods in intra-regional exports nearly doubled from 12½ per cent in 2000 to 22½ per cent in 2009, reflecting strong investment growth within the region over this period (Graph 5). Growth in exports of capital goods to economies outside of east Asia also outpaced growth in other exports to these economies between 2000 and 2009, with the share of capital goods rising from 18 per cent to 27 per cent.

A key feature of the growth in both intra- and extra-regional capital goods exports has been the increasing importance of China. Over the past decade, China has provided a growing share of the world's capital goods, reflecting its dominance in the production of some electronic goods such as laptop computers; Chinese exports of computers grew at an annual average pace of almost 75 per cent between 2000 and 2009. The United States now sources almost 50 per cent of its capital imports from east Asia, up from around 25 per cent in 2000 reflecting an increasing contribution from China.[3]

The two other countries where capital goods exports have grown particularly rapidly are Thailand and South Korea. Unlike in China – where growth in capital goods exports has been relatively broad-based across regional destinations, major advanced economies and other trading partners – growth in capital goods exports from Thailand and

3 In fact, the share of capital imports from east Asia (excluding China) has fallen slightly.

South Korea has been concentrated in exports to economies within the region and, to a lesser extent, to smaller trading partners, including emerging economies. For South Korea, exports of ships have been a key driver of growth in capital goods exports to regional destinations and smaller trading partners. South Korea has the second largest shipbuilding industry in the world in volume terms (having been recently overtaken by China) and produces over one-third of the world's ships by value. South Korea benefited from the rapid growth in this industry prior to the global financial crisis as the rise of China increased global trade volumes. Exports of radio transmission equipment from South Korea have also contributed significantly to exports growth. The rapid expansion of Thailand's trade, in contrast, largely reflects growing exports of computer-related equipment, particularly to its regional partners. Growth in exports to Thailand's smaller trading partners has been more concentrated in transport equipment, reflecting growth in Thailand's motor vehicle industry over the past decade.

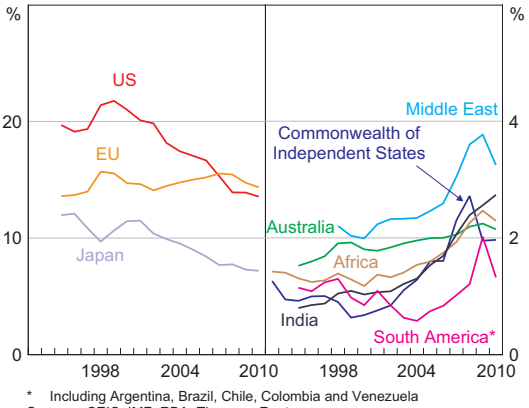
The corollary of the rapid increase in exports of capital goods (and the stable share of intermediate goods) is that consumption goods have fallen as a share of both intra-regional trade and extra-regional exports. The share of consumption goods in extra-regional exports fell from 35 per cent to 28 per cent between 2000 and 2009. This reflects a shift in the composition of exports to the major advanced economies, as these economies have imported more computer and computer-related capital goods from east Asia. The share of consumption goods in intra-regional exports has fallen from 15½ per cent to 10 per cent over the same period. This partly reflects the decline in the share of private consumption expenditure in GDP in east Asia from 52 per cent in 2000 to 43 per cent in 2009, which was driven by the investment boom in China. However, these trends may only be temporary; the share of consumption goods in intra-regional exports and the share of consumption in GDP are likely to rise over coming years as consumption is supported by rising incomes, urbanisation and industrialisation.

Extra-regional Export Destinations

The strong growth in capital and consumer goods exports to emerging economies has seen a modest shift in the importance of these economies to east Asia in aggregate. Exports to extra-regional destinations excluding the United States, the European Union and Japan grew by 11 per cent per year on average from 1994 to 2010, compared with an average annual pace of 8 per cent for the major advanced economies. This has reduced the share of east Asian exports going to major advanced economies from 77 per cent to 60 per cent over this period (Graph 6).

The growth in exports to extra-regional destinations has been broad-based and goes well beyond the major advanced economies. Growth in exports to commodity-producing regions does, however, stand out. Exports to the Commonwealth of Independent States and India have risen by around 18 per cent per year on average over the past

Graph 6
East Asia – Merchandise Exports
Share of total merchandise exports



* Including Argentina, Brazil, Chile, Colombia and Venezuela
Sources: CEIC; IMF; RBA; Thomson Reuters

15 years.[4] Similarly, exports to Africa and the Middle East have risen at an average annual rate of 15 per cent. As a result, the share of exports that leave east Asia for these four regions has nearly doubled, although their combined share remains at around 10 per cent. Exports to South America have also risen markedly since 2005.

East Asian exports to Australia have also experienced strong growth (though not as rapid as the growth in exports to emerging economies), with annual growth averaging 13 per cent between 1999 and 2008, before moderating in more recent years. Reflecting this strong growth, Australia's share of east Asian merchandise exports has risen to be just over 2 per cent. In 2009, almost half of these exports to Australia were of intermediate goods – suggesting Australian firms use components from east Asia in their production of goods and services – while one-quarter were consumption goods, and one-fifth were capital goods.

Conclusion

Trade within east Asia has grown rapidly over the past two decades. While this partly reflects growing regional demand for final capital goods, much of this trade reflects increasing regional integration of supply chains. The establishment of regional production networks by Japanese firms in the 1980s has been continued by firms throughout the region, leading to a high level of intra-regional trade in intermediate goods. Exports of east Asian capital goods to extra-regional destinations have also risen strongly. Growth in consumption goods exports has been more subdued than that of capital goods exports, largely due to weak growth in exports of consumption goods to the major advanced economies. In contrast, there has been strong growth in consumption and investment goods exports to emerging economies, which has reduced the importance of the major advanced economies as destinations for east Asian exports (although they still receive the majority of extra-regional exports). With trend rates of growth in emerging economies substantially higher than trend rates in advanced economies, it seems likely that this gradual diversification of east Asian export destinations will continue.

4 We follow the IMF in defining the Commonwealth of Independent States as Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Krygyz Republic, Moldova, Mongolia, Russia, Tajikstan, Turkmenistan, Ukraine and Uzbekistan. Georgia and Mongolia, which are not part of the Commonwealth of Independent States, are included in this group for reasons of geography and similarities in economic structure.

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Economic Development and Agriculture in India

Adam Cagliarini and Anthony Rush*

This article discusses the key developments in the agricultural sector in India including productivity gains and integration with global food markets, before discussing some of the challenges for future development, which include land distribution policies, access to credit, water management, and food distribution.

Introduction

India's already large population is expected to become the world's largest in the next 20 years, while its economy will soon overtake Japan's to become the world's third largest. The resulting increase in the demand for food will need to be met through higher agricultural productivity or by increasing food imports. This article discusses some of the key areas of progress and challenges for India's agricultural sector, including: productivity, water management, government policies and programs, and food distribution and storage.

Background

India has a particularly large agricultural sector. While the sector's share of GDP has halved in the past 30 years to around 15 per cent, it still employs around half of India's workforce and accounts for much of the volatility in Indian GDP. India has the second largest area of arable land in the world and is a major producer of a number of agricultural products (Table 1). Around the turn of the century, India overtook the United States as the world's largest producer of milk and is also a major producer of pulses, such as chickpeas and lentils, which are major sources of protein in vegetarian diets.

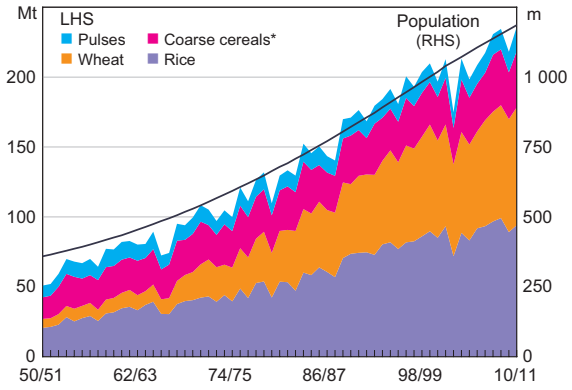
Table 1: India – Major Agricultural Products in 2008

Commodity	World Rank	Production Mt
Buffalo milk	1	60.9
Bananas	1	26.2
Paddy rice	2	148.7
Cow milk	2	44.1
Wheat	2	78.6
Sugar cane	2	348.2
Fresh vegetables	2	31.4
Cotton lint	2	3.8
Potatoes	2	34.7

Source: Food and Agriculture Organisation of the United Nations (FAO)

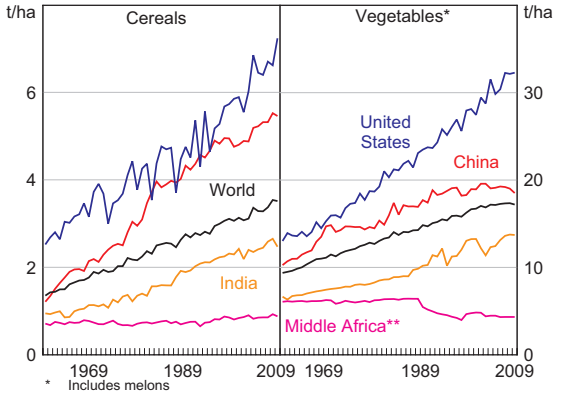
* The authors are from Economic Group.

Graph 1
India – Crop Production and Population
Indian financial years



* Includes barley, maize, millets and sorghum
Source: CEIC

Graph 2
Crop Yields



* Includes melons
** Angola, Cameroon, Central African Republic, Chad, Congo (Brazzaville), Democratic Republic of the Congo, Equatorial Guinea, Gabon, Sao Tome and Principe
Source: FAO

Growth in agricultural output over the past three decades has been strong and, importantly, crop production has been able to broadly keep pace with the demands from a growing population (Graph 1). The introduction of high-yielding seeds (such as improved strains of wheat) from the mid 1960s and the increased use of chemical fertilisers epitomised what became known as the 'green revolution'. Wheat production increased by nearly 150 per cent between the mid 1960s and mid 1970s and the country became self-sufficient in grain production by the end of the 1970s. The increase in agricultural production boosted rural incomes while also causing food prices to fall. This had the effect of reducing rural poverty (World Bank 2004).

Despite the productivity improvements in the Indian agricultural sector over recent decades, yields remain low by international standards and growth in yields has only been marginally higher than the world average (Graph 2). In particular, yields for cereals and vegetables remain substantially lower than the world average. Crop yields have increased much more for rice and wheat than for other cereals, such as barley, or for pulses. Wheat yields have tripled over the past 50 years and rice yields have doubled, while yields for pulses improved little over this period.

While able to meet most of its food requirements from domestic production, India still needs to import some food. Trade in agricultural products accounts for a modest share of total merchandise trade, currently about 8 per cent of exports and 2 per cent of imports. Agricultural trade has, however, grown rapidly over the past decade, with the value of exports and imports both recording average annual growth rates of about 15 per cent. Rice, animal feed and seafood are India's principal food exports, while fruit and vegetables are its largest food imports (Table 2). The diversification of agricultural production over the past couple of decades is also reflected in the changing composition of India's food exports, with the share of traditional exports like tea and coffee declining and the share of meat exports increasing. Food grain imports are relatively low, consistent with India being broadly self-sufficient in grain production. Much of India's trade is with economies within a relatively short shipping distance, although imports of wheat and sugar come from more distant sources such as Russia and Brazil.

Overall, India has become more open to agricultural trade in recent years, although government policies have often been driven by developments in domestic food production

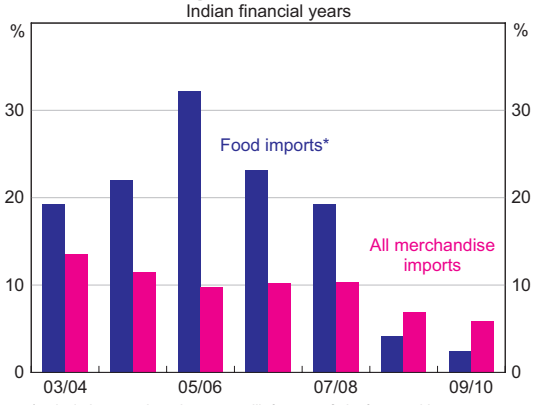
Table 2: India's Agricultural Trade
Annual average over 2005–2009

	Average trade value	Average volume	Largest export/ import partner	Share of trade with largest partner
	US$ million	kt		Per cent
Exports				
Rice	2 137	4 287	Saudi Arabia	24.6
Animal feed	1 636	6 188	Vietnam	23.4
Crustaceans, molluscs	1 093	237	United States	21.6
Fruit and nuts	943	686	United States	22.9
Bovine meat	826	464	Vietnam	15.3
Imports				
Vegetables	1 257	2 650	Myanmar	39.3
Fruit and nuts	935	1 066	United States	19.0
Wheat	374	1 440	Russia	40.3
Sugar, mollasses and honey	258	713	Brazil	74.0
Spices	150	106	Sri Lanka	25.1

Source: UN Comtrade

and global food prices. Since 2006, import duties on wheat, rice and pulses have gradually been abolished to boost the domestic availability of these commodities and to reduce domestic price pressures from rising global food prices. The Government has also, on occasion, used trade policy to ensure domestic supplies. For example, in December 2010, the Government decided to ban all onion exports and abolished import duties on onions after a fall in onion production caused prices to more than double. Two months later, when retail onion prices fell from around INR 70 per kilogram to less than INR 20 per kilogram, the Government lifted its ban on onion exports. In general, agricultural export earnings are mostly exempt from income and other taxes, although the exports of wheat, (non-basmati) rice and pulses (other than chickpeas) are currently prohibited. Overall, average tariff rates on food peaked at just over 30 per cent in 2005/06, but fell significantly in 2008/09, due mainly to a reduction in tariffs on edible vegetable oils from an average of almost 75 per cent to 7.5 per cent (Graph 3).

Graph 3
India – Average Tariff Rates on Imports
Indian financial years



* Includes cereals, pulses, tea, milk & cream, fruits & vegetables, animal fats, and sugar
Source: Ministry of Finance, Government of India

Rural Land Distribution and Access to Finance

A major institutional factor that has limited agricultural productivity in India is regulation of land holdings. In order to address the highly concentrated ownership structure of land in India prior to independence, the Government instituted land reforms that placed ceilings on land holdings. As a result, agriculture in India is dominated by a large number of small-scale, owner-occupied farms. The most recent estimates suggest that around 100 million households were engaged in agricultural production in 2002, roughly 70 per cent of all rural households and only marginally lower than the share of rural households engaged in agriculture in the early 1960s. Over the past 50 years, the share of farming households tending plots of land of less than one hectare has increased from 60 per cent to just under 80 per cent and the average farm size has fallen to around 1 hectare, with only ½ per cent of households farming more than 10 hectares of land (Table 3). By the early 1990s, most Indian states had enacted tenancy laws conferring ownership of land on tenants who were able to buy the land they farmed at a fair price, which reinforced the trend of increased fragmentation of land holdings during that decade. Additionally, the increase in population has also contributed to smaller land holdings, while the subdivision of original family land holdings over generations has left many families with land holdings too small to provide an adequate stream of income.

With small land holdings, farmers have limited incentive to adopt capital-intensive farming techniques, as productivity gains from capital through mechanisation and exploiting economies of scale are minimal. Larger land holdings would also allow farmers to engage in multiple cropping, which would make them less susceptible to adverse weather conditions and help diversify their income base.

Private investment in the agricultural sector has also been limited by restricted access to credit and insurance, although access has generally improved over the past decade with credit to the agricultural sector growing, on average, by more than 20 per cent annually over the period. Nevertheless, credit extension remains predominately focused on assisting farmers through the annual cycle rather than helping them to finance the building and purchase of assets, such as tractors and pump-sets. Government programs have been used to improve access to credit for farmers through a number of channels, including: interest rate subsidies; debt relief; collateral-free loans; improving administration;

Table 3: India's Rural Land Distribution
Millions

	1960/61	1971/72	1981/82	1991/92	2002/03
Total rural households	72.5	78.4	93.9	116.4	147.8
Engaged in agriculture	52.9	56.9	69.4	93.4	101.8
of which land holdings:					
Less than 1 hectare	30.5	34.3	46.6	65.5	80.4
1–2 hectares	8.6	9.3	10.1	13.3	11.4
2–4 hectares	7.3	7.3	7.4	9.1	6.3
4–10 hectares	5.0	4.6	4.4	4.6	3.0
Over 10 hectares	1.6	1.3	1.0	1.0	0.5

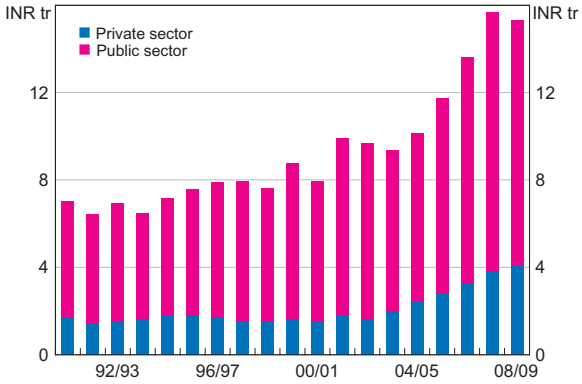
Sources: NSSO (2006); RBA

and mandating banks to increase the flow of credit to rural customers. Much of this expansion has been through so-called micro-finance facilities but while such lending has increased significantly over the past decade, borrowers have often faced interest rates as high as 40 per cent. Furthermore, many have had difficulties repaying debts after crops have failed. In 2009/10, the Indian Government spent roughly 0.2 per cent of GDP on debt waivers and debt relief for farmers.

The Government is also gradually improving access to insurance through the National Insurance Scheme, although in 2009 only 18 million farmers were insured under the scheme. The scheme covers farmers who produce cereals, millets, pulses, oilseeds, sugarcane, cotton and potatoes. In certain areas, farmers growing these crops and accessing Seasonal Agricultural Operations loans from financial institutions are required to purchase this insurance, while others can opt in voluntarily. Importantly, the scheme covers drought and other weather events as well as loss of production due to pests and disease. Premium rates are typically between 1.5 per cent and 3.5 per cent of the value insured, with those farming less than 2 hectares receiving a 50 per cent subsidy. Recently, the Government trialled a modified insurance scheme, expanding coverage to more areas and providing premium subsidies of between 40 and 75 per cent. By reducing credit risk faced by lending institutions, increased coverage of insurance should give farmers better access to credit and encourage further investment in the agricultural sector.

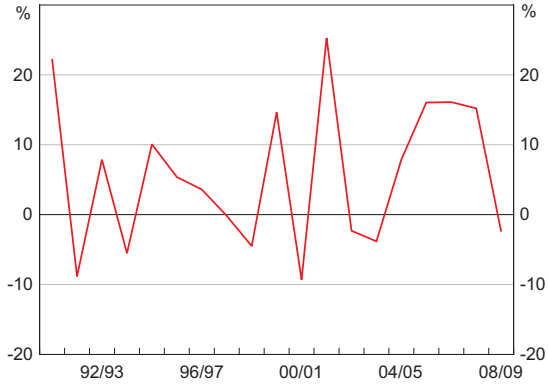
The increase in the flow of credit to the agricultural sector has seen investment by the private sector double over the past decade, although public sector investment still dominates (Graph 4). Since the early 1990s, investment growth in the agriculture sector has averaged over 4 per cent, although prior to the onset of the global financial crisis, investment growth exceeded 10 per cent, suggesting that the improved flow of credit to the sector, and higher food prices, had encouraged capital deepening in the sector (Graph 5).

Graph 4
India – Investment in Agriculture
Constant 2004/05 prices



Sources: Central Statistical Office; RBA

Graph 5
India – Agricultural Investment
Real annual growth in gross capital formation



Sources: Central Statistical Office; RBA

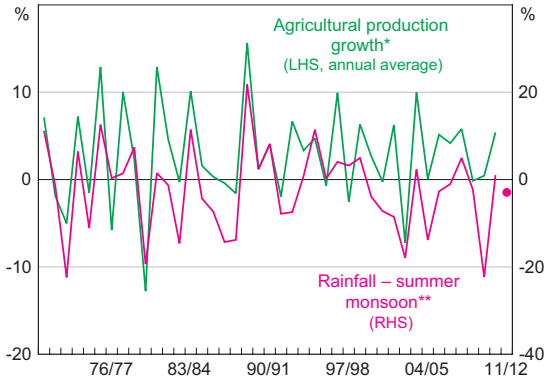
Water Management

Water management is crucial to improving conditions in agriculture. India currently has around 5 000 large dams that are able to store more than 220 teralitres, which ranks seventh in the world in terms of capacity. While dams in other parts of the world are built for flood mitigation, power generation and water supply, the primary purpose of India's dams is irrigation. Around 40 per cent of crop areas are now irrigated, and these areas produce 70 per cent of India's crop output. A significant proportion of farms

have limited or no access to irrigation, and therefore still rely on rainfall as their sole source of water.

With just over 80 per cent of India's rainfall occurring during the summer monsoon season, which occurs from June through to September, deficient rainfalls have often had significant effects on the Indian economy. In 2009, the summer monsoon rainfall was lower than normal, which caused a fall in grain production of 7 per cent and pushed up grain and other food prices. In the past, agricultural production has been much more dependent on the summer monsoon, with large fluctuations in rainfall accounting for most of the volatility in agricultural production (Graph 6). Over time, however, the effect of the summer monsoon rain season has been mitigated through drought management (including drought monitoring), increased use of irrigation, and diversification of agricultural production. These measures have made food production less vulnerable to poor weather conditions. In part, this helps explain why deficient rainfalls since the late 1990s have resulted in less significant contractions in agricultural output. In fact, variations in agricultural output, which once accounted for 60 per cent of the variation in GDP, now account for only 20 per cent, which in part reflects agriculture's lower share of GDP.

Graph 6
India – Rainfall and Agricultural Production



* Indian Government estimate for 2010/11
** Percentage deviation from long-run average; Indian Meteorological Department's first forecast for 2011/12 monsoon
Sources: CEIC; Indian Meteorological Department; RBA

The Food Procurement and Distribution System

In addition to policies on land distribution, the Government has significant influence on the agricultural sector through other policy instruments, including subsidies for inputs, minimum price support arrangements and government procurement of food.

One-third of input subsidies are paid in the form of fertiliser subsidies, which are equivalent to 1 per cent of GDP. Under this subsidy scheme, the Government quotes a maximum retail price for various types of fertilisers and reimburses the seller the difference between the retail price and the 'market' price. The market price for domestically produced fertilisers takes into account transportation, storage, labour and energy costs. The subsidy for imported fertiliser is the difference between the import price and the maximum retail price. Urea fertilisers are a major input into agricultural production and its price has been fixed since 2003 despite large fluctuations in the cost of inputs. While India is able to produce enough urea fertiliser to meet domestic needs, it relies on imports to satisfy its demand for compound fertilisers, so that the increase in global fertiliser prices during 2007 and 2008 saw a large outlay in the subsidies paid for compound fertilisers (Graph 7). There are also substantial subsidies for electricity. Many farms use unmetered power and pay a subsidised lump-sum based on the power ratings of pump-sets used for irrigation purposes.

To help alleviate poverty and to shield Indian consumers from global food price fluctuations, the Government subsidises food purchases for many consumers. The Government procures agricultural goods from producers, who must sell a share of their output to the Government at minimum support prices (MSPs), which are typically below market prices (Graph 8). Procured food is sold through the Targeted Public Distribution System (TPDS), which consists of about half a million 'fair price shops'. In order to purchase food through this system, households apply for ration cards,

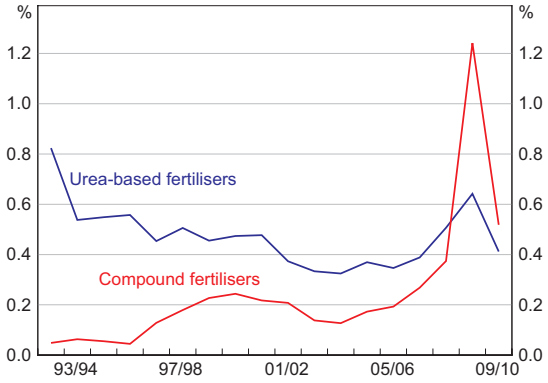
which indicate whether they are assessed to be Above Poverty Line (APL) or Below Poverty Line (BPL). In 2005, 81 per cent of rural households and 67 per cent of urban households held ration cards. The type of ration card a household holds determines the prices they pay (the central issue price) and the amount of food they can purchase through the TPDS. According to the most recent estimates, about one-third of the production of rice and wheat was released for consumption under the TPDS in the 2009/10 Indian financial year.

While the MSP program covers 26 crops, in practice, the program is used to subsidise farmers when market prices fall to very low levels for most of those crops. With market prices generally higher than MSPs for most agricultural commodities, MSPs are typically only used by the Government to procure rice and wheat. The Government also uses its stock of grains to buy or sell produce to ensure retail market prices remain broadly stable.

Although government programs have sought to make food more affordable to poorer households, India's lack of cold-storage facilities and cold-chain transportation have resulted in large quantities of food being wasted. For instance, almost all cold storage is used for potatoes for five months of each year, resulting in only around 10 per cent of remaining fruit and vegetable produce being stored in a refrigerated environment, which means that a significant amount of produce deteriorates and is unfit to consume. Some estimates suggest that between 25 and 40 per cent of fruit and vegetable output is wasted during the storage and transportation stages of distribution. Electricity supply is another major factor, with rolling brown- and black-outs contributing to a loss of food in cold-storage facilities.

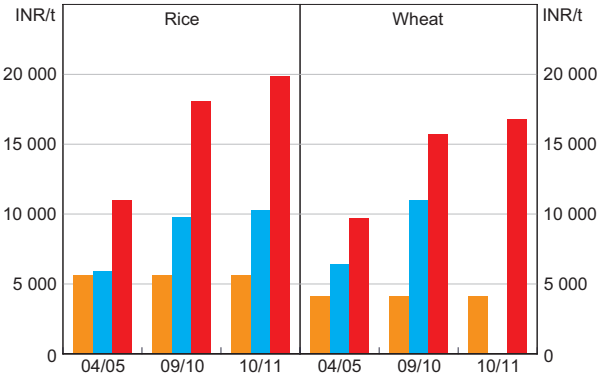
Transport infrastructure is also limited, resulting in further food damage and loss during transit. Most highways in India are narrow and congested, and about 40 per cent of India's villages have no access to all-weather roads. Most of the cold-chain transportation network is used to distribute milk, with only around 20 per cent of the network available for the distribution of other food produce. As a result, fruit and vegetables are typically transported in open-top trucks.

Graph 7
India – Fertiliser Subsidies
Percentage of total value-added



Sources: CEIC; Department of Fertilizers; RBA

Graph 8
India – Grain Prices



Sources: CEIC; Department of Food & Public Distribution, India; Directorate of Economics and Statistics, Department of Agriculture and Cooperation, India; RBA

Conclusion

India's agricultural sector is still very important to the Indian economy, although its share of the economy has decreased over the past 50 years. India has made significant advances in agricultural production in recent decades, including the introduction of high-yield seed varieties, increased

use of fertilisers and improved water management systems. Reforms to land distribution, water management and food distribution systems will further enhance productivity and help India meet its growing demand for food.

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Banking Fees in Australia

The Reserve Bank has conducted a survey on bank fees each year since 1997. The results of the latest survey show that banks' aggregate fee income was unchanged in 2010. Fee income from households declined as exception fee income and ATM revenue fell sharply, while fee income from businesses grew.

Fees from Banking Activities

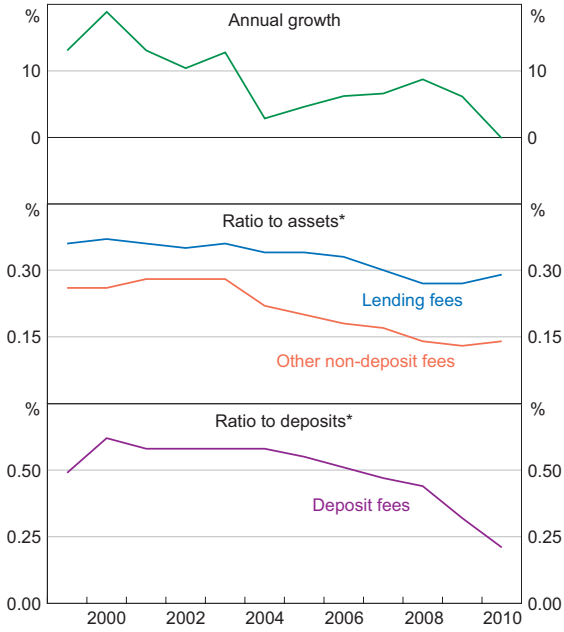
The Reserve Bank's annual bank fee survey provides information on the fees that commercial banks earn from their Australian operations.[1] It focuses on fee income earned by banks in the process of taking deposits, making loans and providing payment services. Other forms of non-interest income, such as income earned from funds management and insurance operations, are excluded from the survey. This article summarises the results of the latest survey, relating to banks' 2010 financial year. It covers 17 institutions, which together account for around 90 per cent of the total assets of the Australian banking sector.

Total domestic fee income in 2010 was unchanged at $11.1 billion from a year earlier, the first time that total fee income has not risen since the survey began in 1997 (Graph 1 and Table 1). This aggregate outcome reflects differing developments, including:

- a decline in fee income from households;
- an increase in fee income from businesses;
- slower growth in fee income from loans, reflecting the slower pace of expansion in banks' lending to businesses and households; and
- a continued decline in deposit fee income despite strong growth in deposits.

1 The survey relates to fee income earned by participating banks over the course of their respective financial years. The data from the survey are published on the Reserve Bank's website: Statistical Table F6, 'Domestic Banking Fee Income'. There have been a number of amendments to the historical data. The main changes stem from revisions to bank bill fee income, particularly acceptance fees, to align their treatment more closely with that in banks' statutory accounts, and reclassifications by one bank of some of its household loan and deposit fees.

Graph 1
Banks' Fee Income



* Adjusted for series break in 2002 due to change in banks' reporting. Financial-year average assets and deposits have been used.
Sources: APRA; RBA

Households

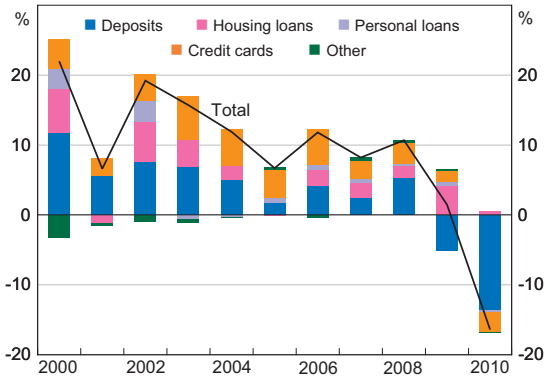
Banks' fee income from households declined by 16 per cent in 2010, to $4.2 billion (Graph 2 and Table 2). This was its lowest level since 2006. Almost 80 per cent of the decline can be attributed to exception fees. A number of banks reduced, and in some cases abolished, exception fees in late 2009, such that income from these fees roughly halved in 2010 (Table 3).

Table 1: Banks' Fee Income

	Households		Businesses		Total	
	$ million	Growth	$ million	Growth	$ million	Growth
		Per cent		Per cent		Per cent
2008	5 008	11	5 503	7	10 511	9
2009	5 081	1	6 077	10	11 158	6
2010	4 247	–16	6 897	13	11 144	0

Source: RBA

Graph 2
Growth in Household Fee Income
Contribution by product



Source: RBA

Exception fees are charged when a customer breaches the terms of a banking product, typically overdrawing a deposit account, making a late payment or exceeding a credit limit. Around 80 per cent of exception fees are paid by households. Exception fee income associated with household deposit accounts fell by $395 million in 2010, or 57 per cent. Exception fee income from household credit cards fell by $220 million, accounting for more than the entire decline in credit card fees from the household sector. Exception fees on housing loans also declined, despite an increase in the share of housing loans that are non-performing.

Table 2: Banks' Fee Income from Households

	2008	2009	2010	Growth 2010	Average growth 2004–2009
		$ million		Per cent	Per cent
Loans:					
– Housing	1 076	1 286	1 313	2	9
– Personal	300	331	317	–4	9
– Credit cards	1 332	1 413	1 263	–11	13
Deposits	2 193	1 935	1 247	–36	3
Other fees	107	115	106	–7	11
Total	**5 008**	**5 081**	**4 247**	**–16**	**8**

Source: RBA

Table 3: Exception Fee Income from Households

	2008	2009	2010	Growth
		$ million		Per cent
Deposit accounts	701	688	293	–57
Loans	481	603	359	–40
– Housing	29	50	33	–33
– Personal	26	32	24	–23
– Credit cards	427	521	301	–42
Total	**1 183**	**1 291**	**652**	**–49**

Source: RBA

Another significant driver of the decline in banks' fee income from household deposit accounts was a decline in revenue from ATMs. The ATM reforms introduced in March 2009 have led to a marked shift in transactions away from 'foreign' ATMs towards the use of cardholders' own institutions' ATMs, which are generally free of charge. In addition, households have reduced their overall ATM usage in favour of using EFTPOS transactions, which are also typically free of charge, to obtain cash (Flood, Hancock and Smith 2011). Deposit fee income has also been under downward pressure over recent years as banks have introduced and expanded deposit products that waive account fees if the account holder makes regular deposits of funds – such as regular salary payments – above a given threshold.

Total fee income from housing loans increased by 2 per cent in 2010, below the rate of growth of housing credit of 8 per cent. While exception fee income from housing loans declined by 33 per cent, other fee income rose by 3½ per cent. Account servicing fee income was boosted by the increase in the stock of housing credit, although the lower level of housing loan approvals contributed to reduced establishment fee income for some banks. There was also a decline in income from break fees; these are charged by banks when a fixed-rate loan is terminated early, as the bank incurs costs in exiting the swap transactions that they undertake to hedge the interest rate risk involved in extending fixed-rate loans. This decline occurred because fewer customers refinanced from a fixed-rate to a variable-rate housing loan; this refinancing activity had picked up significantly in the previous financial year in response to lower variable mortgage rates, but declined in 2010 as mortgage rates increased again.

Fee income from personal lending, excluding exception fees, fell by around 2 per cent, broadly in line with the fall in the stock of personal credit. Credit card fee income rose by 5 per cent (excluding exception fees). Credit card account servicing fee income rose slightly, driven by a small increase in the number of cards and an increase in the annual fees on some credit cards (Table 4). Transaction fee income (arising from items such as cash advance fees) increased by 2 per cent from the previous survey.

Businesses

Banks' fee income from businesses increased by 13 per cent in 2010 to $6.9 billion, despite business credit outstanding falling over the year (Table 5 and Graph 3). Most of the growth in business fee income was driven by growth in fees from lending, including both loans and bank bill facilities; total lending fee income grew by about 25 per cent. This largely reflects the repricing of establishment and line fees, which are charged by banks to maintain a line of credit regardless of use. Bank bill fee income reported

Table 4: Unit Fees on Credit Cards[a]

	2008	2009	2010	Growth
				Per cent
Annual fees ($)[b]				
– No-frills cards	49	52	53	1
– Standard cards	29	29	29	0
– Standard rewards-based cards	80	80	80	0
– Gold rewards-based cards	140	140	151	8
Cash advance fees[c]				
Own banks' ATMs ($)	1.35	1.23	1.06	–13
– Per cent of value	1.3	1.6	1.8	8
Other banks' ATMs ($)	1.63	1.38	1.06	–23
– Per cent of value	1.6	1.6	1.8	8
Overseas ATMs ($)	3.63	3.63	3.63	0
– Per cent of value	1.6	1.7	1.7	0
Foreign currency conversion fee (per cent of value)	2.5	2.6	2.6	0
Late payment fee ($)	31	31	15	–53
Over-limit fee ($)[d]	30	30	14	–55

(a) Simple average of fees for credit cards with interest-free periods issued by major banks, except for the annual fee on no-frills cards, which is based on a wider sample of banks. Note that changes in the sample affect the average fee.
(b) Includes fees for membership in rewards programs where separately charged
(c) Most banks charge the greater of a flat fee or a percentage of the cash advance
(d) Over-limit fees are charged when a credit card limit is exceeded
Sources: RBA; credit card issuers' websites

in the 2010 survey has been adjusted to align it with the banks' statutory reports. In particular, bank bill fee income included in banks' interest income in their statutory reports is no longer recorded as fees; as a result, previous years' figures have been revised down.

Business deposit fee income declined by 7 per cent as a result of reduced exception fees. Small businesses benefited most from this, because they pay around 85 per cent of business exception fees.

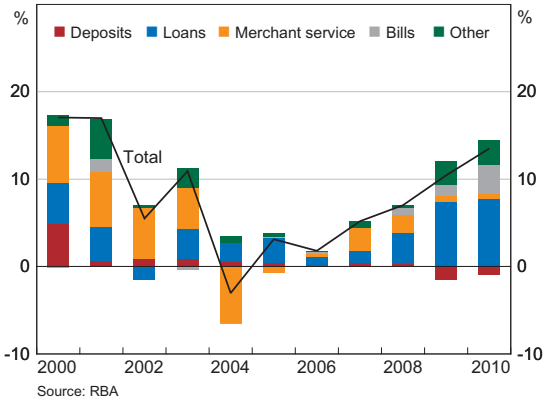
Merchant service fee income – which is derived from providing merchants with credit and debit card transaction services – rose by 2 per cent in 2010 (Graph 4). Since the introduction of the Reserve Bank's credit card interchange reforms in 2003, total merchant service fee income has changed little in net terms despite the value of card transactions having nearly doubled. This largely reflects the decline in merchant service fees on credit cards as a share of the value of transactions; for example, the average merchant service fee paid for transactions on MasterCard and Visa credit cards fell by 60 basis points over this period to about 80 basis points. Small businesses continue to pay around three-quarters of all merchant service fees.

Table 5: Banks' Fee Income from Businesses

	2008	2009	2010	Growth 2010	Average growth 2004–2009
		$ million		Per cent	Per cent
Deposit accounts	855	768	711	–7	–1
– *of which*: exception fees	131	122	59	–51	na
Loans	1 859	2 266	2 737	21	10
– *of which*: exception fees	72	75	53	–30	na
Merchant service fees	1 743	1785	1 824	2	3
Bank bills	314	377	574	52	8
Other	732	880	1 051	19	6
Total	**5 503**	**6 077**	**6 897**	**13**	**5**
– *of which*: exception fees	203	197	112	–43	na

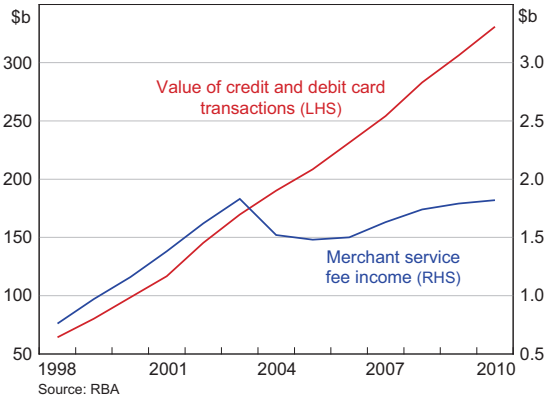
Source: RBA

Graph 3
Growth in Business Fee Income
Contribution by product



Source: RBA

Graph 4
Merchant Service Fee Income and the Value of Purchases



Source: RBA

Reference

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Developments in the Structure of the Australian Financial System

Bernadette Donovan and Adam Gorajek*

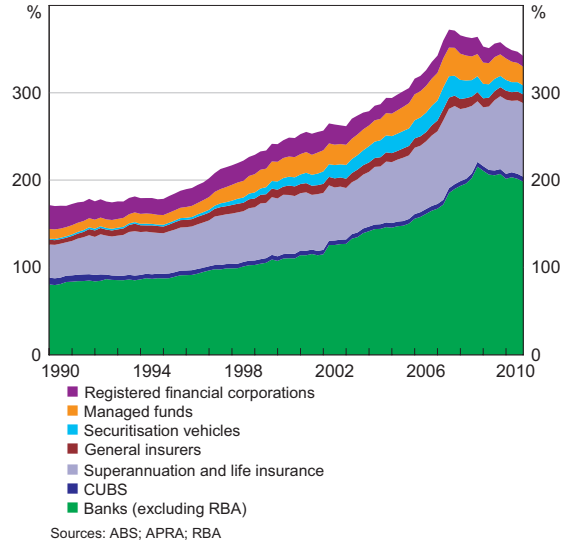
Some countries' financial systems have undergone significant changes in response to the global financial crisis. While Australia's financial system also experienced a variety of pressures and changes as a result of the crisis, the overall effect was much less severe than in some other developed countries and some of the recent changes in the structure of the Australian financial system have been a continuation of longer-term trends. This article examines recent developments in the institutional structure and performance of the Australian financial system, focusing on the past five years or so since the Reserve Bank published an article on this subject.[1]

Introduction

In aggregate, Australian financial institutions held assets of around $4.6 trillion in December 2010, equivalent to nearly 3½ times nominal GDP. After significantly outpacing growth in nominal GDP for much of the previous two decades, financial system assets have grown a little slower than GDP since around 2007 (Graph 1). The largest group of financial institutions are authorised deposit-taking institutions (ADIs), comprising banks, as well as credit unions and building societies (CUBS), which together account for nearly 60 per cent of financial system assets (Graph 2). The share of financial system assets held by ADIs has been growing over the past two decades. Life insurance companies, general insurance companies, and superannuation funds account for around one-quarter of financial system assets, a share that has been broadly unchanged for around a decade. The Australian Prudential Regulation Authority (APRA) regulates ADIs, life and general insurers, and the superannuation industry (excluding self-managed superannuation funds).

Other financial institutions, such as registered financial corporations, securitisation vehicles and managed funds account for a relatively small and declining share of the financial system (13 per cent, down from 22 per cent in 2005). These institutions are not regulated by APRA but they are subject to licensing, conduct and disclosure obligations administered by the Australian Securities and Investments Commission (ASIC) under the *Corporations Act 2001*.

Graph 1
Assets of Financial Institutions
Per cent of nominal GDP

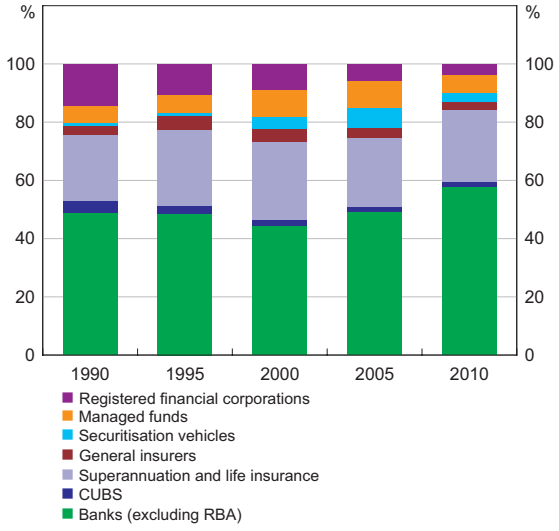


Sources: ABS; APRA; RBA

* The authors are from Financial Stability Department.

1 See RBA (2006) for the previous overview of the structure of the financial system.

Graph 2
Assets of Financial Institutions
Per cent of total, year-ended



Sources: ABS; APRA; RBA

The structure of the Australian financial system has been relatively stable compared with some other developed countries over the past five years, despite the pressures arising from the global financial crisis. The remainder of this article provides an overview of the key changes in the institutional structure and performance of the Australian financial system since 2005 and describes some key characteristics of financial institutions. This article builds on earlier Reserve Bank work which reviewed developments in the Australian financial system over the two decades to 2005.[2]

Authorised Deposit-taking Institutions

Institutional structure

Among the key developments over the last five years or so were that ADIs increased their share of financial system assets, shifted the composition of their balance sheet, and in particular improved their funding and capital positions. They constitute the largest part of the Australian financial system and their share of financial system assets has risen from about 50 per cent in 2005 to nearly 60 per cent in 2010. This increase was supported by high rates of credit growth before the financial crisis, particularly to the household sector. But in more recent years, credit growth has slowed as the one-time boost to credit growth from financial deregulation and the shift to low inflation has passed.

Banks account for 97 per cent of ADI assets in Australia. Within the banking system, Australia's four largest banks – ANZ Banking Group, Commonwealth Bank of Australia, National Australia Bank and Westpac Banking Corporation – together have around $1.9 trillion of assets on their domestic books, and account for about three-quarters of ADI assets (Table 1). Each of these major banks also has some operations overseas, principally in New Zealand but also, to a lesser extent, in the United Kingdom and elsewhere. Overseas assets account for about one-quarter of the major banks' globally consolidated assets, a share that has been broadly unchanged since 2005. The banks' subsidiaries in these countries have generally the same retail-focused business model as their Australian parents.

The major banks are reasonably large by international standards with each ranking, in terms of consolidated group assets, among the top 60 banks worldwide. However, their share of global banking sector assets is estimated at about 2 per cent, which is similar to Australia's share of global GDP and other indicators of the relative size of Australia in the global economy.

Since 2005, the major banks have increased their share of ADI assets in Australia by about 10 percentage points. This was partly due to two acquisitions of smaller banks in late 2008: Westpac acquired St. George Bank in December 2008, which was the fifth largest bank at the time, and Commonwealth Bank acquired the foreign-owned Bankwest in October 2008, which was the eighth largest bank at the time.

2 See RBA (2006) for the previous overview of the structure of the financial system.

Table 1: Australian ADIs[a]

	Australian assets		
	Number	$billion	Per cent of total
December 2010			
Major banks[b]	4	1 887	75
Other Australian-owned banks	7	221	9
Foreign-bank subsidiaries	9	110	4
Foreign-bank branches	34	229	9
Credit unions and building societies	116	76	3
Total	**170**	**2 524**	**100**
December 2005			
Major banks[b]	4	918	65
Other Australian-owned banks	9	193	14
Foreign-bank subsidiaries	11	103	7
Foreign-bank branches	28	140	10
Credit unions and building societies	170	52	4
Total	**222**	**1 406**	**100**

(a) Excludes specialist credit card institutions, providers of purchased payment facilities and ADIs providing specialist services to CUBS
(b) Subsidiaries of the major banks are consolidated into their parent bank
Source: APRA

Aside from the four major banks, Australia's banking system currently consists of seven other Australian-owned banks (9 per cent of ADI assets) and 43 foreign-owned banks operating either as branches and/or locally incorporated subsidiaries (13 per cent of ADI assets). In terms of their domestic assets, these smaller banks range in size from about $40 million to $70 billion, compared with $360 billion for the smallest of the four major banks. Since 2005, the number of other Australian-owned banks and foreign-bank subsidiaries has declined and their share of ADI assets has fallen. Aside from Westpac's acquisition of St. George Bank, there was a merger of two mid-sized Australian banks (Adelaide Bank and Bendigo Bank) in 2007, and a reduction in the share of ADI assets held by foreign-owned banks, largely the result of Commonwealth Bank's acquisition of Bankwest. Other factors also contributed: some foreign-owned banks reduced their domestic lending in the wake of the crisis, while others withdrew from the Australian market altogether. Recently there have been indications that foreign-owned banks are beginning to increase their domestic lending again, and there has also been interest from a number of other foreign-owned banks to begin operating in Australia for the first time.

CUBS account for the remaining 3 per cent of ADI assets in Australia, down from 4 per cent in 2005. CUBS range in asset size from just under $3 million to nearly $7 billion, though the majority have assets of less than $1 billion. Most have a mutual ownership structure where customers are also the 'shareholders'. The trend since the 1980s has been for CUBS to consolidate, and this has continued in recent years. Since 2005, the total number of CUBS has fallen from 170 to 116, comprising 11 building societies and 105 credit unions, mostly due to mergers and acquisitions within the sector and, to a lesser extent, acquisitions by banks. CUBS

have been motivated to consolidate mainly by the benefits of economies of scale and scope, and the perception that bigger institutions can compete more effectively with the banks.[3]

Business focus and performance during the crisis

While there is some differentiation among individual institutions, the primary business focus of Australian ADIs continues to be on traditional banking services – deposit taking and lending – provided to the domestic market. Domestic lending accounts for over two-thirds of ADIs' on-balance sheet assets, most of which is to the retail sector, while deposits account for nearly 50 per cent of their liabilities, a share that has increased significantly in the post-crisis environment (see below). For the smaller ADIs, such as CUBS and some of the smaller Australian-owned banks, retail lending accounts for an even larger share of their balance sheets, and in some cases is as high as 85 per cent. They typically also source a higher proportion of their funding from deposits than the larger institutions. Reflecting this focus, net interest income and banking-related fees account for the bulk of most ADIs' operating income at around 70 per cent.[4]

The larger banks are involved in a range of other banking activities, including business financing, securities underwriting, risk management services, transactions services, trading in financial markets, and stockbroking. Unlike some of their large international peers, however, Australian banks have had very limited involvement in securities trading activities on their own account. Consistent with this, the larger banks have typically earned only about 5 per cent of their income from trading activities. It is therefore not surprising that they had not built up material exposures to the kinds of US structured credit securities that caused large asset write-downs for some of the larger international banks during the crisis.

In addition to their banking activities, many Australian-owned banking groups (including the four major banks) have sizeable funds management operations in Australia and, to a lesser extent, overseas. Typically, these businesses account for a smaller share of their income than their banking operations, ranging from about 5 to 15 per cent of consolidated group income for the major banks. Two Australian-owned banks, Suncorp Bank and AMP Bank, belong to financial groups that generate more of their income from insurance and funds management activities than from banking activities. Macquarie Bank – the sixth largest Australian-owned bank in terms of domestic banking sector assets – undertakes predominantly investment banking activities, generating around two-thirds of its net operating income from trading income, and fees and commissions.

An essentially uninterrupted period of economic growth from the early 1990s, combined with a rapid expansion of household balance sheets, enabled the banking system in Australia to grow continuously and maintain a fairly consistent profit stream for much of the past two decades. The post-tax return on equity for the major banks has averaged around 15 per cent since 1992 (Graph 3). The smaller Australian-owned banks have experienced broadly similar average returns over this period, though with somewhat greater volatility. These returns are similar to those of other major companies in Australia as well as those of banks in other countries prior to the global financial crisis.[5]

The Australian banking sector experienced a downturn in profits during the crisis period, but earned solid profits overall. The decline in profitability was mainly due to sizeable increases in bad and doubtful debt charges in 2008 and 2009, although they were well below those observed in many other countries' banking systems. The

3 For more information on the longer-term decline in the number of CUBS, see RBA (2006).

4 For more information on bank fees, see RBA (2011b).

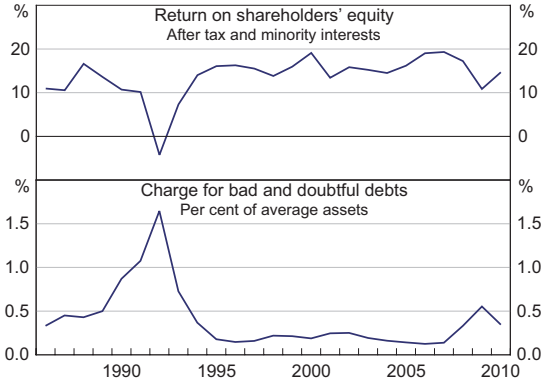
5 For more information see RBA (2010).

major banks' return on equity dropped to about 10 per cent in 2009, down from an average of about 20 per cent in 2006 and 2007, but has subsequently picked up to about 15 per cent in 2010 as bad and doubtful debt charges have declined. Smaller ADIs were more affected by the downturn than the major banks, but in general they remained profitable. The relative resilience of the Australian banking sector during the crisis reflects a number of interrelated factors. These include the relatively mild economic downturn experienced in Australia; the ADIs' focus on domestic lending; and a strong regulatory and institutional environment that promoted prudent lending standards before the crisis.

While banks continued to generate profits throughout the crisis, and asset quality weakened only modestly, they were not immune to the funding challenges that arose after the collapse of Lehman Brothers in September 2008. As in many other countries, banks' access to funding in offshore wholesale markets became impaired and securitisation markets effectively shut down (see below). In response, the Australian Government introduced a temporary fee-based guarantee on ADIs' wholesale funding in October 2008 to support ADIs' funding needs.[6] At its peak, nearly $160 billion of ADIs' wholesale liabilities were guaranteed under the scheme, equivalent to about 15 per cent of their funding liabilities at the time. The scheme was closed to new issuance in March 2010, by which time funding conditions had substantially recovered. As at April 2011, $118 billion of guaranteed wholesale liabilities were outstanding and are due to run off over the next four years.

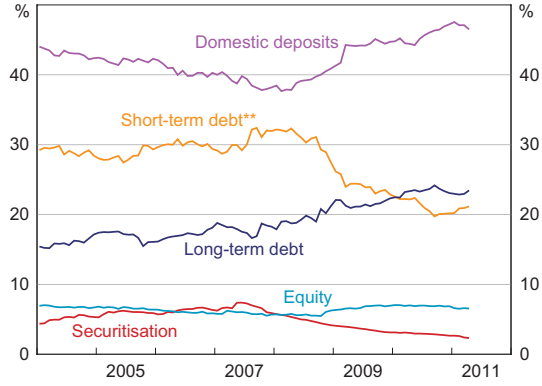
In response to the events of the crisis and the market pressures that have emerged since, as well as in anticipation of stronger global prudential regulatory standards, ADIs in Australia have sought to strengthen their funding and liquidity profiles by reducing their use of short-term wholesale funding and increasing their holdings of liquid assets. Short-term wholesale funding as a share of total ADI funding has fallen from around one-third in the years leading up to the crisis, to around one-fifth, and has been replaced by long-term wholesale debt and deposit funding sources typically regarded as more stable (Graph 4). The deposit share of ADI funding has increased from around 38 per cent to 47 per cent since early 2008, fuelled by strong competition for

Graph 3
Major Banks' Profitability*



* From 2006 data are on an IFRS basis; prior years are on an AGAAP basis; includes St. George and, from 2009, Bankwest
Source: banks' annual and interim reports

Graph 4
ADIs' Funding*
Domestic books, per cent of total



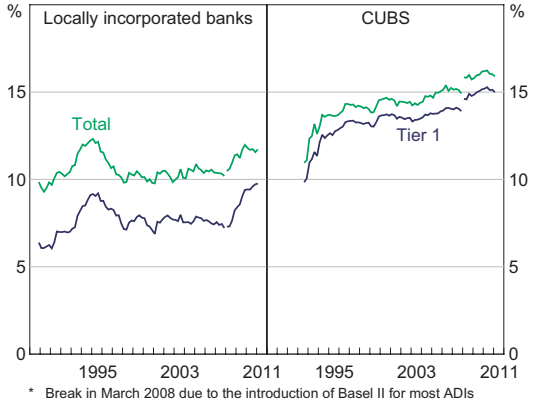
* Adjusted for movements in exchange rates
** Includes deposits and intragroup funding from non-residents
Sources: APRA; RBA; Standard & Poor's

6 For more information on the Government Guarantee Scheme see Schwartz (2010).

deposits among ADIs.[7] The breakdown of funding sources is generally different at smaller ADIs, which tend to make less use of wholesale funding and rely more on deposit funding.

ADIs had strong underlying capital positions going into the crisis, partly because APRA had applied the Basel II capital rules more conservatively than some other prudential regulators.[8] Even so, banks have increased their capital ratios further over the past few years (Graph 5). The aggregate Tier 1 capital ratio of the Australian banking sector has increased by around 2 percentage points since 2005, to 9.8 per cent in March 2011. This is well above the Basel II minimum and is the highest level since the late 1980s (when standardised minimum capital requirements came into force). The increase in capital came from a combination of equity raisings and retained earnings; the public sector did not provide capital support to any Australian institution during the crisis. The banks have focused particularly on increasing their common equity in recent years, which now accounts for nearly three-quarters of the total gross capital of the banking sector, allowing their Tier 2 capital ratios to decline. The CUBS sector in Australia is also well capitalised, with the aggregate Tier 1 capital ratio drifting up since the mid 2000s, to around 15 per cent in 2010. As a result of the strengthening of capital ratios in recent years, Australian ADIs are well placed to meet the more stringent Basel III capital requirements being phased in over the next decade or so.

Graph 5
Capital Ratios
Consolidated group, per cent of risk-weighted assets*



* Break in March 2008 due to the introduction of Basel II for most ADIs
Source: APRA

Registered Financial Corporations

Registered financial corporations (or RFCs) intermediate between lenders and borrowers, but they are not authorised to accept deposits, instead funding themselves through wholesale debt instruments. While they are required to be registered with APRA, and are subject to certain reporting requirements when their assets exceed $5 million, RFCs are not prudentially regulated by APRA. However, if they provide credit to consumers, or sell financial products or provide financial advice, then ASIC requires them to meet disclosure, licensing and conduct requirements. As well, RFCs are subject to the same market conduct and other obligations contained in the Corporations Act and administered by ASIC in respect of all companies.

The relative importance of RFCs in the Australian financial system has been declining and, as at December 2010, they held less than 4 per cent of financial system assets, down from 6 per cent in 2005.[9] As at end December 2010, around 130 registered financial corporations reported data to APRA, of which 21 are money market corporations and the remainder are finance companies. The size of reporting RFCs varies considerably, from the largest having assets of around $20 billion, while 30 or so have assets of $100 million or less. The majority of money market corporations are owned by foreign banks or securities firms and are typically involved in similar activities to investment banks in other countries. Many finance companies are involved in financing motor vehicle sales or the financing of machinery and equipment. A number

7 For more information on recent trends in bank funding and liquidity see RBA (2011a).

8 For more information on bank capital, see Gorajek and Turner (2010).

9 For more information on the activities of registered financial corporations, see RBA (2006).

of the larger finance companies are owned by Australian banks, and APRA's consolidated approach to supervising ADIs includes these subsidiaries.

Managed Funds

The managed funds sector includes assets invested by superannuation funds, life insurance companies and public unit trusts. In some cases, superannuation assets are managed by life insurance companies and other funds managers, so these holdings need to be netted out to obtain a consolidated figure which avoids double-counting. Total consolidated funds under management increased from $1 trillion in December 2005 to $1.4 trillion at end 2010, equivalent to about 30 per cent of financial system assets. Growth in funds under management has been slower over the past few years, compared with the longer-run trend, partly because of volatile investment returns during the crisis period.

Within the managed funds sector, superannuation funds are dominant and account for around 70 per cent of funds under management. The life insurance industry makes up around 13 per cent of the managed funds industry. It has increasingly focused on funds management rather than traditional life insurance business, with the industry's superannuation businesses continuing to account for the vast majority of its assets.

The remainder of the managed funds sector (for which official data are available) is accounted for by public unit trusts (such as property trusts and equity trusts), cash management trusts, common funds and friendly societies. Over the past five years, these institutions have held a smaller share of financial system assets. The attractiveness of cash management trusts has fallen, as ADIs have offered more competitive deposit products, and additional depositor protection has become available through the Financial Claims Scheme.[10]

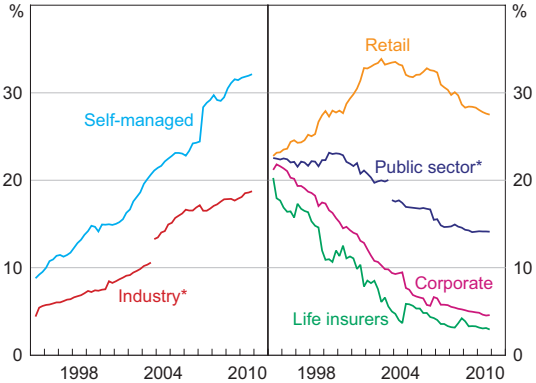
10 The Financial Claims Scheme for depositors provides timely access to deposits up to a specified limit in the event of an ADI failure.

The superannuation industry in Australia is relatively large by international standards with unconsolidated assets of around $1.3 trillion as at December 2010 (Table 2). Around 2008, the industry had a period of negative investment returns associated with falls in domestic and global equity markets. Growth in funds under management at that time was limited by poor market returns, although compulsory employer contributions ensured a steady flow of new funds. Subsequently, asset growth has resumed and asset levels have surpassed their earlier peak in 2007.

The institutional structure of the superannuation sector has changed markedly over the past five years. The share of superannuation assets in self-managed funds has increased by around 10 percentage points; and the share of superannuation assets in industry funds, which traditionally catered for employees in a particular sector of the economy, has increased by around 2½ percentage points (Graph 6). This continues a trend apparent since the mid 1990s (when data first became available) for both fund types to steadily increase their share of industry assets.

Despite the changes in the sector's institutional composition over recent years, the overall investment mix has been fairly stable. By investment type, the largest share of funds are

Graph 6
Superannuation Assets
By fund type, per cent of total, unconsolidated



* Series break in December 2003 due to coverage changes
Source: APRA

Table 2: Assets of Managed Funds

	Dec 2010		Dec 2005	
	Level	Share of total	Level	Share of total
	$billion	Per cent	$billion	Per cent
Superannuation funds	**1 274**	**69**	**793**	**59**
of which:				
Equities	364	29	211	27
Assets overseas	179	14	135	17
Units in trusts	176	14	114	14
Net equity in life offices	168	13	152	19
Deposits	159	12	60	8
Land, buildings and equipment	79	6	33	4
Short-term securities	54	4	28	4
Long-term securities	52	4	43	5
Other assets in Australia	33	3	11	1
Loans and placements	11	1	5	1
Life insurers[(a)]	**233**	**13**	**238**	**18**
Public unit trusts	**288**	**16**	**254**	**19**
of which:				
Listed property trusts	125	43	93	37
Unlisted equity trusts	98	34	89	35
Listed equity trusts	39	13	37	15
Other trusts	26	9	34	13
Other managed funds[(b)]	40	2	57	4
Total (unconsolidated)	**1 834**	**100**	**1 342**	**100**
of which:				
Cross investments	414		343	
Total (consolidated)	**1 420**		**999**	

(a) Includes superannuation assets held in statutory funds of life insurers
(b) Cash management trusts, common funds and friendly societies
Sources: ABS; RBA

allocated to domestic equities, at almost one-third, while overseas assets, units in trusts, life offices and deposits each account for between 12 and 14 per cent of funds. A notable exception to the stable investment mix has been the rise in the share of assets invested in deposits from 8 per cent to 12 per cent. This is likely to be in response to the more attractive interest rates now available on deposits as well as greater caution and lower risk appetite reducing somewhat the appeal of other investments; funds are also paying more attention to their own liquidity needs following the experience of the crisis.

Defined-benefit schemes have accounted for around 10 per cent of the superannuation industry since 2005, after declining in importance for at least the previous decade. The rest of the superannuation industry is roughly evenly divided between defined-contribution funds, where the investor's return depends entirely on the market performance of their invested assets, and 'hybrid' schemes, which comprise a combination of defined-benefit and defined-contribution characteristics.

The assets of life insurers have increased more slowly than those of superannuation funds. Like superannuation funds, a large portion of life insurers' assets are in the form of equities and units in trusts. The profits of life insurers have been weaker in recent years due to lower investment returns, but in 2009/10 they returned to more typical levels.

Hedge funds are included within the managed funds data, although they are not able to be identified separately from other fund types. Separate surveys indicate that this segment is still relatively small in Australia, with total assets under management estimated at around $50 billion as at September 2010.

General Insurance

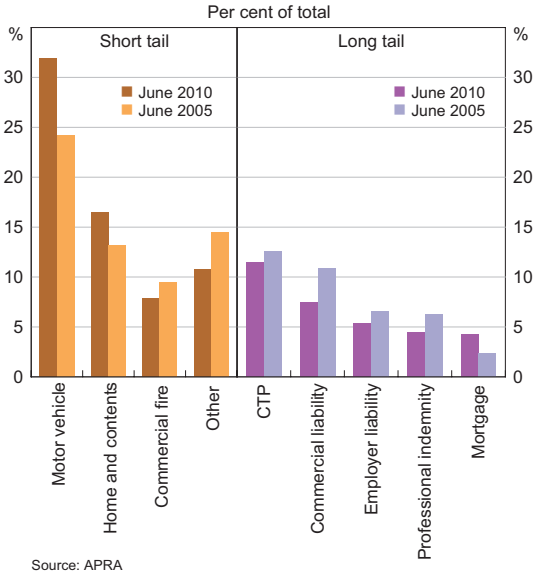
As at end 2010, Australian general insurance companies had assets of $133 billion, accounting for around 3 per cent of financial system assets. There are 116 licenced general insurers and 12 reinsurers in Australia, with the total number remaining relatively steady over the past five years. The general insurance industry is fairly concentrated, with the three largest institutions (Suncorp, QBE and IAG) accounting for just over half of industry assets as at June 2010. Since 2005, this share has grown, mainly because of the merger of Suncorp and Promina in 2007, which were two of the largest domestic insurance groups at the time.

The general insurance industry has generally recorded solid profits over the past five years. The industry's post-tax return on equity declined from around 18 per cent in 2007 to 9 per cent in 2009 due to weaker underwriting results and interest rate movements, before recovering to around 15 per cent in 2010 which is roughly in line with the average over the past decade. The contribution of investment income to industry profits over the past five years has been broadly stable, despite share market volatility, reflecting the relatively large share of fixed-interest assets in their portfolios. General insurers are well capitalised, with the industry as a whole holding around double the regulatory minimum amount of capital.

In terms of business activities, around two-thirds of insurers' revenue comes from 'short tail' policies, providing cover for risks against losses that are typically incurred within 12 months of receipt of premiums (Graph 7). The most prominent examples are motor vehicle insurance and home insurance. Their remaining policies are 'long tail', such as professional indemnity insurance and mortgage insurance. Some of the change in the share of premium revenue earned from short tail versus long tail policies has been due to differing levels of competition in different product lines.

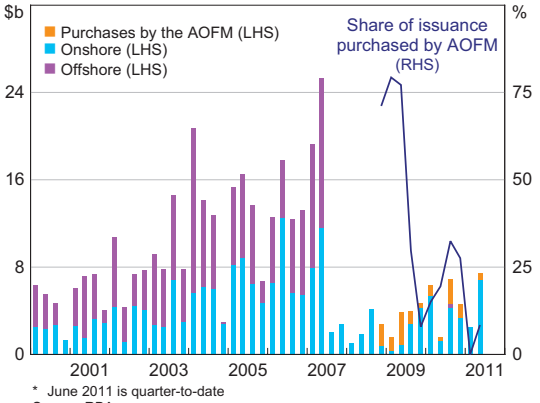
In addition to diversified insurers, there are insurers who specialise in particular market segments, such as lenders' mortgage insurers (LMIs). LMIs provide insurance to ADIs and other lenders to reimburse them against shortfalls following a default and sale of a mortgaged property. In Australia, the provision

Graph 7
General Insurers' Net Premium Revenue
Per cent of total



Source: APRA

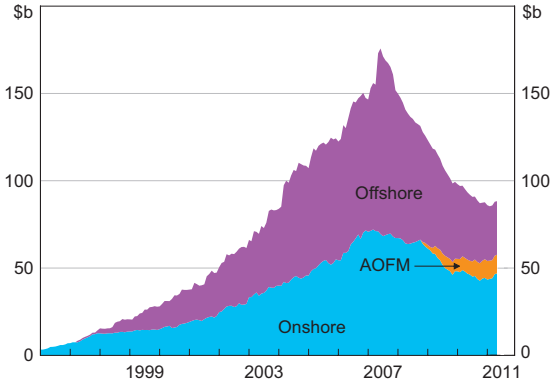
Graph 8
Australian RMBS Issuance*
A$ equivalent



* June 2011 is quarter-to-date
Source: RBA

of lenders' mortgage insurance is dominated by two institutions, Genworth and QBE, following QBE's purchase of PMI in 2008. The other main participants are three so-called captive LMIs, owned by two of the major banks, and used to self-insure a portion of their loans.

Graph 9
Australian RMBS Outstanding



Sources: AOFM; Bloomberg; RBA; Standard & Poor's

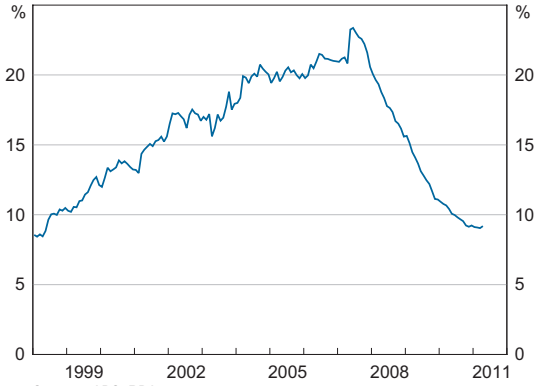
Securitisation

Another change in the structure of the financial system over the past five years has been a reduced reliance on securitisation funding. From around the mid 1990s until the crisis, the securitisation market in Australia expanded rapidly.[11] The size of securitisation vehicles reached 7 per cent of financial system assets in mid 2007 but declined to 3 per cent as at December 2010, due to the problems that emerged in US residential mortgage-backed securities (RMBS) markets in 2007 causing severe brand damage to securitisation markets globally. Most securitisation in Australia involves RMBS, and even though the collateral underlying Australian RMBS continued to perform strongly, the issuance of RMBS in Australia slowed significantly from late 2007 (Graph 8). The value of outstanding RMBS has halved, particularly for offshore holdings (Graph 9).

When securitisation issuance fell sharply in 2007, the share of outstanding housing loans funded through securitisation declined sharply (Graph 10). Lenders who had relied heavily on securitisation experienced significant falls in their market share. The major banks' share of new housing loan approvals increased from about 60 per cent in 2007 to over 80 per cent in 2008 (Graph 11). To support competition in the housing loan market, the

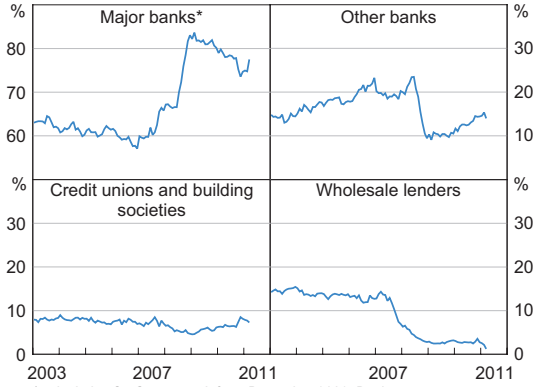
11 For more information on the securitisation market, see Debelle (2010).

Graph 10
Share of Housing Credit Funded by Securitisation



Sources: ABS; RBA

Graph 11
Owner-occupier Loan Approvals
Share of total by value, seasonally adjusted



* Includes St. George and, from December 2008, Bankwest
Sources: ABS; APRA; RBA

Australian Office of Financial Management (AOFM) was mandated by the Treasurer in September 2008 to purchase up to $8 billion of RMBS, with $4 billion to be made available to non-ADI mortgage originators. The program was extended by a further $8 billion in October 2009 and another $4 billion in December 2010. The proportion of new RMBS issuance supported through purchases by the AOFM has been declining as RMBS issuance has been slowly recovering.

Conclusion

ADIs hold the largest share of financial system assets and their share has been growing over the past five years, continuing a longer-term trend. Within the ADI sector, there has been consolidation, particularly during the financial crisis, and there are fewer institutions, especially in the CUBS sector. ADIs remained profitable overall during the financial crisis, as their business focus underpinned their profitability, although they still underwent a number of changes in response to the crisis. Like many other deposit-taking institutions around the world, ADIs have strengthened their capital position, and improved the resilience of their funding by increasing the proportion sourced from deposits and longer-term securities.

The superannuation sector continues to grow, although lower investment returns have slowed the average pace of growth over the past five years. There has been considerable change in the types of funds managing superannuation assets, with self-managed and industry funds increasing their market shares over this period.

As with ADIs, concentration within the general insurance industry has increased over the past five years, owing mostly to merger activity. The industry's business activities have, however, been broadly unchanged over recent years. General insurers maintain a relatively conservative investment mix, consistent with the typically short-term nature of the insurance policies they write.

Securitisation vehicles have decreased their share of financial system assets, following the damage to the reputation of securitisation during the financial crisis. This has reduced the market shares of lenders in the residential mortgage lending market who relied most heavily on this source of funding, and the share of housing credit funded by securitisation over the past five years. In the latest year, however, the smaller lenders have begun to recover market share as conditions in securitisation markets have improved.

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Electronic Trading and the Australian Foreign Exchange Market

Alexandra Heath and James Whitelaw*

The introduction of electronic broking to the foreign exchange market in the early 1990s signalled the start of a process of innovation that has driven significant change. This article looks at the evolution of electronic trading in the global foreign exchange market and focuses on its impact on the behaviour of banks globally and in the Australian market.

Introduction

Electronic trading has been a significant factor behind a number of changes in the structure of the foreign exchange market and the way the market operates. These developments include improvements in the price discovery process, a concentration of activity among a relatively small number of large global banks, a blurring of the traditional activities of different market participants, a marked increase in the activity of non-bank participants and the emergence of new market segments.[1]

This article starts by describing the evolution of electronic trading in foreign exchange and its impact on the global foreign exchange market. It then discusses the extent to which changes in the behaviour of banks and their customers at the global level are evident in the Australian market.

The Evolution of Electronic Trading in Foreign Exchange

Until the introduction of electronic broking systems in the early 1990s, price discovery and trade execution occurred predominately over the telephone. A dealer looking to establish or offset a foreign currency position would typically contact several other dealers by telephone to obtain quotes.[2] While dealers broadcast quotes for foreign currency on electronic information systems used by market participants, these were for indication only. Relative to price discovery today, this iterative bilateral process could be slow and was less transparent. Nevertheless, the bulk of trades between dealers were conducted on this direct bilateral basis.

Dealers also used brokers as intermediaries to transact indirectly with other dealers in the interdealer market. These transactions were also conducted over the telephone. Dealers could place bids (to buy) or offers (to sell) with the brokers for specific amounts and the brokers would communicate the current market price to other dealers. By providing a venue for price discovery, each broker eliminated the need for the iterative price discovery process required in direct trades between dealers. However, as the brokers were effectively matching buyers and sellers and did not provide liquidity themselves, there was no guarantee that liquidity would be available to match a dealer's interest. In addition, dealers using brokers did not know the identity of their counterparty at the time of execution. If the executing dealer was unable to deal with the counterparty due to credit limits, or other issues, the trade had to be 'switched'

* The authors are from Financial Markets Group and would like to thank Alexandra Dwyer and Vicki Newman for their valuable contributions.

1 Price discovery is a term often used to describe the process of establishing the best price at which a financial asset, in this case foreign currency, can be bought or sold at a point in time.

2 The term 'dealer' includes both commercial and investment banks.

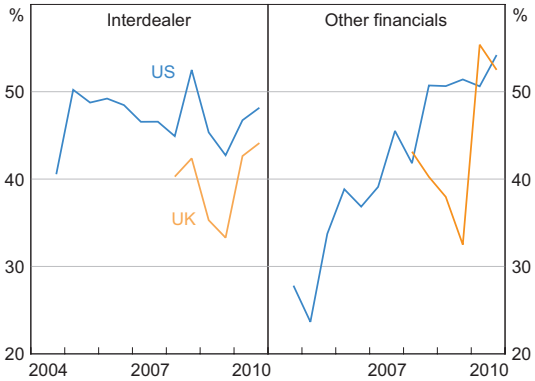
by the broker to a new counterparty. Confirming that the trade had been switched to an acceptable counterparty could take time.

Electronic trading in the foreign exchange market effectively began in the interdealer market with the introduction of electronic broking systems provided by Reuters (in 1992) and EBS (in 1993). Demand for these services came from institutions participating in the interdealer market looking for efficiency gains they were already realising from electronic trading in other markets, in particular the equity market. The electronic broking systems offered by Reuters and EBS largely replicated the role played by the existing brokers (now differentiated by the term 'voice brokers') but provided an enhanced service. The platforms displayed, in real time, the best bid and offer as well as the depth of the market, based on the orders posted by participating banks.[3] As each bank entered counterparty credit limits into the systems prior to trading, the post-trade credit problem encountered when using the voice brokers was eliminated. The two broking systems greatly improved transparency of the price discovery process thereby facilitating more efficient offsetting of net foreign currency positions in the interdealer market.

The adoption of electronic trading through Reuters and EBS was swift. Data for the US market indicate that close to half of all interdealer transactions, by value, were executed electronically by 2005 (Graph 1, left panel). More recent data for the UK market indicate a similar figure. These aggregate figures obscure considerable variation both by instrument and by reporting entity. The penetration of electronic trading is higher for spot transactions than for other types of transactions and significantly higher for some dealers than others.

Until around 10 years ago, corporate and financial customers of banks did not have direct access to the price discovery process in the interdealer market and were generally subject to considerably less attractive

Graph 1
Electronic Execution
Share of turnover in each market



Sources: Foreign Exchange Committee; London Foreign Exchange Joint Standing Committee

pricing than was available to their banks. The introduction of the electronic broking systems did not improve access for this segment of the market as participation was limited to banks for some time. However, in the early 2000s, developments in electronic trading began to transform the trading relationship between banks and their customers.

One key development was the decision by a number of large global banks to develop internal proprietary trading platforms for foreign exchange and to provide their more sophisticated financial customers, including hedge funds and other banks, with access to them. In contrast to the electronic broking platforms, which provide a venue for matching trades between many possible counterparties, the providing bank was counterparty to every transaction on its proprietary platform. The decision to develop these platforms was taken partly in response to demand from customers and partly as a defensive step given the emergence of alternative trading venues. But, most importantly, these systems were seen as being instrumental in increasing market share and improving internal risk management. It was realised that electronic trading would transform the economics of the trade process and that scale would become increasingly important. Given the very large investment

3 Both Reuters and EBS platforms were structured as 'limit order books' composed of orders by participating banks for specific amounts at specific prices. Depth of market refers to the amount of interest to buy and to sell at each price point.

required to develop and maintain these systems, this approach only made commercial sense for the largest of the banks active in the foreign exchange market.

These proprietary bank trading systems, known as single-bank platforms, gave customers direct access for the first time to streaming price quotes and guaranteed access to liquidity. These systems facilitated straight-through-processing of transactions by automating post-trade confirmations, trade allocation and settlement. They also provided customers with real-time information on all parts of the trade process. Access to this technology reduced the cost for customers of executing and managing their foreign exchange business.

The single-bank platforms enabled the providing banks to capture and analyse information in real time about the foreign exchange business they were transacting. This in turn enabled the banks to develop highly automated approaches to matching offsetting customer business internally and to managing the residual net foreign currency positions. This development has become known as the internalisation of customer flows. To the extent that foreign exchange business can be internalised, banks have less need to offset positions in the interdealer market (Nightingale, Ossolinski and Zurawski 2010). This has reduced the cost to the banks of providing guaranteed liquidity to their customers over their trading platforms.

Another important development at this time was the emergence of multi-bank electronic platforms for foreign exchange. These platforms met a demand from non-bank firms for access to pricing from multiple sources. Some of these platforms operated a 'request-for-quote' market in which participants seeking liquidity could request quotes from participating banks for specific amounts at a point in time. The multi-bank request-for-quote platforms effectively replicated the traditional interdealer direct approach to price discovery, but using a more efficient electronic process. Other multi-bank platforms operated limit-order books like the Reuters and EBS broking systems, with streaming prices from multiple sources. Some of these platforms allow non-bank participants to also post prices. As a result, non-bank participants need not trade with a bank through these platforms but can deal directly with other non-banks.

The direct access of non-bank customers to electronic trading platforms was also facilitated by the increased use of technology within the prime brokerage businesses of the global banks (King, Osler and Rime forthcoming).[4] Prime brokerage for foreign exchange first appeared in the mid 1990s but was initially focused on hedge fund business. In the early 2000s, prime brokerage businesses started to expand their foreign exchange coverage, a process facilitated by new market technologies dedicated to the foreign exchange prime brokerage process. By 2005, both Reuters and EBS had introduced products that provided customers of prime brokers with direct access to their matching platforms. For the first time, smaller banks and non-bank financial institutions could directly access the liquidity and pricing available to the largest foreign exchange dealers on these two platforms. Data collected by the London Foreign Exchange Joint Standing Committee indicate that almost 30 per cent of turnover in spot foreign exchange in late 2010 was conducted by clients of prime brokers.

Another significant development was the emergence in the early 2000s of retail aggregators (King *et al* forthcoming). These are internet-based businesses that aggregate small retail foreign exchange transactions into parcels large enough to execute at wholesale market prices on the same platforms available to banks and other institutional participants. Like the single-bank proprietary

4 Prime brokerage is an arrangement between a bank and a customer, typically a financial institution such as a hedge fund, in which the bank provides the customer with a range of services in return for a fee. These services can include the provision of a line of credit, access to market liquidity in the bank's name, collateral management, and clearing and settlement services. A prime brokerage relationship is a precondition for most non-bank entities to have direct access to electronic markets.

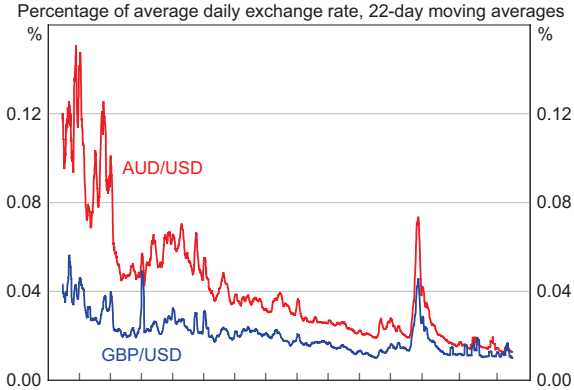
platform providers, retail aggregators look to match much of their customer business internally. Retail aggregators offer retail participants wholesale pricing, typically through a margin trading model.[5] While the traditional clients of retail aggregators were individual investors, small professional proprietary trading firms appear to be a growing part of the client base.

The access of non-bank financial institutions, corporate entities and retail investors to electronic trading platforms, and the advantages of using those platforms, have also driven a significant increase in the share of customer-related foreign exchange business that is conducted electronically. Data from the United States and the United Kingdom show that the share of trading between banks and their financial customers conducted electronically increased steadily from less than 30 per cent in 2004 to more than 50 per cent by 2010 (Graph 1, right panel).

The increased penetration of electronic trading in the foreign exchange market has led, directly or indirectly, to several important changes in the way the market is structured and operates:

- The increased efficiency and transparency of price discovery delivered initially by the electronic broking systems and then by the single-bank and multi-bank trading platforms have driven a marked decline in transaction costs, as measured by the difference between the price at which participants can buy and sell a currency at a point in time, known as the bid-ask spread (Graph 2).
- Price discovery now takes place across multiple venues, a development sometimes described as 'liquidity fragmentation'. In principle, liquidity fragmentation could make price discovery less efficient. However, market participants can now aggregate real-time price streams from multiple venues and execute on any one of them, effectively treating multiple markets as one. Some have also argued that the ability to post prices for a single trade across multiple venues creates the perception of greater market liquidity than is actually available. The implications of this 'liquidity mirage' are not entirely clear.
- There has been a marked increase in the concentration of foreign exchange activity across the books of a relatively small number of large global banks (Gallardo and Heath 2009) (Graph 3). This reflects, to a large extent, the impact of the single-bank platforms on the distribution of foreign exchange business. It is notable that the most recent surveys of market concentration indicate a modest decline in concentration as other global banks look to emulate the success of the early movers using this model (Euromoney 2011).
- Increasingly, banks are sourcing foreign currency liquidity for their customers from the large global banks. In some cases, this can involve an arrangement known as white labelling, where a bank provides streaming prices to its customer through a proprietary electronic interface. The

Graph 2
Average Daily Bid-ask Spreads
Percentage of average daily exchange rate, 22-day moving averages



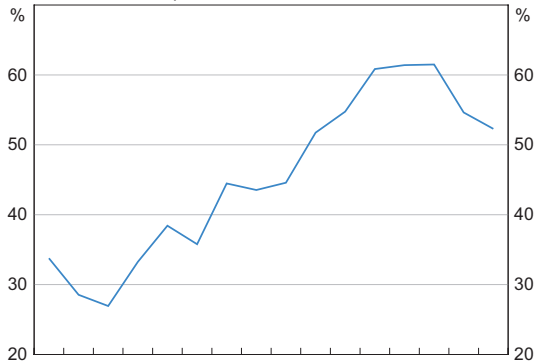
Source: SIRCA (Reuters)

5 In a margin trading model, the retail investor places a deposit with the broker in a margin account. The broker lends additional funds to the investor against the security of the funds in the margin account. The investor can then establish positions in the foreign exchange market up to the sum of their own funds and the funds provided by the broker. If the investor's position sustains revaluation losses, these will be set off against the funds in the margin account and the investor will be required to deposit additional funds. The broker protects its exposure to the investor by ensuring the position is unwound prior to the loss exceeding the margin account balance.

streaming prices appear to be from the customer's bank but are, in fact, being provided directly but anonymously by another bank. In other cases, banks have become customers of the global banks for some foreign currency liquidity, particularly in the major currency pairs, but they continue to provide liquidity directly to their customers and to other banks, including the global banks, in their domestic currencies.

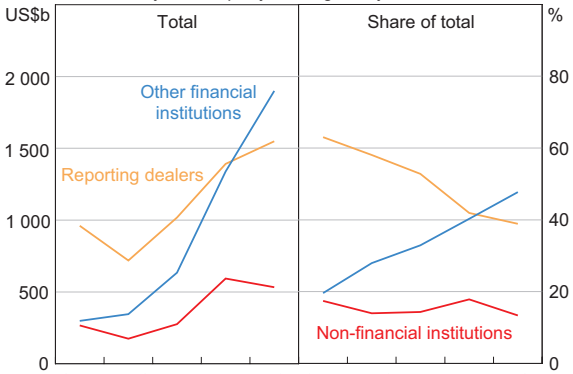
- There has been some breakdown in the distinction between the traditional interdealer and customer markets. With direct electronic access and, where required, prime broker sponsorship, some non-banks can now directly access pricing and liquidity that was traditionally only available to banks. In addition, there has been some blurring between the roles of banks and their customers. As noted, many banks now participate in the foreign exchange market as customers of the largest banks while some non-banks now post bids and offers on electronic platforms, effectively competing with banks as market makers.
- There has been a significant increase in the volume of foreign exchange business undertaken by dealers with their customers, which include other financial institutions, such as hedge funds, and non-financial institutions (Graph 4, left panel). Greater access to both single-bank and multi-bank platforms, broader support from prime brokers and reduced transaction costs are among the factors behind this trend. The increase in the volume of customer business is also reflected in a rise in the share of total foreign exchange activity globally that is executed by dealers with their customers (Graph 4, right panel). However, this increase also reflects the increasing internalisation of customer business by the large dealers; a given volume of customer business will now lead to less activity between dealers than it would have 10 years ago.
- Electronic trading has also enabled new customer market segments to develop. As noted earlier, retail investors have become an increasingly important part of the market. This is particularly true in Japan where retail margin trading has generated large enough foreign exchange flows to help explain developments in specific exchange rate pairs (Terada, Higashio and Iwasaki 2008; D'Arcy and Zurawski 2009). More recently, attention has increasingly focused on the role of high-frequency traders, for whom the ability to trade electronically is a precondition. Although the development of high-frequency trading was noted as an important new market segment before 2007 (Galati and Heath 2007), there appears to have been particularly strong growth in this market segment between 2007 and 2010 (Nightingale *et al* 2010; King and Rime 2010).

Graph 3
Foreign Exchange Market Concentration
Top five dealers' market share



Source: *Euromoney*

Graph 4
Global Foreign Exchange Turnover
By counterparty, average daily turnover



Source: BIS

The Australian Foreign Exchange Market

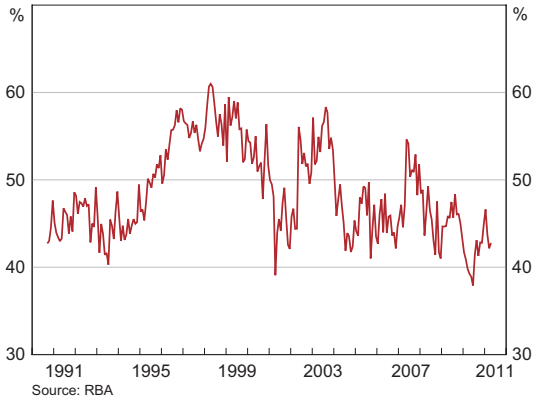
The developments outlined above are well documented at the global level and are clearly evident in data from large financial centres such as New York and London. This section looks at data on activity in the Australian foreign exchange market to see to what extent these same trends are evident.

As is the case globally, there has been an increase in concentration of activity in the Australian market over the past decade. In 1998, 16 dealers accounted for more than 90 per cent of turnover in Australia. In 2010, that same market share was accounted for by just 10 dealers. Interestingly, the consolidation has occurred entirely within the foreign bank dealer community. While this is partly the result of some foreign banks leaving Australia and others being involved in merger activity, it also reflects the concentration of business facilitated by electronic trading at the global level discussed above. The foreign banks with the largest market share in Australia are the same firms that have the largest global market shares (Euromoney 2011).

The five domestic banks that are among the largest local foreign exchange dealers do not appear to be losing market share to the large global banks. The market share of the domestic banks has fluctuated mostly between 40 and 50 per cent over recent years, lower on average than in the late 1990s but comparable with the first half of the 1990s (Graph 5). In a sense, this is surprising. While the large Australian banks are important liquidity providers in Australian and New Zealand dollars, and all provide electronic trading options for their customers, it is not obvious that they are well placed to employ the same foreign exchange business model used by the large global banks. The ability of the domestic banks to maintain significant market share would appear to reflect the importance of the relationships they have with their domestic client base. Another factor could be the relatively small size of the investor community in Australia that trades foreign exchange on an automated basis, such as hedge funds and high-frequency trading firms.

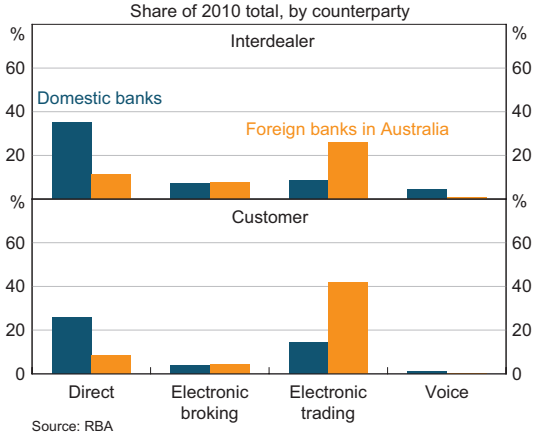
The difference in approach of the large domestic and large foreign banks is reflected to some extent in survey data on foreign exchange execution methods collected as part of the BIS Triennial Survey. Disaggregated data for Australia show that foreign banks in Australia execute a significantly greater portion of their trades across electronic trading platforms than domestic banks. The distinction is clearest for spot transactions, which are most likely to be traded electronically, in both the interdealer and customer markets (Graph 6).

Graph 5
Domestic Share of Total Turnover



Source: RBA

Graph 6
Spot Turnover
Share of 2010 total, by counterparty



Source: RBA

While the strategic focus of foreign exchange businesses within the large domestic banks varies, the banks, as a group, appear to have chosen to maintain a focus on servicing their local client base, which includes large exporters and importers as well as large asset managers. As a result, domestic banks dominate activity with local customers and other banks operating in Australia (Graph 7). They also have significant relationships with offshore institutional customers based around their expertise in Australian dollar denominated products and, in some cases, their expertise in regional financial markets. It is likely, however, that Australian banks have become customers of the large global banks for some currencies for which they do not have such an advantage. New customer segments, such as retail margin trading and high-frequency trading do not appear to have been as important for the Australian market as they have been for the global market over the past five years or so (Nightingale *et al* 2010).

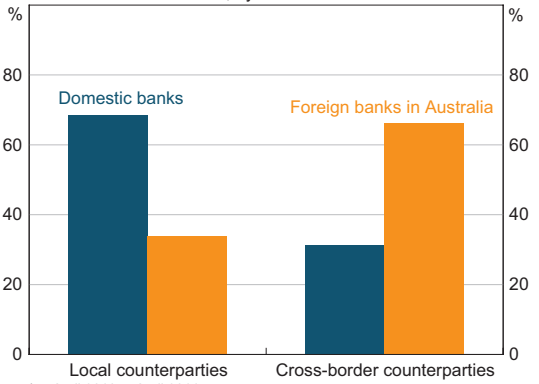
In contrast, foreign banks in Australia trade more actively with cross-border counterparties, and growth in cross-border trade has been a particularly important driver of turnover growth in Australia over the past four years. A significant share of interdealer trades by foreign banks are also reported to have been conducted with related parties, which are likely to be other entities belonging to the same banking group (Graph 8). This share has also grown significantly over the past four years, and is consistent with the increased ability of large global banks to manage their risks at the international level, a development enabled by improvements in technology.

Conclusion

Developments in electronic trading technologies over the past two decades have been an important driver of change in the global foreign exchange market. For banks, three key developments have been a marked increase in the concentration of foreign exchange activity, a change in the relationship between banks in the interdealer market and a significant increase in the volume and share of business conducted with non-bank customers.

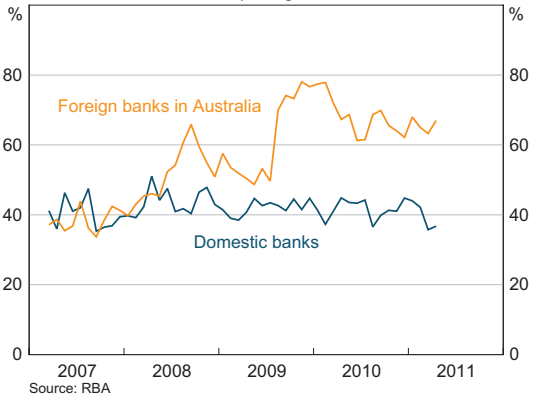
In the Australian market, these developments are apparent in turnover data for foreign banks as a group. There has been some concentration of market activity among foreign banks in Australia. The growth in turnover for these banks has been driven by cross-border trades with related parties in recent years, and these trades are more likely to be executed electronically than they are for local banks. Against this backdrop, Australian domestic banks have largely maintained their market share

Graph 7
Foreign Exchange Turnover by Counterparty*
Share of total, by head office location



* April 2010 to April 2011
Source: RBA

Graph 8
Related Party Foreign Exchange Turnover
Share of total reporting dealer turnover



Source: RBA

because of their significant and long-established relationships with the domestic customer base and their comparative advantage in making markets in Australian and New Zealand dollars.

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Global Commodity Markets – Price Volatility and Financialisation

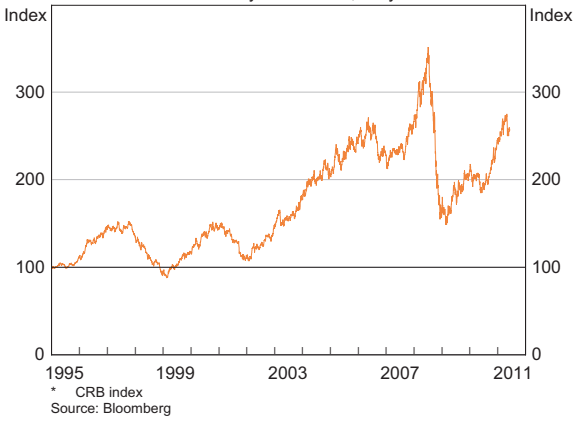
Alexandra Dwyer, George Gardner and Thomas Williams*

A significant increase in the level and volatility of many commodity prices over the past decade has led to a debate about what has driven these developments. A particular focus has been on the extent to which they have been driven by increased financial investment in commodity derivatives markets. This article examines the factors behind the increase in the level and volatility of commodity prices. The available evidence suggests that while financial investors can affect the short-run price dynamics for some commodities, the level and volatility of commodity prices appear to be primarily determined by fundamental factors.

Introduction

The past decade has witnessed a large increase in the prices of many commodities, despite significant falls during the global financial crisis (Graph 1). These increases have raised a number of concerns for policymakers, including the potential for rising commodity prices to feed into broader domestic inflation pressures, with some developing nations particularly concerned about rising food prices. The G-20 has committed to 'work to address excessive commodity price volatility', with a focus on the role played by the growing presence of financial investors in commodity markets. While speculators are present in commodity markets they do not appear to have contributed significantly to the level or volatility of prices except in the very short term. At this stage, the available evidence suggests that fundamental factors are the main determinants of commodity prices.

Graph 1
Commodity Prices*
1 January 1995 = 100, daily



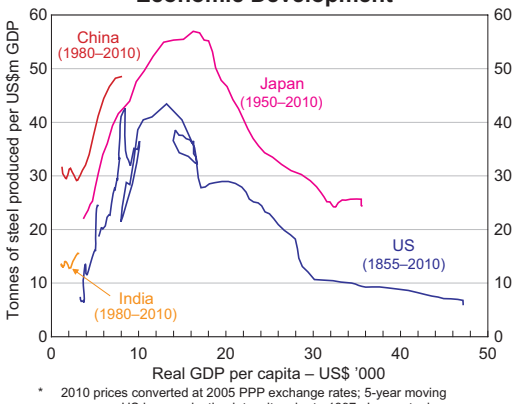
* CRB index
Source: Bloomberg

Fundamental Drivers of Recent Commodity Prices

The substantial increase in commodity prices over the past decade has been supported by a number of fundamental drivers. One of the most significant has been the shift in the composition of global growth over this period, as emerging market economies – particularly China – have come to prominence as the engines of world growth. Since these emerging market economies are generally at a relatively commodity-intensive stage of development, there has been a corresponding shift in global demand towards commodities as these countries industrialise and expand their infrastructure (Graph 2). Food prices have also been affected by economic development, with the composition and volume of food intake changing as per capita

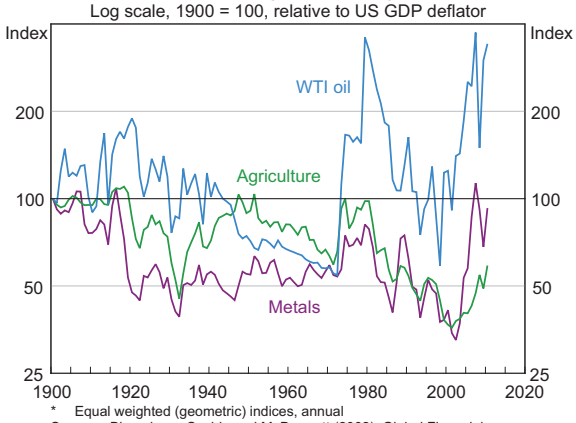
* The authors are from International Department.

Graph 2
Steel Production Intensity and Economic Development*



* 2010 prices converted at 2005 PPP exchange rates; 5-year moving averages. US iron production intensity prior to 1897. Japan steel production is by fiscal year prior to 1980.
Sources: Conference Board Total Economy Database (January 2011); IMF; Japan Iron and Steel Federation; Johnston and Williamson (2010); Maddison (2009); RBA; US Bureau of Mines; US Geological Survey; World Steel Association (worldsteel)

Graph 3
Real Commodity Prices by Sector*
Log scale, 1900 = 100, relative to US GDP deflator



* Equal weighted (geometric) indices, annual
Sources: Bloomberg; Cashin and McDermott (2002); Global Financial Data; Grilli and Yang (1988); IMF; RBA; Thomson Reuters

income in these economies rises, generally resulting in a shift away from grains towards higher protein foods such as livestock and dairy, which have high resource footprints.[1] These trends are likely to continue for some years.

At the same time, supply has struggled to keep pace with the unexpectedly rapid rise in emerging market demand over the past decade. Relatively low and falling real commodity prices throughout the 1980s and 1990s resulted in low levels of investment in production capacity for some commodities. Given the long lead time to bring new production online for many commodities – such as the time to undertake mineral exploration and subsequently build a new mine – prices have increased substantially in order to clear the market, prompting a pick-up in investment.

Weather-related disturbances – droughts, floods, cyclones – in some key producer countries have also boosted the prices of a number of agricultural commodities over recent years. The imposition of export bans (often in response to food security concerns) has further contributed to global supply shortages of some food stocks at times. In addition, accidents and natural disasters have periodically reduced output at mines, including for copper and coal.

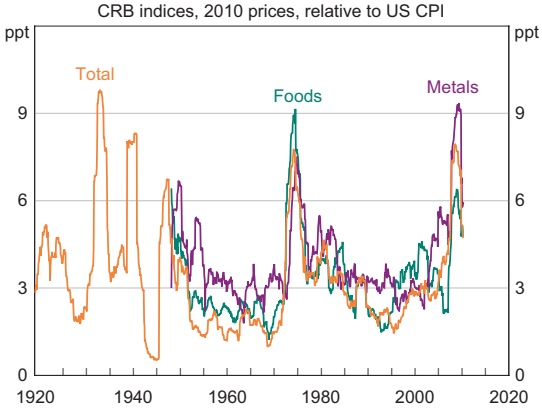
To place the recent price movements in a historical perspective, such a sharp increase in real commodity prices has not been seen since the 1970s (Graph 3). Following the 1970s episode, real commodity prices fell for most of the subsequent two decades. While oil and metals prices are quite high in real terms by historical standards, regaining or exceeding their levels of 40 years ago, real agricultural prices remain well below their previous peaks.

Commodity Price Volatility

The recent increase in the level of commodity prices has been accompanied by a significant rise in the *volatility* of commodity prices (Graph 4). While price signals play an important role in boosting future supply and allocating existing supply, volatility in prices can hinder this process by generating uncertainty about future price levels. The primary focus of this article is on price volatility occurring over a period of months or longer, as this is the frequency at which it can materially affect firms' investment and production decisions. Shorter-term volatility is not inconsequential, however, as it can cause disruption within financial markets.

1 See Rayner, Laing and Hall (2011).

Graph 4
Real Commodity Price Volatility*
CRB indices, 2010 prices, relative to US CPI



* Standard deviation of monthly percentage price changes over preceding 2 years
Sources: Global Financial Data; RBA

The recent increase in commodity price volatility raises two related questions: how does commodity price volatility typically compare to that of other prices? And how unusual is the current level of commodity price volatility?[2]

Starting with the first question, commodity prices do tend to be more volatile than many other prices in the economy because in the short term both global supply and demand for commodities are relatively price inelastic. For example, increasing the level of production takes time if new crops must be grown, mineral exploration undertaken or new mines built. Similarly, it can take considerable time to change consumption habits, such as shifting from coal-fired electricity generation to gas, or altering the share of more fuel efficient cars in the outstanding stock of automobiles. This sluggish response means that supply and demand shocks, due to weather events or natural disasters for example, can result in large price movements in order to clear the market.

The higher volatility of some commodity prices is also related to the fact that many commodities are traded in transparent, continuously priced markets – in contrast to many other goods and services. These commodity prices can thus reflect news and changes in economic (and financial) conditions more quickly than do consumer prices, which manifests as higher average volatility.

Commodity prices are sometimes considered to be even more volatile than other prices that adjust on a daily basis, such as financial prices. However, this is generally the result of comparing the prices of individual commodities to broad-based indices of certain asset classes. For example, the volatility of broad commodity indices is similar to that of broad equity indices, while the volatility of prices for individual commodities tends to be around that for individual share prices (Table 1).

Table 1: Volatility in Commodity and Other Asset Prices
Standard deviation of daily returns, percentage points

	Jan 90–Jun 07	Jul 07–May 11
Individual prices		
Natural gas	3.6	3.5
WTI oil	2.3	2.9
Sugar	2.1	2.7
Rice	1.7	1.8
Wheat	1.6	2.6
Copper	1.4	2.2
Soybeans	1.3	1.9
Gold	0.9	1.4
Individual S&P 500 companies (average volatility)	2.4	2.8
Commodity and financial indices		
S&P 500 energy index	1.2	2.3
Goldman Sachs Commodity Index	1.2	1.9
S&P 500 index	1.0	1.7
CRB index	0.9	1.5
US$ per A$	0.6	1.2

Sources: Bloomberg; RBA

2 There are a number of ways to measure commodity price volatility, with no clear 'best' approach in all circumstances. This article uses the standard deviation of percentage changes in prices over a set time period, or 'window', but in most cases the broad results do not materially change when other approaches are used.

While commodity prices can be expected to be volatile relative to some other prices, commodity price volatility has recently been quite high relative to history at both an aggregate and sector level. The proximate cause of this heightened volatility was the global financial crisis, which saw very large falls and subsequent recoveries in a number of commodity prices, in line with large swings in actual and expected global demand through this period. This degree of commodity price volatility is, however, similar to that witnessed during other periods of large global shocks such as the Great Depression and the 1970s (Graph 4).

Financial Investment in Commodities

It has been suggested that, in addition to fundamental supply and demand factors, the activity of speculators in financial markets may have played a significant role in contributing to the increase in the level and volatility of some commodity prices in recent years. This section describes the growing presence of financial investors in commodity derivative markets, while the next section examines the evidence of the effect of this growth on observed commodity price dynamics over the past decade.

Financial markets provide a useful complement to physical commodity markets because they allow consumers and producers to hedge their exposures to movements in commodity prices. These markets exist precisely *because* prices can be volatile, and allow uncertainty about future price movements to be managed. For example, a farmer could purchase a forward contract at the time of planting a crop, to give certainty about the price that will be received upon harvest. Financial investors provide additional liquidity to these markets, and can improve price discovery.

In theory, there should be a relationship between futures prices and spot prices determined by the 'cost of carry'. This is the opportunity cost of buying and holding a good or financial instrument versus purchasing a futures contract for delivery in the future. In the case of commodities, holding a physical commodity can incur large storage costs, complicating the ability of arbitrage to maintain the relationship. To the extent that such a relationship does hold, any increase in volatility in futures markets could lead to greater volatility in the spot market. However, the relationship also means that if supply and demand factors underpin the spot price, the futures price will be unable to significantly deviate from this fundamental price for an extended period of time.

Over the past decade, regulatory changes and the development of new financial products have allowed financial investors – who do not have a commercial exposure they need to hedge – greater access to commodity futures markets. Demand from investors has been strong, with the 'search for yield' prevalent in financial markets making commodities an appealing investment option. Additionally, influential research by Gorton and Rouwenhorst (2006) highlighted the diversification benefits of including commodities in a portfolio.[3] Some recent surveys of market participants have indicated that desire for return and diversification benefits remain the two key motivations for commodity investment.[4]

Reflecting these incentives, financial investment in commodities has grown rapidly, with assets under management approaching US$410 billion in the first quarter of 2011 (Graph 5). Most of the early investment in commodities was through broad-based commodity index funds, which use derivatives contracts to replicate the return of a specific commodity index, such as the Goldman Sachs Commodity Index. The majority of investment in recent years has been concentrated in exchange-traded products (ETPs) tracking commodities.[5] Almost all non-precious metal commodity ETPs use derivatives to give investors an exposure to commodities, with only a few holding the physical

3 A draft of Gorton and Rouwenhorst's paper was released in 2004.

4 See, for example, Barclays Capital (2010).

5 See Kosev and Williams (2011) for more details on ETPs.

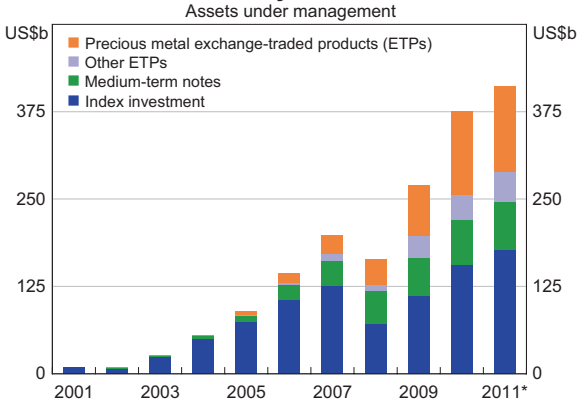
commodities. The analysis here focuses on investors' activities in commodity derivative markets.

Although a large share of ETPs track precious metals – particularly gold and, to a lesser extent, silver – these commodities have long been considered financial products and subject to speculative activity. Precious metal ETPs buy and store the underlying physical commodity, providing an obvious mechanism for investment to affect prices. Also, unlike other commodities, they typically have a smaller role as an input to production but are prominent as a store of value. Reflecting this, these commodities have not been the focus of global discussions by policymakers, including at the G-20.

A widely used measure of the size of commodity derivatives markets is the value of open positions in major commodity futures contracts, which has increased substantially since 2001 (Graph 6).[6] Much of this growth is due to the increasing presence of financial investors. The value of open positions represents the financial claims over future production at a given point in time (although some of these positions will ultimately be 'closed out', meaning that no physical delivery of the commodity takes place). Turnover of these derivative contracts has grown significantly over the same period, although part of this can be attributed to greater ease of access due to the introduction of full electronic trading on commodity futures exchanges (Graph 7).[7]

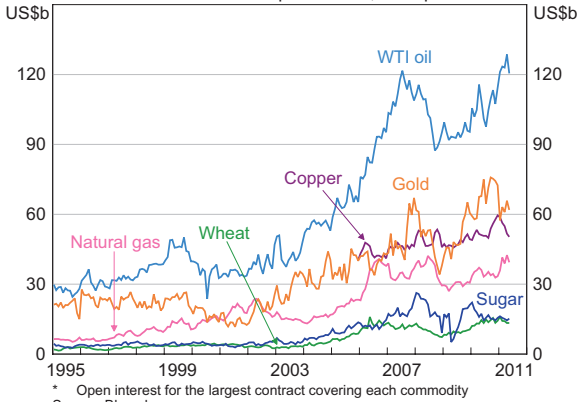
While commodity prices have risen rapidly over recent years as commodities have emerged as an asset class for investors, the size of financial investment still remains modest relative to

Graph 5
Commodity Investment
Assets under management



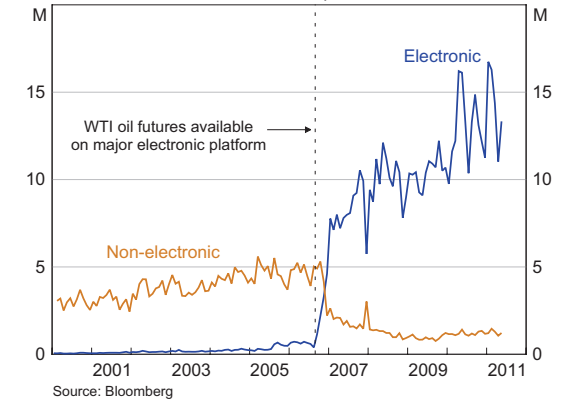
* End March 2011
Source: Barclays Capital

Graph 6
Commodity Futures Market Size*
Value of month-end open interest, 2010 prices



* Open interest for the largest contract covering each commodity
Source: Bloomberg

Graph 7
Trading in WTI Oil Futures
Volume, contracts per month



Source: Bloomberg

6 This is consistent with the growth in futures open interest in other asset classes such as equities over this period.

7 Note that maintaining a particular portfolio composition (or tracking an index) can generate significant turnover volumes, simply to rebalance the portfolio as prices change. This involves selling commodities which have had price rises and buying those for which prices have fallen. Hence this should *mitigate* price movements rather than exacerbate them, as is sometimes suggested.

Table 2: Physical and Financial Market Size of Major Commodities
2009/10, US$ billion

	Physical market[a]			Financial market (exchange traded)	
	Annual production	Annual exports	Inventories (end period)	Annual turnover	Open interest [b]
Oil[c]	2 395	206[e]	312	22 843	193
Natural gas[d]	584	67	na	2 084	29
Coal[e]	844	124	na	24	4
Copper[e]	143[f]	44[d]	6	10 891	81
Iron ore	222	117	na	na	na
Gold[e]	104	na	na	6 249	76
Corn	130	16	23	1 093	20
Wheat	143	28	41	602	14
Soybeans	199	68	29	4 775	41
Rice	235	16	50	35	1
Sugar	81	27	14	4 425	27

(a) RBA estimates based on volumes and indicative world prices
(b) Average of open interest outstanding at the end of each month
(c) Export and inventory figures for OECD economies
(d) Physical market data are for 2009 calendar year
(e) Physical market data are for 2010 calendar year
(f) This figure is for new production only and does not include scrap metal supply
Sources: ABARES; Bloomberg; CFTC; IEA; RBA; USDA

underlying physical commodity markets (Table 2).[8] Measures of total open interest are generally much smaller than the value of production and inventories, but turnover in futures markets can be significantly larger than measures of physical market size.[9] Although a good deal of this turnover is likely to be speculative, the comparatively small level of open interest suggests much of this trading is very short term in nature.

The Effect of Financial Investment

While the role of financial investment in commodities has clearly increased over the past decade, this does not necessarily imply that financial investors have significantly altered price dynamics. A number of factors suggest that, at least for most commodities, the effect has been small.

First, price increases have been just as large for some commodities that do not have well-developed financial markets as for those that do. For example, the prices of iron ore and coal, which do not have large derivatives markets, have increased by as much as prices for most commodities that are actively traded in financial markets (Graph 8). These price increases reflect broad fundamentals, being underpinned by strong demand (particularly from China) and supply constraints. Similarly, the falls in prices during the global financial crisis are consistent with the sharp fall in global growth at that time.

8 Table 2 aggregates turnover and open interest at major exchanges, to provide a comparison with global physical markets. This is different to Graph 6, which uses time series of the open interest in the largest exchange-traded contract for each commodity as an indicative measure of the growth in commodity futures markets.

9 Although these measures give a broad sense of the size of financial investment in commodity markets relative to the physical market, the two concepts are not directly comparable. Open interest and inventories are stocks at a given point in time, while production, exports and turnover are flows over a period of time.

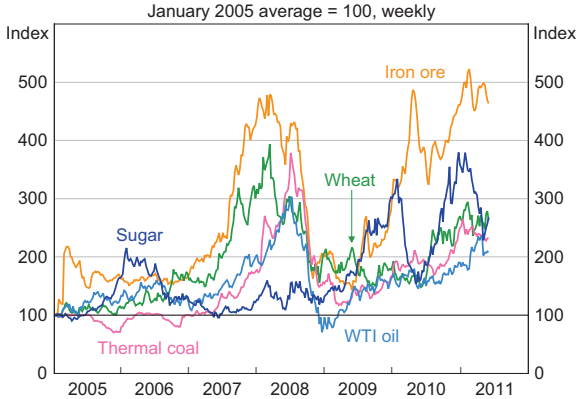
Second, there is significant heterogeneity in price behaviour between commodities, even among those that have large, active derivatives markets. For instance, the prices of oil and natural gas have diverged significantly in recent years, particularly since the start of 2009, despite the associated derivatives markets both growing strongly over recent years (Graphs 6 and 9). The divergence is due to the rapid growth in supply of natural gas in the United States (where these prices are measured) due to technological developments in the shale gas sector. This suggests that even where there has been a large increase in financial investment, fundamentals remain the dominant factor determining commodity prices (except perhaps in the very short run).

Third, the recent increase in the correlation between commodity prices and other financial prices – which is commonly cited as evidence that financial speculators are affecting prices – is not unusual in a historical context. Episodes of increased correlation between commodity and equity prices have occurred in the past at times when financial investment played little, or no, role in commodity markets (Graph 10). This indicates that asset and commodity prices tend to move together more closely when they are affected by common shocks, such as during the Great Depression period and late 1970s.[10] This is unsurprising given the large swings in global demand and supply during these periods, which are fundamental drivers of both equity and commodity prices. The most recent episode is thus not unusual in this regard, given the very large global shocks that occurred; the early 2000s, when the correlation between commodity and equity prices was almost zero at a daily frequency, is not an appropriate benchmark for the crisis period.

Fourth, the evidence of a relative increase in the price correlation between commodities that make up the major commodity indices – and which are

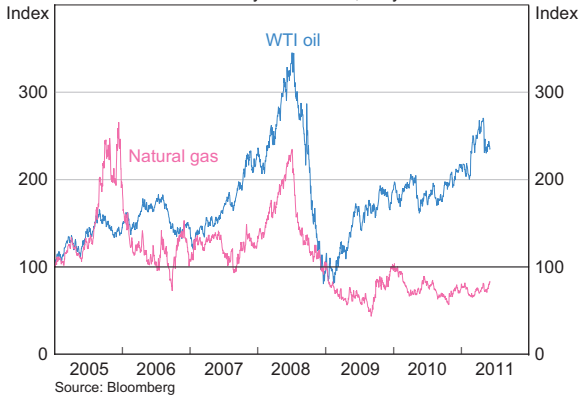
10 The increased correlation from the late 1970s shock does not appear in the graph until the early 1980s due to the phase-shift associated with the 5-year rolling window.

Graph 8
Commodity Prices*
January 2005 average = 100, weekly



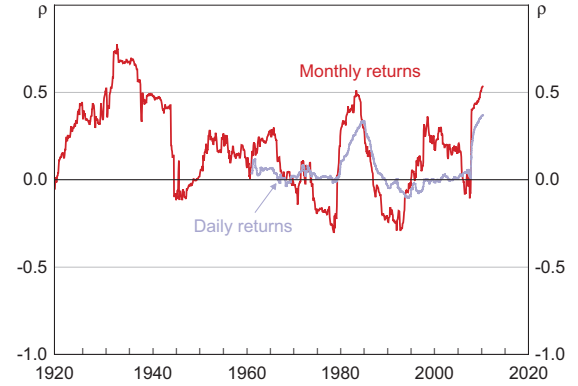
* Iron ore and thermal coal spot prices; oil, sugar and wheat front-month futures prices
Source: Bloomberg

Graph 9
WTI Oil and Natural Gas Prices
1 January 2005 = 100, daily



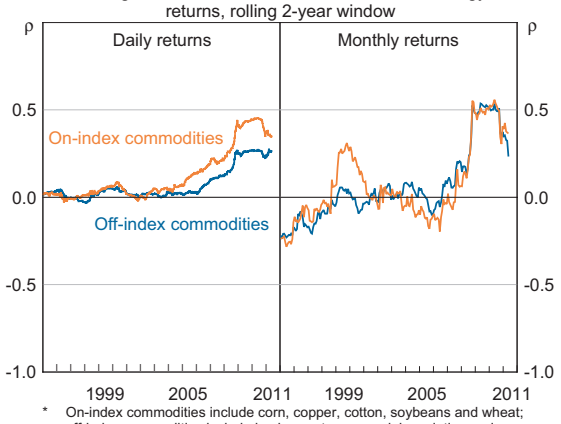
Source: Bloomberg

Graph 10
Commodity and Equity Price Correlation*
Rolling 5-year window



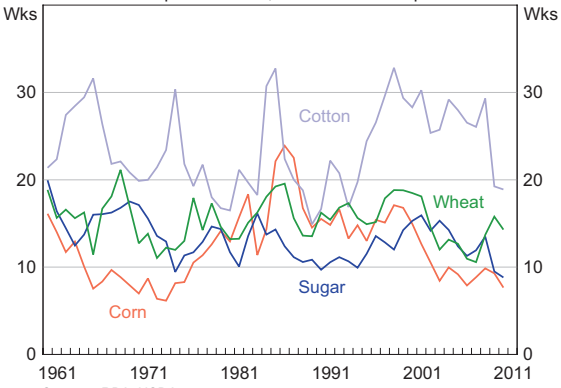
* Correlation between daily or monthly percentage changes in CRB and S&P 500 indices
Sources: Global Financial Data; RBA

Graph 11
Commodity Price Correlations*
Average correlation between WTI oil and non-energy returns, rolling 2-year window



* On-index commodities include corn, copper, cotton, soybeans and wheat; off-index commodities include lumber, oats, orange juice, platinum, rice and tin
Sources: Bloomberg; RBA

Graph 12
Global Inventory Levels
End of period stocks, weeks of consumption



Sources: RBA; USDA

thus invested in by index funds – is mixed. We would expect the behaviour of 'on-index' commodity prices to be more similar, relative to 'off-index' commodities, if index funds were affecting price dynamics. Daily correlations between oil and other major on-index commodity prices did in fact rise significantly from 2004, although there is also a noticeable increase in the correlation between oil and off-index commodity prices from 2006 (Graph 11). Monthly correlations, however, show little discernible difference in the development of on- and off-index commodity price correlations. While this supports the argument that index fund behaviour affects the price dynamics of on-index commodities, the effect appears to be quite short-lived. The increased correlation among commodity prices more broadly suggests that other (fundamental) market forces tend to dominate.

Fifth, there has not been a large increase in commodity inventories that we would expect to accompany speculation-driven price rises. The available – albeit limited – data show that global inventory levels for a range of commodities have been *declining* and are currently below their long-run averages (Graph 12). That said, it is possible that the producers of extracted commodities – such as oil – effectively control their 'in the ground' inventories by limiting production. This is difficult to gauge.

Finally, the academic literature on this topic has generally not supported the proposition that financial investors significantly affect commodity prices over longer time horizons. A number of empirical studies, including by the Commodity Futures Trading Commission, OECD and the IMF, find minimal evidence of speculators' positions driving prices.[11] Gilbert (2010) and Phillips and Yu (2010) do find indications of 'bubble-like' behaviour in some commodity markets, but this is only found for a small number of days concentrated mainly around the peak in prices in 2008. Gilbert also finds evidence that index investors contributed to price increases in crude oil, copper and aluminium. However, the measure of index investment is based on investors' positions in agricultural futures markets (as these were the only data available) and no evidence of an impact is found in physical agricultural markets. Others, such as Tang and Xiong (2010), find evidence of a closer relationship between commodity prices and other asset classes after 2004, although any differences in terms of the effect on 'on-index' and 'off-index' commodities do not appear to be economically significant, as discussed above.

11 See, for example, Buyuksahin, Brunetti and Harris (2010), Irwin and Sanders (2010) and IMF (2011).

Conclusion

Commodity prices are currently both high and volatile relative to the past few decades, consistent with the physical supply and demand fundamentals that underpin these markets. However, the increase in prices and volatility is not unprecedented, having occurred during other large global supply and demand shocks throughout the past century. There is a lack of convincing evidence (at least to date) that financial markets have had a materially adverse effect on commodity markets over time periods of relevance to the economy. It is possible that speculators have had some effect on commodity price volatility, but their contribution would appear to be relatively small – particularly when compared with the contribution from fundamental factors – and short term in nature.

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How Should Central Banks Respond to Asset-Price Bubbles? The 'Lean' versus 'Clean' Debate After the GFC

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Introduction

One of the most important issues facing central banks is whether they should respond to potential asset-price bubbles. Because asset prices are a central element in the transmission mechanisms of monetary policy, the issue of how monetary policy might respond to asset-price movements is not whether it should respond at all but whether it should respond over and above the response called for in terms of objectives to stabilise inflation and employment. Another way of stating the issue is whether monetary policy should try to 'pop', or slow, the growth of possibly developing asset-price bubbles to minimise damage to the economy when these bubbles burst? Alternatively, should the monetary authorities not respond directly to possible asset-price bubbles, but instead respond to asset price declines only after a bubble bursts to stabilise both output and inflation? These two positions have been characterised as leaning against asset-price bubbles versus cleaning up after the bubble bursts and so the debate over what to do about asset-price bubbles has been characterised as the 'lean' versus 'clean' debate. In this article, I examine where this debate stands after what has become known in Australia as the global financial crisis (GFC).

The conclusion that I reach is that the debate has been miscast. Instead of focusing on asset prices, the focus should be on credit market conditions. The case for leaning against potential credit bubbles, a manifestation of financial market imbalances, is much stronger than the case for leaning against asset-price bubbles. Not only does this suggest that macroprudential measures should be used to restrain over-exuberance in credit markets, but there are times when monetary policy may need to be tightened to lean against financial imbalances.

The Debate Before the GFC

Even before the global financial crisis, there was general agreement that asset-price bubbles have negative effects on the economy. As Dupor (2005) emphasised, the departure of asset prices from fundamentals can lead to inappropriate investments that decrease the efficiency of the economy. Furthermore, the bursting of bubbles throughout history has been followed by sharp declines in economic activity, as Kindleberger's (1978) famous book demonstrated.

The clear-cut dangers of asset-price bubbles led some economists before the crisis, both inside and outside central banks, to argue that central banks should at times 'lean against the wind' by raising interest rates to stop bubbles from getting out of

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hand.[1] They argued that raising interest rates to slow a bubble's growth would produce better outcomes because it would either prevent the bubble or would result in a less severe bursting of the bubble, with far less damage to the economy.

The opposing view to the 'leaning against the wind' perspective – that asset prices should have a special role in the conduct of monetary policy over and above that implied by their foreseeable effect on inflation and employment – is often referred to as the 'Greenspan doctrine'. As Chairman of the Federal Reserve Board, Alan Greenspan strenuously argued that monetary policy should not try to lean against asset-price bubbles, but rather should just clean up after they burst (Greenspan 2002).[2] There are several elements to this argument.

First, bubbles are hard to detect. In order to justify leaning against an asset-price bubble, a central bank must assume that it can identify when asset prices have deviated from fundamental values. That assumption was viewed as highly dubious because it is hard to believe that the central bank has such an informational advantage over private markets. If the central bank has no informational advantage, and if it knows that a bubble has developed, the market will almost surely know this too, and the bubble will burst. Thus, any bubble that could be identified with certainty by the central bank would be unlikely to develop much further.

A second objection to leaning against bubbles is that raising interest rates may be ineffective in restraining the bubble, because market participants expect such high rates of return from buying bubble-driven assets.[3]

A third objection is that there are many asset prices, and at any one time a bubble may be present in only a fraction of assets. Monetary policy actions are a very blunt instrument in such a case, as such actions would be likely to affect asset prices in general, rather than solely those in a bubble.

Fourth, although some theoretical models suggested that raising interest rates could diminish the acceleration of asset prices, others suggest that raising interest rates would cause a bubble to burst more severely, thus doing even more damage to the economy (Bernanke, Gertler and Gilchrist 1999; Greenspan 2002; Gruen, Plumb and Stone 2005; and Kohn 2006). This view was supported by historical examples, such as the monetary tightening that occurred in 1928 and 1929 in the United States and in 1989 in Japan.[4] Another way of saying this is that bubbles are departures from normal behaviour, and it is unrealistic to expect that the usual tools of monetary policy will be effective in abnormal conditions. Attempts to prick bubbles were thus viewed as possibly violating the Hippocratic oath of 'do no harm'.

Particularly important was the view that the monetary authorities had the tools to keep the harmful effects of a bursting bubble at a manageable level, as long as they respond in a timely fashion. This was true even if interest rates fell and approached the zero lower bound, and so the conventional tool of lowering the policy interest rate was no longer an option. In this situation, the economy could be stimulated by:

1. managing expectations so that the policy rate would be viewed as staying low for an extended period, thereby lowering long-term interest rates;
2. lowering risk and term premiums by purchasing securities, thereby changing their relative supply; and

1 See Cecchetti *et al* (2000). The Bank for International Settlements (BIS) view, as represented by Borio and Lowe (2002), Borio, English and Filardo (2003), Borio and White (2003) and White (2004), has been viewed as advocating leaning against asset-price bubbles, but the BIS view is far more nuanced. Instead, it advocates leaning against financial imbalances, only one element of which was an asset-price boom. As we will see, the case for leaning against financial market imbalances is far stronger than the case for leaning against asset-price bubbles and so characterising the BIS position as advocating leaning against potential asset-price bubbles is misleading.

2 I was also a proponent of this view (Mishkin 2001, 2007).

3 For example, see the discussion in Greenspan (2002).

4 For example, see Hamilton (1987), Cargill, Hutchison and Ito (1995), Jinushi, Kuroki and Miyao (2000) and Posen (2003).

3. exchange rate interventions to lower the value of the domestic currency, thereby increasing foreign demand for domestic production.[5]

One counterargument to this view was the disastrous experience of Japan after the bursting of the stock market and real estate bubbles. However, as Posen (2003) noted, the problem in Japan was not so much the bursting of the bubble as it was the subsequent policies. The imbalances in Japan's banking sector were not resolved, so they continued to get worse well after the bubble had burst. In addition, as pointed out in Ahearne *et al* (2002), the Bank of Japan did not ease monetary policy sufficiently or rapidly enough in the aftermath of the crisis.

The bottom line from this analysis was that the cost of leaning against asset-price bubbles was likely to be high, while the costs of bursting bubbles could be kept low. Instead of trying to lean against bubbles, this analysis supported an approach in which central banks just clean up after the bubble. This approach was fully consistent with monetary policy focusing on stabilising inflation and employment without a special focus on asset-price bubbles.[6]

I would argue that the Greenspan doctrine, which was strongly supported by Federal Reserve officials, held great sway in the central banking world before the crisis. However, there were dissenting voices. Most prominently, the Reserve Bank of Australia during the period from 2002 to 2004 argued that rising housing prices in Australia posed a risk to the economy and engaged in so-called 'open-mouth operations' to warn the public and the markets about emerging imbalances in the housing market. In addition, the Bank indicated that expansionary monetary policy could fuel potential imbalances in the housing market, and there is evidence that developments in the housing market encouraged the Bank to tighten monetary policy earlier rather than later (see Bloxham, Kent and Robson 2010).

How the GFC Changed the Debate

The global financial crisis undermined one of the key linchpins of the argument for the Greenspan doctrine that the cost of cleaning up after an asset-price bubble burst would be low. To the contrary, it is now recognised that the cost of cleaning up after an asset-price bubble bursts can be very high if it is followed by a financial crisis, as occurred during the GFC period.

Besides the obvious cost of a huge loss of aggregate output as a result of the worldwide recession, the global financial crisis suggests that there are likely to be additional costs that make the overall costs of bursting bubbles much larger. First, financial crises are typically followed by very slow growth, and second, the budgetary position of governments sharply deteriorates.[7]

When economies experience deep recessions, the typical experience is that they subsequently have very strong recoveries, often referred to as V-shaped recoveries. However, as Reinhart and Reinhart (2010) document, this V-shaped pattern is not characteristic of recessions that follow financial crises because the deleveraging process takes a long time, resulting in strong headwinds for the economy. Having analysed 15 severe post-World War II financial crises, the Great Depression, the 1973 oil shock period and the recent crisis, they find that real GDP growth rates are significantly lower during the decade following these episodes, with the median decline in GDP growth being about 1 per cent. Furthermore, unemployment rates stay persistently higher for the decade after crisis episodes, with the median unemployment rate 5 percentage points higher in advanced economies. Although we have many

5 For example, see Svensson (2001), Bernanke (2004).

6 Another argument against focusing on asset prices is that it could lead to public confusion about its objectives. As reported in Giavazzi and Mishkin (2006), interviews with participants from different sectors of Swedish society suggested that statements on house prices by the Riksbank confused the public and led to a general weakening of confidence in the Swedish central bank.

7 A third cost is that the exit strategy for central banks from non-conventional monetary policy may be both complicated and hinder the ability of the central bank to successfully manage the economy in the future. This additional cost is discussed in Mishkin (2011b).

years to go before a decade goes by after the most recent crisis, the early data make it quite conceivable that it might have worse outcomes than the average crisis episode studied by Reinhart and Reinhart. They found that 82 per cent of the observations of per capita GDP during 2008 to 2010 remain below or equal to the 2007 level, while the comparable number for the 15 earlier crisis episodes was 60 per cent. It is now recognised that the cumulative output losses from financial crises is massive, and this current crisis looks like it will be no exception.

As pointed out by Reinhart and Rogoff (2009), the aftermath of financial crises is almost always a sharp increase in government indebtedness. We have seen exactly this situation in the aftermath of the current crisis. The massive bailouts of financial institutions, fiscal stimulus packages, and the sharp economic contractions that reduced tax revenues have adversely affected the fiscal situation for many countries throughout the world. Budget deficits over 10 per cent of GDP in advanced countries like the United States have become common. Furthermore, this rise in indebtedness has the potential to lead to sovereign debt defaults, which has become a serious concern in Europe after the Greek sovereign debt crisis and the problems that the Irish Government is facing because of the spiralling cost of bailing out their banking system. The fiscal retrenchments required to put fiscal balances on a sustainable path are likely to not only be contractionary, but may also increase societal stress. Indeed, there is even a possibility that the fiscal problems brought on by the crisis could lead countries to exit the euro.

Where is the Lean versus Clean Debate Now?

The high cost of cleaning up after asset-price bubbles burst has led to major rethinking on the lean versus clean debate. Initially the debate had a lot of its focus on whether monetary policy should react to potential asset-price bubbles. However, given the interaction between the housing-price bubble and credit markets in the run-up to the GFC, there is now a recognition that we need to distinguish between two different types of asset-price bubbles.

Two Types of Asset-Price Bubbles

As pointed out in Mishkin (2010), not all asset-price bubbles are alike. Financial history and the financial crisis of 2007–2009 indicates that one type of bubble, which is best referred to as a 'credit-driven bubble', can be highly dangerous. With this type of bubble, the following chain of events is typical: Because of either exuberant expectations about economic prospects or structural changes in financial markets, a credit boom begins, increasing the demand for some assets thereby raising their prices. The rise in asset values, in turn, encourages further lending against these assets, increasing demand, and hence their prices, even more. This feedback loop can generate a bubble, and the bubble can cause credit standards to ease as lenders become less concerned about the ability of the borrowers to repay loans and instead rely on further appreciation of the asset to shield themselves from losses.

At some point, however, the bubble bursts. The collapse in asset prices then leads to a reversal of the feedback loop in which loans go sour, lenders cut back on credit supply, the demand for the assets declines further, and prices drop even more. The resulting loan losses and declines in asset prices erode the balance sheets at financial institutions, further diminishing credit and investment across a broad range of assets. The decline in lending depresses business and household spending, which weakens economic activity and increases macroeconomic risk in credit markets. In the extreme, the interaction between asset prices and the health of financial institutions following the collapse of an asset-price bubble can endanger the operation of the financial system as a whole.

However, there is a second type of bubble that is far less dangerous, which can be referred to as an 'irrational exuberance bubble'. This type of bubble is driven solely by overly optimistic expectations and

poses much less risk to the financial system than credit-driven bubbles. For example, the bubble in technology stocks in the late 1990s was not fuelled by a feedback loop between bank lending and rising equity values and so the bursting of the tech-stock bubble was not accompanied by a marked deterioration in bank balance sheets. The bursting of the tech-stock bubble thus did not have a very severe impact on the economy and the recession that followed was quite mild.

The Case for Leaning versus Cleaning

The recent crisis has clearly demonstrated that the bursting of credit-driven bubbles not only can be extremely costly, but are very hard to clean up afterwards. Furthermore, bubbles of this type can occur even if there is price and output stability in the period leading up to them. Indeed, price and output stability might actually encourage credit-driven bubbles because it leads market participants to underestimate the amount of risk in the economy. The case for leaning against potential bubbles rather than cleaning up afterwards has therefore become much stronger.

However, the distinction between the two types of bubbles, one (credit-driven) which is much more costly than the other (irrational exuberance), suggests that the lean versus clean debate may have been miscast, as White (2009) and Cagliarini, Kent and Stevens (2010) indicate. Rather than leaning against potential asset-price bubbles, which would include both types of bubble, there is a much stronger case for leaning against credit-driven bubbles but not irrational exuberance bubbles. As White (2009) and Mishkin (2010) have pointed out, it is much easier to identify credit bubbles than it is to identify asset-price bubbles. Financial regulators and central banks often have information that lenders have weakened their underwriting standards, that risk premiums appear to be inordinately low or that credit extension is rising at abnormally high rates. The argument that it is hard to identify asset-price bubbles is therefore not a valid argument against leaning against credit bubbles.

Macroprudential Policies

Although there is a strong case to lean against credit bubbles, what policies will be most effective? First, it is important to recognise that the key principle for designing effective policies to lean against credit bubbles is whether they fix market failures. Credit extension necessarily involves risk-taking. It is only when this risk-taking is excessive because of market failures that credit bubbles are likely to develop. Recognising that market failures are the problem, it is natural to look to prudential regulatory measures to constrain credit bubbles.

Some of these regulatory measures are simply the usual elements of a well-functioning prudential regulatory and supervisory system. These elements include adequate disclosure and capital requirements, liquidity requirements, prompt corrective action, careful monitoring of an institution's risk-management procedures, close supervision of financial institutions to enforce compliance with regulations, and sufficient resources and accountability for supervisors.

The standard measures mentioned above focus on promoting the safety and soundness of individual firms and fall into the category of what is referred to as microprudential supervision. However, even if individual firms are operating prudently, there still is a danger of excessive risk-taking because of the interactions between financial firms that promote externalities. An alternative regulatory approach, which deals with these interactions, focuses on what is happening in credit markets in the aggregate, referred to as 'macroprudential regulation and supervision'.

Macroprudential regulations can be used to dampen the interaction between asset-price bubbles and credit provision. For example, research has shown that the rise in asset values that accompanies a boom results in higher capital buffers at financial institutions, supporting further

lending in the context of an unchanging benchmark for capital adequacy; in the bust phase, the value of this capital can drop precipitously, possibly even necessitating a cut in lending.[8] It is important for research to continue to analyse the role of bank capital requirements in promoting financial stability, including whether capital requirements should be adjusted over the business cycle. Other macroprudential policies to constrain credit bubbles include dynamic provisioning by banks, lower ceilings on loan-to-value ratios or higher haircut requirements for repo lending during credit expansions, and Pigouvian-type taxes on certain liabilities of financial institutions.[9]

Some policies to address the risks to financial stability from asset-price bubbles could be made a standard part of the regulatory system and would be operational at all times – whether a bubble was in progress or not. However, because specific or new types of market failures might be driving a particular credit bubble, there is a case for discretionary prudential policies to limit the market failures in such a case. For example, during certain periods, risks across institutions might become highly correlated, and discretionary policy to respond to these higher-stress environments could help reduce systemic risk.

Monetary Policy

The fact that the low interest rate policies of the Federal Reserve from 2002 to 2005 was associated with excessive risk-taking suggests to many that overly easy monetary policy might promote financial instability. Using aggregate data, Taylor (2007) has argued that excessively low policy rates led to the housing bubble, while Bernanke (2010), Bean *et al* (2010), Turner (2010) and Posen (2009) have argued otherwise. Although it is far from clear that the Federal Reserve is to blame for the housing bubble, the explosion of microeconomic research, both theoretical and empirical, suggests that there is a case for monetary policy to play a role in creating credit bubbles. Borio and Zhu (2008) have called this mechanism the 'risk-taking channel of monetary policy'.

The literature provides two basic reasons why low interest rates might promote excessive risk-taking. First, as Rajan (2005, 2006) points out, low interest rates can increase the incentives for asset managers in financial institutions to search for yield and hence increase risk-taking. Incentives could come from contractual arrangements which compensate asset managers for returns above a minimum level, often zero, and with low nominal interest rates only high-risk investments will lead to high compensation. They also could come from fixed-rate commitments, such as those provided by insurance companies, forcing firms to seek out higher yielding, riskier investments. Or they could arise from behavioural considerations, such as money illusion in which investors believe that low nominal rates indicate that real returns are low, encouraging them to purchase riskier assets to obtain a higher target return.

A second mechanism for how low interest rates could promote risk-taking operates through income and valuation effects. If financial firms borrow short and lend long, as is often the case, low short-term interest rates increase net interest margins and increase the value of these firms, increasing their capacity to increase their leverage and take on risk (Adrian and Shin 2009, 2010, and Adrian, Moench and Shin 2010). In addition, low interest rates can boost collateral values, again enabling increased lending. This mechanism is closely related to the financial accelerator of Bernanke and Gertler (1999) and Bernanke, Gertler and Gilchrist (1999), except that it derives from financial frictions for lenders rather than borrowers.

Monetary policy can also encourage risk-taking in two other ways. Although desirable from a viewpoint of establishing credibility and a strong nominal anchor, which helps stabilise the economy, more predictable monetary policy can reduce uncertainty and contribute to asset managers underestimating risk (Gambacorta 2009). Monetary

8 For example, see Kashyap and Stein (2004) and Adrian and Shin (2009).
9 For example, see Bank of England (2009), French *et al* (2010).

policy which cleans up after financial disruptions by lowering interest rates – which has been named the 'Greenspan put' because this was the actual and stated policy of the Federal Reserve when Alan Greenspan headed the Fed – can lead to a form of moral hazard in which financial institutions expect monetary policy to help them recover from bad investments (for example, see Farhi and Tirole 2009, Keister 2010, and Wilson and Wu 2010). The Greenspan put can also increase systemic risk because it is only exercised when many financial firms are in trouble simultaneously and so they may be encouraged to pursue similar investment strategies, thereby increasing the correlation of returns.

Micro empirical analysis provides a fair amount of support for the risk-taking channel of monetary policy. Jiménez *et al* (2009), using Spanish credit registry data, find that low nominal interest rates, although reducing the probability of defaults in the short term, lead to riskier lending and more defaults in the medium term. Ioannidou, Ongena and Peydró (2009) examine a quasi-controlled experiment in Bolivia and find that a lower US federal funds rate increases lending to low-quality borrowers resulting in a higher rate of defaults even at lower interest rate spreads. Delis and Kouretas (2010), using data from euro area banks, find a negative relationship between the level of interest rates and the riskiness of bank lending.

Adrian and Shin (2010) discuss and provide evidence for the risk-taking channel of monetary policy using more aggregate data. They find that reductions in the federal funds rate, increase term spreads and hence the net interest margin for financial intermediaries. The higher net interest margin, which makes financial intermediaries more profitable, is then associated with higher asset growth, and the higher asset growth, which they interpret as a shift in credit supply, predicts higher real GDP growth.

Given the support for the risk-taking channel, does this mean that monetary policy should be used to lean against credit bubbles? Besides some of the previously listed objections, an additional objection is that if monetary policy is used to lean against credit bubbles, there is a violation of the Tinbergen (1939) principle because one instrument is being asked to do two jobs: stabilise the financial sector and stabilise the economy.[10] Because there is another instrument to stabilise the financial sector – macroprudential supervision – wouldn't it be better to use macroprudential supervision to deal with financial stability, leaving monetary policy to focus on price and output stability?

This argument would be stronger if macroprudential policies were able to do the job. However, there are doubts on this score. Prudential supervision is often subject to more political pressure than monetary policy because it affects the bottom line of financial institutions more directly. Thus they will have greater incentives to lobby politicians to discourage macroprudential policies that would rein in credit bubbles. After all, during a credit bubble, financial institutions will be making the most money and so have greater incentives and more resources to lobby politicians to prevent restrictive macroprudential policies. A case in point has been the recent Basel III accord. Press reports suggest that the capital standards in the accord was substantially weakened because of complaints by the German Landesbanken. Furthermore, implementation of the accord was put off for 10 years, and the accord did not contain measures to deal with systemic risk considerations such as having higher capital requirements on systemically more important financial institutions. The Basel III episode suggests that political considerations may make it extremely difficult to have effective macroprudential supervision.

10 Stabilising the financial sector is not a completely separate objective from stabilising the economy because financial instability leads to instability in economic activity and inflation. However, because the dynamics of financial instability is so different to the dynamics of inflation and economic activity, for purposes of the Tinbergen principle, promoting financial instability can be viewed as a separate policy objective from stabilising the economy.

The possibility that macroprudential policies may be circumvented and so might not be able to constrain credit bubbles, suggests that monetary policy may have to be used as well.[11] But this raises another objection to using monetary policy to lean against credit bubbles: it may not work. I am sympathetic to the view discussed earlier that tightening monetary policy may be ineffective in restraining a particular asset bubble because market participants often expect very high rates of return when purchasing bubble-driven assets. On the other hand, the evidence on the risk-taking channel of monetary policy suggests that there is a stronger case that raising interest rates would help restrain lending growth and excessive risk-taking. Furthermore, the theoretical analysis discussed immediately above suggests that if the public believes that the central bank will raise interest rates when a credit bubble looks like it is forming, then expectations in credit markets will work to make this policy more effective. The expectation that rates will go up with increased risk-taking will make this kind of activity less profitable and thus make it less likely that it will occur. Furthermore, expectations that rates will rise with increased risk-taking means that interest rates will not have to be raised as much to have their intended effect.

Nonetheless, using monetary policy to lean against credit bubbles is not a monetary policy strategy that can be taken lightly. Doing so could at times result in a weaker economy than the monetary authorities would desire, or inflation that falls below its target. This suggests that there is a monetary policy trade-off between having the inflation forecast at the target and the pursuit of financial stability. Also, having monetary policy focus on financial stability might lead to confusion about the central bank's commitment to the inflation target, with potentially adverse effects on economic outcomes.

Another danger from having monetary policy as a tool to promote financial stability is that it might lead to decisions to tighten monetary policy when it is not needed to constrain credit bubbles. A situation of low interest rates does not necessarily indicate that monetary policy is promoting excessive risk-taking. One lesson from the analysis here is that policymakers, and especially monetary policymakers, will want tools to assess whether credit bubbles are developing. Research is underway (for example, see Borio and Lowe 2002, and Adrian and Shin 2010) to find measures that will signal whether credit bubbles are likely to be forming. High credit growth, increasing leverage, low risk spreads, surging asset prices and surveys to assess if credit underwriting standards are being eased are pieces of data that can help central banks decide if there is imminent danger of credit bubbles. Monitoring of credit market conditions will become an essential activity of central banks in the future and research on the best ways of doing so will have a high priority in the future.

Conclusion

The global financial crisis has led to major rethinking on how central banks should respond to possible asset-price bubbles. Prior to the GFC, the prevailing view in central banks was that they should not try to lean against potential asset-price bubbles. The arguments in this article indicate that there is a much stronger case to lean, not against asset-price bubbles per se, but rather against potential credit bubbles, when financial imbalances appear to be building up. The analysis here, however, indicates that the first line of defence against possible credit bubbles should be to use macroprudential tools to restrain excessive risk-taking in the credit markets. However, because macroprudential policies may either be hard to design or the political will to implement them when needed may be weak, there

11 However, as pointed out in Boivin, Lane and Meh (2010), whether monetary policy will be effective in countering financial imbalances depends on the nature of shocks. They conduct simulations that show that where financial imbalances reflect specific market failures and regulatory policies can be directed to such failures, monetary policy is less likely to be effective. Monetary policy is likely to be more effective when financial imbalances arise from economy-wide factors.

is a case to use monetary policy to lean against credit booms.

The debate on lean versus clean has thus moved to a position that is more supportive of the actions taken by Australian policymakers in the period from 2002 to 2004 when they responded to a rise in housing prices that was accompanied by a rapid growth of credit and a weakening of lending standards. Although the RBA appears to have tightened monetary policy somewhat earlier than it might have otherwise, it is hard to evaluate how successful it was in restraining credit growth.[12] In addition, there were measures by policymakers that could have contributed to the slowdown of the housing boom and so had macroprudential features. The RBA and the Australian Prudential Regulation Authority (APRA) raised concerns about weakening of lending standards and ARPA conducted stress tests of banks' housing loans. In addition, policymakers pursued measures to restrain fraudulent activities related to property investments and more strictly enforced tax laws related to housing (Bloxham 2010).

The lean versus clean debate after the GFC suggests that central bankers face a more complex policy environment. Not only must they design their policies to stabilise both inflation and employment, but these policies will also have to focus on promoting financial stability. Although this will present central bankers with additional challenges, it will make central banking an even more stimulating profession.

12 One possible benefit of the RBA's publicly expressed concerns about rising housing prices is that it may have convinced the public and markets that the RBA would pursue tighter monetary policy to restrain this market, if necessary, and these expectations helped prevent a bubble from developing. Thus, although the amount of monetary tightening to restrain the housing market was not very large, this 'management of expectations' might have prevented the financial imbalances that developed in other advanced countries before the GFC. It is obviously very hard to quantify the impact of this 'management of expectations'.

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America, Australia, Asia and the World Economy

Glenn Stevens, Governor

Address to the American Australian Association 2011 Annual Spring Lecture Lunch, New York, 14 April 2011

Thank you for the invitation to speak in New York.

New York City remains one of the world's dominant financial centres, on any metric. Its stock exchange is by far the largest in the world in terms of market capitalisation. The US corporate debt market similarly eclipses that of other countries and the city is home to some of the world's largest financial institutions. Likewise, the United States remains the world's largest national economy by a substantial margin.

But the world is changing, and quite quickly. The rise of China (and, very likely, India) is a transformative event for the global economy. Unless something pretty major goes wrong, we are likely to see much more of this trend for quite a long time yet.

As recently as 1990, the United States accounted for a quarter of the world economy. The European Union was just a little over a quarter. Japan, east Asia and India combined made up roughly another quarter; Japan on its own was about a tenth of global GDP. (Australia was then, and still is, just over 1 per cent of global GDP.)

In 2010, the US share was about 20 per cent of world GDP, about the same as the European Union. By then, Asia was making up just under a third of the total. China alone had raised its share of global GDP from less than 4 per cent in 1990 to over 13 per cent – quite a change in the space of 20 years. India's share, which had been the same as China's in 1990, had been little changed until about 2004. It has started to increase more noticeably since then, though it remains well below China's at the moment. But given that the demographics for India are more favourable than those for China, we could expect that in another 20 years India's prominence will have grown a great deal – assuming that country continues the process of reform that has helped it to generate impressive growth over recent years.

These figures are all based on the IMF's Purchasing Power Parity estimates for countries' respective GDPs. Some might find them a bit abstract – if you doubt that, try explaining purchasing power parity to your mother. But we can appeal to various other 'real' indicators to chart the rise of China in particular. The number of people in paid employment in China was 780 million as of 2009. The increase since 1990 was about 130 million, which is nearly the total number of employed workers in the United States (and 11 times the total number currently employed in Australia).

In that year of 1990, China produced just over 50 million tonnes of steel products. By 2010, China was producing more than that volume of steel products each month, and accounted for nearly half of global crude steel production. Virtually all of this steel is consumed within China, to build new cities and transport infrastructure. Currently, steel consumption in China is nine times higher than that of the United States. Electricity generation has tripled in China over the past decade, overtaking the European Union in 2008 to become the world's

second biggest generator of electricity after the United States. Of course, per capita usage rates of electricity are still much lower in China but they will rise with incomes. In 1999, just over 23 000 Chinese postgraduate students were studying abroad. A decade later, there were 230 000.

All of these metrics tell a similar story: the rise in the importance of the Chinese economy is extraordinary. Other countries in the Asian region have also shown solid rates of growth over this period, but the size and pace of change in the Chinese economy stands out.

There are few countries that have noticed this more in their trading patterns than Australia. Our trade patterns have been strongly oriented towards Asia since the emergence of the Japanese trade relationship in the 1960s. But this has taken a further step up in recent years, with the share of merchandise exports going to the Asian region rising from a little over 50 per cent as recently as 2003 to over 70 per cent in 2010.[1] A similar trend has occurred in imports. China alone has risen from 6 per cent of exports a decade ago to 25 per cent today. The rise in Australia's terms of trade – about which I will *not* give yet another sermon today – is part of this same picture.

But it is of course not only Australia that has seen this shift in trade patterns. In fact, many countries are seeing a significant expansion in two-way trade with China and there are a number for which China is now the most important partner. Among that group is not only Australia, but also Japan and Korea. Clearly trade integration has been happening quickly in the Asia–Pacific region.

These forces are also being felt further afield. The US economy has seen a much increased trade engagement with China. The share of US imports coming from China has increased from about 3 per cent in 1990 to 19 per cent today. That is a very large increase, though it appears to offset a decline in the shares coming from Japan and other east Asian countries: imports from Asia as a whole make up about the same share of US imports today – about a third – as they did 20 years ago. Probably what is happening here is that China has displaced other Asian countries to some extent as a source of finished products, including by becoming the final point of assembly for many manufactured items constructed from components sourced all over Asia.

Even more interesting is the fact that the United States sells a higher share of its exports to China than to any other single nation apart from Canada and Mexico, its two North American Free Trade Agreement partners.

All these trends will surely continue, for the process of integrating China and India into the global economy has a good way to run yet. The Chinese Government is seeking growth of 7 per cent per annum over the coming five years. That would be a lower outcome than we have seen in the past five years, but is still very strong by the standards of the advanced countries. Growth at that sort of pace, on average, would see China's weight in global GDP exceed that of the euro area within five years and approach that of the United States within a decade.

Of course, the future will not be that deterministic. The Chinese economy will have cycles; it will not trace out a path of steady, uninterrupted expansion. China could not expect to be immune from various other afflictions experienced by all countries that can occasionally impede economic growth. But by any reckoning, the emergence of China is a huge historical event. And then there is India.

So the world of production and consumption is changing.

But it must also follow that the world of finance is changing as well. As incomes rise so there is an accumulation of physical capital (which accommodates further increases in labour productivity and incomes) funded by saving out of current income. Moreover, the scale, scope and sophistication of financial activity increases, which typically sees the size of gross financial claims rise faster than income.

1 These and subsequent trade figures refer to merchandise exports.

The fact that Asian countries have traditionally seen quite high rates of private saving accentuates this trend. China's saving rate, at about 55 per cent of GDP, is one of the highest recorded and because China has become a large economy, the extent of that annual flow of saving is now globally very significant. In absolute terms, according to the available national income statistics, China is in fact now the world's largest saver. Its gross national saving, at an estimated US$3.2 trillion, exceeded that of both the United States and the euro area in 2010.[2] Its gross investment is also the world's largest – at an estimated US$2.9 trillion in 2010. The gap between these two figures – around US$300 billion – is of course China's current account position. That is the extent to which China, in net terms, exports capital to the rest of the world.

As you might expect, to deal with this large volume of saving China has some large banks. As measured by total assets, 12 of the world's 100 largest banks are Chinese. This is a higher number than for any other single country, including the United States. Between 2005 and the start of this year, the Shanghai and Shenzhen stock exchanges grew by over 800 per cent. As measured by the market capitalisation of listed domestic companies, the Shanghai stock exchange is still far smaller than the New York stock exchange, but it is now more than two-thirds the size of the London and Tokyo stock exchanges. In terms of turnover, the annual value of share trading on the Shanghai stock exchange in 2009 surpassed that of each of the London and Tokyo exchanges.[3]

Asian bond markets, and particularly those in China, have also grown in size. Five years ago, total domestic debt securities outstanding in China were less than half of those outstanding in countries such as France, Germany and Italy; today these markets are roughly all comparable in size.[4]

2 These data are compiled from IMF Article IV and *World Economic Outlook* reports.

3 Annual value of electronic order book trades.

4 Total outstanding debt securities issued onshore in local currency, measured in US dollars.

So it is not just the centre of gravity of economic activity that is shifting to Asia – the weight of financial assets is also shifting. Now this is a slower process since the stock of wealth is a result of a long accretion over time and economies that rapidly become large in production terms may have a smaller stock of wealth than countries that have been similarly large for a long time – such as Europe and the United States. So at this point the advanced industrial countries still account for the lion's share of global wealth.

Nonetheless, things are moving quickly. Within the remainder of the careers of many of us here today, we will very likely see a pretty substantial change in relative positions. It is interesting to contemplate how that world might differ from the one to which we have been accustomed.

Every morning, Australian financial market participants wake up to the closing moments of the New York trading day. The rest of the Asian region wakes up shortly thereafter. Despite the rapid increases in size of the Asian markets, most of the time it is changes in US or European markets that set the tone for the Asian trading day.

Every so often, though, an event in Asia prompts global market responses. Surely this will happen more often in the future. As the Asian region becomes more integrated economically, with an ever larger Chinese and Indian economic mass at the core, and as the accretion of Asian financial wealth assumes increasing global significance, Asia is likely more often to be a source of 'shocks' for the global economy and financial system. I am not suggesting that Wall Street will dance exclusively to Shanghai's tune. The US economy and financial system will remain very large and internationally important for the foreseeable future.

The point is that there will be several potential sources of music emanating from various centres around the world, to which markets everywhere will respond to some extent. The United States will certainly be one, and so will Europe (not always an

enjoyable tune of late). We will all need to attune our ear to Asia's rhythms as well.

Sometimes those differing tunes will clash – as they do at present. At the moment we see a US recovery that is gaining some traction after a lengthy period of weakness, a subdued experience in Europe overall with intraregional differences probably at their most extreme since the euro commenced, while China and India are seeking to slow their expansions in the face of clear evidence of rising inflation. US banks are well ahead of their European counterparts in cleaning up their problems, to the extent that the government capital injections of two years ago are being repaid, while markets are still waiting for more complete information about the state of balance sheets in Europe and worrying about the feedback to public sector finances. Asia's banks, meanwhile, did not have a solvency crisis and have been able to perform their task of supporting growth. If anything, their problems are more likely to be those of exuberance. More attention is being paid to the US fiscal position – and that will probably increase further. In Asia, public finances are generally strong except in Japan.

These differences were bound to increase the focus on policy differences between regions, and exchange rate systems in particular. It is not surprising that we are returning to discussion of the 'global imbalances', since many of the underlying factors behind them have not gone away. Renewed efforts to find a framework for talking about these issues are now under way.

As others have said, a prerequisite for a solution is a shared understanding of the problems within an agreed intellectual framework. But finding that combination is not proving easy. The dialogue needs to occur on multiple issues, to which countries bring different perspectives. Many of the countries of Asia come, for example, with a mindset in which the international monetary system is a device for stability, one of the foundations for strategies to grow economies and increase wealth. They see flows of capital, and fluctuations in exchange rates, as potentially disruptive to the real sectors of their economies. This is in many respects a traditional post-war perspective, when there was a US dollar standard, when the United States as an economic and financial power was unrivalled and all other economies and financial systems were truly small. But of course Asia is no longer small.

Countries like the United States or Australia, on the other hand, have a different frame of reference. They tend to see the international monetary system as a device for accommodating shocks and reflecting differences in economic circumstances. They see price movements and capital flows, generally, as helping resource allocation. European countries share that perspective as far as flows and exchange rates between the major regions of the world are concerned, but share Asian perspectives on the need for stability within their own region. There are good reasons, in logic and history, for all these perspectives. We need to understand them, and find an accommodation.

It does not help, in my judgment, that so much of the discussion takes place through a bilateral prism – particularly the US–China current account prism. Twenty years ago the prism was the US–Japan balance. The issues are multilateral, not bilateral. The US trade deficit was pretty widely spread for many years. It wasn't just with China. Over the past decade, the United States had a trade deficit with 13 of the 18 other countries in the G-20 (of the five surplus positions, the largest was with Australia). This bilateral focus can be quite troubling, and not only because it risks oversimplifying problems and therefore lessening the likelihood of solutions. It can be troubling for a host of small countries, which worry about the potential for more widespread effects of solutions that may be attempted. This is why it is so important that the problems be considered, and resolved, in a multilateral setting. Hence the importance of the international financial institutions, and of fora like the G-20, in providing the table around which these discussions should take place.

That of course means that the legitimacy of those institutions, in the eyes of all their stakeholders, is key. Good progress has been made in improving the governance of bodies such as the IMF and no doubt more will be done in this area over the years ahead. The G-20, a body with a broader constituency than the G7, has taken a more prominent role. This is all good, but will need to be accompanied by ongoing efforts to reach a shared vision of the role of the institutions and the system they are supposed to watch over and protect. If we are all still not talking the same language about the role of the system or the institutions, then we will not collectively get very far.

So much work needs to be done yet. America – still the world's dominant single economy and financial power, albeit not as dominant as it was – is critical to reaching the necessary framework. But so too is Asia – a fast-growing, high-saving region with increasing financial resources, a much increased part of the global economy and financial system, and with, therefore, commensurately increased responsibilities. Australia – a small but outward-looking country with very substantial ties to both the United States and Asia – has more than a passing interest in the progress of this very difficult, but very important, discussion. ✠

Recent Financial Developments

Ric Battellino, Deputy Governor

Address to Annual Stockbrokers Conference, Sydney, 26 May 2011

Introduction

My talk today is about some of the changes taking place in the financing of the Australian economy.

As you know, after 15 years of rapid growth, credit has been growing at a much more subdued pace over the past couple of years. In fact, for the first time since the early 1990s, banks are finding that credit is growing more slowly than deposits, with the result that they are able to repay funds previously borrowed in wholesale markets, including from offshore. These developments have been associated with a noticeable increase in national saving and a marked reduction in the current account deficit.

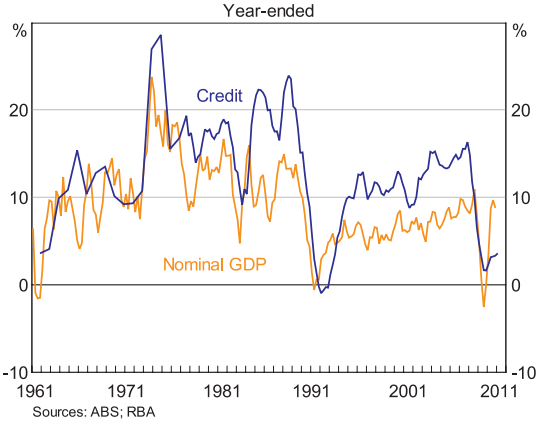
I would like to spend some time today going through these developments.

Credit Cycles

Over the very long run, money and credit in most economies tend to grow somewhat faster than GDP. This is part of the financial deepening that occurs as economies develop and incomes grow. Since 1960, for example, credit in Australia has increased on average by about 12½ per cent per year, while GDP (in nominal terms) has increased on average by about 9 per cent per year (Graph 1).

Over shorter periods, however, credit shows pronounced cycles. During periods when optimism is high, households and businesses tend to increase their use of credit, often for the acquisition of assets. At other times, typically in the wake of economic downturns, borrowers can become very conservative and cut back their demand for credit; lenders, too, can become more cautious.

Graph 1
Credit and GDP Growth
Year-ended

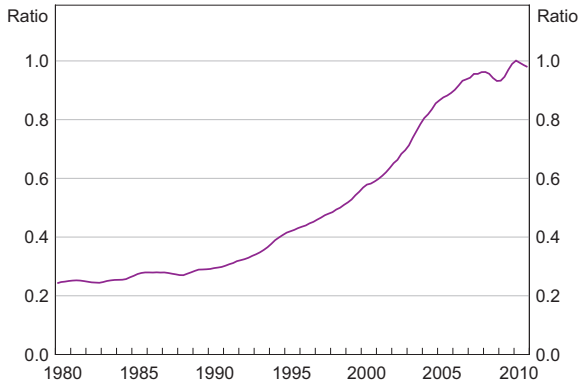


Sources: ABS; RBA

The most recent cycle in credit began in the mid 1990s and extended through the years leading up to the global financial crisis. For most of that period the expansion in credit was driven by households (Graph 2). Financial deregulation and innovation greatly increased the supply of credit, and the fall in interest rates as inflation declined in the early 1990s gave households greater capacity to borrow. The rapid expansion in household debt that followed was not unique to Australia, with most developed economies experiencing sharp rises in household indebtedness. Most of this expansion in household credit, both in Australia and offshore, was used to buy dwellings and was therefore accompanied by strong rises in housing prices.

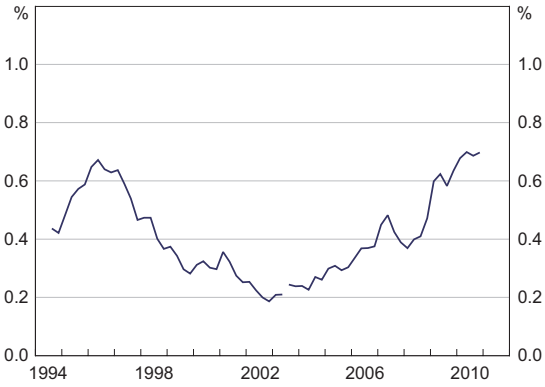
As you know, in many countries the marked expansion in housing credit went on to cause severe financial difficulties. Here in Australia, however, this has not happened; in particular, household loan

Graph 2
Household Credit
Ratio to GDP



Sources: ABS; RBA

Graph 3
Banks' Non-performing Housing Loans*
Per cent of outstandings



* Loans that are 90+ days past-due but otherwise well secured by collateral; from 2003, includes 'impaired' loans that are in arrears (or are otherwise doubtful) and not well secured by collateral
Sources: APRA; RBA

arrears remain relatively low (Graph 3). Contributing to this better outcome in Australia was the fact that the deterioration in lending standards was not as severe or as widespread as in some other countries. Also, household incomes have continued to grow solidly, in the context of a strong economy and low unemployment.

However, within this overall picture of resilience, there are, as always, pockets of housing stress. In the early part of last decade, those pockets were heavily concentrated around the south-west parts of Sydney. These problems followed the very strong rises in Sydney house prices over 2002 and 2003. They were linked to a sharp rise in loan approvals, some lowering of lending standards, particularly by second-tier lenders, and increased speculative activity. Conditions in that region subsequently improved, helped by a period of stable house prices and rising incomes, though the process took a long time and the arrears rate in that part of Sydney remains higher than the national average.

Recently, it has been parts of Queensland and Western Australia that have shown a deterioration in loan arrears, albeit from low levels. As had been the case in Sydney earlier in the decade, the recent increase in loan arrears in these states followed a sharp increase in housing loans and unusually strong rises in house prices between 2006 and 2008. Some part of this was justified by the emerging resources boom but, as had occurred earlier in Sydney, this was accompanied by some lowering of credit standards and increased speculative activity, with the result that some households over-extended themselves. Adding to the stress on household finances was the fact that both these states experienced larger-than-average increases in unemployment during the 2009 downturn, though again from relatively low levels.

Another potential source of vulnerability in the housing market that is often mentioned is the many first-home owners who were attracted into the housing market in 2009 by the increase in the first-home owner grant. The concern is that some of these may have over-committed themselves financially in order to enter the market, and are now vulnerable to rising interest rates. This group bears close watching but, so far at least, first-home owners do not seem to be disproportionately represented in loan arrears.

While the household sector as a whole continues to show a good deal of resilience in meeting loan repayments, the increase in indebtedness over the past 15 years does mean that households are now significantly more sensitive to changes in interest rates. The proportion of household income devoted to debt servicing is relatively high, even

though housing interest rates are only a little above average (Graph 4). It is therefore not surprising that households have become more cautious. Household saving increased markedly in the wake of the global financial crisis, and it has remained high in the face of the continuing problems in European financial markets and rising global inflationary pressures (Graph 5).

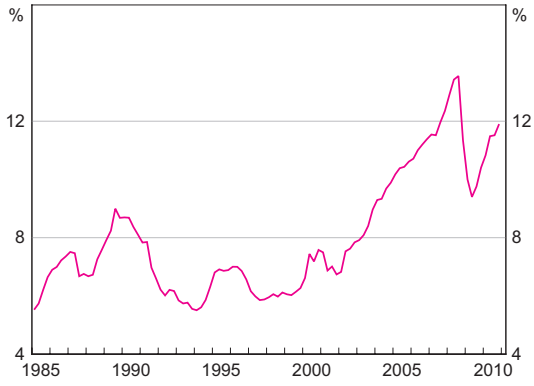
In the current environment, it is unlikely that households will have much enthusiasm for increasing indebtedness. The most likely scenario is that household borrowing will continue to grow at a relatively subdued rate for some time yet. From the Reserve Bank's perspective, this would be a welcome development. It would allow the period of consolidation in household balance sheets to continue and would avoid households adding to pressures in the economy at a time when its productive capacity is already being stretched by the resources boom.

While most of the growth in credit in the lead-up to the global financial crisis was driven by households, a substantial increase in business credit also occurred in the years immediately before the crisis. This expansion in lending was mainly to large businesses and, while some of it was used to fund real investment, a substantial amount was for financial activity.

As often happens during a credit boom, a disproportionate amount of the lending that took place over that period came from second-tier lenders. Business credit provided by foreign banks, for example, rose by about 80 per cent between 2006 and 2008, while business credit provided by regional banks rose by 60 per cent (Graph 6). A lot of this was directed to commercial property.

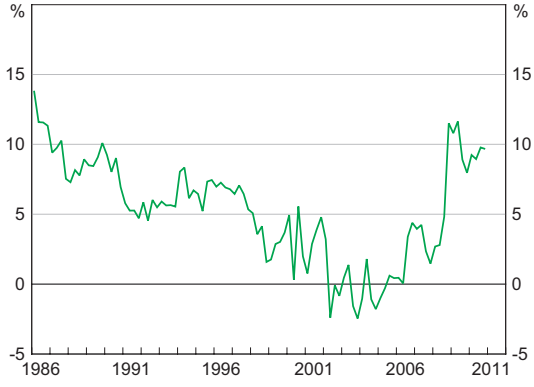
Since the global financial crisis, the inevitable correction has occurred. Business credit has fallen and those lenders that expanded the most have since contracted the most. Similarly, sectors such as commercial property that increased gearing the most have since experienced the sharpest increase in problem loans and the sharpest contraction in credit.

Graph 4
Household Interest Payments*
Per cent of household disposable income



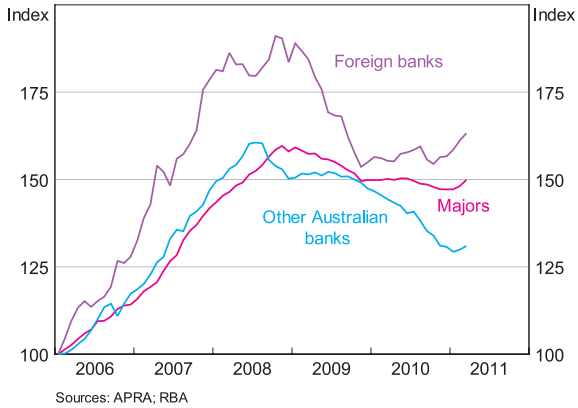
* Excludes unincorporated enterprises; income is before the deduction of interest payments
Sources: ABS; RBA

Graph 5
Household Saving Ratio*
Per cent of household disposable income



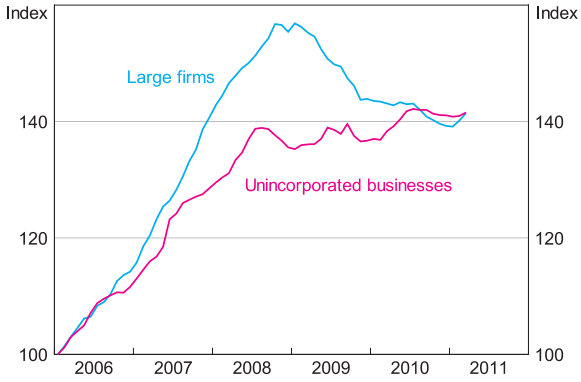
* Net of depreciation
Source: ABS

Graph 6
Business Credit by Source
January 2006 = 100



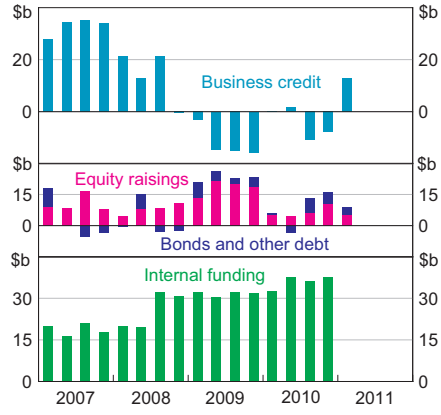
Sources: APRA; RBA

Graph 7
Business Credit by Borrower
January 2006 = 100



Sources: APRA; RBA

Graph 8
Business Funding
Quarterly flow



Sources: ABS; APRA; ASX; Austraclear Limited; RBA

Through all this, credit to the small business sector has been much more stable; it increased by less through the boom and has continued to expand, albeit slowly, since the crisis (Graph 7).

It is not unusual for business credit to be subdued for a time following a period of strong expansion. Both supply and demand usually contribute to this. For instance, businesses often look to repay debt to repair balance sheets that had become stretched during a boom. Also lenders that expand strongly during a boom often end up making significant amounts of bad loans, and when this becomes apparent they respond by cutting back on new lending.

Normally, periods of soft business credit are accompanied by soft business investment. What is somewhat unusual about the current softness in business credit is that it is occurring at a time when business investment is at a very high level. This unusual conjuncture arises largely from the fact that the strength of investment at present is concentrated in the resources sector, and is being funded mainly by the large amounts of cash that resource companies are generating from existing operations. As a result, despite the very high levels of investment, there has not been the need to resort to substantial borrowing (Graph 8).

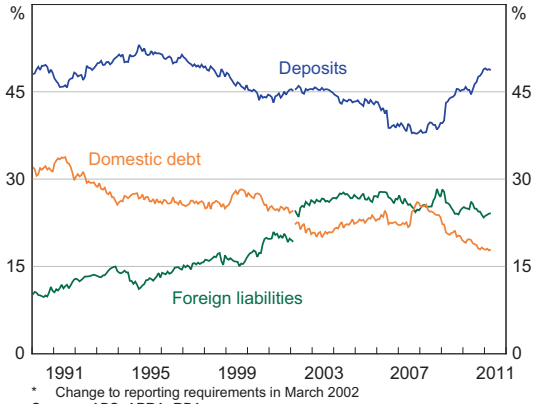
There are signs, however, that the low point in business credit growth is now behind us. Substantial repair has taken place in business balance sheets since the crisis, business investment is picking up and the banking system is showing greater willingness to lend. On average, recent monthly figures for business credit have been somewhat stronger than earlier in the year. It would be normal for this pick-up to continue over the next couple of years as the economic recovery strengthens and broadens.

Implications for Bank Funding

What do recent developments mean for bank funding?

During the period of rapid credit growth that began in the mid 1990s, bank balance sheets expanded rapidly. At the same time, deposit growth slowed noticeably, both because of the decline in national saving and a shift in household saving towards securities rather than deposits. With aggregate credit growing by 12½ per cent per year on average and deposits growing by 10½ per cent per year, banks were left with a noticeable funding gap, which they filled by borrowing in wholesale markets, including from offshore (Graph 9).

Graph 9
Funding Composition of Banks in Australia*
Per cent of funding



* Change to reporting requirements in March 2002
Sources: ABS; APRA; RBA

This funding model was well-suited to the market conditions of the time. Banks had little difficulty in raising funds in wholesale markets, due to the weight of money seeking investments in Australia. In fact, it could be argued that the whole dynamic was driven by this flow of offshore money wanting to come to Australia – i.e. banks were offered ample amounts of funds by foreigners, which they in turn lent domestically, causing an increase in spending, a reduction in saving, a slowing in deposits and a widening in the current account deficit. This is a situation not dissimilar to that faced by the United States over the past decade, which Federal Reserve Chairman Bernanke has described in detail in his explanation of the global savings glut.

Two things can go wrong in this environment. The first is that the weight of money can lead to an erosion of lending standards as banks try to find more and more borrowers. If this is severe enough, it will eventually lead to a financial crisis because loans are made that cannot be repaid. This is essentially what happened in the United States. As noted earlier, however, here in Australia the reduction in lending standards was relatively slight in comparison.

The second risk, which is the one most people focus on, is that the flow of offshore money suddenly stops. The common presumption is that there would then be a crisis because banks could no longer fund themselves. People who worry about this usually do so as part of a broader concern about countries running current account deficits. This view of the world is not new. Its origins lie in the pre-1970s world of fixed exchange rates, since in that regime a cessation of capital inflow quickly caused a crisis. This framework remains relevant for emerging market economies that have relatively fixed exchange rates and unhedged foreign borrowings, but it is not well-suited for analysing risks in mature economies with well-developed financial markets and a floating exchange rate.

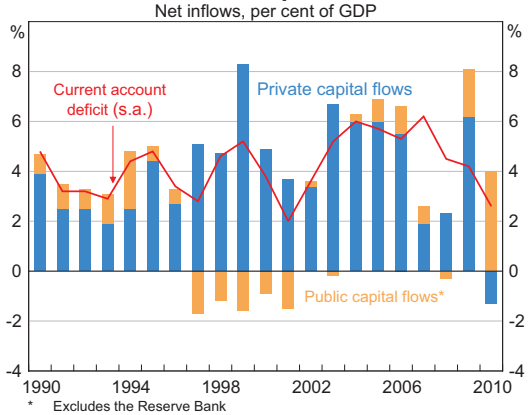
Some people claim that the global financial crisis was a vindication of the view that offshore borrowing causes problems. But this misses the point that all banks were affected by the crisis, irrespective of whether they were borrowers or lenders in international markets. In fact, the Australian banks, which many see as being among the largest users of offshore wholesale markets, emerged from the crisis in better shape than most. While they benefited from a temporary government guarantee, so too did banks in most other countries.

Another point that is often missed in this debate is that, if there is a loss of offshore funding, other things also change due to the ensuing changes in market pricing and consumer and business behaviour. This allows the financial system to adjust. For example, when the financial crisis hit:

- The demand for credit slowed sharply; after growing on average by over 14 per cent per year in the three years to mid 2008, it has grown by only about 4 per cent per year in the three years since.
- Private saving increased, particularly at the household level. This has narrowed the gap between national saving and investment which, as you know, is the counterpart to the current account deficit. The current account deficit in the December quarter fell to 2 per cent of GDP, and is likely to move lower in the immediate future.

- Households became more cautious, shifting their saving from investments in securities towards bank deposits. Deposit growth is currently out-pacing credit growth, allowing banks to reduce wholesale borrowings.
- Capital inflows into Australia did not cease but switched to more conservative investments such as government bonds. The inflow of foreign capital into government bonds during the past year has been more than sufficient to fund the current account deficit, and has been accompanied by the private sector (particularly the banking sector) repaying offshore capital (Graph 10).

Graph 10
Australian Capital Flows
Net inflows, per cent of GDP



* Excludes the Reserve Bank
Source: ABS

The question that arises is what will happen to bank funding if, as expected, credit growth picks up over the next few years? Will it return to the pre-crisis pattern? This seems unlikely at this stage. For one thing, credit growth is unlikely to return to pre-crisis rates in the foreseeable future so pressures on funding will not be as severe. Second, changes to supervisory rules and market conditions have made pre-crisis funding patterns less attractive. In addition, if household saving continues at its recent higher level, it will sustain deposit growth. The household saving rate could even increase further. It is still below its historical highs and strong employment and income growth could provide the wherewithal for higher saving to co-exist with steady consumption growth. Also relevant will be trends in non-bank capital inflows. If the current diversified pattern of capital inflow continues, this too will add to deposit growth as these inflows find their way into bank deposits. All in all, it is likely that banks will be able to maintain the more conservative funding pattern they have put in place recently.

Conclusion

Let me sum up.

The credit boom that began in the mid 1990s ended with the global financial crisis. The Australian financial system weathered that crisis much better than most and, while the adjustment was not painless, the banking system remained resilient. It is currently transitioning through a period of slower growth.

History tells us that periods of weak credit growth such as the present one are relatively short-lived in a growing economy, so some pick-up in credit growth is to be expected. It would be wrong, however, to think that this means a return to the growth experienced in bank balance sheets in the period since the mid 1990s. That was an extraordinary period, driven by what was largely a one-off adjustment to household gearing following financial deregulation and the sustained fall in inflation. In the economic climate likely to be faced by banks over the next few years – solid economic growth but with cautious behaviour by households and relatively low inflation – it would be reasonable to assume that the rate of growth in credit will remain somewhere in the single-digit range. That rate of credit growth should be able to be matched by deposit growth, reducing the need to raise funds in wholesale markets. ☙

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Most of the publications listed below are available free of charge on the Bank's website (www.rba.gov.au). Printed copies of these publications, as well as a wide range of earlier publications, are also available on request; for details refer to the enquiries information at the front of the *Bulletin*.

Statement on Monetary Policy

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.

Annual Reports

- *Reserve Bank of Australia Annual Report*
- *Payments System Board Annual Report*

Research Discussion Papers (RDPs)

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- *Reserve Bank of Australia 50th Anniversary Symposium,* July 2010
- *Inflation in an Era of Relative Price Shocks,* May 2010
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- *Submission to the Inquiry into Access for Small and Medium Business to Finance,* February 2011
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- *Equity & Diversity Annual Report,* 2010
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