

Bulletin

MARCH QUARTER 2011

Contents

Articles

The Iron Ore, Coal and Gas Sectors	1
Household Borrowing Behaviour: Evidence from HILDA	9
Developments in Global Food Prices	15
The Emergence of the Chinese Automobile Sector	23
Domestic Demand Growth in Emerging Asia	31
The Effects of Funding Costs and Risk on Banks' Lending Rates	35
The ATM Reforms – New Evidence from Survey and Market Data	43
Exchange-traded Funds	51

Speeches

The State of Things – Governor	61
The Resources Boom – Governor	67

Appendices

Reserve Bank Publications	73
Copyright and Disclaimer Notices	75

The *Bulletin* is published under the direction of the Publications Committee: Philip Lowe (Chairman), Ellis Connolly, Jacqui Dwyer, Alex Heath, Peter Stebbing and Chris Thompson. The Committee Secretary is Paula Drew.

The *Bulletin* is published quarterly in March, June, September and December and is available on the Reserve Bank's website when released. The next *Bulletin* is due for release on 16 June 2011.

For printed copies, the subscription of A\$25.00 pa covers four quarterly issues each year and includes Goods and Services Tax and postage in Australia. Airmail and surface postage rates for overseas subscriptions are available on request. Subscriptions should be sent to the address below, with cheques made payable to Reserve Bank of Australia. Single copies are available at A\$6.50 per copy if purchased in Australia.

Copies can be purchased by completing the publications order form on the Bank's website or by writing to:

Printing Administrator
Information Department
Reserve Bank of Australia
GPO Box 3947
Sydney NSW 2001

Bulletin Enquiries

Information Department
Tel: (612) 9551 9830
Facsimile: (612) 9551 8033
E-mail: rbainfo@rba.gov.au

The contents of this publication shall not be reproduced, sold or distributed without the prior consent of the Reserve Bank and, where applicable, the prior consent of the external source concerned. Requests for consent should be sent to the Head of Information Department at the address shown above.

ISSN 0725-0320 (Print)
ISSN 1837-7211 (Online)

Print Post Approved
PP 243459 / 00046

The Iron Ore, Coal and Gas Sectors

Virginia Christie, Brad Mitchell, David Orsmond and Marileze van Zyl*

The industrialisation of Asia – particularly China and India – has led to a strong increase in global demand for key resource commodities. The associated sharp rise in the prices of these commodities has underpinned a significant increase in the levels of Australia’s resource investment, production and exports over the past five years, especially for iron ore, coal and liquefied natural gas (LNG). This article outlines some key features and recent developments in these three commodity sectors within Australia.

Overview

Australia has abundant supplies of natural resources, including the second largest accessible reserves of iron ore in the world and the fifth largest reserves of black coal.¹ Known accessible deposits of these commodities are sufficient to sustain Australia’s current production levels for many decades, and ongoing exploration and technological advances could increase supply even further (Table 1). In addition, while small in terms of total global supply, Australia has significant natural gas reserves that can also be used as an energy source.

With the rise in demand for commodities – notably by emerging Asian economies – the value of Australia’s resource exports increased sharply between 2005 and 2010. Resource exports now stand at 57 per cent of Australia’s total exports, having increased from 41 per cent in 2005, with iron ore the largest and coal the second largest export. In part, this reflects a sharp rise in global prices, which increased at an average annual rate of 23 per cent for iron ore and 8 per cent for coal over the same period (measured in Australian dollars). The pace of export volumes growth was lower, with iron ore exports growing at

Table 1: Australia’s Reserves and Production – 2009

	Unit	Reserves	Annual production	Years of production ^(a)	Reserves as share of world Per cent	Production as share of world Per cent
Iron ore	Gigatonnes	28	0.39	71	17	17
Black coal	Gigatonnes	44	0.45	98	7	6
Gas	Trillion m ³	3	0.05	63	2	2

(a) Years of production at current production levels
Sources: ABARES; Geoscience Australia

* The authors are from Economic Analysis Department.

1 Defined by Geoscience Australia as accessible economic demonstrated resources. Ukraine (18 per cent of global total) has the largest reserves of iron ore, while the four countries with larger reserves of black coal are the United States (31 per cent), Russia (22 per cent), China (14 per cent) and India (8 per cent).

THE IRON ORE, COAL AND GAS SECTORS

close to 10 per cent a year and coal exports growing at around half that rate (Table 2).²

In addition to being a large share of total exports, Australia is also a major supplier of these commodities to the global market. Australia is the world's largest exporter of iron ore and coking coal – accounting for over one-third and one-half of global export supply, respectively – and the second largest exporter of thermal coal (Table 3). Some other countries are larger producers of these commodities than Australia, but they typically consume the bulk of their domestic production and hence have a less significant role in the global resource export market. This is particularly noteworthy for China, which is the largest producer of coking and thermal coal and a significant producer of iron ore but also the largest global consumer of these commodities. Similarly, the United States and India are the second and third largest producers of thermal coal, but are significant consumers of their own coal as well.

High global commodity prices and, more generally, the ongoing rapid growth in emerging Asian economies, have underpinned a large increase in mining investment in Australia. Mining investment has doubled – from around 2 per cent of GDP to 4 per cent of GDP – in just the past five or so years, with much of this increase driven by investment in the iron ore, coal and LNG sectors (Graph 1). Further significant investments in these sectors are expected in coming years, which will enable additional

Graph 1
Mining Investment*
Share of nominal GDP

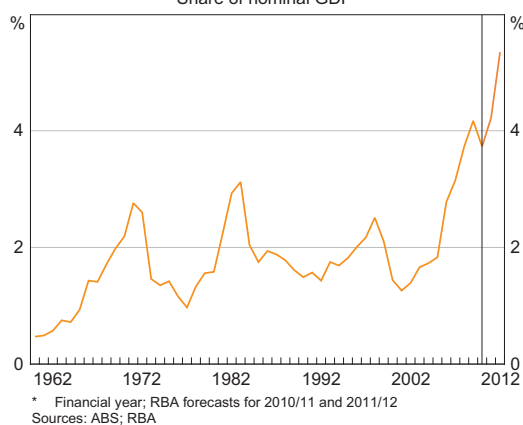


Table 2: Australian Resource Exports
Per cent

	Average annual growth 2005–2010			Share of total (values)	
	Volumes	Prices	Values	2005	2010
Resources sector	4.9	11.0	16.6	41.4	56.7
– Iron ore	10.6	22.8	35.7	5.9	17.3
– Coking coal	4.9	9.2	14.8	8.2	10.5
– Thermal coal	5.6	7.7	13.8	3.8	4.6
– LNG	10.2	10.5	21.8	1.9	3.3

Sources: ABS; RBA

² There are two main types of black coal – coking and thermal coal – the characteristics of which are outlined in a later section.

Table 3: The Global Market for Bulk Commodities – 2009
Top five economies; per cent of global total

Producers		Consumers		Exporters		Importers	
Coking coal							
China	52	China	59	Australia	54	Japan	26
Australia	16	Europe	8	Indonesia	15	Europe	21
Russia	7	India	7	United States	13	China	17
United States	6	Japan	7	Canada	9	India	12
Indonesia	4	Russia	6	Russia	5	South Korea	10
Thermal coal							
China	49	China	51	Indonesia	28	Europe	25
United States	17	United States	16	Australia	19	Japan	15
India	10	India	10	Russia	15	China	14
South Africa	5	Europe	5	Colombia	10	South Korea	11
Indonesia	5	South Africa	3	South Africa	9	Taiwan	8
Iron ore^(a)							
Australia	25	China	54	Australia	39	China	69
Brazil	19	India	9	Brazil	29	Japan	12
India	16	Russia	8	India	13	Europe	10
China	15	Europe	7	South Africa	5	South Korea	5
Russia	6	Japan	7	Canada	3	Taiwan	1

(a) Chinese production and consumption iron ore figures are adjusted to correspond to the world average iron content
Sources: ABARES; AME Group; International Energy Agency; RBA

expansions of export capacity. These developments, as well as some key features of iron ore, coal and LNG production in Australia, are outlined in the rest of this article.

Iron Ore

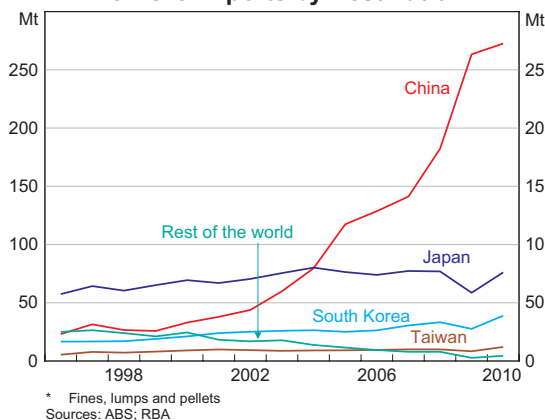
Iron ore is a key input in the production of steel and occurs in two main forms – hematite which is red and has an iron ore content typically greater than 55 per cent, and magnetite which is black and has an iron ore content as low as 30 per cent. Up to now, all Australian commercial iron ore production has been hematite ore; while magnetite ore is the most abundant iron oxide in Australia, it requires more intensive processes to remove its impurities, which significantly increases production costs.

Western Australia accounts for 97 per cent of Australia's iron ore production, which is extracted from open-cut mines located mostly in the Pilbara

region in the north west of the state. After being blasted off the working face, iron ore is crushed and screened to produce rock lumps (greater than 5 mm) or fines (less than 5 mm), and then transported to ports for shipping. Most of Australia's iron ore production is exported, predominantly to Asia. After rapid growth in the past decade, the main export market for Australia's iron ore is now China (almost 70 per cent of iron ore exports in 2010), with Japan and Korea importing most of the balance (Graph 2).

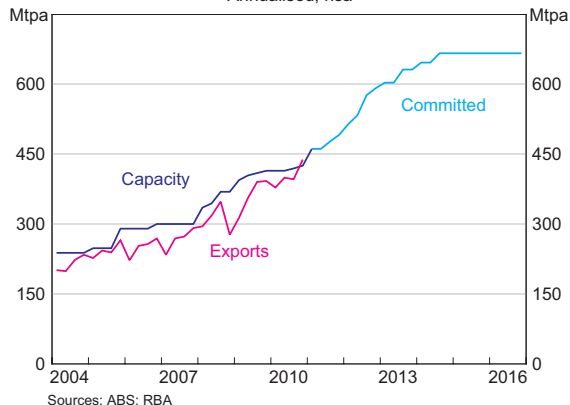
Projects operated by BHP Billiton and Rio Tinto account for over 80 per cent of Australia's iron ore production. Both producers have vertically integrated systems for mine, rail and port infrastructure. BHP Billiton exports from Port Hedland, while Rio Tinto exports from Dampier Port and Cape Lambert. Australia's third largest iron ore producer, Fortescue Metals Group (FMG), also operates in the Pilbara and exports iron ore from Port Hedland.

Graph 2
Iron Ore Exports by Destination*



Iron ore companies have had significant expansion plans in place for several years. Much of BHP Billiton’s Rapid Growth Project 4 has now been completed and Rapid Growth Project 5 is presently underway, which will increase the company’s capacity to around 205 million tonnes per annum (mtpa) by late 2011. Rio Tinto and FMG have also recently committed additional mine and infrastructure expansions in the Pilbara. Rio Tinto committed expansions will raise its production capacity from 220 mtpa to an estimated 283 mtpa by 2013, while those of FMG will take production capacity from 55 mtpa to 155 mtpa. In addition, CITIC Pacific Mining is developing Australia’s first magnetite mine, with upgrades to associated processing and transport infrastructure. Other proposed projects, mainly in the Pilbara and Mid West regions of Western Australia, are at various stages of planning and design. Overall, the investment projects already committed – which total around \$35 billion – suggest that Australia’s iron ore production and exports are likely to increase by around one-half over the next four years (Graph 3).

Graph 3
Iron Ore Export Capacity
Annualised, nsa



Coal

Black coal occurs in two main forms – thermal (or steaming) coal and coking (or metallurgical) coal.³ Thermal coal is primarily used to generate electricity, including 80 per cent of Australia’s electricity. Coking coal is mainly used in the production of steel; it is relatively scarce and hence attracts a higher price than thermal coal. The majority of Australia’s black coal is of good quality, characterised by low ash and sulphur content. Almost all black coal production in Australia comes from New South Wales and Queensland. In New South Wales, black coal is mostly mined in the Hunter Valley. Mines in Queensland are more dispersed, though most are located in the Bowen Basin. In contrast to most global production, three-quarters of black coal in Australia is produced from open-cut mines, which generally enable a higher proportion of the coal deposit to be recovered compared with underground mining, thereby lowering production costs.

Around 80 per cent of Australia’s black coal production is exported. Japan is the main export market (37 per cent of total coal exports in 2010), followed by Korea, China and India (Graphs 4 and 5). Most coal in Australia is transported by dedicated

³ Australia also has extensive reserves of brown coal, which are not exported but used for the production of electricity in Victoria.

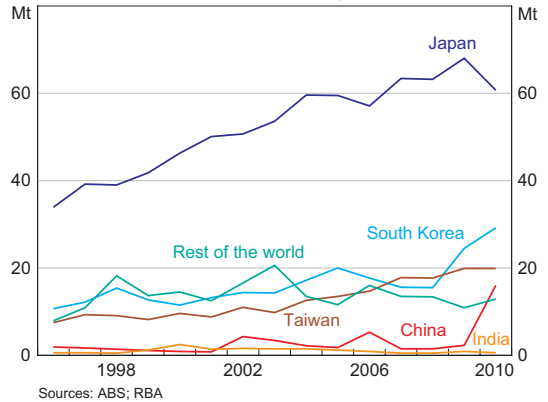
rail connections between mines and ports, and then shipped abroad in bulk carriers. In Queensland, coal is loaded at four ports – the Ports of Brisbane, Abbot Point (north of Mackay in Queensland), Gladstone and Hay Point. In New South Wales, coal is exported through Newcastle and Port Kembla.

Like the iron ore sector, Australia’s coal export capacity has expanded over the past five years following investments in both mine and infrastructure capacity. However, as noted earlier, the pace of volume growth has been comparatively low. In part this has reflected co-ordination difficulties among the various participants in the coal supply chain, especially in New South Wales, though there have been some recent steps to address these issues. In August 2009, the Hunter Valley Coal Chain Coordinator Limited was incorporated to plan and coordinate the daily operation and long-term capacity usage in that area. In addition, a new capacity framework arrangement was recently implemented in the Hunter Valley that requires producers to pay for their agreed infrastructure capacity regardless of their eventual usage. These new arrangements aim to better align incentives and remove obstacles to further capacity expansions.

Notwithstanding co-ordination issues, the ongoing high global coal prices have been an incentive to pursue several infrastructure projects across the eastern seaboard. These have included port expansions (in Newcastle and Abbot Point) as well as the rail networks that link the mines and ports (for example, the expansion of the rail network leading to Abbot Point). Several additional large port and rail expansions are also under consideration, and there are proposals for new mines in the Galilee Basin in Queensland. The mine and infrastructure expansions already under construction or committed – which total around \$6 billion – suggest that coal export capacity will increase by around one-fifth over the next three years (Graph 6). There are also other possible projects being considered that would increase export capacity further.

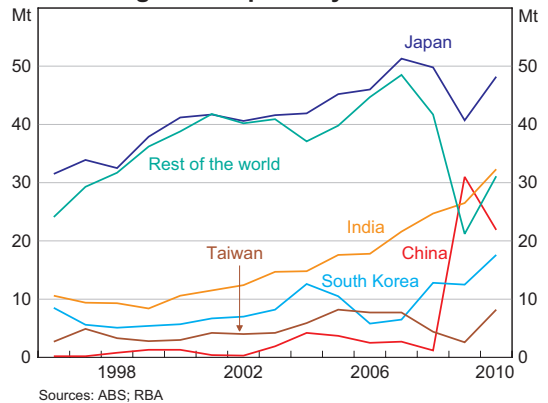
Graph 4

Thermal Coal Exports by Destination



Graph 5

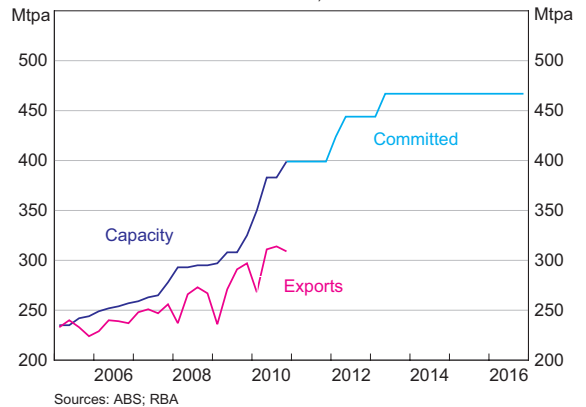
Coking Coal Exports by Destination



Graph 6

Coal Export Capacity

Annualised; nsa



Liquefied Natural Gas

While most of the world's natural gas production is supplied in gaseous form through large pipelines, natural gas can also be converted to a liquid. The conversion takes place in processing plants commonly referred to as 'trains' that remove impurities and condense gas volumes for easier transportation and storage. Although Australia holds less than 2 per cent of the world's known global reserves of natural gas, it is already the fourth largest producer of LNG after Qatar, Malaysia and Indonesia.

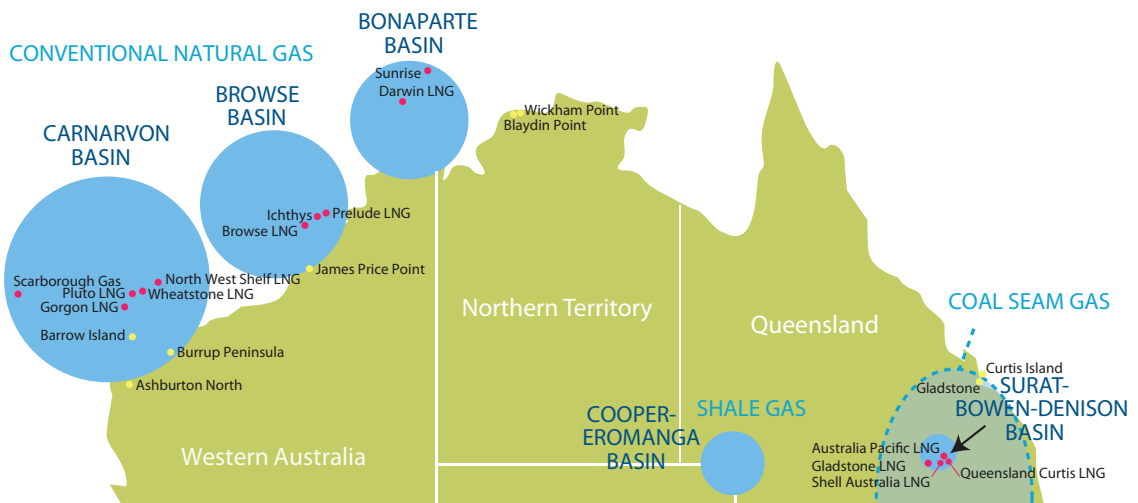
LNG can be produced from conventional and unconventional natural gas resources. Australia currently uses conventional gas resources from offshore fields for its LNG production. The gas is extracted by drilling rock formations that hold trapped reservoirs of natural gas. Two commonly known unconventional gas sources are coal seam methane (CSM) and shale gas. Recent technologies have improved the economics of extracting unconventional gas sources that can be used for LNG production.

The largest proven gas reserves in Australia are located in the Carnarvon Basin in the north west of Western Australia (Figure 1). The Browse Basin and the Bonaparte Basin also have large reserves. In addition, there are large onshore unconventional reserves of CSM in the Surat and Bowen Basins that are of high purity.

Almost all of Australia's LNG production is exported to Asia. By far the largest export destination is Japan, which accounts for around 70 per cent of Australia's total LNG exports. China is Australia's second largest export destination following strong growth in export volumes, and its share of Australian LNG exports is expected to increase further in coming years.⁴ LNG exports to India and Korea have also risen rapidly in recent years, albeit off a low base, and are expected to increase further.

Currently there are two operational LNG plants in Australia. The North West Shelf LNG project is Australia's biggest producing plant and accounts for over 80 per cent of Australia's total production. The onshore facility located in Karratha has been operational since 1989 and sources gas from various

Figure 1
Australian Natural Gas Resources and Major LNG Projects



Sources: Department of Mines and Petroleum of Western Australia; RBA

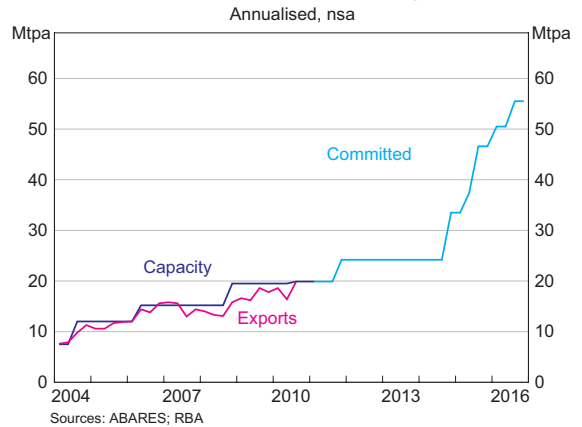
4 According to the International Energy Agency.

fields in the Carnarvon Basin, producing around 16 mtpa of LNG from five trains. The other plant is the Darwin LNG project, which commenced production of LNG in 2006. It sources gas from the Bonaparte Basin and exports from Wickham Point (near Darwin).

In addition to these existing operations, there are four LNG plants at various stages of construction. Most of the heavy construction work for the one-train Pluto Foundation Project has been completed (with production capacity of around 4 mtpa), and exports are expected to commence in late 2011. The Gorgon Project received investment approval in September 2009 and is one of the largest resource projects in Australian history. It involves the construction of three LNG trains with a total production capacity of 15 mtpa on Barrow Island, located around 65 kilometres off the Western Australian coast; first production is expected in 2014.

Following recent State and Federal environmental approvals, two CSM projects are also under construction, and will source gas from the Surat and Bowen Basins. The Queensland Curtis LNG Project was the first CSM project in the world to receive investment approval – in October 2010 – and will have production capacity of 8.5 mtpa from two trains, with production expected to start in 2014. In January 2011, the Gladstone LNG project received investment approval to build two trains with production capacity of almost 8 mtpa, with its first exports scheduled for 2015. A number of other large projects are at an advanced stage of consideration.⁵ Overall, committed LNG investment totals around \$72 billion, which is expected to take export capacity from 20 mtpa at present to more than 50 mtpa by 2016 (Graph 7). While projections about other projects are subject to considerable uncertainty, it is

Graph 7
LNG Export Capacity



quite likely that LNG exports could expand further over coming years, and even start to approach coal and iron ore in terms of its contribution to Australia's total export earnings.⁶

Conclusion

The increased global demand for resources, notably from emerging Asia, is underpinning significant changes in Australia's resources sector. Export values have increased sharply, especially for iron ore, coal and LNG, as both global prices and volumes have increased. As a consequence, exports of these commodities now account for more than one-third of Australia's total exports. In response to the increase in global demand, many large investment projects have been initiated, that have boosted production capacity in Australia over the past five years or so. New projects either under construction or recently committed will see capacity expand significantly further, which will provide the opportunity for additional increases in resource export volumes for several years to come. ✖

⁵ Australia could also produce LNG from large-scale shale gas deposits in the Cooper-Eromanga basin, which borders Queensland and South Australia. Shale gas is found in sedimentary shale rocks, deep beneath the earth's surface.

⁶ Australia also uses significant volumes of natural gas for domestic purposes, which are transported through domestic gas pipelines.

Household Borrowing Behaviour: Evidence from HILDA

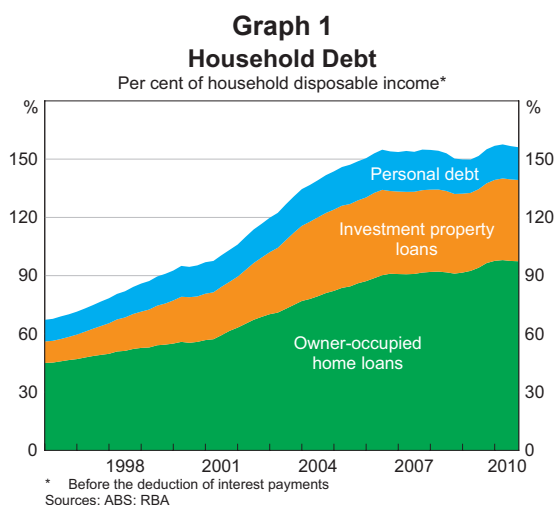
Ellis Connolly and Daisy McGregor*

Over the 1990s and the first half of the 2000s, household debt grew strongly in response to lower nominal interest rates and innovation in the financial system. Since the mid 2000s, the pace of growth in borrowing has slowed significantly. Using household-level data, this article confirms that this slowing has occurred across all age groups. Following the global downturn and the decline in interest rates over 2008/09, there was also a sharp increase in the number of households reporting that they were ahead of schedule in their home loan repayments or paying off their credit card balance each month.

Introduction

Household debt grew strongly through the 1990s and the first half of the 2000s, rising from around 70 per cent of disposable income in 1996 to just over 150 per cent in 2006, before stabilising around this level over recent years (Graph 1). The run-up in household debt is largely accounted for by strong growth in housing-secured borrowing, with investment property loans increasing particularly rapidly in the early 2000s. An important factor explaining the rise in household debt was the structural fall in nominal interest rates following the transition to low inflation in the early 1990s, which raised the borrowing potential of households.¹ Financial deregulation during the 1980s also enabled greater competition in the market, expanding the availability of mortgage finance.² The emergence of mortgage originators in the 1990s boosted competition in the mortgage market, lowering

interest margins particularly for investor housing loans.³ Financial intermediaries also provided new products such as home-equity loans and offset accounts, making it easier for existing home borrowers to redraw from their mortgages.



* The authors completed this work in Economic Analysis Department.

1 Reserve Bank of Australia (2003) estimated that lower interest rates and inflation could explain roughly a doubling of the aggregate debt-to-income ratio, which is broadly consistent with what occurred between the mid 1990s and the mid 2000s.

2 Ellis (2006) highlights that strong growth in housing credit associated with the transition to a low inflation environment and financial innovation was a trend experienced by many industrialised economies during the 1990s and early 2000s.

Since 2005, however, growth in household borrowing has slowed, particularly following the global downturn. Most of the analysis of this recent period has focused on the trends in the aggregate

3 For more detail on residential property investment in the early 2000s, see Parlett and Rossiter (2004).

data. This article contributes to this analysis using data collected from individual households as part of the Household, Income and Labour Dynamics in Australia (HILDA) Survey. This survey is a panel study that began in 2001 with around 7 500 households drawn from the occupants of private dwellings in Australia. Since then, nine annual surveys have been released, with the most recently released survey completed in the second half of 2009. This latest survey is the first to measure the responses of households following the global downturn and the fall in interest rates in 2008/09. The survey collects detailed information on the income, wealth and labour market experiences of households, and also includes a series of questions on owner-occupied home loans (including home-equity loans) and credit card usage, which can be used to explore changes in borrowing behaviour over recent years.⁴

The Distribution of Owner-occupied Home Loans over the 2000s

The HILDA Survey confirms that over the past decade, an increasing share of owner-occupied home loans has been taken out by high-income households (Table 1). In 2009, the top 40 per cent of households in the income distribution held 73 per cent of the value of home loans, up from 69 per cent

in 2001. This rising concentration of debt in high-income households is evident across all age groups, although it is particularly pronounced for younger households. Consistent with this, for households whose reference person is aged 15–34 years, the median income of those with home loans relative to those without home loans rose from 150 per cent to 180 per cent over the period.⁵

The share of older households (where the household reference person is aged 50 and over) with home loans has also increased (Table 1). Since the 1990s, older households have taken advantage of expanded access to their home equity by retaining debt for longer, consistent with rising life expectancy (Battellino 2006). The rise in older households' share of home loans does, however, appear to have slowed somewhat in the late 2000s.

The home-loan-to-income ratio rose rapidly across all age groups over the first half of the decade, before slowing more recently, confirming the trend evident in the aggregate data (Graph 2). This indicates that the levelling-off in the home-loan-to-income ratio was not driven by the aging of the population and the increasing share of debt held by older households, who tend to have lower debt levels than younger households. In fact, the change in trend is clearest for younger households,

Table 1: The Distribution of Owner-occupied Home Loans

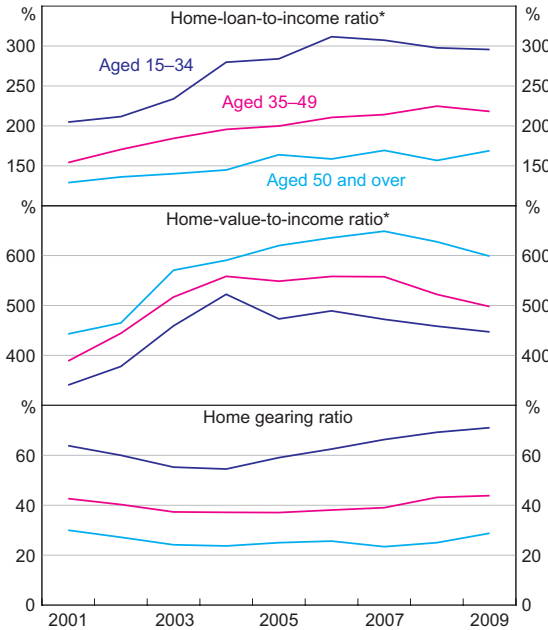
	Per cent of households with home loans			Per cent of the value of home loans		
	2001	2005	2009	2001	2005	2009
Percentile of income						
Under 60	21	20	21	31	25	27
60–100	50	55	55	69	75	73
Age of household reference person						
15–34	33	30	32	28	26	27
35–49	52	54	54	55	52	48
50 and over	16	21	24	16	22	25

Sources: HILDA Release 9.0; RBA

⁴ HILDA Release 10.0, scheduled for release in late 2011, will contain more comprehensive data on household debt and assets, which are included in the survey once every four years.

⁵ The household reference person is the one most likely to be making financial decisions for the household, based on household relationships, income and age.

Graph 2
Home Loans and Gearing
Median of households with home loans



* Per cent of household disposable income
Sources: HILDA Release 9.0; RBA

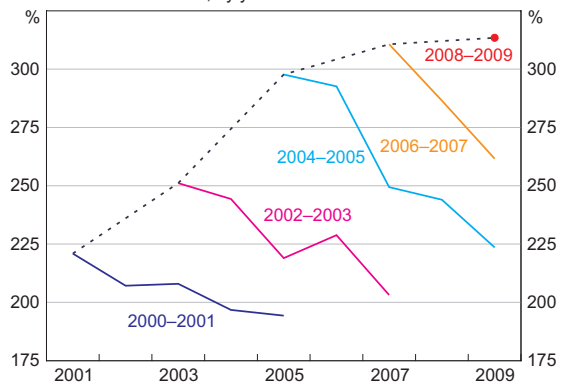
with the median home-loan-to-income ratio rising from around 200 per cent in 2001 to above 300 per cent in 2006 before easing more recently. This has been mainly due to slower growth in borrowing by younger households over the period since 2006, along with faster income growth.

In contrast to the home-loan-to-income ratio, the home gearing ratio (the home loan relative to the home value) fell over the early 2000s before rising over the remainder of the decade, particularly for younger households. Younger households reported stronger growth in the value of their homes between 2001 and 2004 relative to older households. Conversely, from 2004 to 2009, younger households reported the slowest growth in their home values. This is consistent with trends over the decade in the prices of the less expensive dwellings more likely to be purchased by young first-home buyers. Combining the movements in home loans and values, the home gearing ratio fell in the early 2000s as house prices rose rapidly. Ellis, Lawson

and Roberts-Thomson (2003) found that such an effect was largely mechanical, with households not necessarily adjusting their borrowing in the short run to maintain a desired gearing ratio following movements in house prices. Since 2004, with home values increasing more slowly than borrowing against the home, the gearing ratio for younger households has risen, although the rise has been more muted for older households. The rising gearing ratio for younger households could also reflect the higher incomes of those entering home ownership in recent years, with Kohler and Rossiter (2005) finding a positive relationship between gearing ratios and income.

The flattening in the home-loan-to-income ratio across all age groups since 2005 can be partly explained by slower growth in the size of new loans relative to income. The home-loan-to-income ratio on new home loans rose from around 220 per cent for households who moved into their home in 2000–2001 to almost 300 per cent for households who moved into their home in 2004–2005. Along with relatively high turnover in the housing market in the early 2000s, this increase in new loan size boosted aggregate growth in household borrowing. Since then, the size of new loans relative to income has increased only slightly (Graph 3).

Graph 3
Home-loan-to-income Ratio*
Median, by years moved into home



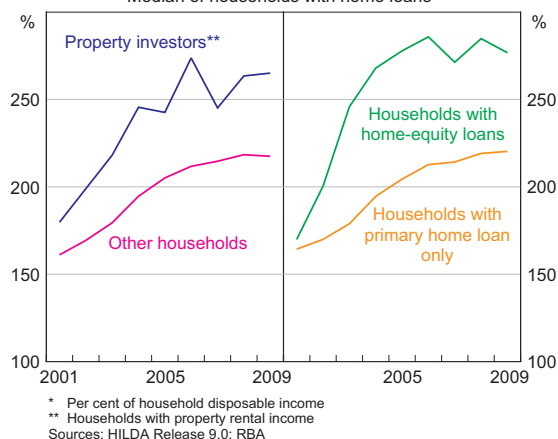
* Per cent of household disposable income; only includes households who took out a home loan
Sources: HILDA Release 9.0; RBA

It appears that the home-loan-to-income ratios of households declined more quickly in the second half of the 2000s than earlier in the decade. For households who moved into their homes in 2000–2001, the home-loan-to-income ratio declined by around 25 percentage points over the following four years (Graph 3). In comparison, households who moved in 2004–2005 experienced around a 75 percentage point decline in their home-loan-to-income ratio over the same period. This has mainly been due to faster income growth since 2005, rather than larger declines in loan balances. This is not surprising since, with a typical home loan, lenders require households to make a constant minimum repayment over the term of the loan for a given interest rate; so early on in the term of the loan, repayments mainly cover interest with only a small fraction repaying principal.

The boom in purchases of investment properties in the early 2000s also influenced trends in the owner-occupied home-loan-to-income ratio. Property investors with owner-occupied home loans rose from 5½ per cent of households in 2001 to 7 per cent in 2004, with the largest increase among older households. Ellis *et al* (2003) found that investment property owners were more likely to have higher gearing on their owner-occupied homes. Consistent with this, the owner-occupied home-loan-to-income ratio of investors was 20 percentage points higher than for other borrowers in 2001, and this differential widened to around 50 percentage points by 2004 (Graph 4). Since then, growth in the number of investors with home loans has slowed, and the home-loan-to-income ratio of investors has not increased further relative to other borrowers.

The borrowing behaviour of households with home-equity loans also changed around 2004. The home-loan-to-income ratio of households with home-equity loans rose much more sharply in the early 2000s than for households with just a primary home loan (Graph 4). During this period, the majority of home-equity loans were taken out by property investors, who may have been using these

Graph 4
Owner-occupied Home-loan-to-income Ratio*
Median of households with home loans



loans partly to finance their investment property purchases. A significant share of the funds raised through home-equity loans would have also been invested in financial assets or spent on consumer goods and services.⁶ Since 2004, the home-loan-to-income ratio of households with home-equity loans has stabilised.

The Recent Increase in Debt Repayments

A range of indicators from the HILDA Survey suggests that household debt repayments trended down over the early 2000s, before stabilising from around 2005, and then increasing sharply in 2009. For instance, through the early 2000s, the proportion of households ahead of schedule on their home loan repayments declined steadily, with households' usual principal repayments falling relative to the home loan value (Graph 5). This trend was partly due to high turnover in the housing market in the early 2000s, which increased the share of borrowers who were in the early stages of paying off their loan, when the required principal repayments are a smaller fraction of the outstanding loan value.

⁶ For an analysis of housing equity withdrawal during the mid 2000s, see Schwartz *et al* (2006).

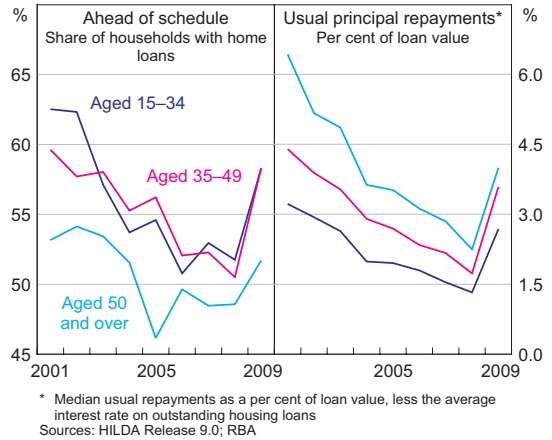
Rising interest rates from 2002 to 2008 would have also reduced the cash flow available to households to make excess repayments. The share of households reporting they were ahead of schedule was broadly flat from 2006 to 2008, before rising sharply in 2009, while usual principal repayments jumped to their highest rate since 2003 across all age groups.

The recent increase in repayments reflects lower home loan interest rates in 2009, which boosted the cash flow available for households to repay debt, as well as the elevated financial caution of households following the global downturn. In the HILDA Survey, almost half of the households reported that they did not lower their usual repayments between 2008 and 2009, despite home loans interest rates falling by almost 3 percentage points over the year. Consistent with RBA liaison with lenders, these households chose to use the extra cash flow provided by low interest rates to repay their home loans faster, which would be consistent with a response to the income uncertainty and wealth losses generated by the global downturn.

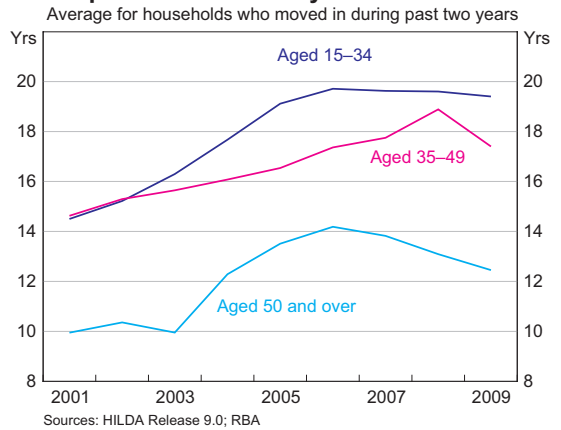
Households' medium-term repayment plans also suggest that households have sought to repay their debts more quickly over recent years. Previous work by Ellis *et al* (2003) found that households' expected pay-off dates contains useful information about household preferences that could help explain the gearing on their housing. When households that had recently moved into their homes were asked about the number of years they expected it would take to pay off their loans, their expectations lengthened between 2001 and 2006 (Graph 6). More recently, this trend has reversed, particularly in the older age group, where the expected length of time to pay off home loans has fallen noticeably.

The trend towards paying debt off more quickly is not limited to housing debt. After rising steadily for most of the past decade, the share of people reporting that they regularly use credit cards fell sharply in 2009, to the level prevailing in 2001 (Graph 7). Furthermore, since the mid 2000s, the share of regular credit card users paying off their

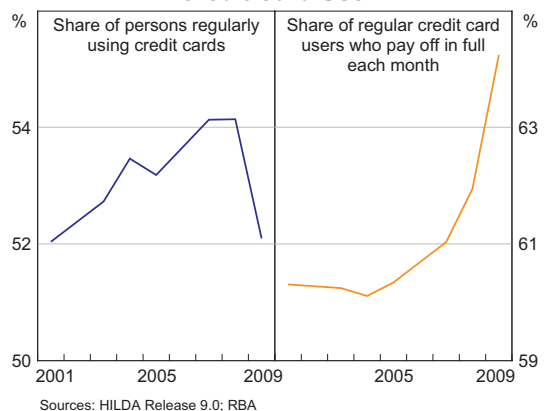
Graph 5
Home Loan Repayments



Graph 6
Expected Years to Pay Off Home Loan



Graph 7
Credit Card Use



credit cards every month has risen consistently, with the largest increase in 2009. This trend towards paying off credit cards in full each month has been particularly pronounced in the younger age group.

Conclusion

The growth of household borrowing has slowed over recent years. While the borrowing ability of households was boosted through the 1990s and the early 2000s by lower nominal interest rates and financial innovation, the associated transition to higher debt levels relative to income appears to have largely run its course. Consistent with this, household-level data from the HILDA Survey indicate that household borrowing has slowed since the mid 2000s across all age groups. This trend was accentuated in the 2009 survey, which showed a sharp increase in the number of households reporting that they were ahead of schedule on their home loan repayments or paying off their credit card balances in full each month. ✕

References

- Battellino R (2006)**, 'Developments in Australian Retail Finance', *RBA Bulletin*, September, pp 12–21.
- Ellis L (2006)**, 'Housing and Housing Finance: The View from Australia and Beyond', RBA Research Discussion Paper No 2006-12.
- Ellis L, J Lawson and L Roberts-Thomson (2003)**, 'Housing Leverage in Australia', RBA Research Discussion Paper No 2003-09.
- Kohler M and A Rossiter (2005)**, 'Property Owners in Australia: A Snapshot', RBA Research Discussion Paper No 2005-03.
- Parlett N and A Rossiter (2004)**, 'Residential Property Investors in Australia', *RBA Bulletin*, May, pp 52–56.
- Reserve Bank of Australia (2003)**, 'Household Debt: What the Data Show', *RBA Bulletin*, March, pp 1–11.
- Schwartz C, T Hampton, C Lewis and D Norman (2006)**, 'A Survey of Housing Equity Withdrawal and Injection in Australia', RBA Research Discussion Paper No 2006-08.

Developments in Global Food Prices

Vanessa Rayner, Emily Laing and Jamie Hall*

Global food prices have increased significantly since the early 2000s, reversing the long-run trend decline in relative food prices over previous decades. A range of supply disruptions in key food-producing countries have contributed to higher food prices, along with strong demand from developing countries as per capita incomes rise and consumption patterns change. Rising commodity prices are leading to higher headline consumer price inflation in many countries though, at this stage, core measures of inflation remain relatively contained.

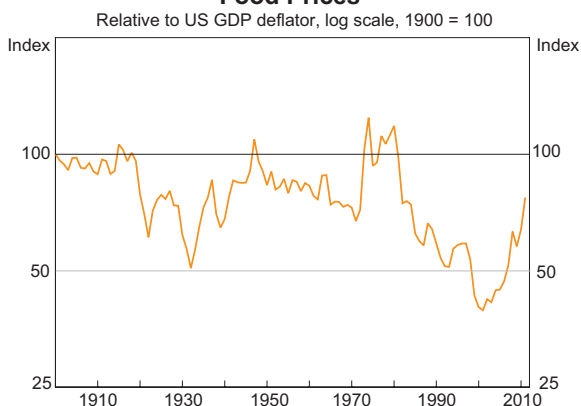
Introduction

The international prices of many agricultural commodities have increased significantly over the past two years. After falling sharply during the global financial crisis, the IMF Food Price Index has increased by 50 per cent since the end of 2008 and is now above its earlier peak in mid 2008. Supply disruptions have been an important factor behind the recent rise in the relative price of food, with unfavourable weather conditions in a number of key food-producing countries weighing on production – particularly for crops such as wheat, sugar, corn and soybeans. More generally, strong demand for agricultural commodities has also contributed to rising food prices since the early 2000s, reversing the long-run trend decline in relative food prices over previous decades (Graph 1). High population growth and rising living standards in developing economies are leading to an increase in protein consumption, which – through demands on land use and demand for feed grains – is contributing to broad-based pressure on food prices.

In many countries, rising agricultural commodity prices are leading to higher consumer price inflation more generally. The effect of higher global food

prices on consumer price inflation tends to be greater in developing countries, where food makes up a larger share of households' consumption basket. Some countries have taken direct measures to contain domestic food price inflation and increase food supply, including imposing trade restrictions and penalties for speculation and hoarding, increasing the supply of fertiliser, and improving supply-chain logistics. This article discusses the demand and supply factors underpinning the recent rise in global food prices and implications for inflation.

Graph 1
Food Prices*



* Equal weighted (geometric) index of 11 commodities; extended from 2004 using IMF commodity price series; latest data point is 2011 to date
Sources: Global Financial Data; IMF; RBA; World Bank

* The authors are from Economic Group.

Demand-side Developments

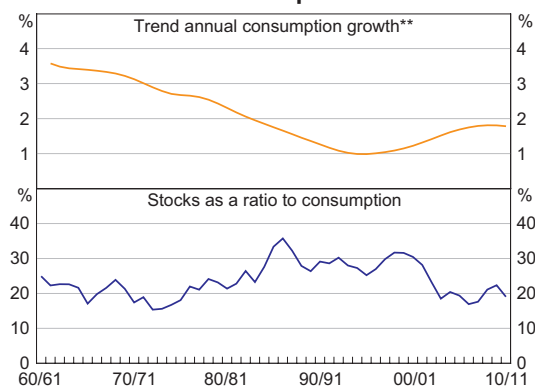
Demand for rural commodities has been strong, particularly from rapidly growing developing countries. High population and income growth in developing countries – where the income elasticity of food demand is typically higher than in developed countries – has supported demand for grains, and increasingly for protein sources such as meat and dairy products.

After slowing through the 1960s to mid 1990s, trend growth in global grain consumption has picked up to around 2 per cent in recent years, with China, Brazil and India accounting for more than one-third of this growth (Graph 2). While trend growth in production has generally kept pace with demand growth in recent years, the United States Department of Agriculture (USDA) estimates that grain production will decline by around 2 per cent in 2010/11. As a result, the level of grain stocks relative to consumption – most notably for corn and rice – will remain at relatively low levels compared with that recorded in the 1980s and 1990s. China’s domestic grain stocks are especially low, and the volume of Chinese imports of grain increased by 28 per cent in 2010.

Population growth can be expected to boost food demand over coming decades, but at a slower pace than in recent decades (Graph 3). The United Nations’ central projections of world population suggest that growth will slow from an average of 1.2 per cent over the past decade to 0.3 per cent by 2050. However, population growth in developing countries is expected to remain higher than in developed economies and food demand should increase as living standards in these countries improve.

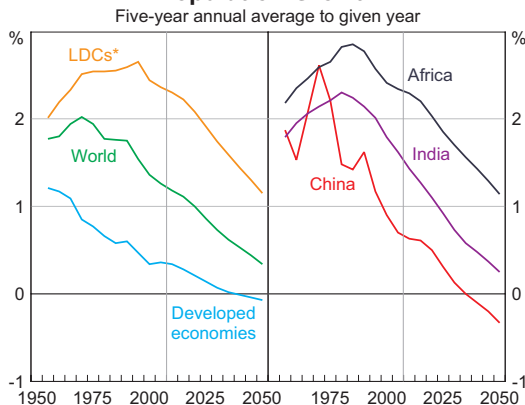
Food consumption patterns tend to change as per capita incomes rise. Specifically, increasing income is often associated with stronger demand for protein sources, such as livestock and dairy products, and a shift away from grains. For example, rapid economic growth in China over recent decades has resulted in a rise in demand for protein and, partly as a result,

Graph 2
Global Grain Consumption and Stocks*



* 2010/11 data are estimates from the United States Department of Agriculture
 ** Trend calculated using Hodrick-Prescott filter
 Sources: RBA; United States Department of Agriculture

Graph 3
Population Growth

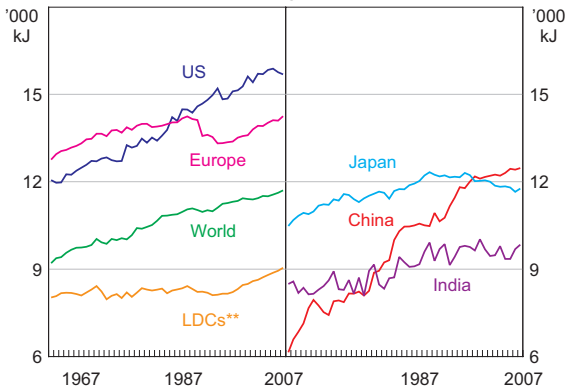


* The world’s 49 least developed countries
 Source: United Nations

the average number of kilojoules consumed on a daily basis in China has converged closer to levels seen in the United States and Europe (Graph 4). Many other developing countries have not experienced such rapid rates of growth in food consumption, and similar patterns would be expected as their per capita incomes rise over time.

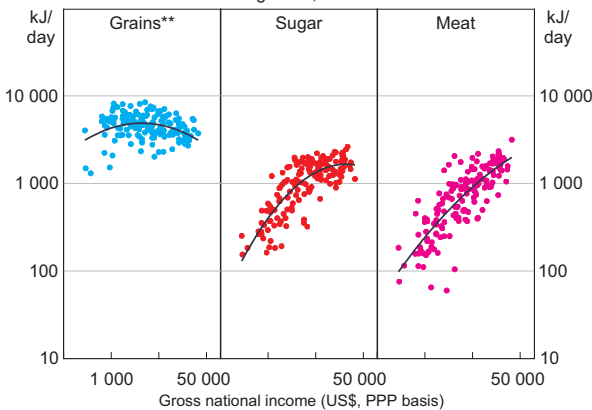
As another simple illustration of these patterns, Graph 5 uses cross-country data from 2007 to examine the relationship between income and food consumption. Trend lines are obtained from

Graph 4
Per Capita Daily Food Intake*



* These data represent each region's total caloric value of food supplied to retail firms and households divided by its population
 ** The world's 49 least developed countries
 Sources: FAO; RBA

Graph 5
Per Capita Food Demand and Income*
Log scale, 2007



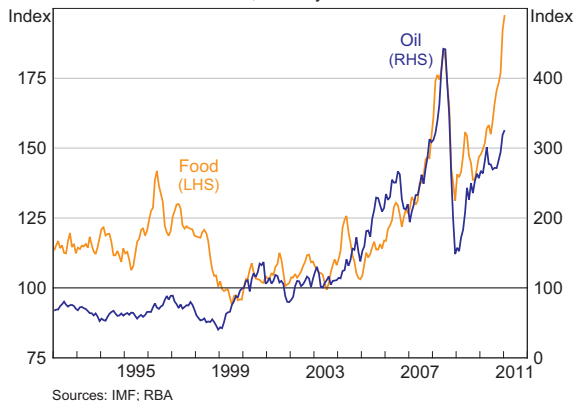
* Data are cross-sectional and represent 158 countries in 2007; trend lines are fitted using a quadratic polynomial
 ** Human consumption of grains
 Sources: FAO; RBA; World Bank

estimating a relationship between the log levels of gross national income and consumption of grains, sugar and meat for 158 countries. The results show that per capita consumption of meat and sugar increases with income and tends to stabilise at high income levels, whereas grains consumption shows little tendency to increase with income. Nevertheless, an implication of rising meat demand is that demand for grains as an intermediate input

to livestock production (i.e. feed) is likely to rise with income.

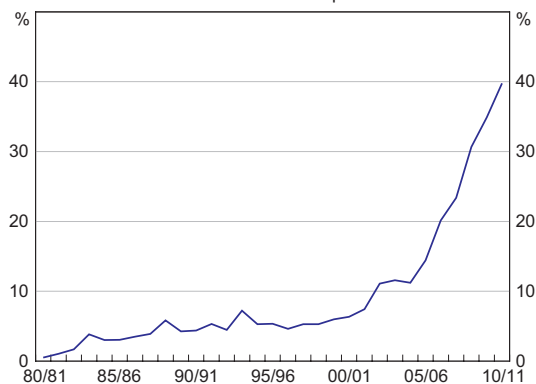
Some rural commodities are also used as intermediate inputs into biofuel production. The production of ethanol and biodiesel – the two main biofuels – requires agricultural inputs such as sugar cane, vegetable oils and corn. Biofuel production has increased rapidly over the past decade, largely in response to high energy prices and government mandates and subsidies. Strong demand for agricultural inputs into biofuel production has been cited as a factor behind the rise in food prices in the years leading up to 2007/08, with record high oil prices increasing the economic viability of this alternative energy source and encouraging farmers to shift plantings towards biofuel feedstocks (see for example FAO (2009) and Mitchell (2008)) (Graph 6). The global financial crisis resulted in some slowing in the growth of biofuel production, with lower energy prices weighing on the profitability of biofuel plants and delaying investment. However, the OECD-FAO (2010) notes that renewed firmness in energy prices since the second half of 2009 has been associated with the enforcement of higher biofuel blending obligations in some countries, resulting in greater demand and higher world prices for feedstocks, ethanol and biodiesel. Consistent with this, almost 40 per cent of US corn

Graph 6
IMF Price Indices
SDR terms, January 2000 = 100



Sources: IMF; RBA

Graph 7
US Corn Used in Ethanol Production
 As a ratio to total US corn production*



* Market year data (September - August); estimate for 2010/11
 Sources: RBA; United States Department of Agriculture

production is estimated to be used in ethanol production in 2010/11 (Graph 7).

Supply-side Developments

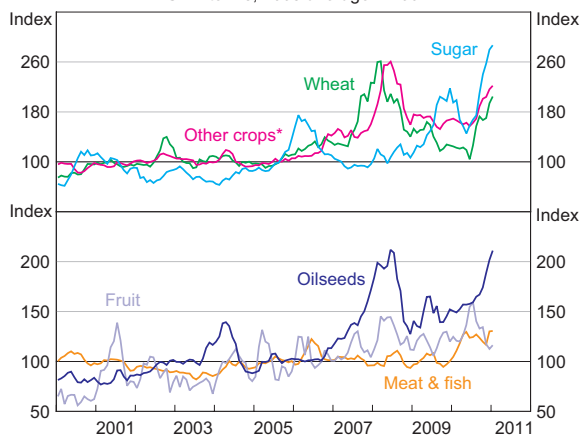
Growth in food supply is driven by changes in the area of land dedicated to crop and livestock production as well as changes in production yields. While productivity changes are an important driver of yields over the long run, yields in the short run can be significantly affected by temporary weather events such as droughts, floods or cyclones. Weather-related disturbances in a number of key food-producing countries have contributed to large price increases for a broad range of agricultural commodities over the past couple of years, most notably wheat, sugar, corn and oilseeds (for example, soybeans) (Graph 8). However, it is important to note that these commodities are not homogenous and price movements observed in local markets may vary because of differences in quality or barriers to trade such as tariffs.

Wheat prices have risen sharply over the past year, partly in response to unfavourable weather conditions in major wheat-producing countries. Yields in Canada have been affected by heavy rains and frost, while dry conditions in Europe and drought in the Black Sea region have weighed further on

global production (Canada, Europe and countries in the Black Sea region have recently accounted for over one half of global wheat exports). Heavy rains and flooding in eastern Australia and dry conditions in Western Australia have affected the quality of the Australian harvest and, more recently, concerns that dry winter conditions in China may affect domestic production also supported wheat prices. Barley production has been affected by similar weather conditions as wheat, and poor weather conditions in the United States have resulted in lower corn yields, with the USDA revising down its forecast for US corn stocks to a 15-year low in 2010/11.

Sugar prices have been particularly volatile over the past two years, also partly reflecting weather-related disruptions. Global sugar stocks declined to low levels in 2009 following poor harvests in Brazil and India (these two countries accounted for nearly 40 per cent of global production in recent years). The subsequent fall in sugar prices in early 2010 reflected higher production in Brazil, as well as slower growth in demand for ethanol during the global financial crisis. Sugar prices picked up again in the second half of 2010, initially reflecting supply disruptions in Brazil, as well as a delay in the annual sugar crush in Queensland due to wet weather (Australia was the world's third largest sugar exporter in 2009). Global

Graph 8
Global Food Commodity Prices
 SDR terms, 2005 average = 100



* Includes corn, barley and rice
 Sources: IMF; RBA

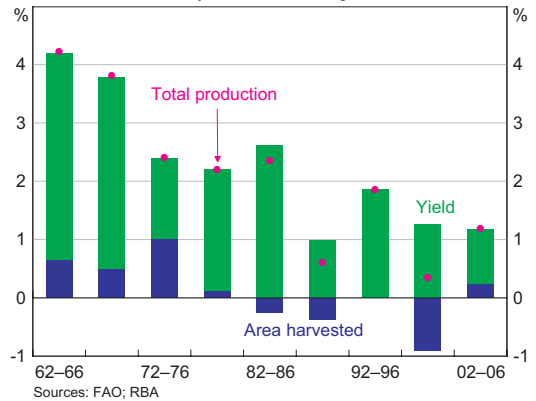
stock levels are expected to remain tight in 2011/12, with Cyclone Yasi having affected Australia's 2011/12 sugar crop.

Prices of oilseeds have also risen in response to projections of lower supply in 2010/11, with dry conditions in Argentina lowering expectations of area planted to soybeans and production yields. This follows price increases in previous years, owing to supply shortfalls in the 2007/08 and 2008/09 seasons and a delayed crop in South America in 2009/10 (even though the latter turned out to be the largest crop on record). Meat prices have increased as farmers seek to rebuild herds, and rising grain prices are also likely to contribute to higher grain-fed beef prices.

While weather developments can affect short-term production yields, long-run trends in yields are mainly influenced by changes in farm productivity. Productivity growth in the grains sector was relatively high from the 1960s to 1980s, with most of the increase in world crop production attributable to higher yields rather than increases in cropping area (Graph 9). This rise in productivity was largely due to the 'Green Revolution', which included the development of improved seed and high-yielding grain varieties, synthetic fertilisers, pesticides and the expansion of irrigation infrastructure. Green Revolution techniques were adopted in the developed world and parts of developing Asia, but considerable potential still exists for extending these productivity gains to other regions, particularly in Africa, Europe and Central Asia (IBRD/World Bank 2009). In many developing economies, agriculture remains very labour intensive and access to modern technology, infrastructure, non-labour inputs, transport and credit is limited; as a result, supply-side constraints can prevent farmers from increasing production in response to higher prices or favourable weather conditions.

Crop productivity growth slowed in the 1990s and 2000s, with gains from the Green Revolution fading and declining relative food prices providing less incentive to invest in productivity improvements.

Graph 9
World Grain Production Growth
5-year annual average

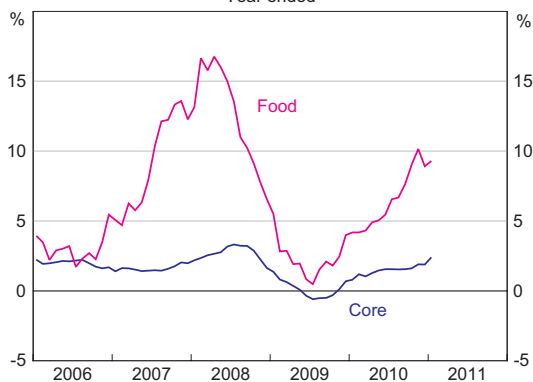


Notably, some commentators partly associated lower productivity growth during this time with a slowdown in the rate of growth in public investment in agricultural research and development (Alston, Beddow and Pardey 2009). More recently, yields have increased in some countries following the introduction of genetically modified crops, but concerns about the environment, food safety and property rights have constrained broad-based adoption of these crop varieties (IBRD/World Bank 2009).

Implications for Inflation

The rise in agricultural commodity prices is contributing to higher consumer price inflation in a number of countries. Most notably, higher food prices are placing upward pressure on headline inflation in several east Asian economies, including China, South Korea and Indonesia. In general, however, food price inflation across the region is yet to reach the highs experienced in mid 2008, and in Taiwan, the Philippines and Malaysia food price inflation is still at or below long-run average rates (Graph 10). Similarly, food price inflation in the United States and United Kingdom has drifted higher over the past year, but at this stage remains well below their respective peaks in mid 2008.

Graph 10
East Asia* – Consumer Price Inflation
Year ended

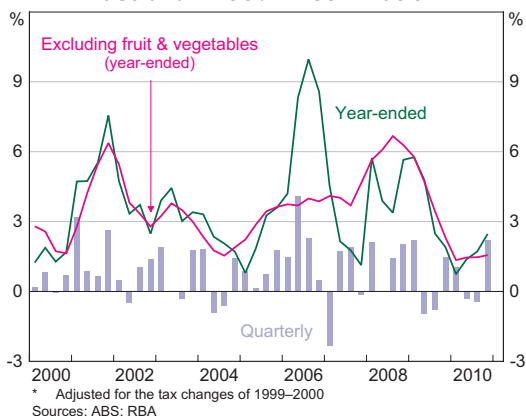


* Excludes Japan
Sources: CEIC, RBA

Some countries have taken direct measures to ensure adequate domestic food supplies and contain inflation. Drought caused some countries in the Black Sea region, namely Russia and Ukraine, to impose export restrictions on grains until the end of June 2011. The Chinese Government has introduced an anti-inflation plan, part of which is aimed at encouraging local governments to promote the supply of fresh vegetables and grains to stabilise prices. The plan includes higher penalties for speculation and hoarding, and measures to increase the supply of fertilizer and improve supply-chain logistics for agricultural products.

Interestingly, food price inflation in Australia has, to date, been relatively modest (Graph 11). Excluding fruit and vegetable prices, food prices increased by only 1.6 per cent over 2010. The appreciation of the exchange rate has, to some extent, moderated imported food price inflation and domestic retail competition has also played a role. Nonetheless, it is expected that higher world prices for commodities such as wheat and sugar will place upward pressure on related food prices. Recent flooding in Queensland and Cyclone Yasi are also pushing up food prices, particularly for fresh fruit and vegetables, although most of this effect is likely to unwind as supply recovers.

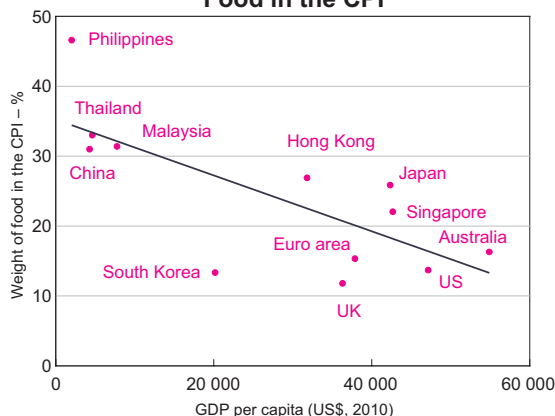
Graph 11
Australian Food Price Inflation*
Year-ended



* Adjusted for the tax changes of 1999–2000
Sources: ABS, RBA

While core inflation has begun to rise in those countries experiencing high food price inflation, it remains relatively contained at this stage. However, a potential concern if food prices continue to rise is that consumers may come to expect higher inflation on an ongoing basis and adjust their behaviour accordingly. This is more likely to be an issue in developing countries, where food makes up a larger share of households' consumption basket (Graph 12).

Graph 12
Economic Development and the Weight of Food in the CPI*



* CPI weights are from the latest year available
Sources: ABS; CEIC; Eurostat; RBA; Statistics Bureau; Office for National Statistics; Bureau of Labor Statistics

Given that unfavourable weather developments have been a factor behind the recent spike in food prices, it is possible that the rate of food price inflation could moderate fairly quickly. Under this scenario, a sharp, temporary rise in food prices should have no long-term effect on inflation expectations. Still, in the medium to long run, it is likely that food prices will remain at a relatively high level given ongoing strong demand. In fact, the OECD-FAO (2010) projects that most crop and livestock prices over the next 10 years (in real and nominal terms) will exceed the average levels of the decade prior to the 2007/08 peaks, underpinned by an increasingly high-cost structure, strong demand from developing countries, continued expansion of biofuel production and slower growth in agricultural production. While monetary policy cannot affect the long-term relative price of food, the challenge for central banks in these circumstances is to keep the general level of prices contained and inflation expectations well anchored. ✎

References

Alston J, J Beddow and P Pardey (2009), 'Mendel Versus Malthus: Research, Productivity and Food Prices in the Long Run', University of Minnesota Department of Applied Economics Staff Papers Series, Staff Paper P09-1.

FAO (Food and Agriculture Organization of the United Nations) (2009), *The State of Agricultural Commodity Markets: High Food Prices and the Food Crisis: Experiences and Lessons Learned*, FAO, Rome.

IBRD (International Bank for Reconstruction and Development)/World Bank (2009), *Global Economic Prospects 2009: Commodities at the Crossroads*, The World Bank, Washington DC.

Mitchell, D (2008), 'A Note on Rising Food Prices', World Bank Policy Research Working Paper No 4682.

OECD-FAO (Organisation for Economic Co-operation and Development and the Food and Agriculture Organization of the United Nations) (2010), *OECD-FAO Agricultural Outlook 2010-2019*, OECD Publishing, Paris.

The Emergence of the Chinese Automobile Sector

Mark Baker and Markus Hyvonen*

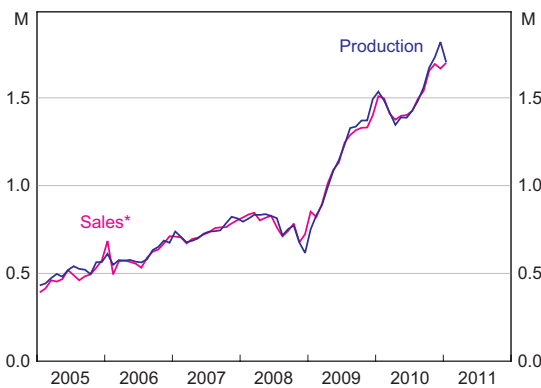
The Chinese automobile sector has experienced rapid growth over the past decade, with China recently becoming the world's largest producer of automobiles. Given the steel-intensive nature of automobile production, the expansion of China's automobile sector has seen it become an important end-user of steel. With the number of cars in China still very low relative to its large population, car sales are likely to remain at a high level for the foreseeable future; accordingly, Chinese car makers should remain a significant (and growing) source of demand for steel.

Introduction

The Chinese automobile sector has expanded rapidly over the past decade. Growth has been particularly strong over 2009 and 2010 (boosted by various stimulus measures), with production and sales of automobiles doubling over this period (Graph 1). As a result of this strong growth, China became the world's largest producer of automobiles in 2009 (as measured by the number of vehicles produced; Graph 2).

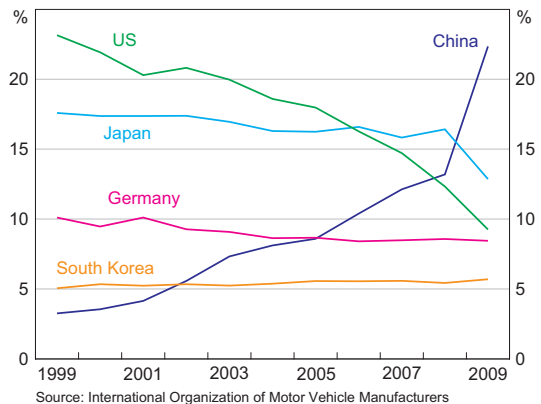
The recent surge in automobile production has seen the sector become an important end-user of steel, accounting for 8 per cent of China's total steel consumption in 2009 (MofCOM 2010). According to the China Iron and Steel Association, between 50 and 60 per cent of the weight of a typical car is made up of steel and a further 12 to 15 per cent comprises cast iron (CISA 2008). Developments in automobile production consequently play an important role in determining Chinese demand for steel and therefore iron ore. Reflecting the growing

Graph 1
China – Motor Vehicle Sales and Production
Units



* Excludes imported vehicles
Sources: CEIC; RBA

Graph 2
Global Motor Vehicle Production
Share of total



Source: International Organization of Motor Vehicle Manufacturers

* The authors are from Economic Group.

importance of the industry, this article discusses the historical development of the Chinese automobile sector, before turning to more recent developments and future prospects.

History and Overview

Since general market-based reforms were introduced in China around 30 years ago, restrictions and controls on the automobile sector have been gradually eased. Prior to these reforms, Chinese state-owned automobile manufacturers primarily focused on large commercial trucks, with only a small number of passenger cars being produced. In the 1980s and early 1990s, the Government began to approve joint venture partnerships with major global automobile manufacturers in order to develop China's domestic production capabilities. Technology and knowledge transfers through these partnerships were an integral part of the early development of the modern industry.

An important step in the development of the industry was the 1994 Automobile Industry Policy. One of the policy's aims was to attract large internationally established manufacturers to operate in China under joint venture, with foreign ownership of such ventures restricted to no more than 50 per cent. The new policy also urged consolidation in the auto sector, indicative of the broader restructuring of Chinese state-owned enterprises throughout the 1990s (Naughton 2007). Beijing-based First Automobile Works (FAW), Shanghai Automotive Industry Corporation (SAIC) and Hubei-based Dongfeng Motors (the so-called 'big three') all participated in the early joint ventures prior to the introduction of the policy in 1994 and continued to be major participants in joint ventures subsequently. The Government's focus on consolidation of the sector and the development of the large established state-owned enterprises meant that smaller producers not involved in joint ventures faced restrictions on market entry and product development throughout the 1990s.

Automobile production began to pick up significantly at the start of the 2000s, consistent with stronger overall growth in the Chinese economy (Graph 3). Higher production was associated with increased domestic competition with a number of new state-owned and private manufacturers entering the market. The passenger car market, in particular, grew rapidly throughout the decade, while commercial vehicle production expanded at a more subdued pace. In 2004, the Government updated the Automobile Industry Policy which placed greater emphasis on domestic research and development and also removed the 50 per cent restriction on foreign ownership for joint ventures located in any of China's export processing zones.

On average, Chinese-produced cars are cheaper than those produced in advanced economies. Price data from the National Development and Reform Commission (NDRC) show that the average price of automobiles sold in 2010 was just under CNY68 000 (around A\$11 000). In addition to relatively low labour costs, domestic producers have been able to keep prices low by using established technologies and models obtained through various joint venture partnerships. The more established joint venture producers (particularly the 'big three') continue to be the largest manufacturers, with sales of passenger

Graph 3
China – Motor Vehicle Production
Units

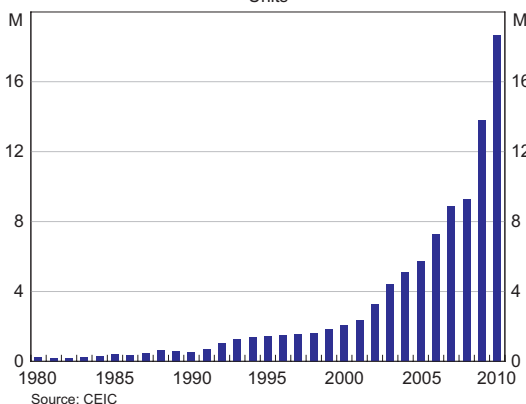


Table 1: China – Passenger Vehicle Sales by Manufacturer in 2010

Manufacturer	Sales	Market share ^(a)
	Units	Per cent
SAIC-GM-Wuling	1 135 600	8.3
Shanghai GM	1 012 100	7.4
Shanghai Volkswagen	1 001 400	7.3
FAW Volkswagen	870 000	6.3
Chongqing Changan	710 000	5.2
Beijing Hyundai	703 000	5.1
Chery	674 800	4.9
Dongfeng Nissan	661 000	4.8
BYD	519 800	3.8
Toyota	505 900	3.7

(a) Share of total passenger vehicle sales

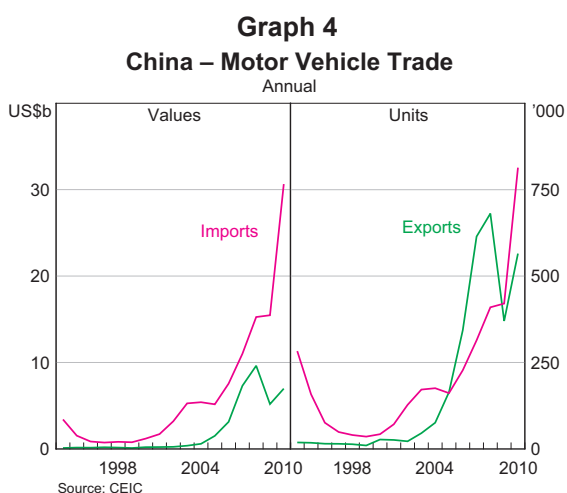
Source: China Association of Automobile Manufacturers

cars in China dominated by models of foreign brands such as GM and Volkswagen produced by these joint ventures (Table 1). However, some of the independent producers that entered the passenger vehicle market in the late 1990s and early 2000s, who produce vehicles under their own brand, have since gained market share; for example, Anhui-based Chery and Guangdong-based BYD, both featured among the 10 highest selling manufacturers in 2010 (Table 1).

Foreign Trade

China's exports of motor vehicles also increased rapidly over the past decade, though they remain small relative to the size of the domestic market. In 2008, motor vehicle exports accounted for around 7 per cent of Chinese automobile production. This share fell to around 3 per cent in 2009 owing to the collapse in overseas demand following the onset of the global financial crisis, together with a surge in domestic production (Graph 4).

Most motor vehicles exported by China go to developing and emerging economies, with Algeria, Vietnam, Russia, Iran and Chile the top five



destinations in 2010 (by value; Table 2). Advanced economies accounted for only around a tenth of total motor vehicle exports in 2010. With the joint ventures involving foreign manufacturers geared towards supplying vehicles for the domestic market, the vast majority of exports of motor vehicles are produced by the independent producers. Intellectual property issues have been a factor constraining the ability of the independent auto companies to export to developed economies, though this is likely

Table 2: China – Exports and Imports of Motor Vehicles by Country in 2010

Exports		Imports	
Destination	Share of total ^(a) Per cent	Origin	Share of total ^(b) Per cent
Algeria	7.9	Germany	38.4
Vietnam	5.6	Japan	24.7
Russia	4.4	United States	11.6
Iran	4.1	United Kingdom	7.0
Chile	4.0	South Korea	5.3

(a) Share of the total value of motor vehicle exports

(b) Share of the total value of motor vehicle imports

Source: CEIC

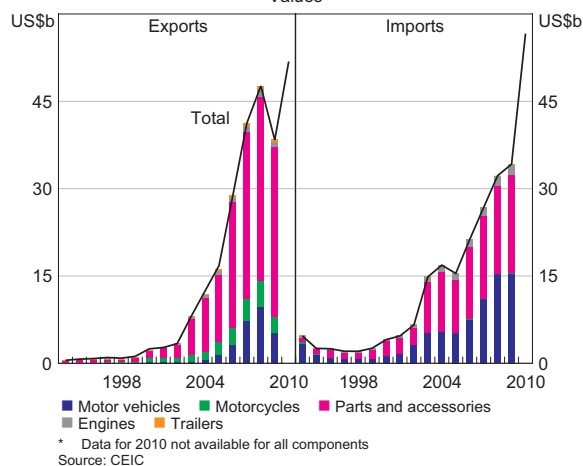
to change as these companies continue to develop their own designs and purchase technologies from foreign car makers.

Growth in motor vehicle imports has also been rapid over the past decade, consistent with strong growth in incomes. Imports of motor vehicles consist mainly of 'luxury' cars, with nearly 40 per cent of the value of car imports sourced from Germany and another one-third or so coming from the US and Japan (by value; Table 2). Highlighting the relatively high-value nature of China's car imports, the *value* of motor vehicle imports has consistently exceeded exports despite the country exporting a greater *number* of automobiles than it imported between 2005 and 2008.¹

In addition to motor vehicles, China also exports automobile parts and accessories, as well as motorcycles. Including these products, total automobile products accounted for around 3 per cent of China's aggregate exports in 2010, with parts and accessories accounting for the majority of such exports (Graph 5). In contrast, imports of automobile products are more evenly divided between motor vehicles and automobile parts and accessories.

¹ Trade data indicate that the average value of an imported motor vehicle in 2009 was just under US\$37 000, compared with an average value of an exported vehicle around US\$14 000. In the case of passenger cars, the difference is even greater, with the average value of an imported car around US\$35 000 compared with only just over US\$7 000 for exports.

Graph 5
China – Automobile Trade*
Values



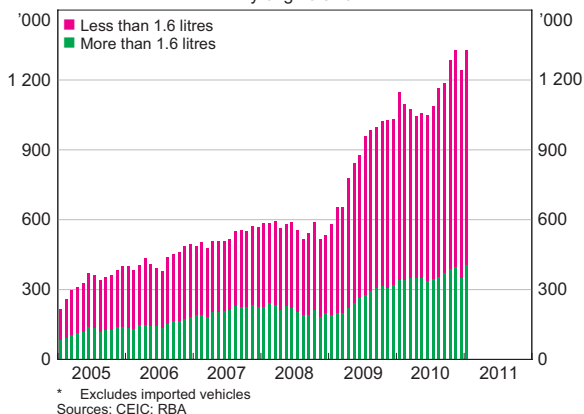
Recent Developments

After the onset of the global financial crisis in late 2008, the Chinese authorities moved quickly to stimulate the economy, including a number of policies aimed at increasing purchases of passenger vehicles. A car-scrappage scheme was introduced, whereby older cars or any vehicle that did not meet China's emission standards could be turned in for a grant of between CNY3 000 and CNY6 000. In January 2010 these grants were increased to between CNY5 000 and CNY18 000 and the scheme was extended by six months to the end of 2010.

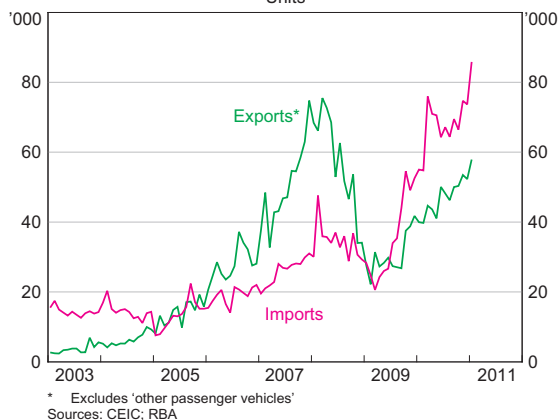
Aside from the car-scrappage scheme, the Government also halved the sales tax on smaller vehicles in January 2009. Initially set at 10 per cent, the sales tax on cars with an engine size less than 1.6 litres was cut to 5 per cent and a further subsidy, implemented in early 2009, was paid on rural purchases of light trucks and mini-vans (up to CNY5 000 in value).² Following the initial policy announcement, sales of eligible vehicles increased sharply and remained at a very high level through to the beginning of 2011 (Graph 6). Overall, sales of cars with engines less than 1.6 litres have nearly tripled since the end of 2008 and have been a major contributor to the growth in overall passenger car sales. In January 2010, the sales tax on smaller vehicles was raised to 7.5 per cent which moderated growth somewhat – with sales of smaller cars up 32 per cent in 2010 compared with 71 per cent in 2009. Both the scrappage scheme and the sales tax discount expired at the end of 2010, although a CNY3 000 subsidy was introduced in 2010 and remains available on purchases of pre-approved ‘green’ cars.

The surge in demand for cars with small engines coincided with an extremely sharp rise in imports of motor vehicles; the number of motor vehicles imported into China increased almost fourfold over the year to March 2010, thereby providing a boost to the automobile sectors of advanced economies such as Germany, the United States, Japan and South Korea (Graph 7). While it is possible that some imported cars had engines small enough to qualify for the temporarily lower sales tax, the volume of such imports is likely to have been small. This is because the average value of imported passenger vehicles is high enough to suggest that most imported vehicles were luxury cars (and therefore unlikely to have had small engines), and furthermore many German, US and Japanese automakers already produced cars with small engines within China. Accordingly, the surge in

Graph 6
China – Passenger Vehicle Sales*
By engine size



Graph 7
China – Motor Vehicle Trade
Units



demand for imported vehicles is consistent with a strong underlying demand for cars in China that is largely unrelated to the recent policy measures.

In contrast to imports, exports of motor vehicles have experienced only a modest recovery following their sharp decline around the time of the global financial crisis (Graph 7). This is consistent with relatively sluggish economic recoveries in former key export markets in eastern Europe and ongoing headwinds faced by Chinese automakers in gaining market share in advanced economies.

² Subsidies for purchases of motorcycles and three-wheelers were also introduced.

Future Prospects

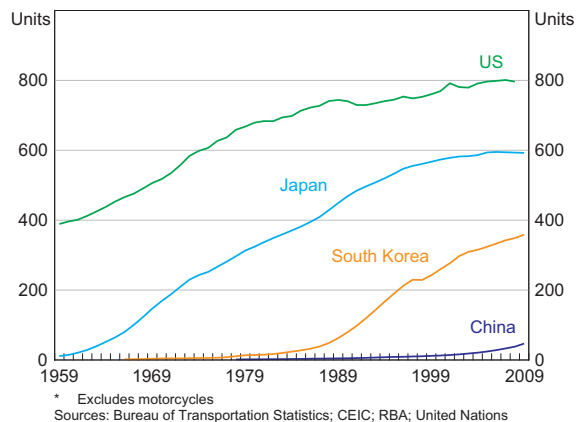
The emergence of China as a low-cost producer of automobiles will continue to have important ramifications for the global automobile market. In 2001, China had six companies in the top 50 global automobile producers, a number that had risen to twenty-one in 2009. Some of the faster growing independent companies have been successful in expanding their presence in the global automobile market; for instance, Geely, Chery and BYD, have been building plants and selling cars in developing car markets abroad. They have also been actively trying to enter markets in advanced economies for some time, including attempts to acquire major international car brands in recent years.³ Australia has recently started importing Chinese-produced vehicles, with passenger cars, sports utility vehicles and light trucks available for sale. While the expansion of Chinese car brands in foreign markets continues to face some headwinds, China is likely to emerge as a large exporter of affordable small-to-medium sized cars in the longer run, similar to the development pattern for both the Japanese and South Korean car industries.

Domestic sales are likely to remain high for the foreseeable future, abstracting from any short-term easing owing to the expiry of stimulus measures. As the urbanisation rate and household incomes continue to rise in China, there is likely to be continued demand for automobiles from first-time buyers. As in other countries, status is attached to car ownership in China and ‘conspicuous consumption’ is likely to play a role in boosting first-car buyer demand. Interestingly, and despite the scrappage incentives introduced by the Government in 2009, scrappage rates for passenger vehicles have remained very low (estimates suggest that less than 2 per cent of the total passenger car fleet was scrapped in 2009). Accordingly, it would seem reasonable to expect purchases by ‘replacement

buyers’ to provide a growing source of demand for cars in the future.

International comparisons also suggest significant growth in the domestic market over the years ahead. The latest estimates show that for every 1000 people in China, there are only 47 motor vehicles on the road, compared with around 800 in the United States, just under 600 in Japan and around 360 in South Korea (Graph 8). The rise in automobiles per person in China to date is comparable to the initial growth in South Korea in the 1980s. If China were to continue at a similar pace to South Korea, and assuming current population projections, the number of automobiles would stand at around 240 per 1 000 people by 2020 – a more than fivefold increase from the 2009 level (with average annual growth in the car fleet of over 16 per cent).⁴ By 2030, the number of cars would stand at just under 360 per 1 000 people. However, it is worth noting that South Korea enjoyed significantly lower real oil prices during the initial expansion of its car fleet than China faces (and is likely to face), suggesting that the South Korean experience might provide an upper bound on the future growth of China’s car fleet.

Graph 8
Motor Vehicles per 1 000 People*



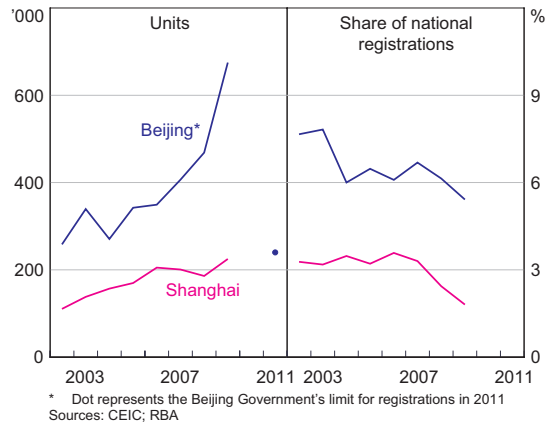
3 A recent example is Geely’s purchase of Ford’s Volvo product line.

4 Based on UN (2009) population projections.

Another potential constraint on future growth in Chinese car sales is congestion, at least in the key first-tier cities, some of which have already imposed restrictions on car ownership.⁵ In Beijing, for example, the Government recently announced a limit of 240 000 on new motor vehicle registrations in 2011, with 20 000 registrations assigned each month through a ballot. This limit will represent a reduction of nearly two-thirds in the number of new registrations from their 2009 level (Graph 9). With registrations in Beijing (and China more generally) portable between automobiles, the limit on registrations will restrict the number of sales of vehicles to first-time buyers. While no hard data exist on the relative size of first-time versus upgrade buyers, it is likely that the decline in sales of new vehicles will be smaller than the restrictions on new registrations imply. Nonetheless, the Beijing automobile market has been declining in importance nationally – accounting for around 5 per cent of total registrations in 2009 – suggesting that these restrictions are unlikely to have a major impact on national car sales. Beyond the near term, improved public transport infrastructure in China’s cities might temper growth in demand for cars; for example, the Beijing Government is planning on nearly doubling the length of the city’s subway network from its current length of 336 kilometres to 660 kilometres by 2015.

Outside the major cities, car ownership is still relatively limited, with congestion unlikely to be a binding near-term constraint on growth in the overall car fleet. China’s network of highways is relatively well developed, particularly when viewed against the size of its fleet of cars; China has 2¼ million kilometres of paved roads for just over 60 million motor vehicles, compared with 2.6 million kilometres of paved roads for over 250 million motor

Graph 9
China – New Motor Vehicle Registrations



vehicles in the US.⁶ Overall prospects for the Chinese automobile sector would appear quite positive. Although near-term growth in sales and production is likely to be relatively subdued, reflecting the withdrawal of various stimulus measures, the number of cars on China’s roads is likely to continue expanding rapidly over coming decades. ❖

References

CISA (China Iron and Steel Association) (2008), ‘China’s Huge Appetite for Auto Steel Expected’, 8 April. Available at: <<http://www.chinaisa.org.cn/news.php?id=2142126>>.

MofCOM (Ministry of Commerce People’s Republic of China) (2010), ‘China’s Steel Industry and Policy Development after the Financial Crisis’, Presented to the 69th Session of the OECD Steel Committee Meeting, Paris, 2–3 December.

Naughton B (2007), *The Chinese Economy: Transitions and Growth*, MIT Press, Cambridge.

UN (United Nations) (2009), *World Population Prospects: The 2008 Revision – Highlights*, United Nations, New York.

5 Since 1994, Shanghai has auctioned off new license plates to control the number of new cars hitting the roads each year. These restrictions appear to have been effective; despite having a population greater than Beijing (according to official data), new registrations in Shanghai averaged a little under 200 000 vehicles a year between 2006 and 2008, compared with an average of around 400 000 in Beijing.

6 The data for China are from the National Bureau of Statistics, and do not include roads within medium to large cities. The US data are from the U.S. Department of Transportation, Federal Highway Administration and do not include private roads.

Domestic Demand Growth in Emerging Asia

David Orsmond*

Domestic demand has grown rapidly in emerging Asia for much of the past 30 years. As a consequence, its contribution to annual global growth has gradually increased, rising from ¼ percentage point in the early 1980s to almost 1 percentage point in recent years. Most of this increased contribution reflects strong growth in China and India, with around half arising from the expansion of household consumption and half from the increase in investment in these countries. Looking ahead, the contribution of domestic demand in emerging Asia to global growth is likely to continue to rise, underpinning Australia’s resource export prospects.

Introduction

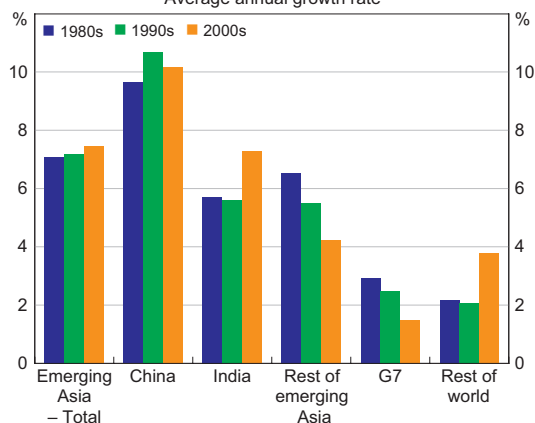
The expansion of domestic demand in emerging Asia has been a key driver of the region’s overall growth for several decades. This article outlines the pace of domestic demand growth using recently updated annual national accounts data published by the United Nations that are comparable across a range of countries. It also discusses trends in household consumption and investment that lie behind this performance, the contribution of domestic demand growth in emerging Asia to global growth, and the outlook.

Domestic Demand and its Components

Domestic demand in the emerging Asia region has grown strongly, averaging 7 per cent a year over the past three decades.¹ The pace of growth has varied across the region. In China, domestic demand

growth has been especially strong, averaging around 10 per cent in each of the past three decades. In India, domestic demand growth was initially less rapid – fluctuating around 6 per cent a year in the 1980s and 1990s – but its pace then picked up noticeably in response to the reforms introduced during the 1990s. In the rest of emerging Asia, domestic demand growth has been a little more moderate, and has been gradually declining over time (Graph 1).

Graph 1
Growth of Domestic Demand
Average annual growth rate



Source: United Nations

* The author is from Economic Analysis Department.

¹ The data are available from 1970 to 2009. The real expenditure data are converted to US dollars based on market exchange rates in 2005. Using these data, 'Emerging Asia' in this article is defined as China, India, Hong Kong, South Korea, Singapore, Indonesia, Malaysia, the Philippines and Thailand. The investment data cited here refer to fixed asset investment; changes in inventories are excluded from the estimates of domestic demand.

DOMESTIC DEMAND GROWTH IN EMERGING ASIA

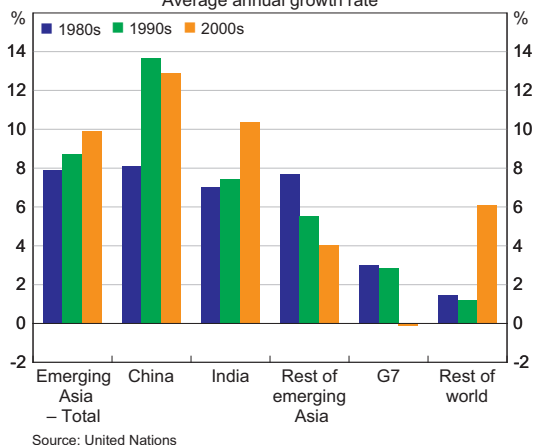
The pace of domestic demand growth in emerging Asia has consistently been much stronger than in many other regions of the world. This comparison is most noticeable for the G7 group of advanced economies, where annual growth of domestic demand has averaged around 2 per cent a year, with growth slowing over the past three decades. Growth in other regions of the world has also been lower than in the emerging Asia region.²

Turning to the main components of domestic demand, investment has grown especially rapidly in emerging Asia, much of it focused on housing and infrastructure. For the region as a whole, annual growth in investment spending averaged close to 9 per cent over the past three decades, and has been rising through time (Graph 2). The pace has varied somewhat between countries. At almost 11 per cent, the fastest average rate was recorded in China, with investment spending especially rapid in the 1990s and 2000s. India's average growth in investment spending was somewhat lower, at 8 per cent a year, although its pace has also picked up in recent years. Investment spending has been more moderate in the rest of emerging Asia and its pace has slowed over time. Compared with emerging Asia, investment spending has been a much smaller driver of economic growth in the G7 countries, and has declined significantly in recent years in the wake of the global financial crisis. Investment spending picked up sharply in the rest of the world in the 2000s reflecting strong growth in other emerging regions, including the recovery in the countries of the former Soviet Union after sharp declines in their output in the early 1990s.

The rapid pace of investment growth in emerging Asia has underpinned large increases in the region's investment to GDP ratio. Aggregate investment has increased from around 26 per cent of nominal GDP in the early 1980s to 37 per cent of GDP in recent

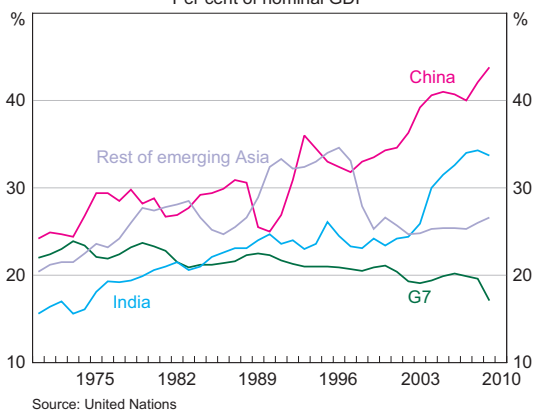
² Very little of this reflects differences in population growth rates. China's population increased at an annual average rate of 1 per cent, India 2 per cent, the rest of emerging Asia 1½ per cent, and the G7 countries by 1 per cent over 1980–2009.

Graph 2
Growth of Investment
Average annual growth rate



years. Until the late 1990s, the investment ratios in China and the rest of emerging Asia were increasing at around the same rate (Graph 3). However, after the Asian financial crisis, the investment to GDP ratio in the latter group of countries fell back while that in China continued to rise strongly. At 44 per cent of GDP, the investment to GDP ratio in China has reached historically high levels. In India, the investment ratio has also increased strongly of late, rising by 10 percentage points of GDP in just the last decade. However, at around 34 per cent of GDP, India's investment to GDP ratio is still far below that in China. In contrast, the investment ratio in the

Graph 3
Investment Ratios
Per cent of nominal GDP

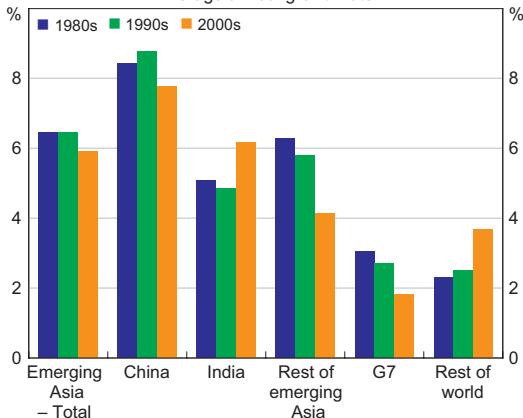


G7 countries has been a lower share of GDP and has declined over time.

Compared with the pace of investment spending in the region, household consumption growth in emerging Asia has been more moderate, though still quite rapid by the standards of the rest of the world. Household consumption growth in emerging Asia averaged 6 per cent a year over the past three decades, more than double the pace of the G7 countries (Graph 4). At 8 per cent, average annual household consumption growth in China was the highest of the countries studied here – and has been quite stable over time – while growth in India and the rest of Asia averaged around 5 per cent a year.

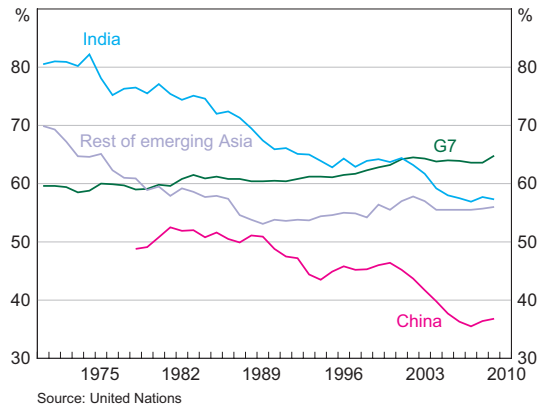
While household consumption in China and India in particular has expanded at a solid rate for many decades, it has lagged that of overall GDP given the rapid growth in investment spending in these countries. As a consequence, household consumption to GDP ratios in China and India have declined, falling by around 15 percentage points over the past two decades, before stabilising in recent years (Graph 5). In contrast, household consumption has remained a significant driver of overall domestic demand growth in the G7. Its share has increased over time to over 60 per cent of nominal GDP, driven in particular by developments in the United States.

Graph 4
Growth of Household Consumption
Average annual growth rate



Source: United Nations

Graph 5
Household Consumption Ratios
Per cent of nominal GDP



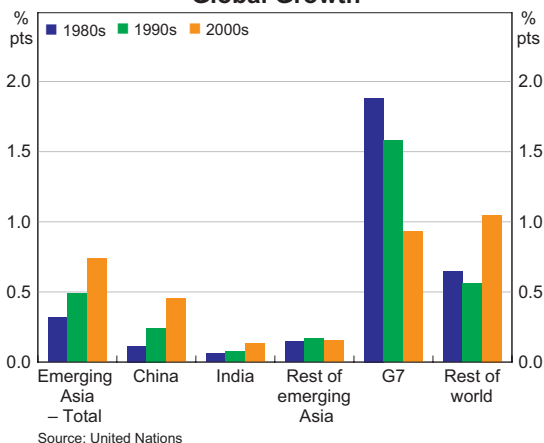
Source: United Nations

Contribution of Domestic Demand to Global Growth

The rapid growth in domestic demand in emerging Asia compared with that in other regions of the world has led to an increase over time in its contribution to global growth. In the 1980s, the share of emerging Asia in total global output was small, so despite rapid growth in domestic demand, its contribution to global growth remained low. However, as the economies of this region expanded, the contribution of their domestic demand growth to total global growth increased over time, rising steadily from ¼ percentage point in the early 1980s to average almost 1 percentage point in the past three years (Graph 6). In contrast, the contribution from the G7 countries to global growth has fallen over time. Indeed, the expansion of domestic demand in emerging Asia has accounted for most of the global growth in recent years, reflecting the impact of the global financial crisis on the G7 economies.

Almost all of the increase in the contribution of emerging Asia’s domestic demand to global growth reflects the rapid growth in China and India. China accounted for over two-thirds of the increase and India comprised most of the balance. These contributions were split roughly equally

Graph 6
Contribution of Domestic Demand to
Global Growth



between growth in investment and household consumption in these countries; while investment spending in China and India grew more rapidly than consumption, the size of its contribution to domestic demand growth was contained by its initially smaller share in total GDP.

Looking Ahead

Despite the rapid growth seen in recent decades, comparisons of investment and consumption indicators in emerging Asia with other countries suggest there is considerable scope for further increases in the region's domestic demand. While there could be set-backs and delays along the way, the current investment levels in emerging Asia compared with those in the G7 countries suggest there is significant scope for this region (and other emerging regions) to 'catch up' to the production and productivity frontiers. Housing and public infrastructure needs alone are likely to be at the forefront of economic development in China and India. These factors could see investment continuing to expand strongly for some decades yet, which would underpin further increases in the contribution of the emerging Asia region's investment spending to global economic growth.

Household consumption in emerging Asia is also likely to be an important contributor to global growth. In China, India and the rest of emerging Asia, household consumption per capita is still well below that of the G7 countries. Assuming the pace of household consumption growth in emerging Asia continues to grow more rapidly than other regions of the world, its contribution to global growth will continue to rise. Furthermore, the current low per capita consumption levels in China and India and the rapid development of these economies suggest that, with appropriate supporting policies, the pace of household consumption and its share in GDP could increase over time.³ Should this occur, the expansion of domestic demand in emerging Asia will continue to have a significant impact on Australia's resource export potential. ↘

Reference

Baker M and D Orsmond (2010), 'Household Consumption Trends in China', *RBA Bulletin*, March, pp 13–17.

³ For further details, see Baker and Orsmond (2010).

The Effects of Funding Costs and Risk on Banks' Lending Rates

Daniel Fabbro and Mark Hack*

After falling for over a decade, the major banks' net interest margins appear to have stabilised in a relatively narrow range in recent years. In the early part of the financial crisis, margins fell to the bottom of this range, reflecting an increase in debt funding costs. Margins have since recovered a little, to around the middle of the range, as a result of some repricing of lending rates relative to these costs. In addition to the increase in the cost of debt funding, there have been other drivers of the rise in lending rates relative to the cash rate. First, the banks have increased their equity funding, which is more costly than debt finance. Second, risk margins on loans have risen to account for higher expected losses.

Introduction

There are a number of factors that influence the way banks set lending rates. Among these, the costs of debt and equity funding and the losses that banks expect to incur on their lending activities are particularly important. Previous Reserve Bank research has noted that the increase in the cost of debt funding – primarily due to higher costs of deposits and long-term wholesale debt – has been a key driver of the increase in banks' lending rates relative to the cash rate in recent years.¹ In this article, we update this research and also discuss the influence on loan pricing of banks' equity funding and expected losses on loans. In estimating the influence of equity funding, we have applied a model that assumes a fixed unit cost, or 'target return', for equity (with the cost based on average historical returns). This assumes banks' return on equity targets have not changed over recent years. As such, changes in the contribution of equity costs in funding loans are determined solely by changes in the share of equity in funding.

Although increased debt funding costs have been the most important determinant of the increase in

lending rates relative to the cash rate, our estimates suggest that there has been a material effect from increases in equity capital and expected losses. This is particularly the case for lending to businesses, as both the share of equity capital used to fund business loans and banks' perceptions of the risks associated with this form of lending have increased noticeably. Increases in equity capital and expected losses are estimated to have had a smaller effect on residential mortgage lending rates.

A consequence of higher equity funding costs and higher expected losses is that the major banks' average lending rates have risen relative to their debt funding costs over the past couple of years. This has contributed to the increase of around 15 basis points in their average net interest margin from historical lows in 2008. The current average margin of 2.35 per cent is around its average level of the past five years.

Composition of Banks' Funding

Banks operating in Australia have diverse funding bases, with most funding sourced from deposits and short-term and long-term wholesale debt. These funding sources have, however, undergone significant change, reflecting a reassessment of funding risks by banks globally as well as regulatory

* The authors are from Domestic Markets Department.

¹ See Brown *et al* (2010) for details.

and market pressures. In particular, banks in Australia have increased their use of deposits (particularly term deposits) and long-term debt, as these funding sources are perceived to be relatively stable (Graph 1).

The increases in deposit and long-term debt funding have facilitated a decline in the share of funding sourced from short-term wholesale debt (domestic and foreign). The share of securitisation has also fallen since the onset of the financial crisis, as the amortisation of the outstanding stock of residential mortgage-backed securities (RMBS) has exceeded new issuance.

Furthermore, Australian banks have bolstered their balance sheets by raising equity, through a combination of retained earnings and share placements. This has led to an increase of nearly 1 percentage point, to 7½ per cent, in the share of equity in the major banks' funding liabilities since mid 2007.²

Cost of Debt Funding

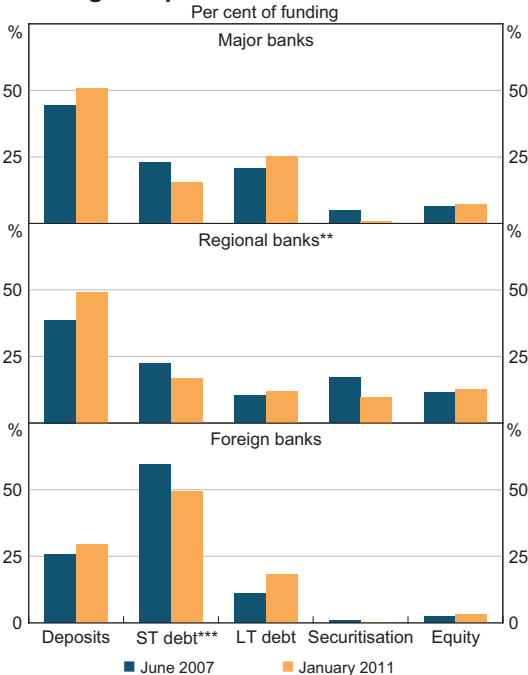
Australian banks' cost of debt funding has increased materially over the past few years. This has reflected both increases in the costs of some of the components of debt funding as well as the shift towards more expensive sources of debt.

Deposits

Competition for deposits in Australia has intensified since around mid 2008, resulting in a significant increase in deposit rates relative to market benchmark rates. The average cost of the major banks' new deposits has risen noticeably relative to the cash rate; currently it is estimated to be only slightly below the cash rate, whereas prior to the onset of the financial crisis, it was about 150 basis points below the cash rate.

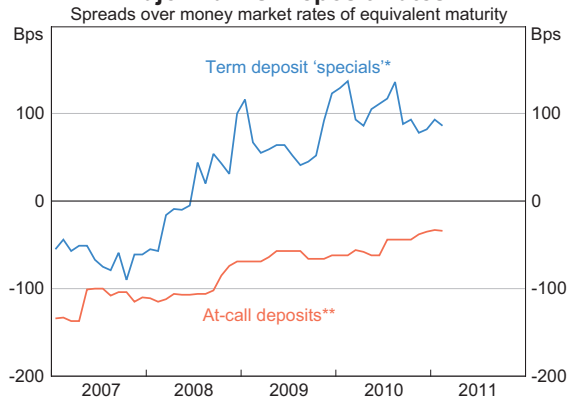
Within the deposit market, competition has been most pronounced for term deposits. The average spread above market rates of equivalent maturity on banks' term deposit 'specials' – the most relevant rate for term deposit pricing – has increased by around 150 basis points since the onset of the crisis (Graph 2). This average spread is currently a little below 100 basis points. For example, 6-month term deposit rates are currently around 6 per cent, compared to bank bill rates of about 5 per cent. Rates

Graph 1
Funding Composition of Banks in Australia*



* Foreign liabilities are adjusted for movements in exchange rates
 ** Data for Suncorp are prior to recent restructure
 *** Includes deposits and intragroup funding from non-residents
 Sources: APRA; RBA

Graph 2
Major Banks' Deposit Rates



* Spreads to bank bill and swap rates
 ** Spread to cash rate. Existing customers only. Excludes temporary bonus rates.
 Sources: Bloomberg; RBA

² For more details on banks' capital, see Gorajek and Turner (2010).

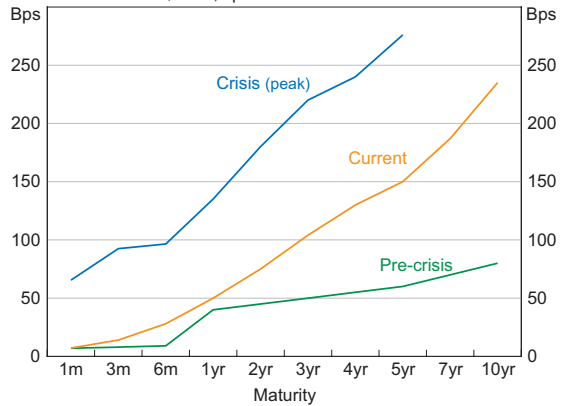
on at-call savings deposits – including bonus saver, cash management and online savings accounts – are currently estimated to be around 35 basis points below the cash rate compared with 100 basis points below in mid 2007. Overall, the average deposit cost for the regional banks is likely to have increased by slightly more than for the major banks, reflecting the regional banks' greater use of (relatively more expensive) term deposits.

Wholesale debt

The cost of issuing long-term bonds increased significantly during the crisis.³ For example, yields on 3-year bonds increased from around 50 basis points over Commonwealth Government Securities (CGS) in the years leading up to the crisis, to a peak in late 2008 of about 220 basis points for debt issued in Australia and at about 280 basis points for debt issued offshore (Graph 3). Improved capital market conditions have seen the cost of issuing new 3-year debt onshore fall to a little over 100 basis points recently. However, this decline in the cost has been offset to some extent as the major banks have lengthened the average maturity of their bond funding by issuing at longer tenors. Issuance over the past year has been at an average tenor of just over 4½ years, compared with 3 years in 2008.

Reflecting these developments, there has been a marked increase in long-term wholesale funding costs, with these costs estimated to have risen by about 110 basis points relative to the market's expectation of the cash rate. The cost of long-term wholesale debt continues to place upward pressure on banks' funding costs, as still nearly one-fifth of bonds outstanding were issued at lower spreads prior to mid 2008. As the repricing of maturing bonds continues, it is estimated that the average spread on banks' outstanding long-term debt will increase by about 15 basis points over the next year. If the share of long-term debt in overall funding were to remain at its current share of around 25 per cent, and spreads

Graph 3
Major Banks' Wholesale Funding Spreads
A\$ debt; spreads to OIS and CGS



Sources: Bloomberg; RBA; Tullet Prebon; UBS AG, Australia Branch

on new issuance remain steady, this would imply an increase in total funding costs from this source of just under 5 basis points over the next year.

The regional banks, which have lower credit ratings than the major banks, have experienced an even larger increase in the cost of long-term wholesale debt, though it is a smaller share of their total funding.

Short-term wholesale debt accounts for about one-fifth of banks' funding, and is priced mainly off 1-month and 3-month bank bill rates. Prior to mid 2007, bank bill rates closely tracked the market's expectation for the cash rate with the spread between 3-month bank bills and overnight indexed swaps (OIS) around 10 basis points. While the onset of the global financial crisis saw bank bill rates rise well above OIS rates, the sizeable risk premium has now largely dissipated. Hence, the major banks' short-term capital market debt is currently only about 10 basis points more costly relative to the expected cash rate than it was in mid 2007.

RMBS account for a negligible share of the major banks' funding, but are more important for the smaller financial institutions. The cost of new securitisation funding is roughly 100 basis points higher than before the onset of the global financial

3 See Brown *et al* (2010) and RBA (2010).

crisis. Given spreads on RMBS are similar for the different types of banks (and also for non-banks), securitisation has remained a relatively more cost effective funding source for the smaller banks.

Overall cost of debt funding

Since mid 2007, the higher cost of deposits has made the largest contribution to the overall increase in debt funding costs, reflecting their large weight in total funding and the 130 basis point rise in average deposit rates relative to the cash rate. Long-term wholesale debt has also made a substantial contribution to the increase in the major banks' debt funding costs. While the cost of short-term wholesale debt initially rose relative to the cash rate, it is now much closer to pre-crisis levels. In aggregate, it is estimated that the average cost of the major banks' debt funding is about 90 to 100 basis points higher relative to the cash rate, than it was in mid 2007 (Graph 4).

Most of the increase in the major banks' debt funding costs occurred during 2008 and early 2009, at the peak of the dislocation in markets. Since then the major banks' debt funding costs are estimated to have moved broadly in line with the cash rate, reflecting offsetting factors. The continued upward pressure on long-term funding, as bonds issued

pre-crisis are rolled over at higher spreads, together with a small increase in the cost of term deposits, has been broadly offset by a decline in the spread to the cash rate on funding sources that have relatively fixed rates.

The available evidence suggests that the overall increase in the regional banks' debt funding costs since the onset of the financial crisis has been larger than that experienced by the major banks. This mainly reflects the larger rises in the costs of the regional banks' deposits and wholesale debt funding, and the large switch in their funding mix from securitisation to deposits, currently a relatively expensive source of funding.

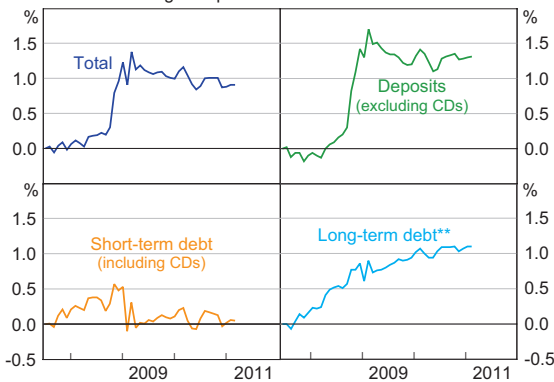
Cost of Equity Capital

While equity is a non-interest bearing source of funds, banks aim to earn a return on this capital.⁴ The cost of equity reflects the bank's total amount of equity funding and the return the bank seeks on this funding source. In our calculations the target return on equity is assumed to be constant at a historical average pre-tax rate of 20 per cent, and does not vary as the share of equity in funding changes. Furthermore, different types of loans will have different amounts of equity allocated to them determined by their riskiness. Given equity is a more expensive source of funds than debt, variation in the share of equity used to fund different types of loans will be one factor leading to different lending rates. For example, the higher level of risk associated with business lending than with residential mortgage lending means a greater share of equity capital needs to be set aside to fund these loans. As such, equity capital contributes more to the cost of funding business loans than residential mortgages (Graph 5).

Graph 4

Major Banks' Average Debt Funding Costs*

Cumulative change in spreads to the cash rate since June 2007



* RBA estimates

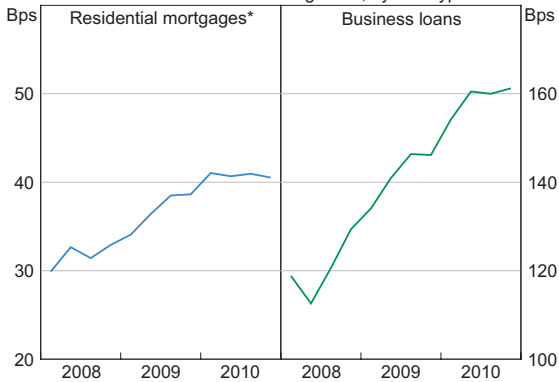
** Weighted-average spread to cash rate and CGS for long-term variable rate and fixed-rate debt, respectively. Includes foreign currency hedging costs.

Sources: Bloomberg; RBA; UBS AG, Australia Branch

4 While banks do not typically disclose the equity return targets that are used in their loan pricing decisions, the cost of equity is greater than that of debt. This reflects the greater risk borne by shareholders (who only have a residual claim on the income and assets of the bank).

Graph 5**Equity Funding Costs**

Contribution to total funding costs; by loan type



* Includes small business loans less than \$1 million secured by residential property

Sources: APRA; RBA

Based on our assumptions noted above, as well as the increase in credit risk (measured using the major banks' reported risk weights), there has been an increase in the contribution of equity to total funding costs, especially for business loans. For residential mortgage lending, it is estimated that about 2 per cent of the value of these loans is now funded from equity, up from around 1½ per cent in early 2008. This would have increased the equity cost of funding these loans by as much as 10 basis points, from around 30 basis points to just over 40 basis points.⁵ In comparison, equity funding for business loans is estimated to have risen from about 6 per cent to 8 per cent of the value of these loans. As a result, this would have increased the equity cost of funding business loans by as much as 40 basis points, from around 120 basis points to 160 basis points.

Banks' Lending Rates and Pricing for Risk

In addition to the costs of debt and equity funding, lending rates include a risk margin designed to cover the expected losses from making that particular type of loan.

⁵ The equity cost of funding a loan is calculated by multiplying the share of equity used to fund the loan (e.g. currently 2 per cent for residential mortgages) by the target return on equity, which is assumed to be 20 per cent.

The following analysis focuses on two broad categories of lending for which it is possible to compare interest rates and credit risk (or expected loss) information under the current capital standards (referred to as Basel II).⁶ The two categories are:

- residential mortgage lending (predominantly loans to households, but also includes residentially secured loans under \$1 million to small businesses); and
- all other business lending.

Residential mortgage lending

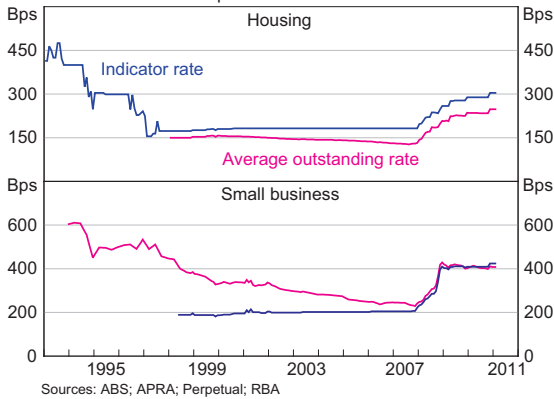
In the decade prior to the crisis, indicator rates on banks' residential mortgage lending tended to move closely with the cash rate. This reflected that banks' debt funding costs also generally followed the movements in the cash rate, in conjunction with little change in equity capital or expected losses. In addition, competitive pressures meant that it became commonplace for lenders to offer most household borrowers a discount, which gradually increased to around 60 to 70 basis points on the indicator rate (Graph 6).

Banks also typically reduced risk margins on residentially secured lending to small businesses in the lead-up to the crisis. This reduction in risk margins, combined with an increase in the use of residential property as security (i.e. reduced unsecured lending), contributed to the overall reduction in average risk margins on the stock of small business lending.

Since mid 2007, the major banks' average interest rates on housing loans and residentially secured small business loans have each risen relative to the cash rate. Overall, it is estimated that the increase in the major banks' interest rates on residential mortgage lending, which is heavily weighted towards housing loans, has been about 120 basis points relative to the cash rate. Only a small part of

⁶ The expected loss information reported by the major banks is based on the probability that borrowers will default, and the amount that the banks expect to lose in the event of default.

Graph 6
Residentially Secured Variable Lending Rates
 Spread to cash rate



this increase appears to reflect an increase in risk margins to account for higher expected losses, as the major banks reported that the expected loss rate for this type of lending rose by only about 5 basis points from March 2008 to a peak in March 2010. The major factor behind the increase in residential mortgage lending rates relative to the cash rate has been the increase in debt funding costs, with a modest contribution of about 10 basis points from the cost of equity funding.

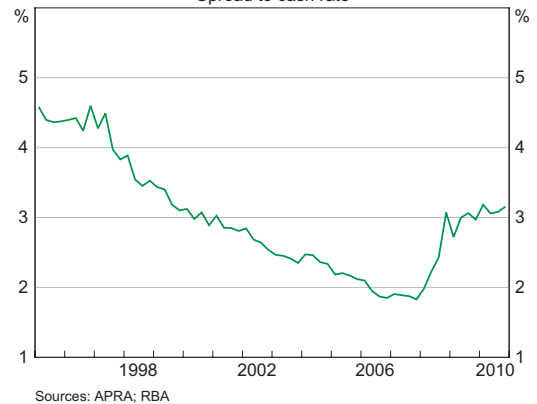
Business lending

There can be considerable variation in interest rates across business loans, as banks base their pricing on the characteristics of the individual borrower and the quality of collateral (such as commercial property or equipment). The available evidence suggests that the average spread to the cash rate on new term loans to large businesses increased by about 200 basis points, from around 150 basis points in mid 2007 to a peak of around 350 basis points in mid 2009. Since then, spreads on new loans have declined, and are now closer to the average margin on existing loans. As such, the average margin on outstanding business lending facilities appears to have broadly stabilised (Graph 7). Overall, the average interest rate on outstanding business loans

is estimated to have risen by about 120 basis points relative to the cash rate since mid 2007.

For business lending, debt funding costs have also been the largest individual driver of the increase in lending rates relative to the cash rate, though there have also been significant contributions from the cost of equity and from higher risk margins to cover expected losses. The expected loss rate reported by the major banks has increased from around 45 basis points to about 75 basis points. This has been mainly due to the banks' perceptions of a higher chance of default across borrowers, and implies an increase in risk margins of around 30 basis points. The significantly larger increase in the expected loss rate for business lending (relative to residential mortgage lending) appears broadly consistent with developments in actual loss rates experienced by the major banks.

Graph 7
Variable Rates on Outstanding Business Loans
 Spread to cash rate



Lending rates and net interest margins

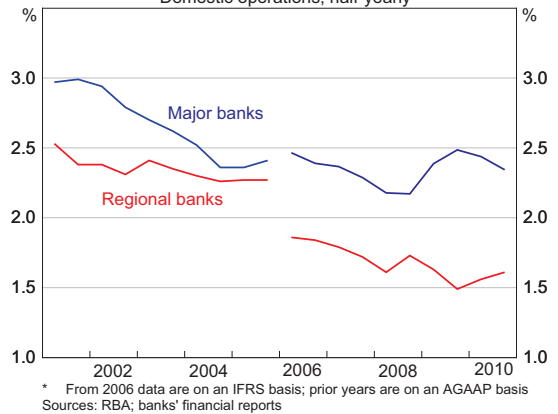
Australian banks' net interest margins are largely driven by movements in interest rates on loans relative to debt funding costs. There is also an influence from other asset holdings, such as holdings of liquid assets, and other factors, such as net interest earnings from interest rate derivatives. An additional factor that influences the calculation

of banks' margins is the amount of equity in funding, which is treated as having zero interest cost (i.e. non interest-bearing). However, as noted above, for the purposes of loan pricing, banks apply a cost to these funds.

While the net interest margins of the individual major banks differ, the average margin for these banks has fluctuated within a fairly narrow range between about 2¼ per cent and 2½ per cent over the past few years (Graph 8). After falling to historical lows in 2008 as funding costs rose early in the global financial crisis, the major banks' margins recovered a little, as lending rates increased by a little more than debt funding costs. Currently they are around the average level of the past five years. The above analysis broadly demonstrates that some of the increase in lending rates relative to debt funding costs can be explained by the banks passing on the higher costs of equity capital and the increase in expected losses. Consequently, some of the increase in the major banks' margins from their recent lows is also largely a reflection of these factors.

The regional banks' net interest margins lie below the major banks' margins, primarily reflecting more expensive deposit and long-term wholesale debt funding costs and a greater share of lower margin household lending. In contrast to the major banks, the regional banks' margins remain below their level in mid 2007. This reflects the regional banks' overall funding costs having risen by more than the major banks, and their overall lending rates having risen by a little less, reflecting differences in their lending mix. ❖

Graph 8
Banks' Net Interest Margin*
Domestic operations, half-yearly



References

- Brown A, M Davies, D Fabbro and T Hanrick (2010)**, 'Recent Developments in Banks' Funding Costs and Lending Rates', *RBA Bulletin*, March, pp 35–44.
- Gorajek A and G Turner (2010)**, 'Australian Bank Capital and the Regulatory Framework', *RBA Bulletin*, September, pp 43–50.
- RBA (Reserve Bank of Australia) (2010)**, 'Submission to the Inquiry into Competition in the Australian Banking Sector', Submission to the Senate Economics References Committee Inquiry into Competition in the Australian Banking Sector, 30 November. Available at: <<http://www.rba.gov.au/publications/submissions/inquiry-comp-aus-bank-sect-1110.pdf>>.

The ATM Reforms – New Evidence from Survey and Market Data

Darren Flood, Jennifer Hancock and Kylie Smith*

Following the introduction of direct charging in March 2009, ATM pricing has become more transparent and flexible. Cardholders continue to respond to the clearer price signals by changing their cash withdrawal behaviour to avoid paying direct charges, and newly available data indicate that behaviour varies across age groups and geographic locations. For the small proportion of transactions that do incur a direct charge, flexibility in ATM pricing has led to a distinct pattern in these charges across different types of ATM locations. Variations in business models between ATM owners mean that most consumers have access to a large number of ATMs on which they pay no direct charge, while it remains possible for ATMs to be profitably deployed in high-cost or low-volume locations.

Introduction

The Bank is continuing to closely monitor the move to direct charging at Automated Teller Machines (ATMs) that was implemented in March 2009. An initial discussion of the effect of this reform was provided in June last year (Filipovski and Flood 2010). A key finding at that time was that consumer behaviour had changed markedly as consumers sought to avoid paying ATM direct charges by, among other things, increasing their use of EFTPOS facilities and ATMs provided free of charge by their own financial institutions to obtain cash.¹ In total, these changes were estimated to have saved consumers around \$120 million in withdrawal fees in the first year of the new arrangements. Another finding of this early analysis was that the availability of ATMs had increased, including in rural and regional areas.

As well as providing an update of broad trends in consumer behaviour, this article provides additional information on the effects of the reforms which is drawn from new data sources. These sources

include information that the Bank has collected directly from ATM owners on pricing and the results of a consumer survey, which sheds more light on consumer behaviour. Also, a new market study on ATM deployment and costs (Edgar, Dunn & Company 2010) helps to provide a more complete picture of the effect of the reforms on competition among different types of ATM owners.² All of the available information continues to suggest that consumers are responding to the pricing signals inherent in direct charging, and ATM owners are responding by increasing the availability of ATMs.

The Response of Cardholders to Direct Charging

Since the implementation of the ATM reforms, there have been significant shifts in consumers' behaviour. These shifts have been observed in data on total cash withdrawals that the Bank receives from most financial institutions and some other payment industry participants as part of a regular collection. The total number of cash withdrawals from any source by consumers contracted sharply

* The authors are from Payments Policy Department.

1 Some financial institutions charge their own customers for ATM transactions after they have exceeded a certain threshold in a given month.

2 ATM deployment refers to the installation and placement of ATMs.

following the introduction of the reforms, driven largely by reduced ATM use (Graph 1).³ This was partially offset by a sharp increase in the use of EFTPOS to obtain cash, which is typically free of charge to customers. Following consumers’ initial adjustment to the reforms, ATM use has levelled out, while continued growth in EFTPOS cash-outs has underpinned modest growth in cash withdrawals overall.

The marked shift towards consumers using their own institutions’ ATMs observed in the year following the reforms has been maintained and, if anything,

has strengthened a little (Graph 2). There has also been an increase in the number of agreements between card issuers and ATM owners to provide free transactions to cardholders.⁴

To enhance the understanding of how individual consumers pay for goods and services, including their cash withdrawal behaviour, the Bank commissioned Roy Morgan Research to conduct a survey of payment patterns in late 2010. The 1 241 individuals participating in the survey were asked to record details of every cash withdrawal they made during a week, including the method used to withdraw the cash, the amount of cash obtained, and whether they paid a direct charge at an ATM. According to the survey, 23 per cent of ATM withdrawals incurred a direct charge during the week of the study.⁵

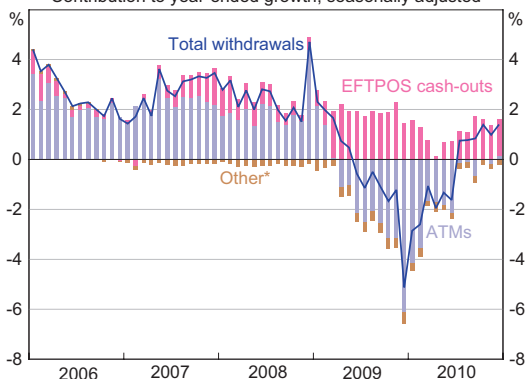
One issue raised during public consultation prior to the implementation of the reforms was that certain groups of consumers – for example older people – may be less willing or able to travel to seek out an ATM provided by their own financial institution and therefore are more likely to pay a fee. The survey data suggest, however, that younger consumers are much more likely to pay direct charges than older consumers (Graph 3). This is likely to reflect a variety of factors, such as different preferences regarding the use of their time and the locations of their cash withdrawals, with older consumers possibly more likely to withdraw cash as part of a regular spending pattern.

Another issue often raised is that people in non-metropolitan areas are more likely to pay ATM charges than those in metropolitan areas because they have more limited access to ATMs provided by their own institution. The survey results confirm

Graph 1

Number of Cash Withdrawals

Contribution to year-ended growth, seasonally adjusted

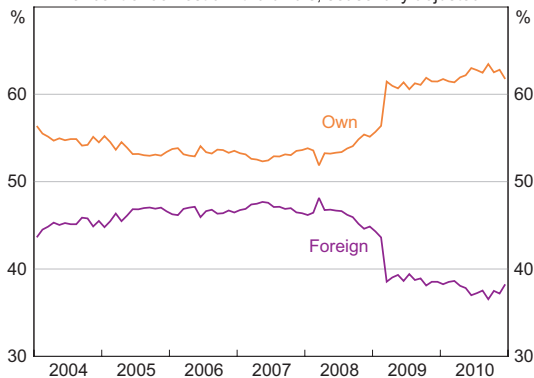


* Over-the-counter and cash advances
Source: RBA

Graph 2

Composition of ATM Withdrawals

Per cent of domestic withdrawals, seasonally adjusted



Source: RBA

³ Movements in cash withdrawals during this period were also influenced by both the global financial crisis and Government stimulus payments.

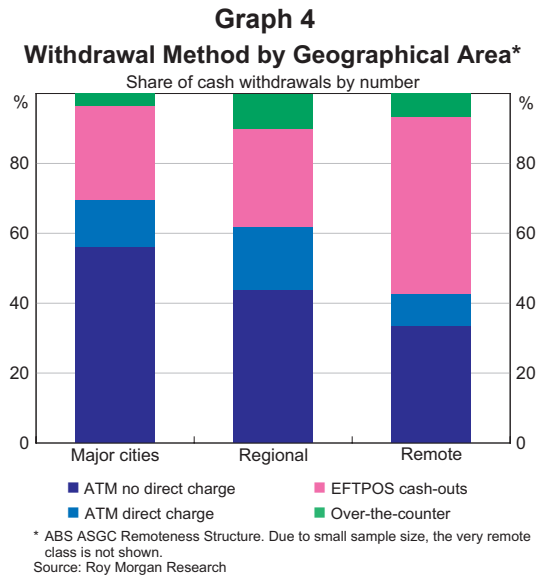
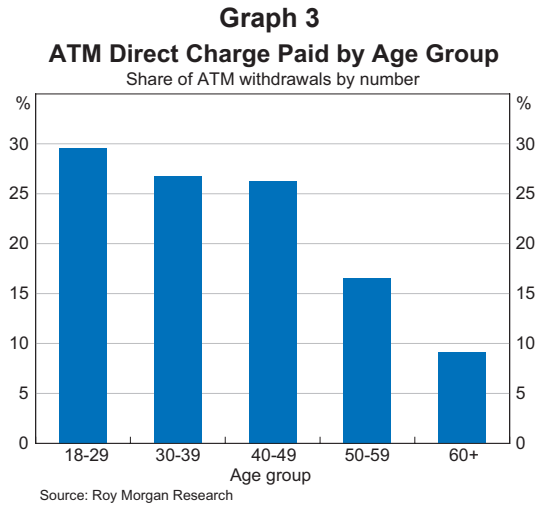
⁴ These include: agreements that provide cardholders with charge-free access to another owner’s ATMs; ATM sub-networks (e.g. rediATM); and arrangements between merged financial institutions.

⁵ This is lower than the one-third previously estimated using data collected from financial institutions (Filipovski and Flood 2010). It is possible that the survey respondents may have modified their behaviour during the course of the survey as a result of making a record of the direct charges incurred. Data from Edgar, Dunn & Company (2010) suggest that 28 per cent of domestic transactions (including balance enquiries) attract a direct charge.

this; on average, people in regional areas pay a direct charge on a larger proportion of their ATM withdrawals (29 per cent) than those in major cities (20 per cent, Graph 4).⁶ Direct-charged ATM withdrawals also make up a slightly higher share of their cash withdrawals from all sources (18 per cent), compared with those living in major cities (14 per cent). However, the situation is quite different in areas classified as ‘remote’, where direct-charged ATM withdrawals make up only 9 per cent of cash withdrawals from all sources – the lowest of any of the location classifications that can be analysed from our survey data. Instead, use of EFTPOS cash-outs in these areas tends to be much higher than in major cities. Hence, it appears that most people in remote areas can still access cash in a way that avoids making direct-charged cash withdrawals.

It is worth noting that residents of areas classified as remote may still have access to multiple ATMs and other means of cash withdrawal. The consumer survey does not provide sufficient data to analyse ‘very remote’ locations, where people may have access to one machine at best. In these locations, ATMs are generally owned by independent providers, leaving consumers with no option but to pay direct charges.

As part of the ATM reform package, consumers now have the opportunity to cancel an ATM transaction without cost if they do not wish to pay the direct charge displayed. However, data on the extent to which cardholders have taken this opportunity have not previously been readily available. To address this issue, the survey specifically asked consumers about their reactions when faced with a direct charge. Around 10 per cent of respondents

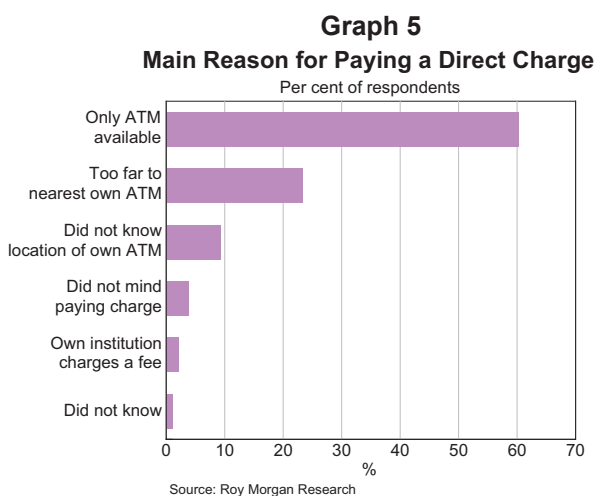


indicated that they had planned to make an ATM cash withdrawal in the past month but cancelled the transaction because the ATM owner charged a fee. This willingness to cancel transactions confirms that cardholders are responding to the charges and suggests there is some scope for ATM owners to attract foreign withdrawals by lowering their direct charges.

Around half of consumers reported completing an ATM withdrawal knowing that they would incur a

6 The Australian Bureau of Statistics’ (ABS) Australian Standard Geographical Classification (ASGC) Remoteness Structure identifies five remoteness area classes: major cities, inner regional, outer regional, remote and very remote areas. Remoteness is based on a weighted proximity by road to five different sized urban centres with populations large enough to support a particular level of services. As of the 2006 Census, just under 70 per cent of Australia’s population lived in major cities, with a further 30 per cent in (inner and outer) regional areas (e.g. Launceston, Cairns). The remaining population lived in the remote areas, including towns such as Alice Springs, and very remote Australia.

direct charge. Of those, around 60 per cent indicated that their main reason for doing so was that it was the only ATM available (Graph 5). Nearly one-quarter indicated that they paid a direct charge because it was too far to the nearest ATM of their own financial institution. This group effectively made a judgement that the cost of going to the nearest ‘own’ ATM exceeded the direct charge. Around 10 per cent of consumers indicated that they did not know the location of their own institution’s nearest ATM.



Direct Charges and Deployment

While the majority of ATM transactions are undertaken without consumers incurring a direct charge, in those cases where people do pay charges, the Bank has closely monitored their level by collecting detailed data from ATM owners. The most recent data indicate that there has been a small increase in the average direct charge on withdrawals since the previous collection in May last year (Table 1). The average direct charge for a withdrawal is now \$2.04, up 5 cents since May 2010, despite some increases and reductions in direct charges at individual ATMs. The increase in the average direct charge partly reflects changes in the composition of ATMs deployed, with more ATMs installed in higher-cost locations or by ATM owners who charge higher prices. Around 17 per cent of ATMs now

Table 1: Direct Charges – Withdrawals
Per cent of ATMs

	May 2010	December 2010
\$1.00 or less	<0.1	0.3
\$1.01–\$1.50	6.5	6.0
\$1.51–\$2.00	88.3	77.0
\$2.01–\$2.50	5.1	16.3
More than \$2.50	0.1	0.4
Average	\$1.99	\$2.04

Source: RBA

charge more than \$2.00 for a foreign withdrawal, compared with 5 per cent in May 2010.

The broad trend has been similar for balance enquiries, with the proportion of ATMs charging more than \$1.50 increasing by around 5 percentage points since May 2010 (Table 2). However, it appears that many consumers are not prepared to pay this fee. Data from Edgar, Dunn & Company (2010) indicate that balance enquiries make up around 23 per cent of domestic transactions at ATMs owned by financial institutions, compared with only 6 per cent for independent ATMs. This reflects the fact that most transactions at ATMs owned by financial institutions are made by customers of that institution and therefore do not incur a direct charge, while almost all transactions at independently owned ATMs incur a direct charge.

Table 2: Direct Charges – Balance Enquiries
Per cent of ATMs

	May 2010	December 2010
\$0.50 or less	7.6	6.7
\$0.51–\$1.00	12.1	7.8
\$1.01–\$1.50	0.2	0.4
\$1.51–\$2.00	78.5	83.4
More than \$2.00	1.6	1.7
Average	\$1.76	\$1.82

Source: RBA

There is a distinct pattern in direct charges across different types of ATM locations (Table 3). Direct charges tend to be higher in licensed venues than other locations, followed next by retail premises. These appear to be locations where there are no competing ATM providers on site and customers are willing to pay for the convenience of not having to leave the store or venue. These locations are more likely to be served by an independent ATM, with a substantial portion of the direct charge revenue being shared with the owner of the premises. The average direct charge at independent ATMs is higher than at financial institution ATMs – \$2.15 for withdrawals and \$1.96 for balance enquiries, compared with \$1.94 and \$1.68, respectively, for financial institutions.

ATMs in the branches of financial institutions offer the lowest direct charge for foreign withdrawals,

on average, while charges in shopping centres and on-street locations are also relatively low. The highest direct charge that the Bank is aware of in any location is \$5.00 for a cash withdrawal at a specialised venue.

There is also some variation in direct charges according to whether ATMs are located in cities, regional areas or remote areas (Table 4). Direct charges on withdrawals are on average around 13 cents higher in very remote locations than in major cities. In large part this reflects the fact that a higher proportion of ATMs in very remote locations are provided by independent ATM owners who have relatively high direct charges on average, rather than ATM owners applying higher direct charges in remote areas than in major cities. Independent owners' operations appear to be well suited to servicing locations where the cost of installing and maintaining ATMs may be relatively high, in

Table 3: Direct Charges by Location Type
As at December 2010

	ATMs	Withdrawal		Balance enquiry	
	Per cent	Average	Maximum	Average	Maximum
Retail premises	31.5	\$2.08	\$3.50	\$1.84	\$2.85
Licensed venue ^(a)	23.5	\$2.15	\$4.00	\$1.93	\$2.85
Branch	20.6	\$1.94	\$2.50	\$1.76	\$2.00
Shopping centre	15.1	\$1.96	\$2.50	\$1.73	\$2.00
Street	5.7	\$1.97	\$2.50	\$1.76	\$2.50
Other	3.6	\$2.04	\$5.00	\$1.69	\$2.50

(a) For example, pubs and clubs
Source: RBA

Table 4: Direct Charges by Geographical Area^(a)
As at December 2010

	Withdrawal		Balance enquiry	
	Average	Maximum	Average	Maximum
Major cities	\$2.03	\$5.00	\$1.80	\$2.85
Regional	\$2.06	\$4.00	\$1.85	\$2.85
Remote	\$2.09	\$2.85	\$1.91	\$2.85
Very remote	\$2.16	\$3.00	\$1.91	\$2.85

(a) ABS ASGC Remoteness Structure
Source: RBA

part because for an independent owner almost all transactions are direct charged. It is worth noting, however, that transaction volumes may also be relatively high in some remote locations.

In general, the move to direct charging has made deploying ATMs in costlier locations more viable and has thereby increased the availability of ATMs. The number of ATMs now stands at around 29 500, up from around 27 000 in the year prior to the reforms.⁷ Growth has been consistent across metropolitan and non-metropolitan areas, with 42 per cent of ATMs located outside metropolitan areas.⁸ The installation rate for ATMs in remote and very remote communities has increased by over 50 per cent between 2008 and 2010.⁹

ATM Costs

The business model for ATMs varies greatly between financial institutions and independent providers and this is reflected in the average cost of providing each ATM transaction. In particular, transaction flows through ATMs owned by financial institutions are significantly different to those through independently owned ATMs. According to Edgar, Dunn & Company (2010), the average number of transactions per month at an independent ATM is around 1 200, compared with just over 6 500 transactions at an ATM owned by a large bank and over 4 000 at an ATM owned by a smaller financial institution. As a result, while independent owners account for just over half of the ATMs in Australia, those ATMs account for only 16 per cent of ATM transactions.

A direct corollary of this is that the average cost per transaction for independent owners is often significantly higher than for financial institutions,

because overheads are spread across fewer transactions. Edgar, Dunn & Company (2010) estimates costs per transaction at 54 cents for large banks, compared with \$1.12 for independent owners.

In addition to relative transaction volumes, differences in per-transaction costs between financial institutions and independent owners also reflect deployment strategies. While over 40 per cent of financial institutions' ATMs are located in branches, almost all independent ATMs are located off-premises. To secure ATM locations, ATM owners usually have to pay some form of rent or rebate (site costs) to the owner of the premises. On average, payments for each non-branch ATM site are more than double those for branch ATM sites. On a per-transaction basis this differential is even larger as the average volume of transactions at non-branch ATMs is less than half that at branch ATMs. Not only are site costs for non-branch ATMs generally higher but they have also been rising rapidly; between 2007/08 and 2009/10, average site costs per-transaction for the industry as a whole increased by 19 per cent and by around 40 per cent for independent owners (Edgar, Dunn & Company 2010). This may in part reflect a general increase in demand for ATM sites.

The nature of the ATM business model for financial institutions is different to that of independent owners because their ATM networks are mainly aimed at providing a service to their own customers. Indeed, financial institutions compete for depositors partly by providing direct-charge-free transactions on a wide network of ATMs. Hence, although ATMs owned by financial institutions attract high transaction flows, around 83 per cent of these transactions do not incur a direct charge (that is, they are mainly used by the institution's own customers). As a result, for financial institutions as a whole, the direct charges generated do not cover the cost of providing their ATM networks (Edgar, Dunn & Company 2010). That is not to say, however, that financial institutions do not recoup the cost of providing ATMs in other ways (e.g. via account-keeping fees).

7 The figure for the year prior to the reforms is for December 2008 and is from the Australian Payments Clearing Association.

8 Calculated from a combination of data provided by Edgar, Dunn & Company (2009, 2010) and data obtained separately from ATM owners by the RBA.

9 This installation rate measures the number of ATMs being installed in a location for the first time, as well as the 'churn' in ATM locations (i.e. one ATM replacing another) but it does not take into account the removal of ATMs.

Conclusion

Several newly available data sources have provided a better understanding of both consumer behaviour in relation to ATM direct charges, and ATM pricing and costs. These data serve to further emphasise that individuals actively seek to avoid paying direct charges – including by cancelling transactions, making EFTPOS cash-outs and using their own institution's ATMs. It is clear, however, that behaviour in relation to direct charges varies. Older people pay charges on a far smaller proportion of their ATM withdrawals than people in younger age groups. People in both large cities and remote areas pay direct charges on a slightly lower proportion of ATM withdrawals than those in regional areas. Furthermore, average ATM charges vary from location to location, with the highest charges typically experienced in licensed venues.

New data highlight the different models adopted by financial institutions and independent owners of ATMs. Independent owners face higher average site costs and rely on average transaction volumes that are typically only a fraction of those at financial institutions' ATMs. While this results in significantly higher average costs per transaction, independent owners collect a direct charge on nearly all transactions, while most transactions at financial institution ATMs do not incur a direct charge. This combination means that most consumers can access a large number of ATMs on which they will pay no direct charge, while it remains possible for ATMs to be profitably deployed in high-cost or low-volume locations by independent owners. As a consequence, ATM numbers have continued to increase overall, rising by around 10 per cent since 2008. ❏

References

- Edgar, Dunn & Company (2009)**, 'Australian ATM Market Study 2008', Report sponsored by FirstData, NCR, ITS, Wincor Nixdorf, CUSCAL and Diebold, January.
- Edgar, Dunn & Company (2010)**, '2010 Australian ATM Market Study', Report sponsored by Diebold, Wincor Nixdorf and Cashcard, November.
- Filipovski B and D Flood (2010)**, 'Reform of the ATM System – One Year On', *RBA Bulletin*, June, pp 37–45.

Exchange-traded Funds

Mitch Kosev and Thomas Williams*

The exchange-traded fund (ETF) industry has grown strongly in a relatively short period of time, with the industry attracting greater attention as it grows in size. The original appeal to investors of these products was their simplicity, low-cost diversification benefits and ability to trade intraday. While this is still broadly the case, the evolution of the industry has resulted in a greater variety of ETFs becoming available to investors and improved accessibility to different asset classes. However, ETFs have also become more complex in the structure and types of strategies they employ in generating returns. These developments have created new opportunities and challenges for investors, market participants and regulators.

Introduction

This article examines a relatively recent innovation in financial markets, exchange-traded funds (ETFs). ETFs are investment vehicles that are listed on a stock exchange and provide investors with the return of some benchmark, such as an equity index. The appeal of ETFs is twofold: a simple, low-cost means of gaining a diversified portfolio and the capacity for intraday trading. They also offer investors the ability to invest in a range of asset classes which may otherwise be inaccessible or prohibitively expensive, including emerging market equities and commodities. ETF investment has grown strongly in recent years, with global assets under management well in excess of US\$1 trillion (Graph 1). Investment in these securities is not without risks, however, and the industry's rapid growth has attracted increased attention from regulators.

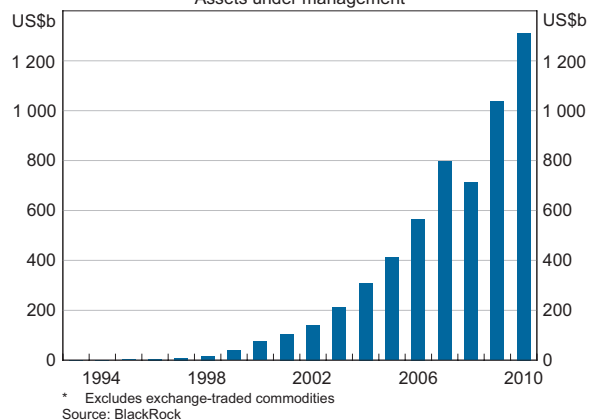
The ETF Industry

ETFs are securities backed by a pool of assets, the return on which is expected to track a specific benchmark as closely as possible. Generally, an ETF will physically hold the underlying assets. For example,

an ETF may hold the stocks underlying a benchmark equity index. However, some use derivatives such as futures, forwards, options and swaps to simulate the return from physically holding the asset, and are referred to collectively as synthetic ETFs. ETFs may also use some combination of the two strategies. The differences between physical and synthetic ETFs are discussed in greater detail in the next section.

ETFs are similar to managed funds in that both can provide broad exposure to an underlying asset. However, there are a number of key differences

Graph 1
Global ETFs*
Assets under management



* The authors are from International Department.

EXCHANGE-TRADED FUNDS

between the two investment vehicles. While investors can trade ETF shares intraday on a stock exchange, transactions in managed funds occur, at most, once a day. ETFs also tend to have lower management fees and brokerage costs because an ETF will not generally buy or sell its underlying assets to create shares (see Box A for details on how ETF shares are created and redeemed in the primary market). Furthermore, ETFs have tax advantages in some jurisdictions, including the United States, because a managed fund may have to sell its holdings to meet redemptions (potentially creating a taxable capital gain), while an ETF does not. Unlike investment in managed funds, ETF investors cannot buy or sell shares directly from the issuer, but instead must make transactions via a stock exchange.

There are around 2 700 ETFs globally, with strong growth in total assets under management over the past decade (Table 1). Those domiciled in the United States account for around US\$1 trillion, or 70 per cent, of global ETF assets, with trading in US ETFs equivalent to around one-quarter of aggregate turnover in US equities. In Europe, ETFs have attracted investment of approximately US\$300 billion, while those domiciled in Australia have assets of around US\$4 billion.

The majority of ETFs track equity indices. Globally, equity ETFs have around US\$1.1 trillion in assets under management and account for around three-quarters of total ETF investment. Equity ETFs allow investors to buy a single security that aims to replicate the return of an entire portfolio of stocks such as the S&P 500 index.

Most equity ETFs focus their investment in equities from a specific country or region (Graph 2). Of these, the number and size of ETFs that invest in emerging market equities have grown strongly, with assets under management of nearly US\$200 billion in 2010 from less than US\$1 billion in 2001. In some cases, emerging market ETFs are the only way that foreign investors can access these markets. Growth has also been strong in a range of equity ETFs that allow investors to invest in specific equity market sectors, such as financial or technology indices, and style-specific investments, such as 'growth' or 'small-cap' stocks.

ETFs that track fixed income returns represent 15 per cent of total ETF assets under management. Fixed income ETFs provide investors with access to a range

Graph 2
Equity ETFs by Type of Investment
As at end February 2011

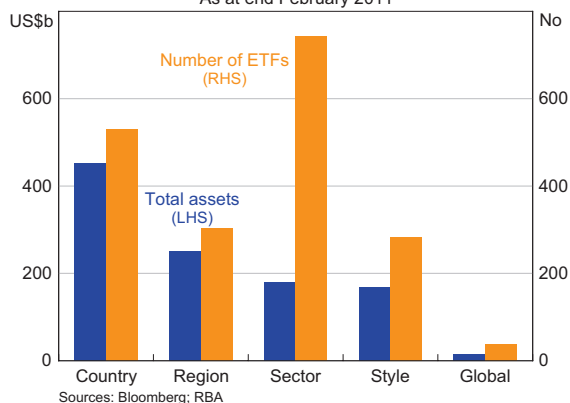


Table 1: Global ETF Investment by Type of Asset
As at end February 2011

ETF type	Number of ETFs	Assets under management US\$b	Per cent of total assets
Equity	1 895	1 067	74.0
Fixed income	365	217	15.0
Commodity ^(a)	358	147	10.2
Other	86	12	0.8
Total	2 704	1 442	100.0

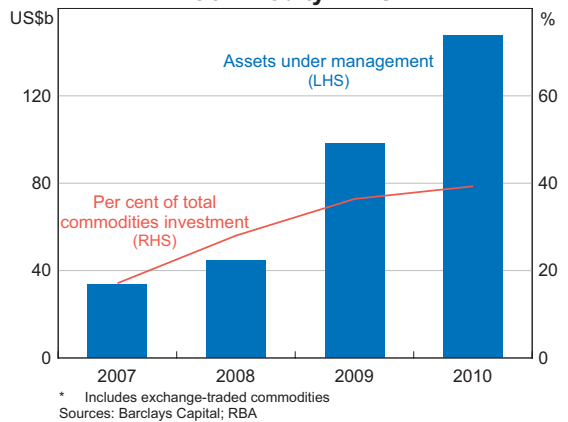
(a) Includes exchange-traded commodities.
Sources: Bloomberg; RBA

of bond and money market investments, including government and corporate debt, as well as broad aggregates, such as investment-grade bonds and high-yielding securities. The greatest proportion of investment is concentrated in government bonds, comprising around 30 per cent of fixed income ETF assets.

ETFs that track commodities represent 10 per cent of total ETF assets under management and have become one of the most popular means of gaining exposure to commodity prices.¹ Commodity ETFs represent a more cost-effective means of accessing this asset class than alternative investment vehicles. Investment in commodity ETFs has grown from around US\$40 billion in 2008 to around US\$150 billion in 2010 and now accounts for 40 per cent of total commodities investment (Graph 3).² Like futures, holding commodity ETFs does not require the investment in infrastructure needed to buy and store the physical commodity. Moreover, ETFs require a small minimum outlay and are more liquid than other forms of commodities investment. For example, one crude oil futures contract represents an interest in 1 000 barrels of oil and requires an initial investment (margin) of around US\$7 000. In contrast, the price of one share in the synthetic United States Oil Fund ETF is currently around US\$40.

Setting up exchange-traded instruments for commodities is slightly more complicated than is the case for equities. Regulation and the illiquid nature of many commodity markets mean that in some cases commodities cannot be structured in the same legal form as traditional ETFs. This is because investment companies have a restricted range of assets in which they can invest and must also meet minimum requirements for diversification. Therefore, most products in Europe are legally set up as exchange-

Graph 3
Commodity ETFs*



traded commodities (ETCs).³ ETCs are technically debt instruments linked to the value of an underlying portfolio of assets (i.e. secured, undated, zero coupon notes). Despite having different regulatory and disclosure requirements, both commodity ETFs and ETCs are similar in the way they trade and both need to be taken into account in forming a complete picture of the size of the commodity exchange-traded product market.

ETFs that are designed to expand investors' allocation opportunities by providing exposure to alternative asset classes and investment structures are becoming increasingly common. Notable examples include ETFs attempting to deliver hedge fund performance and those that track currency returns. There is also a growing number of ETFs, particularly in the United States, which use leverage (predominantly through derivatives) in an effort to enhance returns. These include leveraged ETFs providing specified multiples – often two or three times – of the *daily* return of an underlying asset. Others, known as inverse ETFs, aim for the opposite (or in the case of

1 This figure includes exchange-traded commodities.

2 Total commodities investment includes assets under management in commodity exchange-traded products, commodity index funds and commodity-linked medium-term notes.

3 There are also products tracking a range of asset classes known as exchange-traded notes (ETNs). ETNs are typically unsecured debt instruments issued and held on the balance sheet of large financial institutions (typically investment banks or asset management firms). In contrast, the assets of ETCs (which are also debt instruments) are often held by a ring-fenced special purpose vehicle to protect against default risk.

EXCHANGE-TRADED FUNDS

leveraged inverse ETFs, multiples of the opposite, such as negative two or three times) return and are used to gain from falling prices or to hedge existing portfolio positions. A small number of ETFs are also available where the fund actively manages its investments, with some attempting to make higher returns than would be earned by passively tracking the return on an asset.

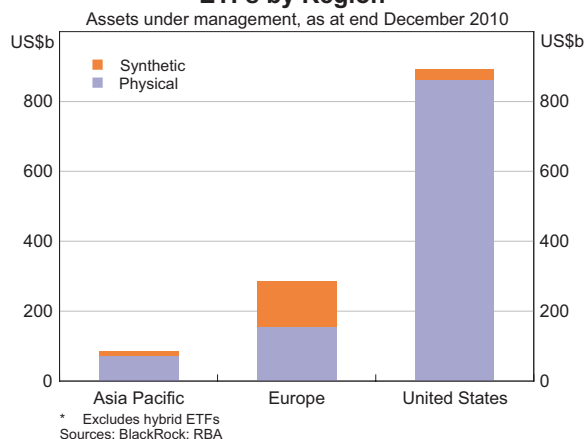
Physical versus Synthetic ETFs

As mentioned previously, there are two common strategies employed by ETFs to achieve the target return: physical and synthetic. Physical ETFs hold the assets underlying a particular benchmark. For example, an equity-based ETF can hold all or a sample of the stocks underlying a benchmark equity index. The advantages of a physical replication strategy include greater transparency of the ETF's asset holdings and more certainty of entitlement for investors should the ETF be liquidated. Restrictions on the use of derivatives in some regions, particularly in the United States, have also contributed to the continued dominance of physical replication. Most ETFs in the United States and Asia Pacific region use physical replication to track their underlying benchmark (Graph 4).

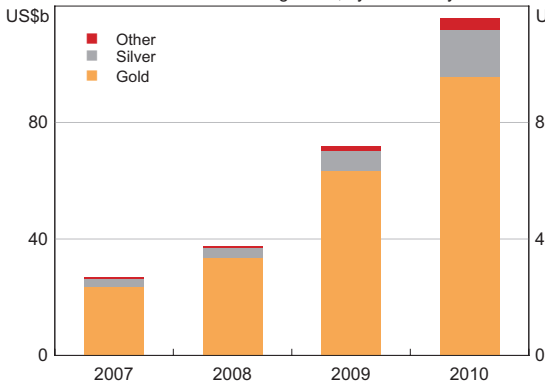
In Europe, however, regulatory changes have seen the use of synthetic ETFs grow rapidly, with such funds accounting for almost half of total ETF assets under management. The advantages of a synthetic strategy can include lower cost, improved accessibility to particular asset classes and investments (including emerging market shares) and greater accuracy in delivering the targeted return. That is, a synthetic strategy can reduce tracking error as the ETF is contractually guaranteed to receive the same return as the underlying asset. For example, physical equity ETFs must rebalance their constituent holdings each time the target index is reweighted, while for a synthetic ETF using swaps, this becomes the responsibility of the swap counterparty. A synthetic strategy may also be necessary when physical replication is not possible (e.g. an ETF may be unable to directly access Chinese shares). However, the structure of synthetic ETFs can be complex and may lack transparency, with the use of derivatives also exposing the ETF to counterparty risk. Box A discusses synthetic ETFs in more detail.

Around four-fifths of investment in commodity ETFs occurs through physical replication (e.g. buying and storing gold bars to track the spot price of gold). Compared with equity ETFs, where synthetic strategies tend to provide lower tracking error, only by holding physical commodities can these ETFs closely track the return on the spot price of the underlying commodity (less fees).⁴ Investment in physically backed commodity ETFs is concentrated in precious metals, which are ideal for this structure because they have low storage costs relative to their value, are not perishable and have futures price curves which are frequently in contango (i.e. the futures price for the closest-to-maturity contract is lower than for the next month). Gold accounts for around 80 per cent of investment in physically backed ETFs. The large increase in investment in gold ETFs during the financial crisis has been attributed to gold's safe-haven status (Graph 5). The popularity of these products has seen

Graph 4
ETFs by Region*



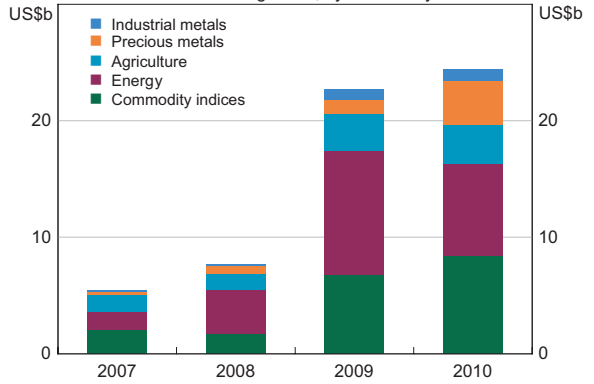
⁴ The return on commodity ETFs that use synthetic replication can differ substantially from the return on the spot price of the underlying commodity for reasons discussed in more detail below.

Graph 5**Physical Commodity ETFs***
Assets under management, by commodity

* Includes exchange-traded commodities
Sources: Bloomberg; RBA

Graph 6**Synthetic Commodity ETFs***

Assets under management, by commodity sector



* Includes exchange-traded commodities
Source: Barclays Capital

the number of physical commodity ETFs rise, and the first products backed by holdings of base metals such as copper were launched late last year.

Apart from precious metals, and to a lesser extent base metals, commodities are generally both costly and difficult to buy and store. This has led a number of commodity ETFs to use synthetic replication to achieve their return objectives. A typical strategy involves the ETF purchasing closest-to-maturity futures contracts and rolling them prior to expiry. If the price of the futures contract for the next month is lower than that for the current month – that is, the market is in backwardation rather than contango – then the roll return is positive. As a result, investing in a synthetic commodity ETF can generate a return above the return from holding the physical commodity. The opposite occurs when the market is in contango. In this situation the roll return is negative and the return from investing in such a synthetic commodity ETF will be lower than the return from holding the physical commodity. Because of this, most investment in synthetic commodity ETFs is in energy commodities and broad commodity indices (with large weights given to energy), since the futures curves of these commodities have historically spent most of the time in backwardation (Graph 6).

Benefits and Risks of ETF Investment

ETFs can offer a number of benefits to investors, including: a simple, low cost means of diversification and the ability to be bought and sold intraday. As ETFs trade like ordinary shares they can often be short sold (where a security is borrowed and then sold, allowing the seller to profit from falling prices) and investors can use risk-management strategies such as limit and stop-loss orders in making trades. They also enable investors to invest in a range of asset classes, including emerging market equities and commodities that might otherwise be difficult to access. Further, ETFs tend to be a cost-effective method of investing, with expenses generally lower than similar products offered by managed funds.

However, ETF investment does not come without risks and ETFs are increasingly attracting the attention of regulators. Generally, concerns about ETFs stem from liquidity and counterparty risk and, in some cases, complexity and a lack of transparency. An ETF's liquidity on the primary market is linked to the liquidity of the underlying assets. In addition, some ETFs may not trade actively intraday and market volatility can inhibit liquidity for ETFs if large ETF traders withdraw from the market or there is difficulty in creating new ETF shares. Events such as the 'flash crash' of the

EXCHANGE-TRADED FUNDS

S&P 500 on 6 May 2010, where ETFs were severely affected by the sudden fall in US equity prices, have also raised questions as to their potential contribution to heightened market volatility as well as their broader impact on market structure.

Counterparty credit risk is an issue for synthetic ETFs, particularly those using swaps (see Box A), and those lending the securities underlying the ETF to generate additional income. Collateral arrangements and swap resetting are typically used to address this and attempts have been made by a number of swap-based ETF providers to increase the frequency of swap resetting, with some providers also engaging multiple swap counterparties.⁵ There has also been a shift by some ETF providers towards a swap structure where collateral is pledged to the fund. However, this may not guarantee immediate access to the collateral in the event of a counterparty default and highlights the importance of sound collateral management practices.

Finally, there is the issue of complexity and transparency. Part of the appeal of physical ETFs is their simplicity, and some investors are attracted by the fact that their interest in the fund is backed by the assets underlying the benchmark. However, there has been significant growth in the number of ETFs with complicated structures using derivatives to create leverage, as well as funds based on opaque performance benchmarks. In some cases, the exact structure and types of derivatives being used by ETFs are unclear. These more complex investments can vary considerably in both their structures and the risks they present.

⁵ Swap resetting occurs when a payment is made by either the counterparty or ETF to match the value of the ETF's holdings to changes in the value of the asset being tracked.

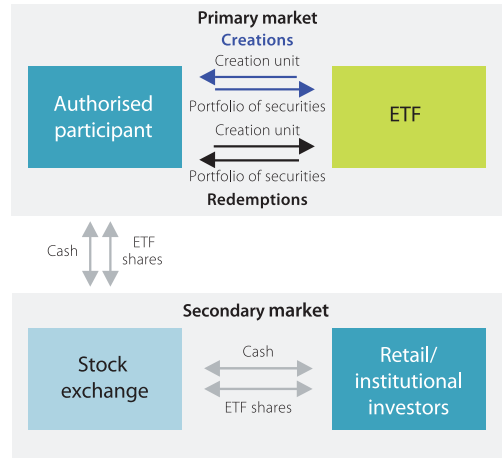
Box A How Do ETFs Work?

The Creation and Redemption Process

ETFs are typically structured as open-ended companies, which allows the number of shares in the fund to vary over time. Unlike managed funds, however, retail and institutional investors must purchase ETF shares on a stock exchange and cannot buy or sell shares directly from the fund. Before an ETF can commence trading, the fund undertakes a process of creation in the primary market (Figure A1). An ETF will create shares in large blocks (typically of between 25 000 and 200 000 shares), referred to as 'creation units', which can only be purchased by Authorised Participants – usually market-makers or institutional investors that must be registered with the ETF. To purchase a creation unit in an ETF tracking an equity index, an Authorised Participant does not generally use cash but instead transfers a portfolio of securities to the ETF (usually comprising the shares underlying the index it is tracking).

Once the creation unit is transferred to the Authorised Participant, it can be broken up and sold on the secondary market. Only at this point can retail and institutional investors buy and sell ETF shares via a stock exchange. Authorised Participants can also dispose of their shares by selling them back to the ETF through a process of redemption, which is essentially the reverse of creation. Cash may be used during the creation and redemption process for those funds using derivatives to track their benchmark.

Figure A1
ETF Creation and Redemption Process



Source: RBA

Creations and redemptions of ETF shares occur on an on-going basis and are priced at the net asset value (NAV) of the assets held by the fund. ETFs are required to publish daily information about the fund's holdings of securities and NAV, as well as the composition of the portfolio needed for creations and redemptions. On the secondary market, ETF prices are determined through intraday trading on the stock exchange, but should usually mirror the ETF's intraday NAV. Because ETFs trade on the stock exchange, their prices are subject to fluctuations in supply and demand, which may cause the ETF to trade at a premium or discount relative to its NAV. However, these deviations are usually small, with any sufficiently large opportunities exploited by arbitrageurs. Dividends are either paid to investors periodically or reinvested into the ETF.

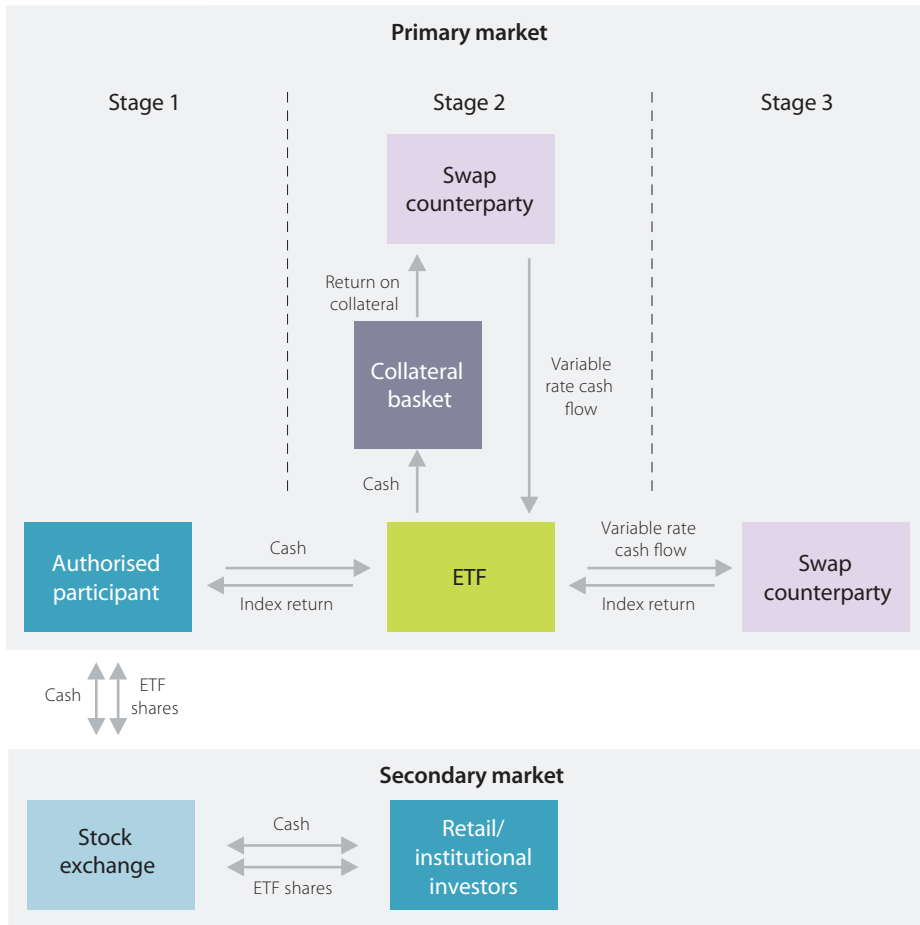
The Structure of a Synthetic ETF

ETFs may use any number of derivatives, including forwards, futures, options and total return swaps to deliver synthetic exposure to a target benchmark. Swap-based structures are commonly used by synthetic equity ETFs to achieve exposure to the underlying index (Figure A2). Total return swaps are an agreement between two parties to exchange one type of return for another. This involves the fund engaging a swap counterparty, which will be paid a stream of cashflows. In return, the swap counterparty

will transfer the complete performance of the target benchmark (e.g. the return on the German DAX index) to the ETF, including both capital gains and dividends. While variations exist, in practice, this can be done in three stages.

To create shares, an Authorised Participant uses cash rather than a portfolio of assets to buy a creation unit (Stage 1). The ETF then invests the cash in a basket of securities which may not be the same as the asset being tracked by the ETF. The securities held are typically liquid, high quality assets and form the ETF's

Figure A2
An Example of a Swap Replication Strategy



Source: RBA

collateral. The return on this collateral basket is then swapped for a stream of cash flows based on a variable rate such as LIBOR (Stage 2), which the ETF uses to invest in a second swap paying the return on the target asset (Stage 3). Often the counterparty to both transactions is the ETF's parent financial institution (typically an investment bank or asset management firm). While some swap-based ETFs lack transparency regarding the ETF's exact structure, holdings and potential losses in the event of counterparty default, disclosure of this information is improving. For these ETFs, counterparty exposure is managed by the fund regularly resetting (typically daily) the value of the swap.

Another type of swap structure has also evolved in response to investor demands for greater transparency. This involves the ETF investing directly in a swap, rather than a basket of securities, to return the target asset performance. To provide collateral to the ETF, the swap counterparty will enter an agreement to pledge assets to the ETF. Some ETFs have begun publishing information about the composition of the collateral held in the fund's name. The pledged securities are held in a ring-fenced structure with a custodian and are not available for securities lending. The collateral is only accessible by the ETF in the event of a credit default by the counterparty. ❖

The State of Things

Glenn Stevens, Governor

Address to Australian Business in Europe – United Kingdom

Robert Walters Boardroom Series – Australialive Business Lunch, London, 9 March 2011

Quite a lot has happened since I last had the opportunity to address a London audience in January 2008. Later that year, a sequence of financial events saw the global financial system teeter on the brink, followed very quickly by a very sharp global economic slowdown in the closing months of 2008 and the early part of 2009.

For the global economy, a recovery in activity commenced shortly thereafter. It has turned out, contrary to widely held expectations two years ago, to be quite a robust one overall. Real GDP for the world is estimated by the IMF to have grown by 5 per cent in 2010, well above the medium-term trend of a touch under 4 per cent. As of the most recent published forecasts, the IMF expects the world economy to grow by almost 4½ per cent this year – still above trend.

But the pattern of the growth has been rather uneven. Here in this part of the world, recovery is proving to be difficult and protracted. Yet in the Asian region, the recovery has been quite rapid and concerns have been expressed about excesses.

There is more than just cyclical dynamics at work in these trends. Important structural forces are in operation, and they have significant implications. These are worthy of careful consideration, even though we cannot do them full justice today.

The North Atlantic Region

The group of countries that could be labelled as being in the North Atlantic region (North America, the United Kingdom and continental Europe) are in the early phase of recovery from a deep downturn. For several of them, the downturn was the worst for decades. In other cases the downturns were serious, though not more so than those of the mid 1970s or the early 1980s. But what has been unusual is less the depth of the downturn than the slowness of the recovery.

For most major countries, in most cycles in the second half of the 20th century, the pace of a recovery tended to be related to the depth of the preceding recession: generally, the deeper the recession, the sharper the upturn that followed. This episode has been different, in that a serious recession has been followed by a fairly shallow upswing so far. In the case of the United States, the level of real GDP has reached its pre-crisis peak, but it took three years to do so. In the United Kingdom and the major continental economies, levels of real GDP remain well below their peaks of three or so years ago. In some other cases in Europe the declines are larger and, in fact, are continuing. In all these cases the level of output remains well below what policy-makers would regard as their respective economies' 'potential' level. A corollary of that is the rate of unemployment in most cases remains unusually high after a year or more of recovery.

Output and Unemployment

	Real GDP Percentage change from pre-crisis peak	Unemployment rate Percentage point change from pre-crisis trough
North Atlantic		
Canada	1.2	1.9
United States	0.0	4.5
Euro area	-2.9	2.7
<i>Germany</i>	-1.4	-0.6
<i>France</i>	-1.6	2.0
<i>Spain</i>	-4.3	12.5
<i>Ireland</i>	-12.8	9.3
United Kingdom	-4.6	2.7
Asia-Pacific		
China ^(a)	23.2	-
India ^(a)	20.9	-
East Asia ^(b)	8.0	0.5
<i>South Korea</i>	6.2	0.6
Australia	4.4	1.1
New Zealand	-1.8	3.4
Japan	-4.1	1.3

(a) Quarterly GDP did not contract during the global downturn; percentage change in GDP is from the quarter preceding a marked slowing in output growth

(b) Excluding China and Japan; GDP aggregated at market exchange rates; unemployment rate also excludes Indonesia, Malaysia, the Philippines and Thailand

Sources: ABS; CEIC; RBA; Thomson Reuters

This slowness of initial recovery is of course related to the nature of the downturn, which differed from most of the post-war business cycles in that it was characterised by serious and widespread financial distress. History shows that recoveries from downturns associated with banking crises and collapsed asset booms are, more often than not, drawn-out affairs. Really we need look no further than Japan's experience over the past two decades to see this, but in fact it is well established by a great deal of research. Moreover, while banking systems are in the process of regaining health, that process is not yet complete. Nor is it clear that households are yet finished the process of reducing their leverage.

There are now some other factors that may impede the recovery. One of them is the delicate state of government budgets, which leaves many of these countries feeling they have little choice but to pursue policies of fiscal contraction. In a proximate sense, this problem is due to the financial crisis. The direct costs of assisting banking systems were the smaller part of the effect – the main impact on budgets has simply been the cumulative loss of revenue and the general impost on spending that comes with a protracted period of economic weakness.

Ideally, government budgets *should* move temporarily into a position of deficit when the private economy suffers an adverse shock. The budget should play the role of a 'shock absorber'.

But that ideal assumes that the government's own accounts are in a strong enough position to play such a role without raising questions of the state's own solvency. The problem is that in a number of countries, large burdens of spending, significant debt burdens, underfunded pension systems and unfavourable demographics have been on a collision course for a long time. What the crisis has done is to bring on the adjustment sooner.

In the euro area the intersection of banking and fiscal issues – including through the exposures of banks to sovereign debt – heightens the difficulty. Although the single monetary policy framework is highly developed, single frameworks for other areas of financial policy have been less highly developed. This is gradually being addressed, though of course it is a complex issue. At its heart, the debate is essentially over the incidence across the taxpayers of Europe of the various costs of fixing banking problems.

The Asia-Pacific Region

The contrast between the story for the North Atlantic countries and that for Asia could, in all frankness, hardly be more pronounced. Most of the countries in the Asian region have had a 'v-shaped' recovery. Of course this has been led by China and India, where levels of GDP actually did not fall at all and where very robust growth rates have been maintained since the second quarter of 2009. Real GDP in both cases is now 20 per cent or more above pre-crisis levels. A range of other countries have also had a pretty strong rebound.

Japan is an exception. The long aftermath of the 'bubble economy' period, together with a declining population and generally low rates of return on capital, have made Japan a much less significant source of dynamism for the region and the world than it was for the couple of decades up to 1990. In truth, though, the global economy has become used to this.

How is it that the Asian story has been so different to that of the North Atlantic?

The first important factor was that Asia did not have a banking crisis. In fact, most countries in the world didn't have one. The extraordinary events of September and October 2008 put immense pressure on markets, and banks everywhere inevitably felt the effect of that. But most banks in Asia and Latin America over the past few years have generally not seen unusually bad losses on loans, nor had they been very much involved in the holdings of securities that did such damage to some of the world's largest banks. Similarly, the majority of governments have not ended up needing to re-capitalise banks in these regions.

The second factor was that various countries in the Asian region had ample scope for fiscal stimulus, and were prepared to use it. The Chinese stimulus measures were just about the largest anywhere. The manner in which these were implemented may have led, in the view of some people, to other problems. But there is little doubt such measures were effective in boosting demand at the critical moment.

The fact that there was scope to use fiscal policy this way reflects a long period of impressive fiscal discipline among most countries in the region. This is reinforced by Asian habits of thrift among the population and the generally better growth dynamics for these countries, which of course makes fiscal management inherently easier.

There is another factor at work too, whose implications have been powerful but increasingly are being seen as not quite so benign. That is that monetary policy in Asia has been quite accommodative. Compared with the North Atlantic countries, this monetary accommodation has been much more effective as a stimulus, again because of the better state of banks through which much of its effect is transmitted. The issue more recently has been that accommodative conditions have started to look out of place given the robust growth in output, rising asset values and increasing goods

and services price inflation. A number of countries, including key ones such as India and China, have been responding to this with tightening. Some of the Latin American countries have done likewise.

The matter is complicated for those countries by the very low interest rates in the major countries – implemented, understandably, for their own domestic reasons – and concerns over the extent of capital inflow and potential exchange rate appreciation. This is one of the key issues for the year ahead.

Shifts in the Global Economy

These are all important manifestations of the fact that different regions are at different points in their recoveries from the crisis. It isn't, however, only a cyclical matter. This contrast between the economic performances of the key emerging countries and those of the older industrial economies in the past few years is seeing a marked acceleration in the shift in the world economy's centre of gravity towards the east (or west, if viewing from North America). Since the beginning of 2008, Asia (excluding Japan) has accounted for about 70 per cent of the growth in global GDP (measured on a purchasing power parity basis). It has also accounted for about 70 per cent of the growth in global demand over that period. This compares with a figure of about 30 per cent over the period 2000–2007.

It has often been said that more domestic demand is needed in Asia to help 'rebalance' the global economy. There may have been a structural sense in which Asian saving rates were 'too high' and saving in some other countries too low. But it is not at all clear that more demand growth in Asia is desirable at present. After all, global GDP growth has been strong, and prices for most commodities have been rising. Just at the moment, from a global perspective, what we need is not so much faster domestic demand growth in Asia, but a way of supplying more of Asia's demand for goods and services from the parts of the world where excess

supply remains – mainly the North Atlantic countries. Of course exchange rates are relevant here.

Moreover, there is a secular increase in living standards occurring in Asia and changes in consumption patterns are accompanying that. Energy intensity is rising quickly with income. The steel intensity of production is already high in China but, with China seeking strong overall growth for many years yet, steel consumption could well continue to increase at a rapid pace. In India, steel intensity has a long way to rise yet. In many developing countries, higher living standards are also prompting changes to diets. The already clear trend towards higher protein consumption in emerging countries such as China potentially has major implications for demand (and prices) for livestock and grain feed globally.

So it is not really surprising that rapid economic growth in Asia is placing upward pressure on prices for foodstuffs, energy and minerals. There may be speculative demand adding to these pressures at the margin. But speculators can't hold up prices over the long run. These big changes, which appear to be rather long-running, surely are mainly a result of powerful, and rather durable, fundamental forces.

What is new is that this pressure on prices is not coming from the advanced world (except perhaps in the case of demand for grain to be converted into ethanol). It is not the story that would have been told, until only a few years ago, of the industrial cycle of the OECD countries picking up and adding to demand for resources and energy. The action is, for the most part, occurring outside that group. Prices are under upward pressure because of rising demand,¹ but it is the demand coming from a couple of billion people in Asia seeking, and in many cases rapidly converging on, the way of life that the advanced countries have enjoyed for decades.

These price rises, not to mention those occurring most recently as a result of pressure on oil supplies, are quite unhelpful for the advanced countries,

¹ Food prices, as well as oil, are also being affected by supply disturbances at present.

particularly those whose recoveries have been hesitant to date. They will also be unwelcome for very poor countries whose populations spend much of their meagre incomes on food. For practical purposes they amount to a supply shock for the advanced countries – someone else's demand has pushed up the price at which markets are prepared to supply energy, agricultural and resource commodities. That will make it harder to engender a strong recovery in the advanced countries. Moreover, were demand in the advanced countries to grow faster, as is presumably the intent of current economic policies in those countries, the price pressures will grow more intense, unless substantial new capacity comes on stream and/or growth in the emerging world moderates somewhat.

As it happens, new capacity is being planned in many resource commodities. In Australia, where iron ore shipments are running a little over a million tonnes a day, projected capacity expansion will likely take that to about 2 million tonnes within four or five years. Significant capacity expansion is also planned in other areas. These and similar expansions in other countries will presumably help to contain pressure on prices for many resources over time.

In the case of foodstuffs, much of the growth in supply over the medium term will need to come from productivity gains or greater farming intensity. The experts seem to think that such productivity gains are possible but not given. In fact the rates of productivity growth will need to be higher than those actually observed in recent years to generate sufficient output.²

One thing is for certain: the rise of Asia is changing the shape of the world economy and the set of relative prices that goes with it. It seems to be doing so more quickly than was generally assumed.

² See, for example, the UN Food and Agriculture Organization (FAO) discussion paper 'How to Feed the World in 2050', which was prepared for a high-level expert forum of the same name held in Rome on 12–13 October 2009. The document, and other background information, is available at: <<http://www.fao.org/wfs/forum2050/wfsf-background-documents/issues-briefs/en/>>.

Australia

Australia sits in an interesting position here. Like our Asian neighbours we were affected by the events of late 2008. But the downturn was fairly brief. We were in a position to apply a liberal dose of stimulus to the economy, which was done in a timely fashion. The banks remained in good shape. Hence recovery began in the first half of 2009. A strong Asian recovery has also helped Australia.

As in other developed countries, our consumers feel the effects of higher commodity prices as a reduction in real income. But since Australia is also a producer, the big rise in demand for energy, resources and food is expansionary for the economy. In fact, with our terms of trade at by far their highest level, on a five-year average basis, in more than a century, these events are very expansionary indeed. A very large increase in investment in the resources sector is under way and has a good deal further to run yet.

Just recently, we have been experiencing growth close to trend, relatively low unemployment – about 5 per cent – and moderate inflation, about 2¼ per cent in underlying terms. In comparison with the experience of the past generation, that is a pretty good combination.

Looking ahead, our job is to try to manage the terms of trade and investment booms. Historically, Australia has often not managed periods of prosperity conferred on us by global trends terribly well. On this occasion, we have to do better. We have to take the opportunity to capitalise effectively on some very powerful trends in the global economy to which we are, almost uniquely, positively exposed.

A few things are working in our favour. One is that the exchange rate is playing a role of helping the economy to adjust to the change in the terms of trade in a way that it was prevented from doing on numerous previous occasions. Another is that, at least so far, households are behaving with a degree of caution, insofar as spending and borrowing are concerned, that we have not seen for a long time.

THE STATE OF THINGS

Having taken on quite a degree of debt over the preceding 15 years or so, households have thought better of taking on too much more. They are saving more than at any time for 20 years or more. So are households in many other countries, of course, but our good fortune is to be making that adjustment against a backdrop of rising income.

We are now engaged in a national discussion about how to stretch the benefits of the resources boom over a long period, and how to manage the risks that it will bring. These are complex matters that involve a wide range of policy areas – macroeconomic, microeconomic, taxation, industrial and so on. But if that discussion can be conducted in a mature fashion, and followed up with sensible policies, then we have a good chance of leaving to the next generation a wealthier, more secure and more stable Australian economy. ✕

The Resources Boom

Glenn Stevens, Governor

Remarks at the Victoria University Public Conference on The Resources Boom:
Understanding National and Regional Implications, Melbourne, 23 February 2011

The rise in prices for natural resources and the associated planned increase in Australian-based capacity to supply key commodities is one of the largest such economic events in our history. The Reserve Bank has had a good deal to say about it. I will touch again today on the main points we have made.

I will not say much that is new. Nor will I be seeking to convey any messages about monetary policy. Those matters were covered in some depth with the House Economics Committee less than two weeks ago.

I will structure my remarks around four questions.

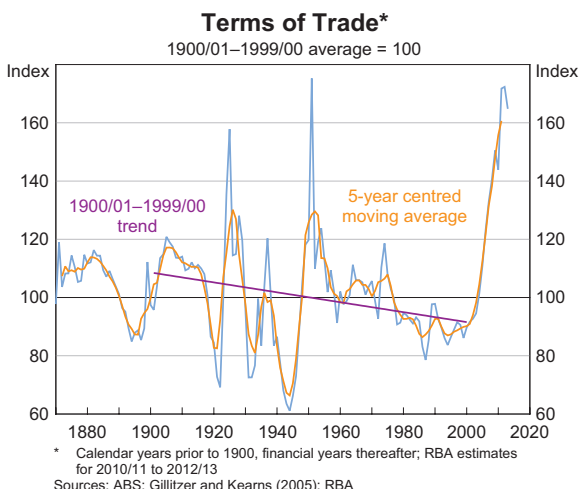
- What do we know from previous booms?
- What do we know about this one?
- What don't we know?
- Finally, how should that knowledge, and the limits to it, guide our response to the boom?

What Do We Know about Previous Booms?

I am going to re-use a chart that originated in a research paper by Jonathan Kearns and Christian Gillitzer,¹ with some updating. This was the basis of a previous address last November.² I have

1 Gillitzer C and J Kearns (2005), 'Long-Term Patterns in Australia's Terms of Trade', RBA Research Discussion Paper No 2005-01.

2 'The Challenge of Prosperity', address to CEDA Annual Dinner, Melbourne, 29 November 2010. Available at: <<http://www.rba.gov.au/publications/bulletin/2010/dec/pdf/bu-1210-9.pdf>>.



noticed it being shown rather more widely of late, no doubt because of the striking messages it conveys.

One thing we know, by observing this time series, is that large swings in prices for agricultural and resource commodities, resulting in big variations in Australia's terms of trade, have been a recurring feature of our economic experience ever since Australia became a significant producer of such commodities.

There have been a number of big booms. They all ended. The really high peaks were quite temporary – just one or two observations in this annual time series, such as in the mid 1920s or the early 1950s. Periods of pretty high terms of trade lasted for some years in several instances – as shown by the five-year average – but so far they have all been followed by a return to trend, or even a fall well below trend.

We also know that these swings were very important for the macroeconomy. My colleague Ric Battellino gave a very thoroughly researched speech on this question a year ago today.³ He looked at five major episodes, including the current one, over two centuries. Let me offer a reprise of his four main observations.

First, global developments have always played a part in causing the booms. Changes to the availability of capital or the emergence of large, low-income countries with rapid growth prospects (Japan or China) have often affected the price of minerals and energy.

Second, these booms were always expansionary for the Australian economy overall.

Third and related, previous booms were usually associated with a rise in inflation. The exception was the one in the 1890s, which occurred when the economy was experiencing large-scale overcapacity.

Fourth, the role of the exchange rate is crucial. The current episode stands apart from the previous ones because all those booms were experienced with a fixed or heavily managed exchange rate. This severely compromised the conduct of monetary policy, and also muddled many of the price signals that the economy needed to receive.

In short, these episodes were major externally generated shocks that proved very disruptive, not least because the country's macroeconomic policy framework was not well equipped to handle them. The high levels the terms of trade reached on some occasions were not permanent, but they did persist long enough to have a big impact on economic outcomes.

What Do We Know about This Boom?

The main thing we know about the current episode is that it looks very large. It is being driven by a big increase in demand for key Australian export commodities. Global consumption of coal has increased by about 50 per cent over the past decade; consumption of iron ore has increased by 80 per cent since 2003. Back then, Australia shipped around half a million tonnes of iron ore each day; now it is over a million tonnes a day. Coal shipments have been running at a rate of around 300 million tonnes a year, at least until the recent floods. Australian capacity to export LNG is now around 20 million tonnes a year, up from around half that in 2004. This looks like it will increase to over 50 million tonnes within five years.

The rise in demand has been driven in large part by the rapid growth of key emerging market economies such as China and India. Over the past decade:

- the average annual growth of GDP per capita has been around 5½ per cent in India and almost 10 per cent in China;
- the number of people living in cities in those two countries, especially China, has risen by over 250 million, which implies having to expand or create cities (with the attendant buildings and infrastructure) to house the entire population of Australia more than 10 times over or, alternatively, to house the populations of France, Germany and Japan combined; and
- steel production has doubled in India and it has more than quintupled in China.

Thus far, the demand for resources has stretched the global capacity of suppliers. Prices of key raw materials have consequently been driven upwards. As a result Australia's terms of trade have risen sharply, to be about 65 per cent above the 20th century average level, and about 85 per cent above the level that would be expected had the downward trend observed over the 20th century

³ 'Mining Booms and the Australian Economy', address to The Sydney Institute, Sydney, 23 February 2010. Available at: <<http://www.rba.gov.au/publications/bulletin/2010/mar/pdf/bu-0310-10.pdf>>. The fact that we were talking about this issue a year ago, and indeed two years earlier than that, that we are still taking about it now, and doubtless will be for another year at least, says something in itself.

continued. Even assuming the terms of trade soon peak and decline somewhat, they are nonetheless, over a five-year period, at their highest level since at least Federation – by a good margin. With the terms of trade at their current level, Australia's nominal GDP is about 13 per cent higher, all other things equal, than it would have been had the terms of trade been at their 100-year average level. Of course Australia has substantial foreign ownership in the resources sector so a good proportion of this income accrues to foreign investors. Nonetheless, probably about half of that additional 13 per cent of GDP accrues to Australians one way or another.

We also know that a large expansion in the resources sector's capacity to supply commodities is being planned. Already, mining sector capital investment has risen from an average of around 2 per cent of GDP over the past 25 years to about 4 per cent, which exceeds the peak reached in the booms of the late 1960s and early 1980s. Given the scale of possible additional investment projects that have been mooted, resources sector investment could rise by a further 1–2 per cent of GDP over the next couple of years. If it occurs, this will be by far the largest such expenditure of a capital nature in the resources sector in Australia's modern history. Again, a significant proportion of the physical investment will be imported, but a large domestic spend is nonetheless likely.

A further thing we know about the boom is that it is associated with a much higher level of the exchange rate than we have been accustomed to seeing for most of the time the currency has been market determined, a period of more than 25 years (though, over the long sweep of history, the nominal exchange rate was often considerably higher than it is now). On a trade-weighted basis, it is 25 per cent above its post-float average. The striking relationship between the effective exchange rate adjusted for price level differentials (the 'real' exchange rate) and the terms of trade that is observable over quite a long period in the data still seems broadly to be in place.

Interest rates also have a bearing on the exchange rate. Even though most market interest rates are very close to medium-term averages, or even below them in some cases (e.g. the cash rate and the 90-day bill rate), interest differentials have recently strongly favoured the Australian dollar because of the persistence of extremely low rates in all of the world's major financial centres. Moreover, the expectation that relatively high returns will be earned on real capital in Australia – in mining for example – is a powerful factor influencing capital flows.

We know that changes in the real exchange rate are part of the textbook adjustment mechanism to shocks like changes in the terms of trade. In past episodes, where movements in the nominal exchange rate were more limited (or did not occur at all), a range of other prices in the economy had to respond – arguably a more disruptive way of adjusting to the shock. On this occasion, the nominal exchange rate has responded strongly. This helps to offset the expansionary effect of the increase in investment, and also gives price signals to the production sector for labour and capital to shift to the areas of higher return. In other words, firms in the traded sector outside of resources are facing a period of adjustment. But in the face of such a shock they were always going to face that adjustment, one way or another.

What Don't We Know?

The main thing we don't know is how long the boom will last. This matters a great deal.

If the rise in income is only temporary, then we should not respond to it with a big rise in national consumption. It would be better, in such a case, to allow the income gain to flow to savings that would then be available to fund future consumption (including through periods of temporarily weak terms of trade, which undoubtedly will occur in the future). Likewise it would not make sense for there to be a big increase in investment in the sorts of resource extraction activities that could be profitable *only* at temporarily very high prices. Moreover, the

economic restructuring that would reduce the size of other sectors that would be quite viable at 'normal' relative prices and a 'normal' exchange rate – assuming there is such a thing – would be wasteful if significant costs are associated with that change only to find that further large costs are incurred to change back after the resources boom ends.

If, on the other hand, the change is going to be quite long-lived, then national real income is going to be permanently higher, and we can look forward to enjoying significantly higher overall living standards into the distant future. In that world, a great deal of structural economic adjustment is bound to occur. In fact it almost certainly could not really be stopped. It would not be sensible to try to stop it.

We know that the peaks of previous terms of trade booms were relatively short-lived. In the current episode, the very high level of the terms of trade already seems to be persisting for longer than in previous episodes. Is this telling us that we should expect the boom to disappear at any moment? Or is it telling us that this episode is different from the others?⁴

In favour of the latter view, if China and India maintain, on average, their recent rates of 'catch-up' to the productivity and living standards of the high-income countries, and if they follow roughly the same pattern of steel intensity of production as seen in the past in other economies, a strong pace of increase in demand for resources will likely persist for some time yet. On the other hand, resources companies in Australia and beyond are rushing to take advantage of the current increase in prices by bringing new capacity on line. Will this increase in supply be just sufficient to match demand? Will it be too little? Or too much? An additional complicating factor is that serious attempts at reducing CO₂ emissions would probably change the story at some

point. The lessons of history, moreover – that booms don't go on indefinitely – are also too great to ignore.

At this stage, the Reserve Bank staff are assuming that the terms of trade will fall in the latter part of the forecast horizon. The associated assumptions about key resources prices are toward the conservative end of current market forecasts, which typically assume a smaller fall in prices. Even under the Bank's current assumptions, however, the terms of trade are still very high, by historical standards, at the end of the forecast period.

But any forecast or assumption made in this area is subject to wide margins of uncertainty. We know that something very big is happening and has been for a while. We simply do not know whether it will continue like this, or not.

How to Respond?

How, then, should we respond to our knowledge, and to the limits of our knowledge?

To recap, we know that:

- Previous commodity price and/or mining investment booms were big events that had major expansionary and inflationary effects.
- Those booms all ended, generally with more or less a total reversal of the earlier rise in the terms of trade, though this often took some time. On some occasions, this brought on a significant economic downturn.
- The current boom looks bigger than any other since Federation at least, in terms of the rise in the terms of trade over a period of several years.
- The previous episodes occurred without the benefit of a flexible exchange rate to help manage the pressures. On this occasion that particular price is adjusting, which should help to contain the pressures and help the economy to adjust more efficiently.

We do *not* know what the terms of trade will do in future. It would be rather extreme to assume that the rise of China and India is a short-run flash-in-the-

⁴ I asked our econometricians to test the hypothesis that the observations over the past few years were drawn from the same process as generated the observations over the 20th century. Their answer, based on a battery of suitable tests for a univariate time series, was that it was too early to tell.

pan phenomenon. Likewise it would be imprudent not to allow for a fairly significant fall in prices, even if only to still pretty attractive levels, over several years.⁵ But the truth is that we will learn only gradually what the detailed shape of the new environment is.

How should we handle this uncertainty?

A few simple messages seem to me to be important.

First, we should not assume that the recent pace of national income growth is a good estimate of the likely sustainable pace. We should allow a good deal of the income growth to flow into saving in the near term. We can always consume some of that income later if income stays high, but it is harder to cut back absorption that rises in anticipation of income gains that do not materialise.

To date, that precautionary approach seems to be in place. Households are saving more than for some years and the much-discussed 'consumer caution' has been in evidence. Firms are consolidating balance sheets. Governments have reiterated commitments to stated medium-term fiscal goals.

Second, there is going to be a nontrivial degree of structural change in the economy as a result of the large change in relative prices. This is already occurring, but if relative prices stay anywhere near their current configuration surely there will be a good deal more such change in the future. Because we can't confidently forecast where relative prices will settle, we cannot know how much such change is 'optimal'. Therefore we can't be sure that some of it will not need to be reversed at some point. But the optimal amount of change is unlikely to be none at all. So we should not look to prevent change; we should look to make it cost as little as possible. In general, that means preserving flexibility and supporting adaptation.

Third, productivity is going to come back into focus, especially in sectors that are exposed to the rise in the exchange rate. Their prices will be squeezed, and their costs potentially pushed up by the demand of

the resources sector and related industries for labour. Surely maintaining viability will involve achieving significantly bigger improvements to productivity than we have observed in recent years.

Fourth, if we have to face structural adjustment, it is infinitely preferable to be doing it during a period in which overall income is rising strongly. If nothing else, in such an environment the gainers can compensate the losers more easily. Many other countries face major issues of economic adjustment in an environment of overall weakness.

Conclusion

At the risk of sounding like a broken record, the rise in Australia's terms of trade over the past five years is the biggest such event in a very long time. It reflects powerful forces at work in the global economy to which our country is more favourably exposed than most. It presents opportunities and challenges. With a large boost to income, we need to think about the balance between saving and spending, because we do not know the permanent level of the terms of trade. I argue for erring on the side of saving for the time being, and I think this is by and large what is happening so far. With a large change in relative prices, we should also expect to see a good deal of structural change in the economy. A careful response to that prospect is also needed, and no doubt your conference will examine such issues over the day ahead. I wish you well in your deliberations. ✕

⁵ I note that prices observed over the past year have exceeded, more or less continually, what had been assumed.

Reserve Bank Publications

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)

This series of papers is intended to make the results of current economic research within the Bank available for discussion and comment. The views expressed in these papers are those of the authors and not necessarily those of the Bank.

The abstracts of most RDPs and the full text of RDPs published since 1991 are available on the Bank's website.

Conference Volumes

Conference volumes have been published since 1993. The most recent titles are:

- *Reserve Bank of Australia 50th Anniversary Symposium*, July 2010
- *Inflation in an Era of Relative Price Shocks*, May 2010

- *Lessons from the Financial Turmoil of 2007 and 2008*, October 2008
- *The Structure and Resilience of the Financial System*, November 2007
- *Demography and Financial Markets*, October 2006
- *The Changing Nature of the Business Cycle*, October 2005
- *The Future of Inflation Targeting*, November 2004
- *Asset Prices and Monetary Policy*, November 2003

Other Publications

The Bank periodically produces other publications that may take the form of submissions to inquiries, surveys or consultation documents. Some recent examples include:

- *Submission to the Inquiry into Access for Small and Medium Business to Finance*, February 2011
- *Submission to the Inquiry into Competition within the Australian Banking Sector*, November 2010
- *Equity & Diversity Annual Report*, 2010
- *2009/10 Assessment of Clearing and Settlement Facilities in Australia*, October 2010
- *Submission to the Inquiry into Access of Small Business to Finance*, March 2010
- *Submission to the 16th Series Review of the Consumer Price Index*, March 2010
- *A Revised Interchange Standard for the EFTPOS System*, November 2009
- *Self-Assessment of the Reserve Bank Information and Transfer System*, September 2009

Recent Bulletin Articles

December Quarter 2010

Trends in Farm Sector Output and Exports
Developments in Utilities Prices
China's Steel Industry
The Repo Market in Australia
Domestic Market Operations and Liquidity Forecasting
Activity in Global Foreign Exchange Markets
Developments in Emerging Equity Markets
The Financial Position of Australian Unlisted Businesses

September Quarter 2010

Structural Change in the Australian Economy
Durable Goods and the Business Cycle
Economic Change in India
Ownership of Australian Equities and Corporate Bonds
Interpreting Market Responses to Economic Data
Australian Bank Capital and the Regulatory Framework
A Guide to the Card Payments System Reforms
Real-time Gross Settlement in Australia
The Impact of the Financial Crisis on IMF Finances

June Quarter 2010

Housing Turnover and First-home Buyers
Price-setting Behaviour – Insights from Australian Firms
Demography and Growth
Commercial Property and Financial Stability – An International Perspective
Banking Fees in Australia
Reform of the ATM System – One Year On
The Financial Crisis through the Lens of Foreign Exchange Swap Markets
The Impact of the Financial Crisis on the Bond Market

Recent Speeches

The State of Things, Glenn Stevens, Governor, March 2011

Changing Relative Prices and the Structure of the Australian Economy, Philip Lowe, Assistant Governor (Economic), March 2011

The Resources Boom, Glenn Stevens, Governor, February 2011

Some Current Issues in the Australian Economy, Philip Lowe, Assistant Governor (Economic), February 2011

Bank Funding and Capital Flows, Guy Debelle, Assistant Governor (Financial Markets), December 2010

Forecasting in an Uncertain World, Philip Lowe, Assistant Governor (Economic), December 2010

The State of Play in the Securitisation Market, Guy Debelle, Assistant Governor (Financial Markets), November 2010

The Challenge of Prosperity, Glenn Stevens, Governor, November 2010

Economic Developments, Ric Battellino, Deputy Governor, November 2010

Cross-currents in the Global Economy, Glenn Stevens, Governor, October 2010

Remarks to Finsia Financial Services Conference, Luci Ellis, Head of Financial Stability Department, October 2010

Financial Developments, Ric Battellino, Deputy Governor, October 2010

Financial Stability: Review and Response, Luci Ellis, Head of Financial Stability Department, October 2010

Monetary Policy and the Regions, Glenn Stevens, Governor, September 2010

The Development of Asia: Risk and Returns for Australia, Philip Lowe, Assistant Governor (Economic), September 2010

The Financial Situation Three Years On, Guy Debelle, Assistant Governor (Financial Markets), September 2010

Copyright and Disclaimer Notices

HILDA

The following Disclaimer applies to data obtained from the HILDA Survey and reported in the article 'Household Borrowing Behaviour: Evidence from HILDA' in this issue of the *Bulletin*.

Disclaimer

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

