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# Australian Banknotes: Assisting People with Vision Impairment

Kylie Springer, Priya Subramanian and Terence Turton\*

A key function of the Reserve Bank is to design and produce banknotes that meet the needs of all sections of the community. The Bank has consulted a wide range of subject matter experts and stakeholders to ensure that the next generation of Australia's banknotes reflects Australia's cultural identity, is secure and remains functional. One aspect of functionality is that the banknotes are accessible to people with vision impairment. This article outlines the work the Bank has undertaken to meet the needs of the vision-impaired community, from the paper decimal banknote series that was issued in 1966 through to the forthcoming next generation series of banknotes.

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## Introduction

The Next Generation Banknote (NGB) program was initiated by the Reserve Bank to upgrade the security features of Australia's banknotes so that they remain difficult to counterfeit. As part of the design process, the Bank must ensure that the banknotes are easily recognisable by the public, reflect Australia's cultural identity and can be used in machines for accepting or dispensing cash (such as automated teller machines (ATMs), self-service checkouts and vending machines).

Another key consideration in design is incorporating characteristics that assist people with vision impairment to recognise different banknote denominations. While current Australian banknotes already have some such features – including different sizes, contrasting colours and large denominational numerals – the NGB program provided an opportunity to consider additional enhancements to further assist those with impaired vision.

This article describes the features on Australia's banknotes designed to assist people with vision impairment, from the paper decimal banknote series that was issued in 1966 through to more recent work

by the Bank to introduce a new tactile feature on the forthcoming next generation series of polymer banknotes.

## The Vision-Impaired Community

Vision impairment encompasses a variety of conditions that may be present from birth or result from a range of factors including disease, injury or age-related degeneration of the eye. Vision impairment is broadly defined as a limitation in one or more functions of the eye, and can be measured in terms of visual acuity (the clarity or sharpness of vision) (Australian Institute of Health and Welfare 2007).

Normal visual acuity is measured by Vision Australia<sup>1</sup> as 6/6 and indicates what a person with normal vision can see on a distance-based visual acuity chart<sup>2</sup> from a distance of 6 metres (Vision Australia 2012b).<sup>3</sup> Low vision is measured as an acuity level of less than 6/18, which means that a person cannot see at 6 metres what someone with normal vision can see at 18 metres. The term 'legally blind' refers to a visual acuity of less than 6/60 in both eyes, or a field

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\* The authors are from Note Issue Department.

1 Vision Australia is a major national provider of blindness and low vision services in Australia.

2 Two examples of visual acuity charts are the LogMAR or Snellen charts.

3 Six metres is the equivalent of 20 feet, hence the term '20/20' vision.

of vision less than 20 degrees in diameter (Vision Australia 2012a).

Vision Australia estimates that there are 357 000 people in Australia who have low vision, with around 40 000 considered to be legally blind (Vision Australia 2012a). The most common causes of legal blindness are age-related macular degeneration, followed by glaucoma (Access Economics 2010).<sup>4</sup> Furthermore, these common causes of blindness are becoming increasingly prevalent in the community as the demographic and public health profile of the population changes.

Banknotes typically incorporate a number of different features to assist people with different types of vision impairment. Importantly, most of these features make it easier for all people to recognise the different denominations of banknotes, so that the entire community benefits from accessibility.

### Accessibility of Australian Banknotes

For many years, the Reserve Bank has been committed to ensuring Australia’s banknotes are accessible to all members of the community, including people who have vision impairment. In

this regard, a significant step was taken with the introduction of the paper decimal banknote series in 1966. This series featured denominations with different lengths and heights, and had distinguishing colours and large numerals. Feedback provided by the vision-impaired community prior to the introduction of the paper decimal \$100 banknote in 1984, however, suggested that the 5 mm length differential between denominations, used up to the \$50 banknote, was insufficient for accurate identification. As a result, the paper decimal \$100 banknote was designed to be 7 mm longer than the paper \$50 banknote (Table 1).

The polymer banknote series, introduced from 1992, provided an opportunity for the Bank to enhance accessibility of Australia’s banknotes resulting in the following features (see ‘Box A: Accessibility Features of Australia’s Banknotes’):

- *Colours:* Strong colour contrast between denominations was considered by representatives of the vision-impaired community to be a particularly important way to help people with low vision to distinguish between different banknote denominations. The contrast in colours between denominations was, therefore, strengthened.

**Table 1: Sizes of Australian Paper Decimal Series Banknotes**

	First issued	Length (mm)	Height (mm)
\$1	14 February 1966	140.0	70.0
\$2	14 February 1966	145.0	72.5
\$5	29 May 1967	150.0	75.0
\$10	14 February 1966	155.0	77.5
\$20	14 February 1966	160.0	80.0
\$50	9 October 1973	165.0	82.5
\$100	26 March 1984	172.0	82.5

Source: RBA

<sup>4</sup> Due to the large number of organisations that assist in representing the vision-impaired community in Australia, and the differences in definitions of what constitutes ‘blind’ versus ‘vision impaired’ or ‘vision loss’, the data and statistics that are made available on the vision-impaired community websites are not always consistent across the sources. A person with a vision impairment that can be corrected with prescription glasses would not be included in these statistics.

Box A

# Accessibility Features of Australia’s Banknotes

During the development of Australia’s current polymer banknote series, the Reserve Bank consulted with representative groups about features that could be used by people with vision impairment to recognise different banknote denominations. From

this consultation, it was concluded that banknotes with different lengths, strong colour contrasts and large bold numerals would best assist the vision-impaired community (Table A1).

**Table A1: Accessibility Features of Polymer Banknote Series**

Different lengths	Colour contrasts	Large, bold numerals
130 mm 		
137 mm 		
144 mm 		
151 mm 		
158 mm 		

Source: RBA

- *Large, bold numerals:* Another feature strongly endorsed by the vision-impaired community for those with partial sight was large and bold numerals that contrasted with the background on the banknote. Reflecting the importance of this feature, enhancements to the style of the numerals on the polymer series were applied.
- *Different sizes:* Different-sized denominations are particularly beneficial to people who are blind and cannot identify colour contrasts or bold numerals. Based on feedback from the vision-impaired community relating to the paper decimal \$100 banknote, the increase in length of each denomination in the polymer banknote series, commencing with the \$5 banknote, was changed from 5 mm to 7 mm.<sup>5</sup>
- *Guides:* Banknote measuring devices can be used by people with vision impairment to distinguish different-sized banknote denominations. Taking advantage of the size differentials of the 1992 polymer banknote series, the Bank developed a banknote measuring device in conjunction with Blind Citizens Australia (BCA) (see 'Box B: Banknote Measuring Device'). Development and production costs were fully funded by the Bank and the device has been distributed for free through BCA.

In addition to the initiatives outlined above, the Bank also investigated other possibilities for inclusion on the first polymer banknote series that were ultimately ruled out. A critical point for consideration in tactile features is their durability (so that they can always be properly identified), along with their impact on the storage and processing of banknotes by machines. One of the possibilities considered was a tactile feature created through the application of raised-ink (intaglio).<sup>6</sup> A critical drawback of this feature was that it was likely to degrade significantly over the lifetime of the banknote, particularly with the polymer banknotes which were expected to

last much longer than their paper counterparts. Following an examination of new and worn test banknotes with prototype tactile features, most representatives of the vision-impaired community expressed the view that a tactile feature should not be included on Australian banknotes unless better durability could be achieved.

Other features considered for inclusion, but ruled out at that time, were notched-edge and clipped-corner features. While these features offer obvious advantages to people with vision impairment, it was not possible to produce them accurately and cost-effectively in high volumes with the available production techniques.<sup>7</sup> In addition, there were concerns that these features could diminish the durability of a banknote as well as cause problems with banknote processing, accepting and dispensing equipment.

## The Next Generation Banknote Program

Following the issue of the current polymer banknote series, the Bank continued to conduct research into new anti-counterfeiting technologies, eventually resulting in the establishment of the Next Generation Banknote program in 2007 and the public announcement in 2012 that new banknotes would be issued within several years (RBA 2012). The primary purpose of upgrading Australia's banknotes is to improve their security; however, this program has also provided an opportunity to explore how banknote accessibility can be further enhanced, including the possible addition of a tactile feature. The Bank's choice of feature – embossed 'bumps' for people to feel the difference between denominations – has been informed by extensive research and consultation.

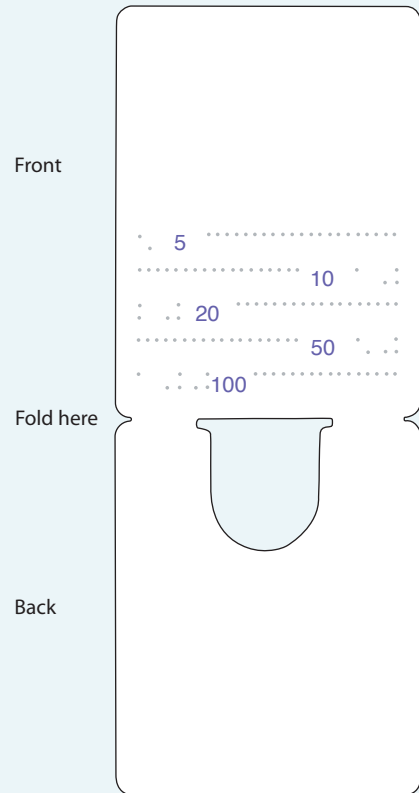
5 Lengths of the 1992 polymer series banknotes are: \$5 – 130 mm; \$10 – 137 mm; \$20 – 144 mm; \$50 – 151 mm; \$100 – 158 mm. The height of all denominations is 65 mm.

6 Intaglio printing is a process that involves applying ink that has been pressed into the recesses of an etched or engraved plate onto the destination surface, resulting in raised print.

7 One example of why it is difficult to produce banknotes with notched edges or clipped corners relates to the process of cutting individual banknotes from the sheets on which they are printed. After all of the features and artwork have been printed, the sheets, which can hold up to 45 banknotes, are cut into individual banknotes using guillotines. This process helps to minimise waste. At present, the banknote printing industry does not have the technology or equipment that can cut the sheets into individual banknotes with notched edges or clipped corners accurately and without significant waste, and, therefore, noticeable costs.

## Box B Banknote Measuring Device

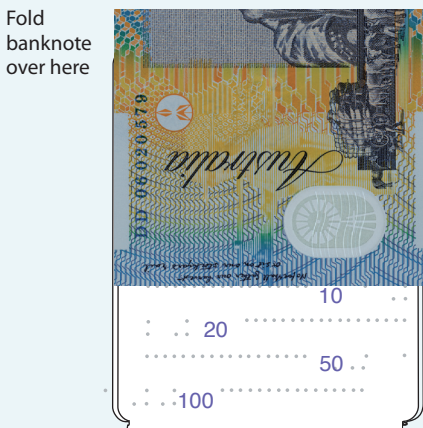
**Figure 1: Banknote Measuring Device**



1. Plastic banknote measuring device that folds to fit easily into a standard wallet or purse.



2. The short edge of the banknote is placed in the fold of the measuring device, ready to be folded around the device.



3. Braille numerals align with the different lengths of each denomination.

Source: RBA

## International literature

As part of the Bank's research into improving accessibility, key studies and bodies of research conducted by other relevant overseas agencies were reviewed.

One of the earlier comprehensive studies of banknote design for the vision impaired was conducted by the National Research Council (NRC) in the United States (National Research Council 1995). The study examined how banknote issuing authorities provided assistance to the vision-impaired community to distinguish between banknote denominations. It identified varying banknote denomination sizes, large high-contrast numerals and different banknote colours for each denomination as features that the vision-impaired community would find useful. The NRC concluded that varying banknote sizes by denomination was the most effective feature to assist the vision-impaired community, but this was tempered by the observation that it was also the most costly to implement.<sup>8</sup>

Another US study, prepared by ARINC Engineering Services for the Bureau of Engraving and Printing, outlined options that could assist people with vision impairment to recognise different US banknote denominations (ARINC Engineering Services 2009). The study asked blind and low vision participants to distinguish different banknote denominations, including some banknotes from other countries that contained a mix of features. It found that high-contrast numerals made it quicker to distinguish between denominations, and that over 50 per cent of participants considered that different denomination sizes would help them distinguish banknotes, with blind participants being particularly receptive to the idea. It was also noted that as the participants became more familiar with the accessible features on banknotes from

other countries, their accuracy with distinguishing different banknotes improved.

In addition to the merits of high contrast numerals and different-sized banknotes, the ARINC study also reported results related to other accessible features:

- *Printed intaglio dots*: The banknotes tested with this feature achieved high accuracy when the banknotes (and the feature) were new, with 84 per cent of participants distinguishing denominations correctly. However, when using worn banknotes, accuracy decreased to only 49 per cent. The study concluded that the 'ease of use in transaction scenarios would therefore decrease as the features experience wear from circulation' (ARINC Engineering Services 2009, p 88).
- *Printed intaglio bars*: The banknotes tested with this feature achieved high accuracy when they were new, with an average of 85 per cent of participants successfully distinguishing denominations. As with the raised dots, when using worn banknotes, the accuracy decreased to only 42 per cent on average.
- *Notches cut into the top and bottom edges*: This feature also had high accuracy with an average of 89 per cent of participants correctly distinguishing denominations. In this case, it was a prototype feature and worn samples were not reported on.
- *Different sizes*: The banknotes with the most distinct size differences were distinguished most quickly during the usability test.

In 2009, De Nederlandsche Bank published the results of a comprehensive study into banknote design features for the vision impaired (de Heij 2009). The study considered a number of categories of vision impairment (colour blind, partially sighted and blind). Varying the lengths of banknote denominations was noted to be an effective method for the blind to distinguish between denominations. The study also observed a preference by the blind community for maintaining a common banknote

<sup>8</sup> This cost relates mainly to the alterations needed for all cash handling equipment in the community to accommodate a shift to denominations with different sizes.



height, in conjunction with increasing denomination lengths.

The Bank of Canada has also conducted considerable research into banknote features for the vision-impaired community (Lederman and Hamilton 2002; Samuel 2010). A variety of options were investigated including different-sized banknotes, clipped corners, tactile features, handheld readers and design enhancements such as larger numerals and stronger colour contrast between denominations.

The Bank of Canada concluded early in its research that varying the sizes of different banknote denominations, while common in many industrialised countries, would substantially increase the cost of handling banknotes for businesses and individuals. Similarly, clipping corners was also judged to cause issues for processing and assessing banknote quality in circulation. These two options were therefore ruled out and the Bank of Canada concentrated on designing an electronic reader and developing a raised tactile feature.<sup>9</sup> The reader was introduced in 1989 and an embossed tactile feature was included on the Canadian banknote series from 2001.

Another relevant body of work was conducted by the Federal Reserve Bank of St. Louis, which highlighted the difficulties a banknote issuer faces when attempting to conduct a cost-benefit analysis of including accessible features on banknotes. In this study, it was noted that benefits accrue to a diverse group and at very different levels. For example, some low-cost features that assist the vision-impaired

community (colours and numerals) also assist normal-sighted people to distinguish banknotes. On the other hand, the high-cost features (sizes and tactile features) that benefit the people with vision impairment may be extremely costly to implement for many other stakeholders (Williams and Anderson 2007).

### International experience

Supplementing the review of international literature, the Reserve Bank sought information from 23 central banks about the features included on their banknotes to assist people with vision impairment with distinguishing denominations and the performance, efficacy and durability of those features (Table 2).

The feedback suggested some common themes. First, different sizes, supported by large, high-contrast numerals, were noted as key features used by people with vision impairment, even for the currencies that also had a tactile feature. Second, intaglio tactile features are popular as most issuing authorities are familiar with the technology but they often do not last well in circulation, reducing the degree of reliance the vision-impaired community can place on the feature once the banknotes become worn. Finally, the feedback indicated that it is desirable to have more than one feature to accommodate the wide range of vision impairments that exist. It was also noted by a number of central banks that there was not a strong preference within the vision-impaired community for the provision of a mechanical banknote reading device.

**Table 2: Countries with Accessibility Characteristics on Banknotes<sup>(a)</sup>**

Countries	Size	Colour	Numeral size	Intaglio feature	Emboss feature	Device
Australia	✓	✓	✓	–	–	✓
Other	18	21	22	19	1	4

(a) Information was sought from 23 central banks as of July 2014  
Source: RBA

<sup>9</sup> Handheld electronic banknote readers are made available free of charge and distributed by a registered charity, CNIB, to blind individuals on behalf of the Bank of Canada.

## Consultation with the vision-impaired community

The Bank also contacted representative groups and peak bodies of the vision-impaired community to assess how the accessibility features of the current banknotes are regarded and their appetite for additional features. In total, the Bank consulted with 10 representative bodies of the vision-impaired community<sup>10</sup> and conducted two separate focus group studies covering a range of age groups and vision-impairment types.

These consultations confirmed that Australian banknotes do, in fact, have accessibility characteristics that are valued by people with vision impairment. Specifically, the consultations confirmed that the incremental sizing of Australian banknote denominations, together with the use of the banknote measuring device, considerably assisted with denominating banknotes.

Notwithstanding the current high level of accessibility of Australian banknotes, the feedback also highlighted the challenges that people with vision impairment face when checking their banknotes in fast-paced point-of-sale environments, such as supermarkets or fast-food outlets. In addition, many people felt heightened vulnerability when using the banknote measuring device or other commercial devices such as smart phone applications in public spaces. In this respect, the inclusion of a durable, tactile feature on Australian banknotes, allowing faster and more discrete recognition of a banknote, would be welcomed by the vision-impaired community.

## Assessment of Additional Tactile Features for Australia's Banknotes

In light of this research, the Bank concluded that accessibility of the next generation of Australia's banknotes could be enhanced by the addition of a

tactile feature. It therefore undertook an investigation of alternative tactile features to assess their suitability for inclusion on the NGB series.

Information from other central banks indicated that only two types of tactile features are currently used on circulating banknotes. One is the traditional raised-print intaglio feature that is printed onto the surface of the banknote, and the second is a pattern of 'bumps' stamped or embossed into the banknote. The embossed bump is a relatively new feature for polymer banknotes and is only used on a very small number of banknotes elsewhere in the world. In fact, of the 23 other central banks that the Reserve Bank consulted with about tactile features, only one (Canada) had the embossed bumps on their banknotes.

In addition to these two features, the Bank investigated other features that had not yet been commercialised or were still under development. Due to lead times associated with bringing these features to the point of being ready for application, however, a decision was made to focus on the intaglio and emboss features, which had already been tested in circulation.

To test the viability of the intaglio and emboss features for the NGB series, the Bank established an evaluation criteria and a regime of tests was conducted to measure each feature's performance relative to these criteria.

### Evaluation criteria

Ideally, any new feature being considered would need to satisfy a number of criteria:

- *Efficacy*: It must consistently meet its purpose of helping the vision-impaired community distinguish banknote denominations with higher accuracy and greater speed.
- *Durability*: It must remain functional over the life of the banknote.
- *Security*: It must not compromise the security features of the banknote.

<sup>10</sup> These include Able Australia, Association for the Blind of WA, Blind Citizens Australia, Association of Blind Citizens of NSW, DeafBlind Association (NSW), Guide Dogs NSW/ACT, Retina Australia, The Royal Society for the Blind, Vision Australia and Vision 2020 Australia.

- *Production:* The Bank and its suppliers must have the capability to produce the feature on the banknote in a consistent, reliable and efficient manner. Production of a tactile feature should not adversely affect the other printing processes.
- *Circulation impact:* Any new feature should not impose significant costs on other stakeholders in the banknote life cycle, including the general public and industry groups.

## Efficacy

Two focus group studies conducted by the Bank served as a way to test the efficacy of the two tactile features under consideration.

The primary objective of the first focus group study was to assess the efficacy and designs of the tactile features being considered. To take into account the likely impact of wear in circulation, the focus group participants were shown both pristine and worn samples of each feature.

Feedback from this study indicated that the traditional application of an intaglio tactile feature was not favoured by the vision-impaired community as an accessible feature, which is consistent with the feedback from the consultations conducted relating to the current polymer banknote series. This also aligned with international experience, where intaglio features were considered not to function well once in circulation. The emboss feature, however, was viewed favourably by the focus groups.

Over 80 per cent of participants in the first study were able to find the embossed tactile feature on the test banknotes quickly and easily, and concluded that this feature was preferred over the intaglio feature (for pristine and worn banknotes). These results were consistent with the positive feedback on the embossed tactile feature on Canada's new polymer banknotes.

Participants from the first focus group were also shown different tactile design approaches. One was based on different shapes for each denomination, and another was a scalar system, where the number of dots or characters increased per denomination. More

than two-thirds of focus group participants strongly preferred the scalar-based tactile feature design.

The second focus group study sought input on an optimal scalar-based tactile design. Focus group participants in this study were presented with two scalar-design options based on:

1. Increasing numbers of single dots.
2. Increasing numbers of rows of dots.

A clear majority of focus group participants (over 85 per cent) preferred increasing the number of single dots, primarily due to the even spacing of the tactile characters. There was also concern that participants who were familiar with braille could be confused by two rows of dots close together, as in the second option, by reading them as a single character rather than individual rows.<sup>11</sup>

## Durability

The Bank also conducted extensive tests to assess the durability of both tactile features being considered.

To test durability, banknote samples with the two potential tactile features were subjected to a range of chemical, physical and environmental durability tests to assess the resistance of the feature to circulation wear (see 'Box C: Critical Durability Tests of Tactile Features'). The intaglio feature was significantly less durable than the emboss feature, performing unsatisfactorily across the range of tests (Table 3). This result confirmed the experience of most central banks.

Some durability deficiencies of the emboss feature were observed. However, the nature of the deficiencies and the expectation that they were only likely to be manifested in extreme environments suggested that the embossed feature would be suitable in most circumstances for use on Australian banknotes. Testing also highlighted the importance of including a suite of features to assist the vision-impaired community to reduce their reliance on any one feature.

<sup>11</sup> A full braille cell is made up of two columns of three dots positioned close to each other.

Box C

## Critical Durability Tests of Tactile Features

A comprehensive range of physical and chemical durability tests were conducted to assess the performance of potential tactile features in circulation. A digital micro gauge was used to assess the change in height of the tactile feature after each of the durability tests listed in the Table C1 below,

with the exception of the test for crumple resistance where, due to the complexity of the folds and crumples that are introduced to the feature, the loss in the tactile feel of the feature needs to be assessed manually.

**Table C1: Critical Durability Tests of Tactile Features**

Test	Description
Chemical resistance	Evaluates the resistance of the tactile elements and security features to chemical exposure. A range of chemicals that are commonly used in household and industrial applications are applied to the banknote.
Crumple resistance	Evaluates the resistance of the banknote to the folds and crumpling that are likely to occur during the lifetime of a banknote in circulation. A specialised ‘crumpling’ device is used that simulates complex folds and crumples.
Rub resistance	Evaluates the resistance of the tactile feature to abrasion using a controlled rub test where an 8 mm spot region containing the feature is continuously rubbed for 100 rub cycles.
Soil and wear	Evaluates the soil and wear resistance of the tactile feature using a specialised soil and wear tumbling apparatus that simulates likely wear in circulation.
Taber abrasion	Evaluates the abrasion resistance of the tactile feature by subjecting the feature to abrasion caused by a combination of aluminium oxide impregnated rubber wheels moving in a circular manner and the weight of the mechanical arms that are connected to these wheels.
Accelerated oven ageing	Evaluates the durability of the tactile feature to heat using a specialised oven where the feature is placed at an elevated temperature for a predetermined time. This simulates circumstances where a banknote is exposed to high heat.
Machine wash	Evaluates the progression of wear of the tactile feature during normal circulation using a specialised washing machine where the banknote is subjected to various combinations of wash cycles and temperatures.

Source: RBA

**Table 3: Results of Durability Testing of Tactile Features**

	Intaglio	Emboss
Chemical resistance	x	✓
Crumple resistance	x	✓
Rub resistance	x	✓
Soil and wear	x	✓
Taber abrasion	x	✓
Accelerated oven ageing	x	x
Machine wash	x	✓

Source: RBA

### Security

The intaglio and emboss features were assessed at various stages of research, development, design and testing to ensure that their inclusion on a banknote did not compromise the security features of the banknote at any point. Assessment by the Bank’s scientists, designers and Note Printing Australia provided reassurance that an appropriately designed tactile feature could be incorporated into the new design without affecting other security elements of the banknote.

### Production

A number of trials were conducted to assess the ability to produce both of the tactile features. Although the intaglio and emboss features had been produced on other overseas banknotes (and intaglio ink is already present on the portraits and numerals on Australian banknotes), it was essential to confirm that these features could be produced in tandem with the security features and designs that will appear on the next generation of Australian banknotes. The production trials indicated that the intaglio and emboss features could be produced consistently on the NGB series.

### Circulation impact

It is estimated that in Australia more than 35 000 ATMs, 8 000 self-service checkouts, 200 000 gaming machines and 250 000 vending machines will

be affected to some extent through the upgrade of Australia’s banknotes, including the addition of a new tactile feature for the vision-impaired community (Kim and Turton 2014). The Bank is therefore working closely with the industry to minimise this impact.

### Preferred Approach

In light of the research, evaluation and testing conducted by the Bank, the next generation design of Australian banknotes will include different numbers of embossed bumps on each denomination to assist people with vision impairment to distinguish between banknotes.

The accessibility features that are currently used – different-sized denominations, strong colour contrasts and large bold numerals – will also be retained.

### Conclusion

The vision-impaired community has expressed a strong and consistent preference to retain the existing Australian banknote characteristics designed specifically to assist people with impaired vision – size differentials, strong colour contrasts and large bold numerals – as part of the next generation banknote design. In addition, there is substantial support for the inclusion of some form of tactile feature, that would reduce the need to use a banknote measuring device at the point of sale. Focus group feedback confirmed that this preference was sustained even with potential degradation of the tactile feature over time.

The input of the vision-impaired community, together with an extensive review and testing of two tactile features, has resulted in the Bank deciding to retain the existing accessibility features as well as add a new embossed tactile feature into the design of the next generation of Australia’s banknotes. The Bank will also continue to support the production of the banknote measuring device. ❖

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# The Economic Performance of the States

Sam Nicholls and Tom Rosewall\*

Over the past decade, the mining investment boom in resource-rich states accounted for much of the difference in the pace of economic growth across states. More recently, there has been a gradual rebalancing of growth, though the transition has been uneven. Housing market activity has picked up and this has been accompanied by stronger consumption growth, particularly in New South Wales and Victoria. State labour market conditions have generally softened and the unemployment rate is elevated in all states.

## Introduction

Economic growth across Australia's states and territories has been uneven for much of the past decade. The mining investment boom underpinned growth in the resource-rich states, while growth in the non-mining parts of the economy and those states less exposed to mining has been more subdued. Business investment in the resource-oriented states has declined from its peak in 2012/13 and this is expected to continue over coming years. At the same time, supported by low interest rates, consumption growth and housing market activity have strengthened, particularly in New South Wales and Victoria. These developments have brought about more balanced growth across the country and are also reflected in trends in state labour markets and population movements. This article analyses these differences in economic conditions across the states in more detail.

## Economic Growth across the States

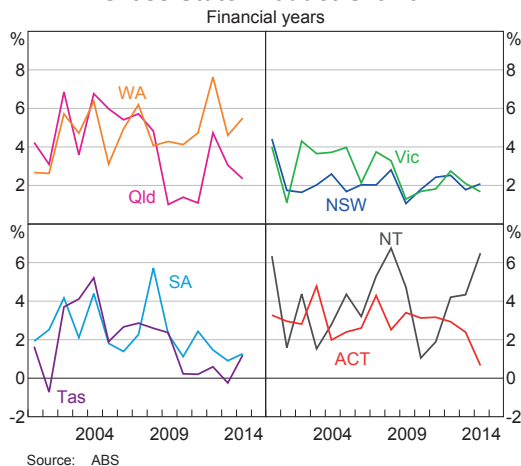
The mining boom has made a substantial contribution to Australian economic growth over the past decade. Investment in the mining sector grew strongly as businesses responded to the historically high level of commodity prices. As resource projects have gradually been completed over recent years and few new projects have commenced, mining

investment has started to decline, though growth of mining activity overall has remained firm supported by an increase in resource exports. In contrast, growth in the non-mining part of the Australian economy has been subdued for several years, in part due to the high level of the exchange rate, while public spending growth has also declined. Nevertheless, growth in non-mining activity has picked up slightly in the past year, supported by low interest rates and the depreciation of the Australian dollar. Dwelling investment has strengthened and there has been a modest increase in the rate of growth in consumption.

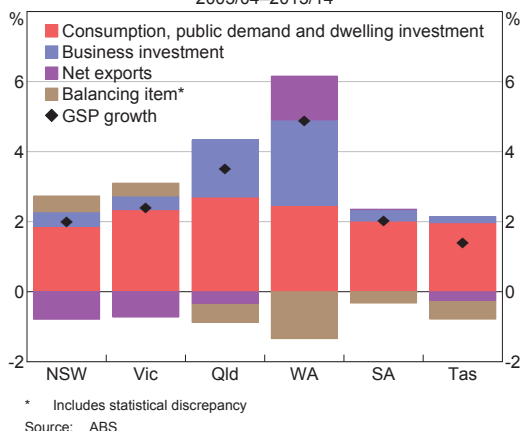
The contribution to economic growth from the mining boom has been most pronounced in Western Australia and Queensland, which have the highest concentration of mineral resources. Mining activity has made a smaller contribution to growth in other states, both directly through mining operations and supporting business services, and indirectly through positive income effects such as higher government revenues. Gross state product (GSP), which measures the level of state production by adjusting spending for both interstate and overseas trade, has grown at an average annualised rate of close to 5 per cent in Western Australia and 3½ per cent in Queensland since 2003/04, compared with 2½ per cent, or less, in the other states (Graph 1 and Graph 2).

\* The authors are from Economic Analysis Department.

**Graph 1**  
**Gross State Product Growth**

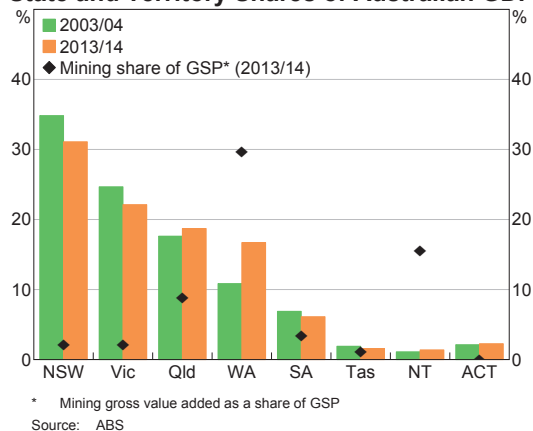


**Graph 2**  
**Contributions to Average Annual GSP Growth**  
2003/04–2013/14



As a result of the strong growth in Australia's mining sector, the resource-rich states now account for a larger share of the Australian economy. Western Australia's share of national GDP has grown to 17 per cent, compared with a share of 11 per cent in 2003/04 and a share of the national population of 11 per cent (Graph 3; see Table A1 for summary statistics of state size). Queensland's share of the national economy has also increased over this period, though to a lesser extent, reflecting the smaller role of mining in the state. Although the Northern Territory's share of the national economy remains small in absolute

**Graph 3**  
**State and Territory Shares of Australian GDP**



terms, it has increased by around a quarter over the past decade due to strong growth in its relatively large mining and construction sectors.

Growth in the non-mining part of the Australian economy has been subdued for several years. Because the mining boom was associated with a significantly higher exchange rate, trade-exposed sectors such as manufacturing and tourism, as well as parts of the non-mining business services sector, have faced challenging conditions. Against the backdrop of subdued growth in the non-mining economy, there has been little growth in non-mining business investment over recent years. Differences in state industry composition mean that the impact has been varied across the states. For example, South Australia and, to a lesser extent, Victoria and Tasmania have been more exposed to the weakness in the manufacturing sector (see Table A3 for industry composition by state). Nevertheless, the depreciation of the Australian dollar since 2013 has helped improve the competitiveness of trade-exposed sectors and there are tentative signs that growth in some of these sectors has improved.

Public demand growth has slowed across most states in recent years as both federal and state governments seek to improve their budget positions. The public sector contribution to state growth has been particularly weak in Queensland



and Tasmania in the past few years. In addition to weak public sector revenues associated with below-average economic growth in many states, the fall in commodity prices over recent years has significantly reduced royalties for some state governments and company tax receipts for the federal government. Governments have chosen to offset these revenue losses through fiscal restraint on current expenditures, such as transfer payments to households, and partly by increasing borrowing over the next few years.

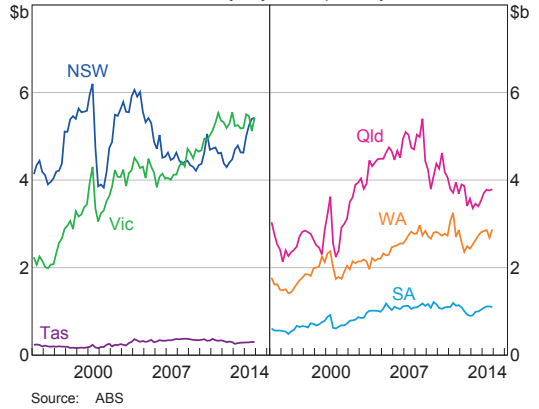
Aggregate dwelling investment has grown strongly since mid 2013. Although the low level of interest rates is supporting activity in all markets, growth in dwelling investment by state has been quite varied, in part due to differences in the pace of housing price growth and population growth (Graph 4). The recent pick-up in activity has been most pronounced in New South Wales and follows several years of subdued activity in its housing sector. Dwelling investment has also strengthened in the resource-rich states over the past two years. Dwelling investment in Victoria has been at a relatively high level since 2010, supported by strong growth in apartment building activity, particularly in inner Melbourne. Building approvals data point to further growth in most states over coming quarters (Graph 5).

Consumption growth has strengthened in many states over the past two years, following a period of subdued growth. Consumption has been supported by low interest rates and the strengthening in housing market activity, both directly through increased demand for household goods and also through the boost to household wealth from the sizeable increases in housing prices. Indeed, consumption growth over the past year has been firm in New South Wales and Victoria, which have experienced the strongest housing markets and, relatedly, have had less direct exposure to the contraction in mining investment (Graph 6). Consumption growth has picked up in South Australia and Tasmania. In contrast, consumption growth has moderated in the resource-rich states

**Graph 4**

**Dwelling Investment**

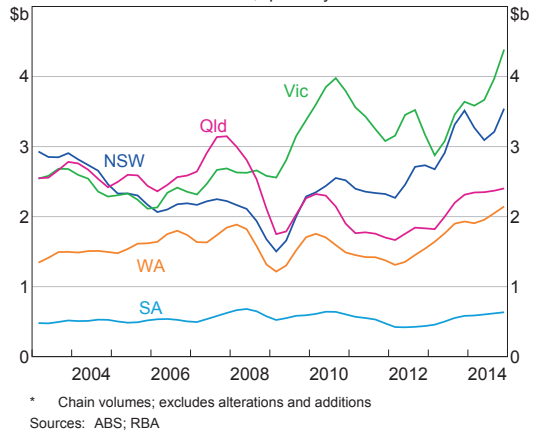
Seasonally adjusted, quarterly



**Graph 5**

**Residential Building Approvals\***

Trend, quarterly

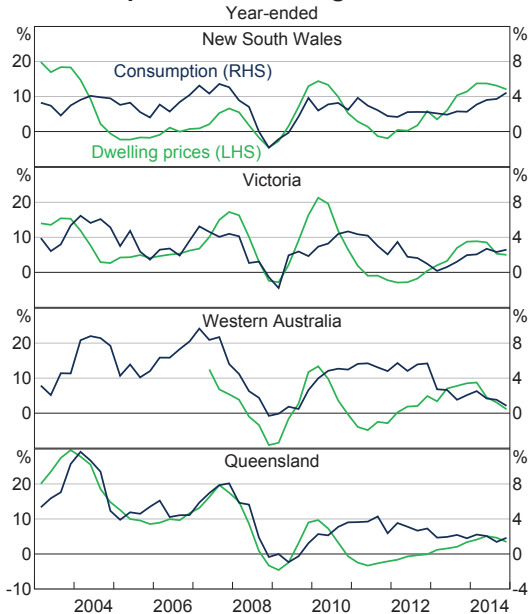


over the past two years, following a period of strong growth on the back of the mining boom, particularly in Western Australia.

Across the whole economy, consumption has been growing faster than household incomes, and the saving ratio has declined gradually over the past couple of years following a significant increase in the ratio from the mid 2000s. While all states experienced a rise in gross saving rates over this period, the largest increases were in Queensland and Western Australia (Graph 7). These two states were also the main beneficiaries of the rise in household income growth that resulted from strong growth of

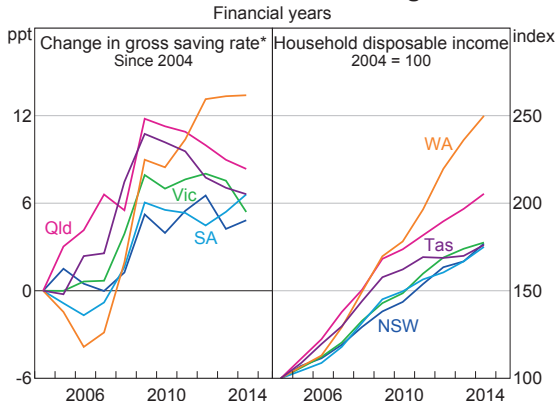
employment and wages in the resources sector. This is consistent with the possibility that households viewed the boost to their income from the resources investment boom as temporary and responded by raising the rate at which they save in order to smooth their consumption over time.

**Graph 6**  
**Consumption and Dwelling Price Growth\***



\* Consumption is real household final consumption expenditure; dwelling prices are nominal median dwelling prices  
Sources: ABS; Australian Property Monitors

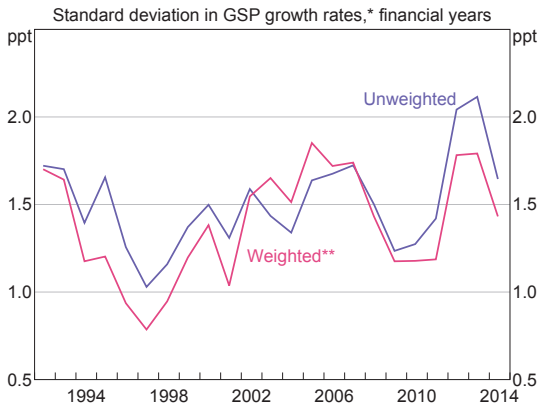
**Graph 7**  
**Household Income and Saving Rate**



\* Gross saving includes depreciation  
Sources: ABS; RBA

The decline of mining investment in the resource-rich states and the pick-up of dwelling investment and consumption in some other states have brought about more balanced growth across the country relative to recent years. A summary measure of the degree of variation in economic growth across the states is the standard deviation in GSP growth rates. According to this measure, variation in economic growth has declined recently to be a little above its long-run average (Graph 8).

**Graph 8**  
**Variation in State Economic Growth Rates**

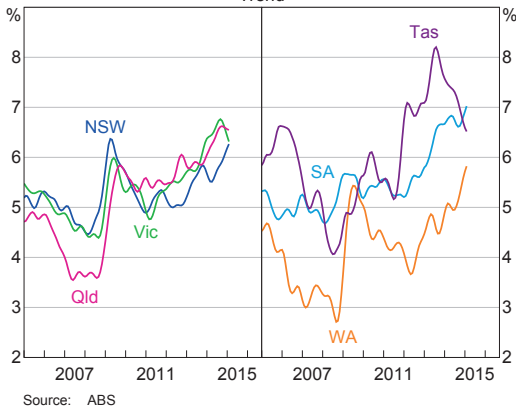


\* Two-year moving average, excludes territories  
\*\* Weighted by GSP  
Sources: ABS; RBA

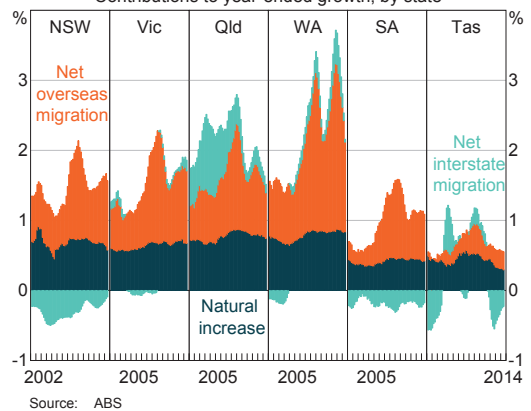
## Labour Markets and Population Growth

Labour market conditions have weakened across all states over recent years. Most states have recorded an increase in the number of people employed, but this has been insufficient to offset growth in the size of the labour force. As a result, unemployment rates are elevated in all states (Graph 9). Differences in labour force growth by state partly reflect marked changes in population growth rates in recent years, though overall population growth remains strong in Australia. The variation in state unemployment rates has declined recently, to be well below its average level since 2000 (Graph 10).

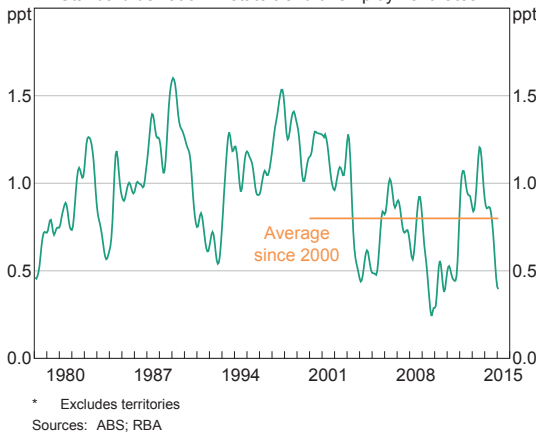
**Graph 9**  
**Unemployment Rates**  
Trend



**Graph 11**  
**Population Growth**  
Contributions to year-ended growth, by state



**Graph 10**  
**Variation in State Unemployment Rates**  
Standard deviation in state trend unemployment rates\*



Western Australia had the lowest unemployment rate of all the states for most of the past decade, though the rate has increased over the past three years as growth in the labour force outpaced strong employment growth. Western Australia maintains the highest rate of population growth in the country, though growth has slowed somewhat in both of the resource-intensive states as mining investment started to decline (Graph 11). Employment growth in Queensland has been weak across several industries over the past few years and the unemployment rate has remained relatively elevated compared with the other large states.

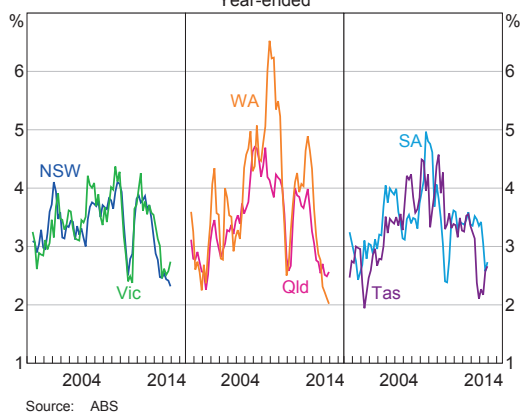
In contrast with the resource-intensive states, population growth has picked up in New South Wales and Victoria over recent years, underpinned by net overseas migration. At the same time, employment has been growing at a modest pace in New South Wales supported by increased hiring in household and business services, and more recently in the construction sector. Employment growth in household services has also been strong in Victoria over recent years but broadly steady in several other sectors. The unemployment rate in New South Wales and Victoria has increased by around 1 percentage point since 2011 to be 6¼ per cent in trend terms.

In contrast to the upward trend in the unemployment rate in the other states, the unemployment rate in Tasmania has declined significantly from its recent peak of over 8 per cent in mid 2013, to be around 6½ per cent. Population growth remains relatively weak in both Tasmania and South Australia, in part due to ongoing net outward migration to the other states.

Wage growth in both the public and private sectors has eased substantially across all states as labour market conditions softened. The impact of the mining investment cycle has been particularly marked in Western Australia. Following several years of sustained wage growth above the national average, private sector wages growth in Western

Australia declined sharply after 2012, to reach the slowest pace of growth in the country (Graph 12). Wage growth across all states is at, or around, its slowest pace in decades and differences across states are minimal.

**Graph 12**  
**Private Wage Price Index Growth**  
Year-ended



## Conclusion

The mining boom has made a substantial contribution to Australian economic growth over the past decade. Although mining activity has contributed to growth in all states, the effects have been most pronounced in resource-rich states. This has influenced differences in state-based labour market outcomes and population growth rates. Mining investment has started to decline. Growth in the non-mining economy has improved slightly following several years of subdued activity supported by a strengthening in dwelling investment and a pick-up in consumption. These developments have brought about more balanced growth across the country. ✖

## Appendix A

### Indicators of State Size, Growth and Industry Composition

**Table A1: Relative Size of States**  
Share of Australia, 2013/14, per cent

	NSW	Vic	Qld	WA	SA	Tas
Gross state product	31	22	19	17	6	2
Population <sup>(a)</sup>	32	25	20	11	7	2
Employment <sup>(a)</sup>	31	25	20	12	7	2
Exports <sup>(b)</sup>	19	12	18	43	5	1

(a) As at June 2014

(b) Gross exports of goods and services

Source: ABS

**Table A2: GSP Growth**

Chain volumes, average annual growth rate, per cent

	NSW	Vic	Qld	WA	SA	Tas	Australia
1989/90–2003/04	2.8	3.0	4.5	4.4	2.5	2.3	3.3
2003/04–2012/13	2.0	2.5	3.7	4.8	2.1	1.5	2.9
2012/13–2013/14	2.1	1.7	2.3	5.5	1.3	1.2	2.5
Per capita							
1989/90–2003/04	1.9	2.2	2.5	2.8	2.0	1.9	2.1
2003/04–2012/13	0.8	0.9	1.4	2.2	1.2	0.8	1.2
2012/13–2013/14	0.6	-0.2	0.6	2.6	0.4	0.9	0.8

Source: ABS

**Table A3: Industry Share of State Production<sup>(a)</sup>**

2013/14, per cent

	NSW	Vic	Qld	WA	SA	Tas	Aus
Agriculture, forestry and fishing	1	3	2	3	5	8	2
Mining	2	2	9	30	4	1	8
Manufacturing	7	7	6	5	8	7	6
Electricity, gas, water and waste services	2	3	3	2	4	5	3
Construction	5	6	10	12	7	6	8
Wholesale trade	4	5	5	3	4	3	4
Retail trade	5	5	5	3	5	6	4
Transport, postal and warehousing	5	5	5	5	5	6	5
Public administration and safety	5	4	6	3	6	6	5
<b>Business services</b>	<b>30</b>	<b>27</b>	<b>18</b>	<b>14</b>	<b>19</b>	<b>15</b>	<b>23</b>
Information media and telecommunications	4	4	2	1	2	3	3
Financial and insurance services	12	10	6	4	7	6	8
Rental, hiring and real estate services	3	3	3	2	2	2	3
Professional, scientific and technical services	7	8	5	5	5	3	6
Administrative and support services	3	3	2	3	3	2	3
<b>Household services</b>	<b>17</b>	<b>17</b>	<b>16</b>	<b>10</b>	<b>19</b>	<b>21</b>	<b>16</b>
Accommodation and food services	3	2	2	1	2	3	2
Education and training	5	5	4	3	5	7	5
Health care and social assistance	6	7	7	4	9	9	6
Arts and recreation services	1	1	1	0	1	1	1
Other services	2	2	2	1	2	2	2
Other <sup>(b)</sup>	17	16	15	11	15	15	15

(a) Gross industry value added as a share of gross state product

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

Source: ABS



# Insights from the Australian Tourism Industry

Corrine Dobson and Karen Hooper\*

Conditions in the tourism industry mirror many of the broader economic trends observed in the rest of the economy because tourism expenditure is discretionary and, like all trade-oriented industries, the tourism industry is exposed to developments in overseas markets and movements in the exchange rate. Over recent years, the Australian tourism industry has experienced challenging conditions. However, the fundamental conditions facing the industry have become more favourable, supported by improved economic conditions in key North Atlantic markets and the depreciation of the Australian dollar, as well as continued strong growth in tourism exports to China. This article examines recent developments in Australia's tourism industry and how these relate to broader economic conditions.

## Introduction

Over recent years, the Australian tourism industry has experienced difficult demand conditions, reflecting a combination of factors including the high exchange rate, subdued economic conditions in key export markets, a slower pace of growth in spending by domestic households and a downturn in business travel following the peak in the resources investment boom in mid 2012. Through this period, strong growth in the number of Chinese travelling overseas has played an important role in bolstering growth in Australia's leisure tourism exports. The outlook for tourism exports to China remains strong and the fundamental conditions facing the Australian tourism industry appear to be more favourable, supported by improved conditions in key markets in the North Atlantic economies and the depreciation of the Australian dollar, which is expected to benefit both the domestic and export leisure tourism markets. Liaison suggests these factors have lifted sentiment within the tourism industry.

Conditions in the tourism industry mirror many of the broader economic trends observed in the rest

of the economy because tourism expenditure is discretionary and, like all trade-oriented industries, the tourism industry is exposed to developments in overseas markets and movements in the exchange rate. For these reasons, tourism expenditure provides a useful barometer of conditions facing households both domestically and overseas. Furthermore, travel by the business sector, which is also serviced by the tourism industry, is highly cyclical, reflecting changes in business conditions. The tourism industry also makes an important direct contribution to the Australian economy.<sup>1</sup> According to the ABS Tourism Satellite Account, in 2013/14 the industry accounted for 2.7 per cent of Australia's GDP and employed directly around half a million workers, contributing 4.6 per cent of Australia's total employment.

This article draws on available data and on perspectives from the Bank's business liaison program to discuss recent developments in Australia's tourism industry and how these relate to broader economic conditions.<sup>2</sup>

\* The authors are from Economic Analysis Department.

1 For earlier analysis, see Hooper and van Zyl (2011). The Productivity Commission has recently completed a research project to examine the trends, drivers and barriers to growth in Australia's international tourism industry (PC 2015).

2 For further details of the business liaison program, see RBA (2014).

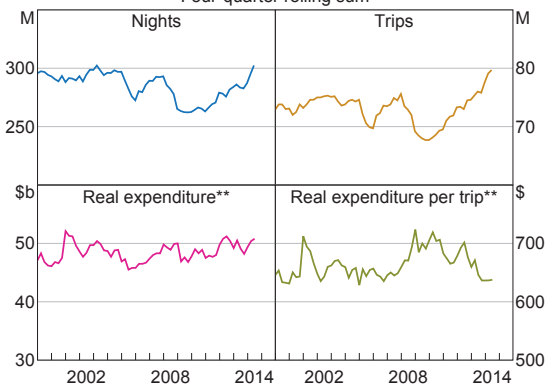
## Domestic Tourism

Changes in domestic tourism demand have an important bearing on the tourism industry in Australia, as Australian residents travelling domestically account for the majority of travel undertaken within Australia. The National Visitor Survey (NVS), published by Tourism Research Australia (TRA), provides a suite of regular and detailed tourism indicators that are useful for monitoring domestic tourism demand.<sup>3</sup> These data confirm that there has been a protracted period of weakness in domestic tourism demand since 2008. From peak to trough, the number of domestic tourism nights declined by 10 per cent, and the recovery in domestic tourism demand since 2011 has been slow, with the number of nights only recently reaching its previous peak of six years earlier (Graph 1). While real domestic tourism expenditure did not fall as sharply as the number of nights over the period from 2008, there has not been an obvious recovery since 2011 because of a trend decline in average spending per trip. This is consistent with a slower pace of growth in household consumption expenditure and subdued survey measures of consumer and business confidence over much of

this period. The NVS measures of domestic tourism demand have increased strongly since the start of 2014, but it is likely that this growth is somewhat overstated due to methodological changes in the survey. Nonetheless, the Bank's liaison with the tourism industry also suggests that demand conditions improved through 2014.

Domestic tourism can be classified into two broad categories of travel that can behave quite differently. Leisure travel is the largest category with more than three-quarters of all domestic trips undertaken for the purpose of visiting friends/relatives (so-called VFR travel) or for a holiday.<sup>4</sup> The balance largely reflects travel for business purposes, which captures travel by both private firms and the public sector.<sup>5</sup> Since 2011, growth in business travel has outpaced growth in leisure travel, providing support to the early stages of the recovery in domestic tourism demand (Graph 2). In contrast, the recovery in leisure travel has been much more subdued. These divergent trends in leisure and business travel are discussed below.

**Graph 1**  
**Domestic Tourism Indicators\***  
Four-quarter rolling sum

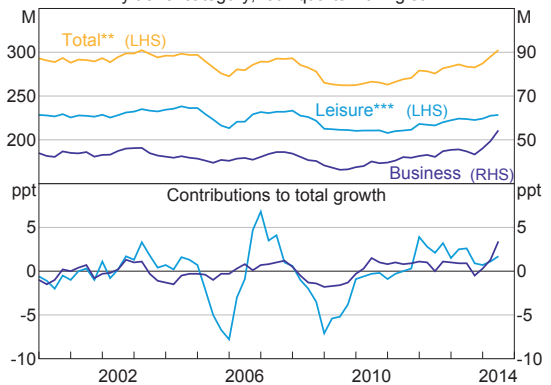


\* Overnight travel only; series break in March quarter 2014  
\*\* Deflated by domestic holiday prices index adjusted for GST, 2011/12 prices

Sources: ABS; RBA; Tourism Research Australia

3 For the latest survey results, see TRA (2014b).

**Graph 2**  
**Domestic Visitor Nights\***  
By travel category, four-quarter rolling sum



\* Series break in March quarter 2014  
\*\* Refers to all travel for leisure, business or other purposes  
\*\*\* Refers to travel for holiday purposes or to visit friends/relatives  
Sources: RBA; Tourism Research Australia

4 Trips taken for the purpose of attending a sporting, cultural or musical event or to watch/participate in sport are also included in the leisure travel category.

5 This article does not specifically discuss domestic travel for 'other purposes', which covers travel for education and other non-discretionary reasons. Travel for 'other purposes' accounts for around 5 per cent of total domestic travel.



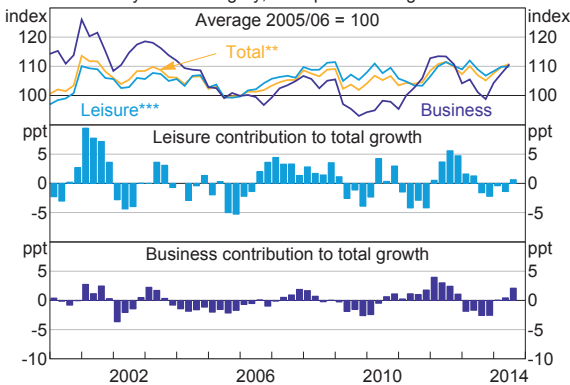
**Leisure travel**

Real domestic leisure travel expenditure was generally weak over the four years to 2012 and weighed heavily on growth in total tourism expenditure for much of this period (Graph 3). Liaison with the tourism industry suggests that the appreciation of the Australian dollar, which lowered the cost of international travel relative to travelling domestically, contributed to the weakness in domestic leisure travel over that period.<sup>6</sup> Much of this period was also associated with below-average survey measures of consumer confidence and subdued growth in household consumption expenditure.<sup>7</sup> Growth in outbound travel by Australians has been very strong since 2009 (Graph 4); this was largely driven by the strength in demand for leisure travel, which is generally the most discretionary and price-sensitive category of outbound travel.

ABS data on consumer prices can be used to compare movements in the price of international travel relative to domestic travel; these data show

that the price of domestic travel increased relative to the price of overseas travel from 2009 to 2013, a period marked by a substantial appreciation of the Australian dollar (Graph 5). However, since peaking in 2013, the ratio of domestic to international travel prices has fallen by 6 per cent, supported by a sharp depreciation in the real tourism-adjusted trade-weighted exchange rate ('tourism TWI') from 2012.<sup>8</sup>

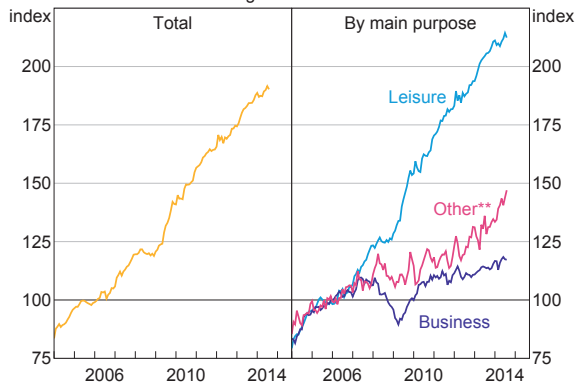
**Graph 3**  
**Real Domestic Visitor Expenditure\***  
By travel category, four-quarter rolling sum



\* Deflated by domestic holiday prices index adjusted for GST; series break in March quarter 2014  
 \*\* Refers to all travel for leisure, business or other purposes  
 \*\*\* Refers to travel for holiday purposes or to visit friends/relatives  
 Sources: ABS; RBA; Tourism Research Australia

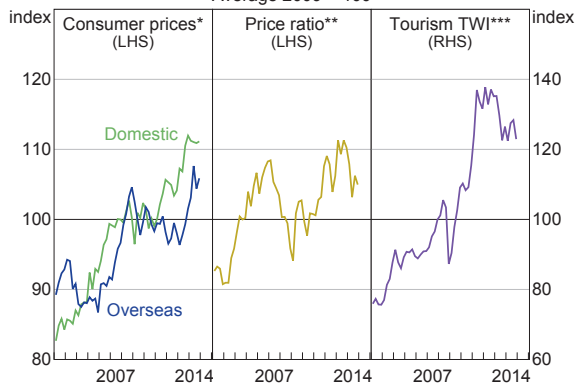
6 Hooper and van Zyl (2011) also identified a trend decline in both the propensity for Australians to holiday domestically and the share of total household spending on overnight domestic holiday travel as factors constraining growth in domestic tourism expenditure.  
 7 Severe weather, for example the Queensland floods in 2011, may have also disrupted travel during this period.

**Graph 4**  
**Short-term Overseas Departures\***  
Average 2005/06 = 100



\* Three-month moving average; seasonally adjusted by RBA  
 \*\* Travel for education and employment purposes  
 Sources: ABS; RBA

**Graph 5**  
**Tourism Prices**  
Average 2009 = 100



\* Holiday travel and accommodation prices adjusted for GST  
 \*\* Ratio of domestic to overseas holiday and accommodation prices  
 \*\*\* Tourism import-weighted real exchange rate  
 Sources: ABS; RBA; Thomson Reuters

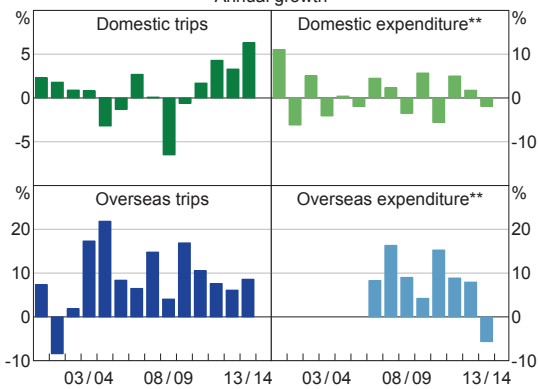
8 The real 'tourism TWI' is an augmented real TWI calculated using Australia's tourism import shares, rather than total trade shares, as weights for international real exchange rates; this index therefore places more importance on movements in the currencies of countries that Australians travel to the most.

While the level of the exchange rate remains high relative to history, there is already tentative evidence suggesting that the exchange rate is no longer providing the same impetus to outbound travel, with expenditure on overseas leisure travel declining in 2013/14, the first time in at least eight years (Graph 6). Similarly, the depreciation in the tourism TWI has coincided with a pick-up in the number of domestic leisure trips.<sup>9</sup> The decline of the Australian dollar is regarded positively by the tourism industry and appears to be supporting sentiment among

firms exposed to tourism. However, a decline in average expenditure per trip continues to constrain growth in total domestic leisure tourism spending.

Another factor that could constrain growth in Australian outbound travel is the current subdued pace of growth in Australian household incomes, which could facilitate some substitution towards domestic travel given that overseas trips are much more expensive on average (Table 1). Lower fuel prices, if sustained, may also support growth in domestic leisure travel that is heavily reliant on motor vehicle use. For example, around 90 per cent of domestic leisure day trips involve self-drive motor vehicles.<sup>10</sup> In short, the fundamental conditions for domestic leisure tourism appear more favourable than they have been for some time.

**Graph 6**  
**Australian Leisure Travel\***  
Annual growth



\* Overnight trips only, excludes domestic day trips; series break in March quarter 2014  
 \*\* Expenditure deflated by relevant holiday prices index adjusted for GST  
 Sources: ABS; RBA; Tourism Research Australia

**Business travel**

As one of the most discretionary categories of business expenditure, business travel tends to be highly cyclical (Graph 7). Information gathered through the Bank’s business liaison program also confirms that travel is one of the first areas of expenditure where firms look to reduce costs. This can be achieved by scaling back the number of trips, shortening trips or reducing spending on components such as accommodation. For this

**Table 1: Australian Leisure Travel Patterns**  
By type of leisure trip, 2013/14

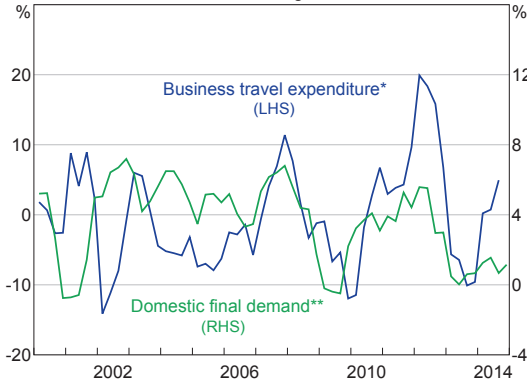
	Trips taken Millions	Total expenditure <sup>(a)</sup> \$ billions	Trips per person <sup>(b)</sup> Number	Expenditure per trip \$	Expenditure share <sup>(c)</sup> Per cent
Outbound travel	7	39	0.3	5 995	4
Domestic travel	189	52	10	277	6
<i>Of which:</i>					
Overnight	62	39	3	621	4
Day trip	126	14	7	107	2

(a) Current prices  
 (b) Trips per Australian resident aged 15 and over  
 (c) As a share of household final consumption expenditure  
 Sources: ABS; RBA; Tourism Research Australia

9 The TTF-Mastercard Tourism Industry Sentiment Survey finds that the lower Australian dollar has had a positive effect on the number of domestic visitors (Tourism and Transport Forum 2015).

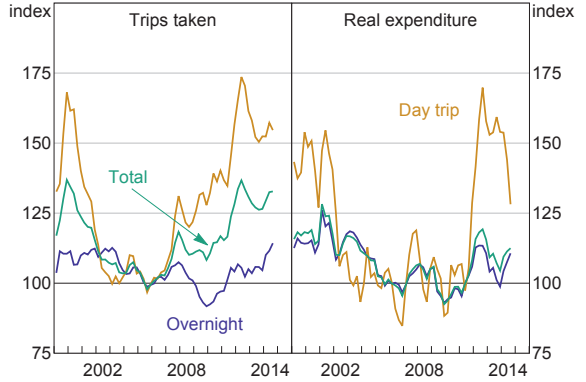
10 This information is sourced from unpublished NVS data.

**Graph 7**  
**Australian Domestic Business Travel**  
Year-ended growth



\* Real expenditure on travel for business purposes; series break in March quarter 2014  
 \*\* Real gross domestic final demand  
 Sources: ABS; RBA; Tourism Research Australia

**Graph 8**  
**Australian Domestic Business Travel\***  
Four-quarter rolling sum, average 2005/06 = 100



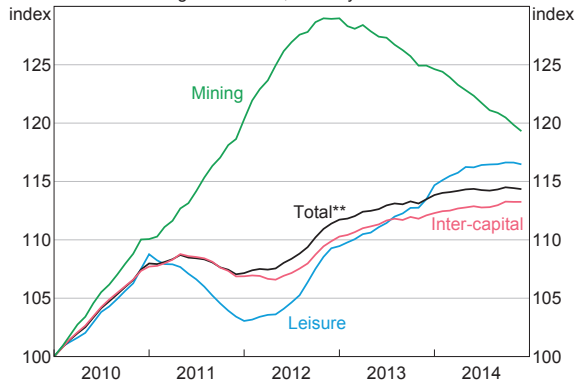
\* Deflated by domestic tourism prices index adjusted for GST; series break in March quarter 2014  
 Sources: ABS; RBA; Tourism Research Australia

reason, business trips and average expenditure per trip, particularly for overnight travel, appear to be quite sensitive to economic conditions.

Business travel expenditure and the number of overnight trips taken declined markedly from 2008 when growth in domestic demand slowed sharply in the wake of the global financial crisis. This episode was followed by a strong run-up in spending on business travel from 2011, which appears to have been disproportionate relative to the pick-up in domestic demand, as well as a particularly strong increase in business day trips. However, this growth was short-lived and business travel expenditure fell sharply in 2013, reflecting declines in spending on both overnight and day trips (Graph 8). Liaison and other indicators of tourism demand by region confirm this pronounced cycle closely mirrors developments in the resources sector.

The resources investment boom led to a marked rise in travel to Australia's resource-exposed regions, boosting demand for air travel and accommodation (Graph 9 and Graph 10). In large part, this reflects the requirement for large on-site construction workforces, including 'fly-in fly-out' or 'drive-in drive-out' workers. During this period, there were shortages of short-term accommodation in some

**Graph 9**  
**Passenger Numbers by Route Type\***  
Rolling annual sum, January 2010 = 100

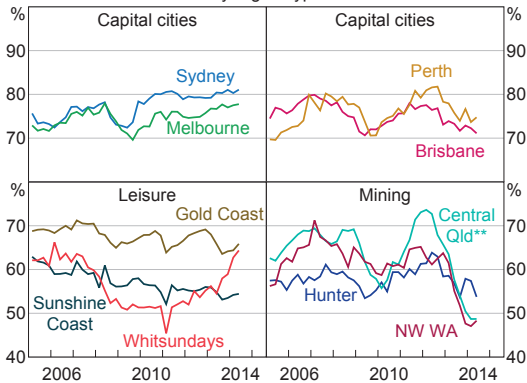


\* For consistent top 50 routes  
 \*\* Includes routes not elsewhere classified  
 Sources: Bureau of Infrastructure, Transport and Regional Economics; RBA

mining areas, which prompted sharp rises in room rates. Following the peak in resource investment activity in mid 2012, there has been a marked decline in accommodation occupancy rates within, and air travel to and from, mining areas. Part of this sharp unwinding reflects the much smaller operational workforces at mines and LNG facilities compared with the project construction phase.<sup>11</sup> In some mining areas, the magnitude of the reduction in construction workforces has been quite sizeable.

<sup>11</sup> For further details, see Doyle (2014).

**Graph 10**  
**Room Occupancy Rates\***  
By region type



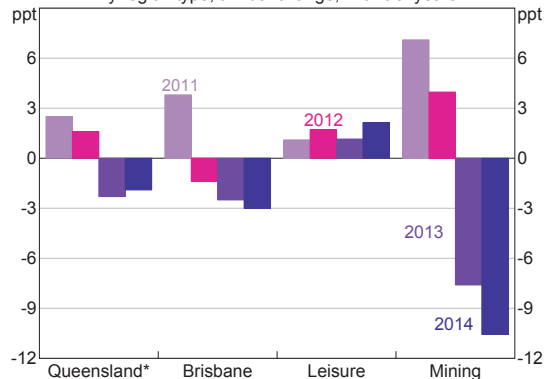
\* Seasonally adjusted by RBA; covers accommodation establishments (hotels, motels and serviced apartments) with 15 rooms or more  
 \*\* Weighted average of Mackay and Central Queensland regions  
 Sources: ABS; RBA

For example, between June 2012 and June 2014, it is estimated that the size of the on-shift workforce in the Bowen Basin, a key coal mining region in Queensland, declined by around 30 per cent.<sup>12</sup>

The decline in resource-related business travel has led to heavy falls in accommodation occupancy rates in mining regions in Queensland, New South Wales and Western Australia. On average, occupancy rates in mining regions are now lower than prior to the resources boom.<sup>13</sup> The impact has not been confined to regional areas as occupancy rates in Brisbane and Perth, which are heavily exposed to mining activity through the business services sector, have also fallen. It is highly likely that the sharp decline in bulk commodity prices since mid 2012, which liaison confirms has prompted resource companies to focus on cost-cutting, contributed to the decline in business travel over this period. In resource-exposed states, particularly Queensland,

accommodation statistics confirm that a dichotomy has emerged in tourism conditions between areas exposed to mining-related travel and those parts of the state more exposed to the leisure tourism market (Graph 11),<sup>14</sup>

**Graph 11**  
**Queensland Room Occupancy Rates**  
By region type, annual change, financial years



\* Total Queensland including regions not elsewhere classified  
 Sources: ABS; RBA

While the NVS data point to a recovery in business travel and expenditure for Australia as a whole since early 2014, recent methodological changes affecting the survey make it difficult to assess whether this represents a reliable signal or changes to sampling methods.<sup>15</sup> Liaison does not suggest that there has been a strong rebound in domestic business travel, as many firms, particularly those in the resources sector, and much of the public sector, continue to adopt a cautious approach to discretionary spending. While a recovery cannot be discounted, the ongoing transition in the mining sector and broad-based focus of business on cost containment may continue to constrain growth in the business tourism market in the near term.

12 The on-shift workforce refers to those workers living temporarily in the region while on shift who would usually live outside the region. This is a point-in-time measure and excludes those workers not on shift at the time of the survey. These estimates are published by the Queensland Government Statistician's Office (2014).

13 This appears to reflect a reduction in the number of room nights occupied rather than an increase in the supply of rooms.

14 Leisure tourism regions in Queensland include, for example, the Gold Coast, Sunshine Coast, Whitsundays and Tropical North Queensland; these regions are defined according to the ABS Tourism Regions boundaries.

15 It is likely that some of the recent increase in business travel is related to the introduction of new survey questions into the NVS by Tourism Research Australia from 2014 to better identify travel by 'fly-in fly-out' (FIFO) workers. Some FIFO trips were previously classified as out of scope.

## International Tourism

While Australian tourism output is dominated by domestic tourism activity, the expenditure of overseas visitors in Australia represents an important share of Australia's export receipts and is the faster-growing component of tourism demand.

There are various definitions of tourism exports. In the ABS Balance of Payments statistics, the expenditure of visitors to Australia is broadly defined as travel services exports and includes the spending of overseas students, business travellers and leisure travellers.<sup>16</sup> Given around half the spending of overseas students in Australia relates to the payment of fees to education providers, this article classifies education-related personal travel services exports separately as 'education exports'. On this basis, the balance of travel services exports is defined here as 'tourism exports',<sup>17</sup> and includes travel for business and a wide variety of personal travel such as travel for holidays, to visit friends and relatives, and for health

and cultural reasons. This category of personal travel can be defined broadly as 'leisure travel'.

Australia earned \$18 billion in tourism export receipts in 2013/14, ranking tourism as one of Australia's most valuable exports behind iron ore and coal, and the largest services export (Table 2). Growth in the value of Australia's tourism exports slowed noticeably in 2008/09, in step with a fall in short-term visitor arrivals, and in each of the following three years receipts from the leisure tourism market made no contribution to growth (Graph 12). This period was marked by a sharp slowing in global growth and a strong appreciation of the Australian dollar. In contrast, business travel exports continued to grow through much of this period. Since 2012/13, there has been a significant shift in the composition of growth in tourism exports towards leisure tourism, reflecting the recovery in global growth and weaker business travel exports. This rotation in the composition of growth is likely to have been supported by the depreciation of the Australian dollar.

**Table 2: Australia's Major Exports<sup>(a)</sup>**  
As a share of total exports, 2013/14<sup>(b)</sup>

	\$ billion	Per cent
Iron ore and concentrates	74.7	22.6
Coal	40.0	12.1
Tourism exports <sup>(c)</sup>	18.0	5.4
Natural gas	16.3	4.9
Education exports <sup>(d)</sup>	15.7	4.8
Gold (non-monetary)	13.3	4.0

(a) Goods are on a trade basis; services are on a balance of payments basis

(b) Current prices; total is recorded on a balance of payments basis

(c) Travel services excluding education-related personal travel services

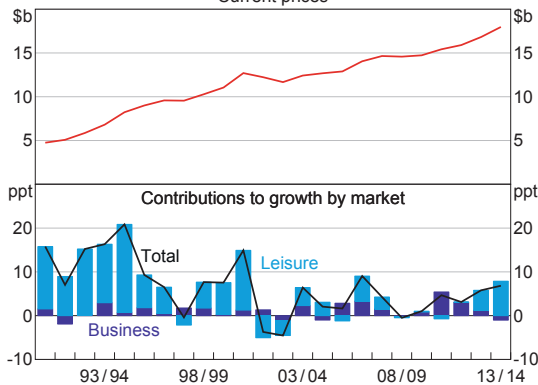
(d) Education-related personal travel services only

Sources: ABS; RBA

<sup>16</sup> For further details of travel services exports, see ABS (1998).

<sup>17</sup> The ABS Tourism Satellite Account excludes the spending of international students from international tourism expenditure, unless they are studying courses of less than one year (ABS 2014). The ABS also has a separate measure, called tourism-related services exports, which combines total travel services (business, education-related and other personal travel) and passenger transportation services (which includes agency fees and commissions for air transport). This broad measure is used as an indicator of the change in tourism-related activities, rather than as an absolute measure of the level of these activities.

**Graph 12**  
**Australia's Tourism Exports\***  
 Current prices



\* Travel services excluding education-related personal travel  
 Sources: ABS; RBA

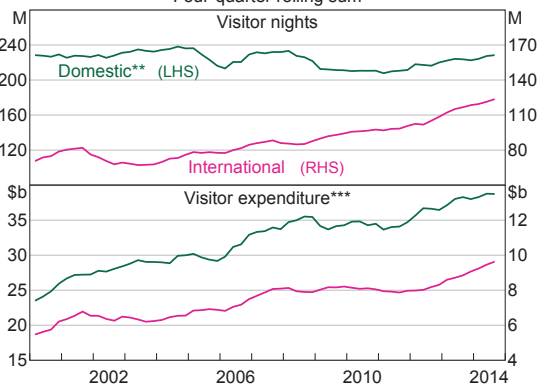
**Leisure tourism exports and the role of China**

Leisure tourism exports contributed just over three-quarters of Australia's tourism exports in 2013/14 and, over the past 10 years, overseas demand for leisure tourism has increased at a faster pace than demand from the domestic market (Graph 13). One of the main factors has been strong growth in demand for leisure tourism from China. The Chinese leisure market generated \$1.9 billion in export receipts in 2013/14 and has accounted for around half of the growth in Australia's leisure travel exports over the past decade. As a result, China displaced the United Kingdom as Australia's most valuable market for leisure travel exports in 2013/14 (Graph 14).

China is also Australia's largest market for education exports, further demonstrating that Australia's important trade relationship with China extends beyond the resources sector. There is a close relationship between leisure tourism and education exports. Unpublished data from the International Visitor Survey indicate that in 2013 around 19 per cent of Chinese leisure visitors visited family and/or friends studying in Australia.<sup>18</sup>

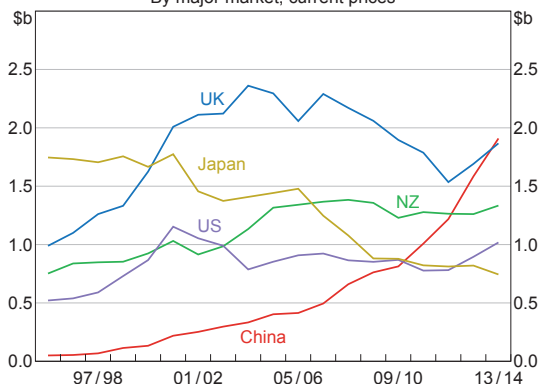
<sup>18</sup> The International Visitor Survey is published quarterly by Tourism Research Australia; see TRA (2014a).

**Graph 13**  
**Leisure Tourism Indicators\***  
 Four-quarter rolling sum



\* Leisure is defined as travel for holiday purposes or to visit friends/relatives  
 \*\* Series break in March quarter 2014  
 \*\*\* Expenditure in Australia only; current prices; overnight travel only  
 Sources: RBA; Tourism Research Australia

**Graph 14**  
**Australia's Leisure Travel Exports\***  
 By major market, current prices



\* Defined as 'other' personal travel services exports  
 Source: ABS

Chinese students also travel domestically during their studies and liaison suggests they represent a valuable channel for marketing Australia as a travel destination through word of mouth.

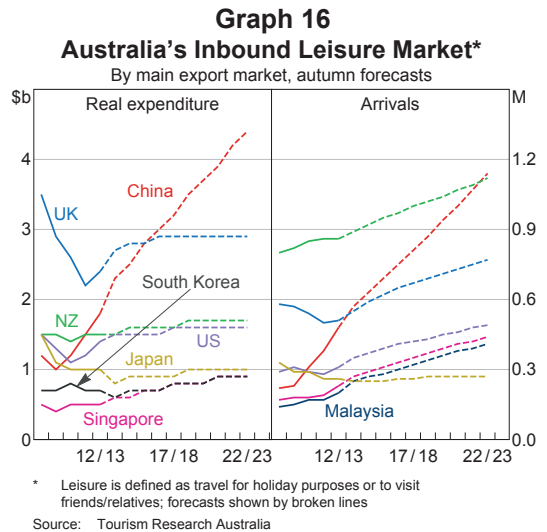
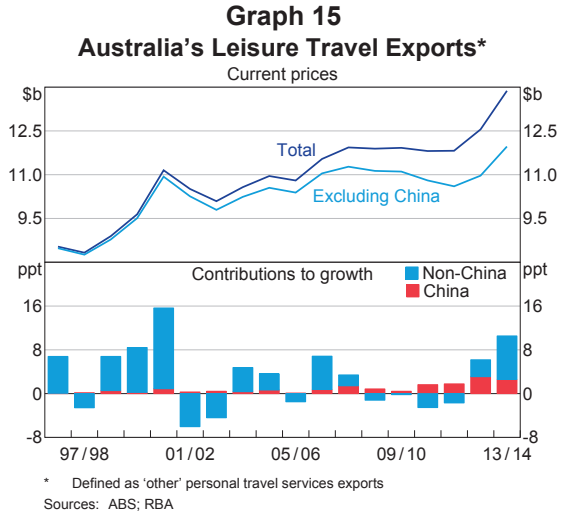
Growth in the Chinese tourism market has helped to cushion the tourism industry from the decline in leisure visitors from Japan, which was Australia's largest inbound leisure market (by value) until the late 1990s. Total visitor numbers to Australia from Japan peaked in 1997 and have fallen by an

average of 7 per cent per annum over the 10 years to 2013/14, compared with average annual growth in short-term visitor arrivals from China of around 13 per cent over the same period. While demographic and economic factors have weighed on overseas travel from Japan, Australia's share of the Japanese market has also fallen from 4 per cent in 2000 to 1.9 per cent in 2013, possibly reflecting increased competition from short-haul markets and the higher cost of travel to Australia.<sup>19</sup> The number of Chinese visitors to Australia is now approaching the peak levels reached by the Japanese market in the mid 1990s.

Without the benefit of growth from the Chinese market, there would have been a more conspicuous decline in Australia's leisure tourism exports between 2008/09 and 2011/12 (Graph 15; and see 'Box A: Chinese Outbound Travel', which examines the factors supporting growth in the Chinese travel market). The value of leisure tourism exports rose by 6 per cent in 2012/13 and by a further 11 per cent in 2013/14, which is the strongest pace of growth since 2000/01 when Australia hosted the Olympic Games. This sharp pick-up was assisted by a recovery in demand from the United States and United Kingdom, which is likely to have been supported by improved economic conditions facing households in these economies and the depreciation in the Australian dollar.

Forecasts published by Tourism Research Australia, which predate the announcement of a new air services agreement with China and the China-Australia Free Trade Agreement, suggest the inbound Chinese leisure market will contribute nearly 25 per cent of the growth in international leisure arrivals and just over 40 per cent of inbound leisure visitor expenditure in Australia in real terms

over the decade to 2022/23 (Graph 16).<sup>20</sup> By 2022/23, Chinese leisure visitors are expected to outnumber those from New Zealand, which is currently Australia's largest source of visitor arrivals.<sup>21</sup>



<sup>19</sup> Other long-haul destinations, including Canada, have also experienced a decline in the number of visitors from Japan (PC 2015).

<sup>20</sup> In January 2015, the Australian Government announced the settlement of a new air services agreement between China and Australia which more than doubled capacity entitlements for Australian and Chinese airlines and will relieve capacity constraints that faced Chinese airlines operating in Australia's gateway cities (PC 2015).

<sup>21</sup> Visitors from New Zealand spend less in Australia, on average, than visitors from other markets, such as China or the United Kingdom.

## Box A Chinese Outbound Travel

The number of Chinese visitors travelling overseas has grown at an average annual rate of 14 per cent over the 10 years to 2014 (Graph A1, lower panel). In 2014, the number of Chinese overseas departures rose by 9 per cent to 107 million. Over the 10 years to 2012 (the latest World Bank data), Chinese international departures increased five times faster than the total number of international visitors worldwide. Reflecting this strong growth, China became the world's largest importer of tourism services (by value) in 2012, accounting for 10 per cent of the value of international visitor expenditure<sup>1</sup> worldwide and 7 per cent of total international departures (Graph A1, top panel). With growth in departures from China exceeding growth in arrivals, China has also become a significant net importer of tourism services, posting its first tourism trade deficit in 2009.

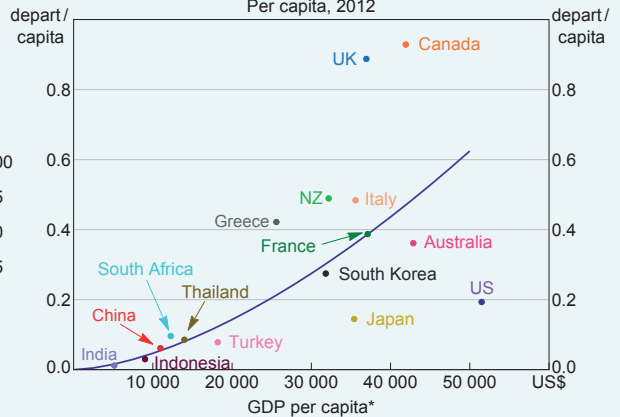
The propensity for overseas travel has increased markedly in China, consistent with rising incomes. Overseas departures per capita have more than tripled over the past 10 years (Graph A1, top panel). However, the propensity for Chinese citizens to travel abroad remains very low in comparison with developed economies, but consistent with countries that have a similar per capita income level (Graph A2). Outbound travel from China should continue to sustain relatively strong rates of growth as incomes and living standards rise. Other factors that are likely to have supported strong growth in Chinese overseas travel over the past decade include:

- greater access to other countries through more accommodative visa policies<sup>2</sup>
- the sustained appreciation of the renminbi for much of this period
- increased international aviation capacity to and from China.

**Graph A1  
Chinese Overseas Departures**



**Graph A2  
Overseas Departures and GDP**  
Per capita, 2012



<sup>1</sup> Excluded from this measure of tourism imports is the value of international passenger travel, such as airfares.

<sup>2</sup> For a description of recent changes in visa arrangements to improve access for Chinese visitors, see PC (2015).



## Conclusion

Conditions facing the Australian tourism industry are improving, although there is a risk that business travel in resource-exposed areas may continue to decline as resource investment unwinds further. The exchange rate depreciation should support growth in Australia's leisure tourism market by increasing the relative cost of holidaying overseas for Australians and by making Australia a more attractive travel destination for overseas visitors. There are some signs that these forces have been at play in 2013/14. China has been an important driver of growth in Australia's leisure tourism exports over the past decade and will continue to be the dominant influence on Australia's tourism export industry, reflecting the positive long-term outlook for growth in leisure travel from China. ✕

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# Australia and the Global LNG Market

Natasha Cassidy and Mitch Kosev\*

Australian exports of liquefied natural gas (LNG) will rise significantly over the next few years as a number of large-scale investment projects reach completion. The bulk of these exports will be to Asian customers under long-term contracts, with their price linked to the price of oil. The Asia-Pacific LNG market over the next decade will be influenced by potential changes to the composition of Asian energy demand, the magnitude of the increase of US LNG exports to Asia and any changes to the traditional oil-based pricing mechanism. The ramp-up in LNG production will boost Australian output and incomes over the next few years; however, the effect on Australia's living standards will be lessened to some extent by the high level of foreign ownership and the relatively low labour intensity of LNG production.

## Introduction

Australian exports of liquefied natural gas (LNG) are expected to pick up substantially as a number of large-scale LNG projects begin production over the next few years. This follows investment of approximately \$200 billion – equivalent to around 12 per cent of annual Australian GDP – which was largely in response to increased Asian demand for LNG. In value terms, LNG is expected to become Australia's second largest commodity export (after iron ore) by 2018, with the bulk of these exports destined for Asian markets. This article provides an overview of the global market for natural gas and details the oil-linked pricing of Australian LNG exports.<sup>1</sup> It also discusses factors that are likely to influence the LNG market in the Asia-Pacific region over the period ahead, as well as the channels through which developments in the Australian LNG sector affect the domestic economy.

## Global Natural Gas Trends

Natural gas is a low carbon-emitting fossil fuel primarily used for power generation, as well as a

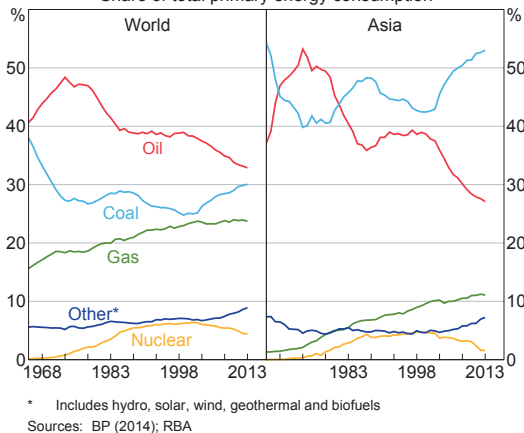
wide range of other industrial, commercial and residential uses. It reaches the end user either directly in its gaseous form through pipelines or via the production of LNG. The latter involves processing and cooling the natural gas into its liquid form (in a liquefaction facility through modules known as 'trains') for transportation. At the destination, LNG is either stored or converted back into natural gas at regasification plants and then delivered to the end user by pipeline.

Consumption of natural gas has increased gradually to account for around one-quarter of global primary energy consumption (Graph 1). North America and Europe are the largest consumers of natural gas, delivered via vast pipeline networks. However, natural gas consumption has gradually become more widespread, increasing markedly in the Middle East and Asian regions. While natural gas still comprises a relatively small share of Asia's total energy mix, it has increased in importance due to a number of factors including greater emphasis on lowering air pollution and carbon emissions through use of cleaner burning fossil fuels. Within the Asian region, China has recently overtaken Japan as the largest consumer of natural gas, with consumption increasing almost fourfold in the past decade.

\* The authors are from Economic Analysis Department.

1 See Jacobs (2011) for additional background on the global market for LNG and an earlier overview of the Australian LNG industry.

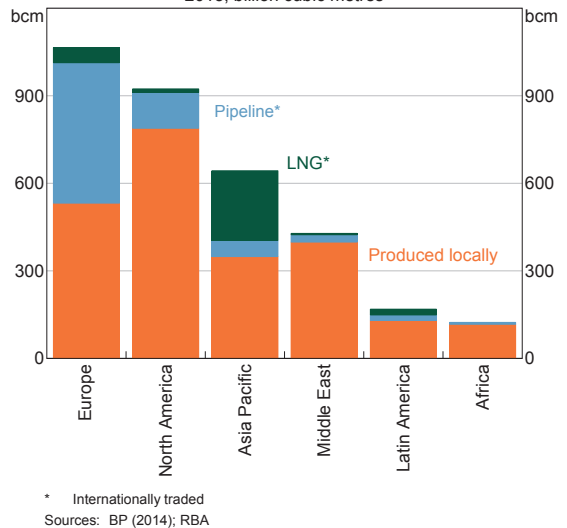
**Graph 1**  
**Energy Consumption Shares**  
 Share of total primary energy consumption



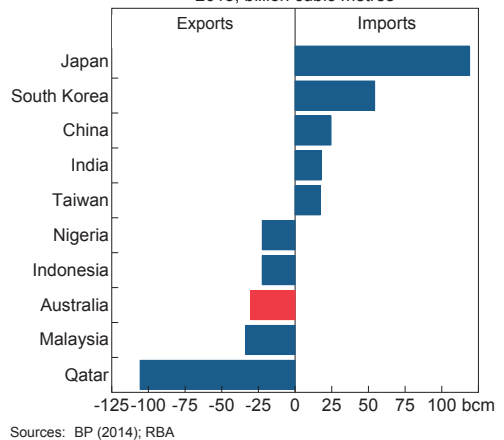
Localised sources of production accounted for around 70 per cent of global natural gas consumption in 2013 (Graph 2). In North America, natural gas production has benefited from new extraction methods, including horizontal drilling and hydraulic fracturing, which have driven rapid growth in US unconventional production of crude oil and natural gas (see below). In Asia, many areas are geographically removed from substantial natural gas reservoirs, making it expensive or impractical to transport natural gas by pipeline. LNG has proven to be a viable alternative for Asian consumers, which represent 75 per cent of global LNG demand; overall, LNG currently accounts for around 10 per cent of global natural gas consumption.

While LNG only accounted for 5 per cent of Asia’s total energy consumption in 2013, this is expected to rise as the supply of LNG increases markedly over the next few years. Trends in consumption (and production) tend to change slowly given the costly and large-scale investments in infrastructure required for both liquefaction at the source and regasification at the destination. Japan is the largest global importer of LNG and demand for natural gas has increased since the Fukushima nuclear disaster in March 2011, as utilities have used gas-fired power generation to replace the country’s idled nuclear power capacity (Graph 3). Other major importers such as Korea, India and Taiwan also rely primarily

**Graph 2**  
**Natural Gas Consumption Composition**  
 2013, billion cubic metres



**Graph 3**  
**International LNG Trade**  
 2013, billion cubic metres



on LNG to satisfy domestic demand for natural gas. China’s LNG imports supplement its sizeable domestic gas reserves and natural gas imports supplied via pipelines.

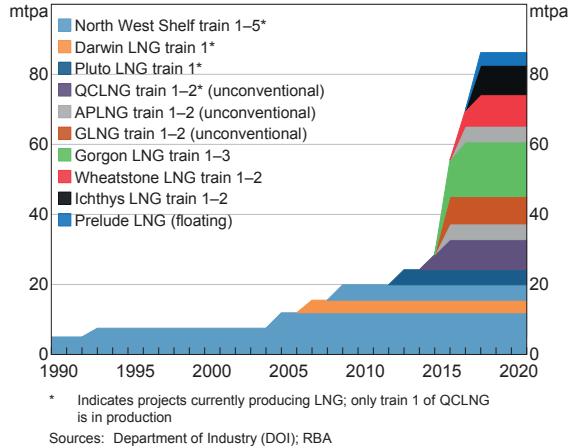
In response to increased demand for natural gas, global liquefaction capacity has risen since the early 2000s. Qatar is currently the largest exporter of LNG, producing around one-third of the LNG traded, following a substantial increase in liquefaction capacity between 2004 and 2011.

In 2013, Australia was the third largest exporter of LNG, producing a little less than 10 per cent of global LNG exports. However, if the global liquefaction capacity currently under construction or committed proceeds as planned, Australia is expected to become the largest global producer of LNG by 2018 at a total nameplate (theoretical maximum) capacity of around 85 million tonnes per annum (mtpa). The ramp-up of exports is expected to occur largely between 2015 and 2017 (Graph 4). A total of eight new Australian liquefaction projects received final investment approval between 2007 and 2012; two have begun production while the remaining projects are under construction.<sup>2</sup> These comprise large-scale conventional LNG projects in Western Australia and the Northern Territory, including the world's first floating LNG vessel to be located offshore in the Western Australian Browse Basin.<sup>3</sup> In addition, three unconventional coal seam gas (CSG) projects are under construction in Queensland, one of which has commenced production.<sup>4</sup>

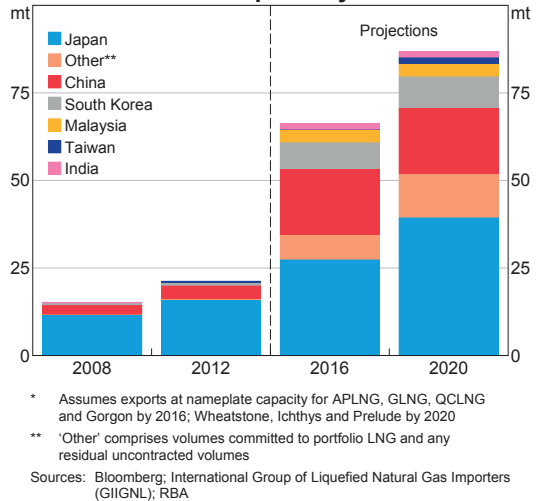
Most of Australia's current LNG production is exported to Asia; more than 80 per cent is exported to Japan, while China and Korea account for much of the remaining share (Graph 5). The LNG from Australian projects under construction is also committed to Asian purchasers under long-term contracts, albeit with more diversification in the destination of these exports. However, some projects under construction have volumes that are not yet under contract, as

well as volumes assigned to the producer's own portfolio ('portfolio LNG'); the ultimate destinations for these LNG cargoes are uncertain.<sup>5</sup> Nonetheless, our current estimates (under the assumption that

**Graph 4**  
**Australian Liquefaction Capacity**  
 Nameplate capacity



**Graph 5**  
**Australian LNG Exports by Destination\***



2 Australian projects which are currently producing LNG include the North West Shelf (NWS) and Pluto LNG in Western Australia; Darwin LNG in the Northern Territory; and Queensland Curtis LNG (QCLNG) train 1 in Queensland. Projects currently under construction include Gorgon, Wheatstone and Prelude Floating LNG in Western Australia; Ichthys in the Northern Territory; and Australia Pacific LNG (APLNG), Gladstone LNG (GLNG) and QCLNG train 2 in Queensland. There are a number of additional Australian LNG projects that have been proposed or are at the feasibility stage, without yet being committed (Department of Industry 2014).

3 Floating LNG involves the use of a specially designed vessel to produce, liquefy, store and transfer LNG from offshore.

4 Unconventional LNG refers to production from resources such as tight geological formations, including shale and coal seams (CSG). CSG accumulates in layers along the surfaces of coal deposits, kept in place under water and ground pressure. CSG production involves drilling wells, including horizontal wells if the geology is suitable, and stimulating the coal bed to release pressure within the production zone, allowing natural gas to be extracted.

5 Portfolio LNG is marketed by major energy companies from multiple, potentially geographically diverse projects in which the company has an interest. In practice, this might involve consigning part or all of an LNG project's liquefaction capacity to their internal portfolio, which is onsold to customers under long-term contracts. In some instances, an LNG project will assign a share of production to the portfolio and the remainder falls under traditional long-term agreements, often to equity partners in the project. A number of the conventional and unconventional Australian projects reportedly have volumes assigned to producers' portfolios.

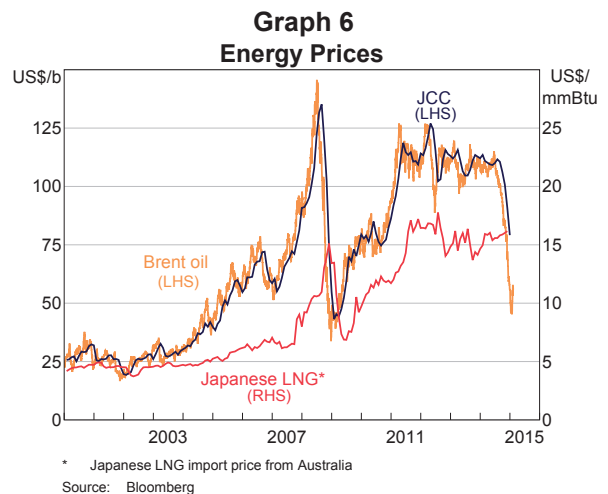
the production ramp-up for projects proceeds as publicly indicated) suggest that China will purchase around 20 per cent of Australian LNG exports under contract by 2020, while the share of exports to Japan under contract will fall to around 45 per cent. The share of exports to other regional trading partners will also rise, with small increases in exports to Malaysia, India and Taiwan.

### Asia-Pacific LNG Market Structure and Pricing

As noted in Jacobs (2011), the natural gas market is globally segmented. As there are differences between market structure and pricing conventions in the Atlantic (covering North America and Europe) and the Asia-Pacific regions, there can often be significant differences in the price of natural gas around the world. The current pricing of Australian LNG exports is based on conventions in the Asian LNG market, which involve long-term contracts linked to the price of oil. The historical reason for this was because Japan began importing LNG in 1969 to diversify its energy supply. Crude oil was the major competing source of fuel for generating power at the time, providing a basis for oil-linked LNG pricing (Rogers and Stern 2014). As other Asian economies began importing LNG, long-term oil-linked contracts were already well established, which provided the basis for the LNG pricing that prevails in the Asia-Pacific region. This contrasts with the more developed spot market pricing of natural gas in North America, and to a lesser extent Europe, where competing sources of gas (pipeline and LNG) are priced in ‘hubs’, which also act as the pricing and delivery points for natural gas futures contracts. These hubs reflect the interaction of multiple sources of natural gas supply and demand, either physically via pipeline networks (such as the US Henry Hub) or notionally (such as the UK’s National Balancing Point, which is a ‘virtual’ hub rather than a physical location).

Asian LNG purchasing agreements tend to be long term in nature, typically in the order of 15 to 20 years. This affords producers a degree of certainty over the recovery of the substantial upfront expenditure required for LNG investments. LNG customers have often contributed to the funding of major projects, which have tended to be accompanied by long-term LNG purchasing agreements and align the interests of producers and customers. The security of energy supply under long-term contracts is also important for many Asian importers.

The link between LNG and oil prices in Asian LNG contracts is negotiated confidentially between producers and customers. However, contracts are typically linked to the price of Japanese customs-cleared crude oil (JCC), which reflects the average price of crude oil imported into Japan and in turn is highly correlated with the lagged price of Brent oil (Graph 6). While the benchmark relates to Japanese crude oil imports, it has also been adopted for LNG pricing by other Asian importers. LNG prices are denominated in US dollars per million British thermal units (US\$/mmBtu), which is a measure of the price per unit of energy content.



In generic terms, the formula linking the price of LNG to JCC can be approximated by the following:

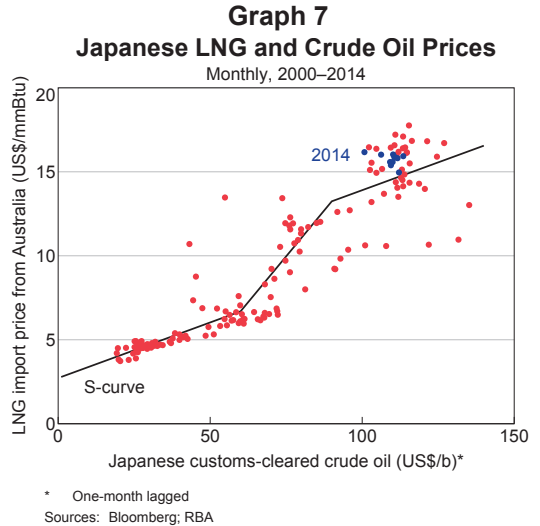
$$Price_{LNG} = \alpha + \beta Price_{JCC} \quad (1)$$

where  $Price_{LNG}$  is the long-term delivered contract price of Asian LNG (measured in US\$/mmBtu) and  $Price_{JCC}$  is the JCC price of oil (measured in US\$/barrel), often measured as a lagged average of the Brent oil price.  $\beta$  is typically referred to as the pricing slope, which determines the sensitivity of LNG prices to changes in the oil price benchmark (factoring in the conversion between US\$/barrel and US\$/mmBtu). The Australian LNG pricing slope reportedly ranges between 12 and 15 per cent.  $\alpha$  reflects transportation costs, and typically ranges between US\$0.5 to US\$1/mmBtu for Australian LNG.

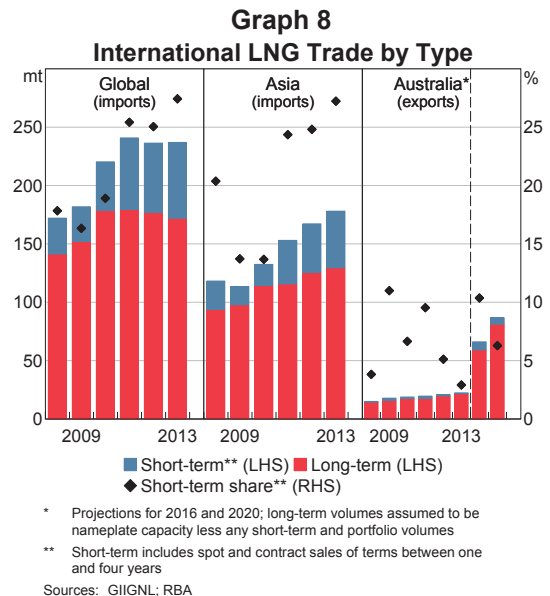
Since the 1990s, contracts have become more flexible and incorporate additional features to address pricing risk. Some newer contracts have flexibility on fixed destination clauses and take-or-pay commitments, and a greater share of sales contracts are under more flexible free on board (FOB) agreements.<sup>6</sup> Long-term contract price arrangements can often be subject to periodic renegotiation (e.g. every three to five years). Renegotiations may occur due to bilateral agreement or can be triggered contractually by large oil price movements. Some contracts also include a non-linear pricing slope, referred to as an ‘s-curve’. With an s-curve agreement, the sensitivity of LNG prices to oil price movements varies, protecting producers’ earnings at low levels of oil prices and limiting the impact on purchasers’ energy costs when oil prices are high (Graph 7). Empirically, the s-curve ‘kinks’ appear to occur at oil prices below around US\$40–60/barrel and above US\$90–110/barrel.<sup>7</sup>

6 A fixed destination clause restricts the importer from diverting or onselling any surplus LNG cargoes. FOB contracts shift the risk of transportation from the producer to the purchaser, who is responsible for transportation and associated costs. This contrasts with the other main form of sales agreement, where the purchase price includes costs, insurance and freight. This typically makes the seller responsible for transportation and is referred to as ‘delivered ex-ship’.

7 The s-curve in Graph 7 is estimated with a constrained regression, which specifies inflexion points at US\$60 and US\$90 per barrel, and restricts the slope of the curve to be identical above and below US\$60 and US\$90 per barrel, respectively.



There has also been an increase in shorter-term LNG trade (i.e. spot and contract sales of terms between one and four years). At present, short-term purchases account for 25–30 per cent of global LNG trade, compared with less than 5 per cent before the mid 2000s (IEA 2013) (Graph 8). This reflects a number of factors, including increased flexibility in some contracts facilitating short-term sales, an increase in Japanese demand following the Fukushima disaster, and less concentration of sources of supply and demand for LNG.



\* Projections for 2016 and 2020; long-term volumes assumed to be nameplate capacity less any short-term and portfolio volumes  
 \*\* Short-term includes spot and contract sales of terms between one and four years  
 Sources: GIIGNL; RBA

Of Australia’s current LNG production, only around 5–10 per cent is estimated to be sold on a short-term basis. The share of shorter-term pricing is not expected to change significantly over the next few years. This is mainly because producers have to recover significant costs associated with developing greenfield projects (including both upstream drilling and processing, and downstream liquefaction and port facilities) and many Australian LNG projects under construction were, in part, financed by customers who wanted to secure their LNG supply.

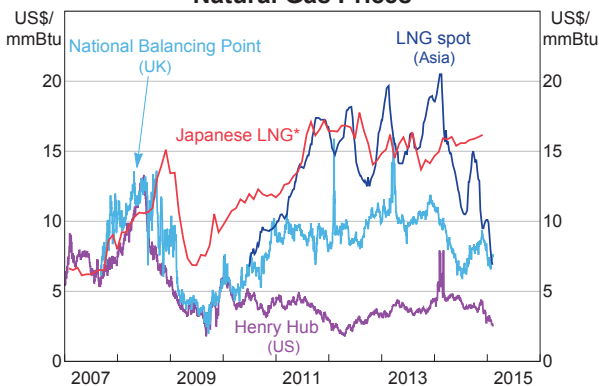
However, as the share of short-term LNG trade has increased in Asia, spot LNG prices have become a more relevant indicator of market conditions, leading to the creation of several spot ‘markers’ for Asian LNG and a nascent derivatives market. Asian spot and import LNG prices have traded at a premium to international gas prices since 2008, particularly US Henry Hub gas, although this has become significantly less pronounced more recently (Graph 9). The LNG spot price has fallen sharply over the past year, largely reflecting the impact of the sharp decline in oil prices. The average price of Australian exports to Japan remains significantly higher than the spot price due to the lagged structure of long-term Japanese contracts but can be expected to decline over the first half of 2015 in response to the lower oil price.

## Factors Influencing the Future of Asia-Pacific LNG Markets

There are a number of factors that are likely to affect the dynamics of the Asia-Pacific LNG market in the medium term. US LNG supply is expected to increase considerably as technological advancements and a period of high energy prices have led to a dramatic increase in assessments of recoverable resources of natural gas and oil from unconventional sources.<sup>8</sup> This has spurred a rapid surge in unconventional natural gas and oil production, which is expected to result in US natural gas production exceeding domestic consumption by 2017 (Graph 10).

Since the scale of natural gas reserves became apparent, US producers have commenced construction of four projects with planned construction of nameplate liquefaction capacity of around 50 mtpa, which are expected to gradually ramp up production between 2016 and 2020 (compared with Australia’s expected nameplate capacity of around 85 mtpa by 2018).<sup>9</sup> Long-term agreements from US LNG projects with Asian customers for 40 mtpa of LNG have been announced to date. Around 20 mtpa of this is under tolling agreements, which commit customers to paying a fee for *reserving* liquefaction capacity (rather than necessarily *purchasing* LNG), with additional liquefaction fees only charged for LNG volumes processed. Some of these agreements between Asian buyers and US producers are reportedly linked to the price of US natural gas (at around 115 per cent of the Henry Hub price plus a liquefaction fee of around US\$3/mmBtu). Shipping costs from the US east coast to Asia are expected to be between US\$2/mmBtu

**Graph 9**  
**Natural Gas Prices**



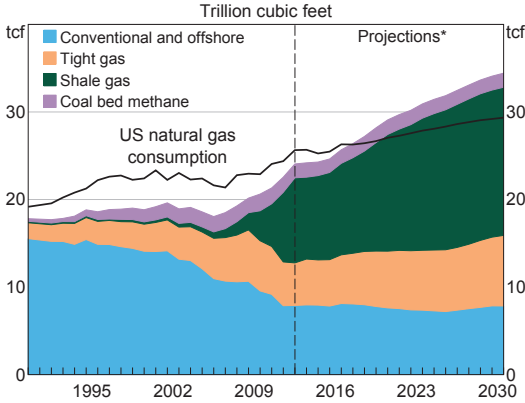
\* Japanese LNG import price from Australia  
Sources: Bloomberg; Thomson Reuters

8 Unconventional oil and gas refers to resources which are generally produced from more tightly formed geological systems, requiring advanced technologies and extraction methods, including horizontal drilling and hydraulic fracturing. This contrasts with conventional production which involves traditional drilling techniques. Unconventional gas is extracted from coal seams (CSG), shale rock and other tightly formed geological areas (dispersed within silts or sands). Unconventional oil production, often referred to as tight oil, is extracted from shale rock, sandstone and carbonate.

9 Currently, 30 mtpa of additional US liquefaction capacity appears likely to proceed and considerably more is under regulatory review. Agreements with customers for prospective capacity are typically a prerequisite for the project receiving final approval.



**Graph 10**  
**US Natural Gas Market Balance by Source**



\* Projections based on the EIA (2014) reference case  
Sources: EIA (2014); RBA

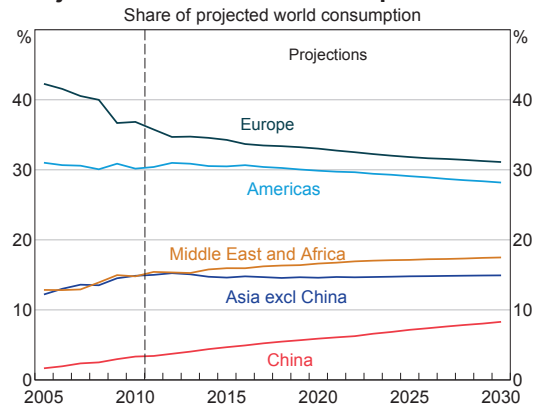
and US\$3/mmBtu (compared with shipping costs from Australia to Asia of around US\$1/mmBtu).

The rise in US natural gas and oil supply has a number of implications for the Asia-Pacific LNG market. Oil prices (and hence LNG prices) have declined sharply over the past year, and additional supply from US unconventional production has been cited as a key factor. Additionally, these developments mean that the United States could potentially become the world’s largest LNG exporter, adding considerably to market supply. Moreover, US exports of LNG based on Henry Hub pricing could substantially reduce the costs of LNG for Asian importers and diversify their energy mix, while providing flexibility for customers (via tolling agreements). Offsetting this, shipping costs from the east coast of the United States to Asia will be higher than Australian shipping costs and the cost of new US liquefaction capacity could be greater in the future.

The significant new LNG supply coming on line over the next decade reflects not only technological advancement but also a response to burgeoning demand for gas, particularly from Asia. Energy agencies project that global natural gas demand will increase by almost 15 per cent by the end of 2020, with China’s demand almost doubling over that period (EIA 2013; IEA 2014) (Graph 11). The actual

and projected increase in Asian demand, particularly from China, reflects government policies designed to reduce reliance on thermal coal for electricity generation and lower carbon emissions. However, the outlook for LNG demand in Asia will depend on the availability and price of competing energy sources (including renewable energy), and the extent to which Asia’s natural gas demand translates into demand for LNG (rather than pipeline imports or locally produced gas).

**Graph 11**  
**Projected Natural Gas Consumption Shares**



\* Projections based on the EIA (2013) reference case  
Sources: EIA (2013); RBA

Alternatives to Asian oil-linked pricing arrangements have the potential to influence the future of the Asia-Pacific LNG market. A period of elevated LNG prices relative to international natural gas prices had prompted some Asian LNG customers to raise the prospect of shifting away from oil-linked pricing and towards other mechanisms that might better reflect fundamental forces of supply and demand for LNG, leading to a range of pricing proposals.<sup>10</sup> These include contracts based on the Henry Hub natural gas price, which is gaining some traction due to the prospect of significant US LNG exports by the end of the decade. However, Henry Hub-based LNG pricing is not guaranteed to result in lower energy

<sup>10</sup> For a detailed discussion of alternative pricing structures in the Asia Pacific, see IEA (2013); Rogers and Stern (2014).

prices than oil-linked contracts, particularly given the liquefaction and transportation costs involved. Contracts based on the Asian spot price of LNG have also been advocated.

The confluence of new sources of LNG supply, the evolution of demand and alternative pricing arrangements are expected to have the greatest influence on future Australian LNG projects, given most existing (and forthcoming) production is committed under long-term oil-linked contracts. However, the factors outlined above could also affect pricing and volumes of Australia's uncommitted short-term production capacity. As such, the impact on the domestic economy of Australia's increasing LNG production will be determined by the arrangements pertaining to existing projects, which will remain relevant for the foreseeable future given the long-term nature of LNG projects.

## Channels through which LNG Production Affects the Australian Economy

The decline in LNG investment and ramp-up in LNG production and exports is expected to affect Australian economic output (real GDP) and national income in a number of ways.<sup>11</sup> LNG investment contributed an estimated ¼ percentage point on average to Australian annual GDP growth between 2008 and 2013, once the high share of imported inputs used to construct these projects is taken into consideration. The peak in LNG investment was in late 2013, and the continued falls in LNG-related investment will subtract from GDP growth in the next few years as the construction of large-scale projects is gradually completed. As the projects begin to ramp up production, the Bank currently estimates that LNG exports will contribute around ¾ percentage point to GDP growth in 2016/17. The timing of the boost will depend on whether

these projects are completed on schedule and how quickly production is ramped up. As production of LNG gradually stabilises at a higher level, the boost to GDP growth will dissipate although GDP will remain at a higher level.

LNG is expected to become Australia's second largest commodity export in value terms after iron ore by 2018. This means that LNG will have an increasingly important bearing on Australia's terms of trade over the next few years. As Australia's LNG export prices are tied to oil prices, fluctuations in the global price of oil will have an important effect on the terms of trade (see 'Box A: Oil Price Scenarios and LNG Export Prices'). While changes in the terms of trade do not directly affect real GDP, they will affect the purchasing power of domestic income. This effect is commonly measured by comparing the change in real GDP with the change in real gross domestic income (real GDI), which deflates nominal exports by import prices rather than export prices (RBA 2015). However, in the event that LNG prices boost the terms of trade (e.g. if oil prices were to increase over the next few years), the real GDI measure will overstate the increase in purchasing power of national income as some of the benefit from the rise in terms of trade will accrue to foreign investors (e.g. through dividend payments to non-resident owners of LNG companies operating in Australia), and as a greater share of gross income will be used to offset depreciation of the LNG capital stock as it increases in size. Real net national disposable income (real NNDI) attempts to adjust real GDI for these effects. While it is difficult to gauge the share of foreign ownership of the LNG industry, it is estimated to be substantial. This suggests that a sizeable portion of profits will flow to foreign investors.

With this in mind, the rise in LNG export receipts is expected to affect the domestic economy in a number of different ways. Household incomes are boosted for those employed in either the LNG investment or production phase. However, liaison and company reports suggest that the production phase of LNG is highly capital intensive and will not

<sup>11</sup> This discussion assumes that all production is destined for the export market and also does not explore the likely effects this LNG production will have on domestic gas prices and its subsequent impact on output.

Box A

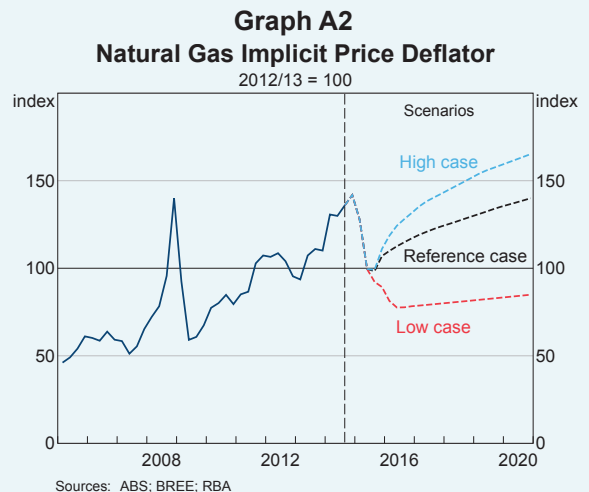
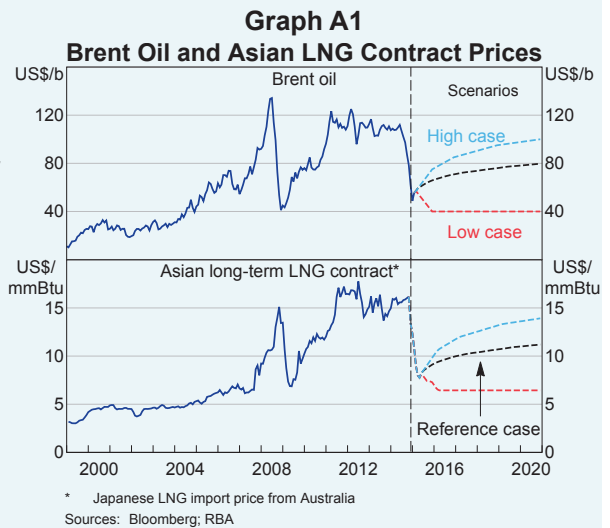
# Oil Price Scenarios and LNG Export Prices\*

The price of Australia’s current and future LNG production is linked to the price of crude oil, so fluctuations in the oil price will affect the terms of trade (and hence Australian living standards). This box explores the sensitivity of Australian LNG export prices to fluctuations in oil prices under three scenarios: a ‘reference case’ which assumes that Brent oil prices follow futures prices as at February 2015 (i.e. oil prices move higher to US\$80 per barrel by the end of 2020); a ‘low case’ where oil prices fall to US\$40 per barrel; and a ‘high case’ which assumes oil prices increase to US\$100 per barrel.<sup>1</sup>

Under the reference case, Asian LNG prices under long-term contracts are estimated to fall to a low of US\$8/mmBtu by mid 2015 (in lagged response to the sharp fall in oil prices seen to date), before increasing to US\$11/mmBtu at the end of the scenario horizon (Graph A1).<sup>2</sup> This is considerably lower than the price observed in recent years (reflecting the sharp fall in oil prices over the past year) but above the price of US\$6.5/mmBtu under the low case.

Using the historical relationship observed between oil prices and Australian gas export prices, the natural gas implicit price deflator in

the reference case is assumed to fall sharply in 2015 before gradually returning to its earlier level (Graph A2). This reflects the recovery in Brent oil prices implicit in the futures curve.

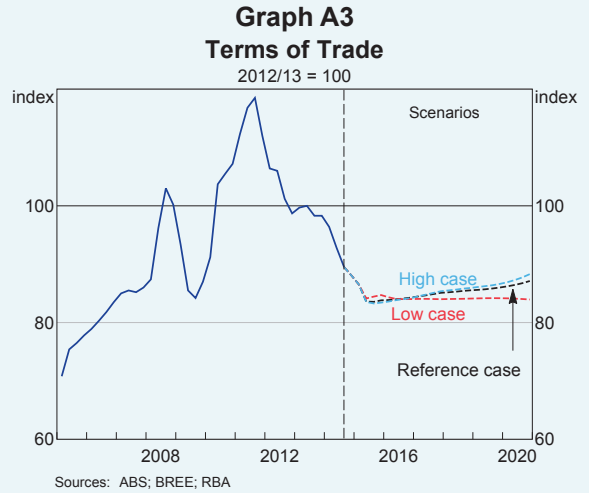


\* The authors would like to thank Trent Saunders for his valuable technical assistance in this analysis.

1 LNG export volumes are assumed to follow BREE’s (2014) long-run projections until 2018/19 and are constant thereafter. For all other variables, RBA estimates taken at the time of the February 2015 *Statement on Monetary Policy* are used until the June quarter of 2017 and are assumed to be unchanged thereafter.

2 The Asian long-term LNG contract price used in this analysis assumes a price slope of 13.5 per cent and a constant of US\$0.5/mmBtu. The contract price is assumed to follow a one month lag of the Japanese Customs-cleared Crude oil price, which is proxied by the 3-month average of the Brent oil price, one month lagged.

The terms of trade reach a trough in mid 2015 under the reference scenario, largely reflecting the impact of lower bulk commodity prices (Graph A3). As Australia is a net oil importer, the terms of trade are boosted by lower oil prices in the near-term. This is expected to be offset to some extent by lower LNG prices; this effect is small in the near term but is expected to grow as LNG exports increase in importance. The terms of trade under the low scenario are 3 percentage points lower than the reference case by the end of 2020, which reflects the US\$40 per barrel difference between the two scenario oil price assumptions in 2020.



require as much labour as the investment phase. Household incomes will also be supported via the domestic share of the profits of LNG companies. To the extent that the increase in government revenues (discussed below) are passed on to households via transfer payments or changes to taxes, this will also support household incomes. The effect of changes to domestic gas prices resulting from increased LNG production for export markets will offset some of these factors on real household incomes.

Government revenues are also expected to rise as LNG production increases. Federal government revenue will increase via corporate tax income and the petroleum resource rent tax, while some state and territory governments will receive higher royalties. The magnitude of the increase to revenues will depend on the prevailing oil price and royalties arrangements between state and territory governments and LNG producers, and the extent to which tax payments will be reduced by deductions (which are assumed to be fairly large in at least the first few years of production).

## Conclusion

By 2018, Australia is expected to become the world's largest exporter of LNG. The bulk of these exports have been purchased by Asian importers under long-term contracts, and the price of these is linked to the oil price. There are a number of factors that are likely to influence the Asia-Pacific LNG market over the next decade, including the emergence of the United States as a key supplier of LNG and the gradual change in the scale and composition of energy demand in Asia. Australian production of LNG is expected to ramp up substantially over the

next few years, providing a significant contribution to domestic output. The effect on Australian living standards will be less noticeable than this given the low employment intensity of LNG production, the high level of foreign ownership of the LNG industry and, in the near term, the use of deductions on taxation payments. ✎

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# China's Property Sector

Alexander Cooper and Arianna Cowling\*

Property development, especially of residential property, represents a sizeable share of China's economic activity and has made a considerable contribution to overall growth over recent history. Residential property cycles in China have been larger than cycles in commercial real estate, and may pose risks to activity and financial stability. The current weakness in the property market differs somewhat from previous downturns as there are indications that developers may be much more highly geared than in the past, contributing to financial stability risks. Although urbanisation in China may provide support for property construction in coming years, weakness in the residential property market is likely to persist. Policymakers have taken actions to support activity and confidence in the market, and have scope to respond with further support if needed. However, broader concerns about achieving sustainable growth may limit the scale of any stimulus they are willing to provide to the sector.

## Background

Private property markets are still a relatively new phenomenon in the People's Republic of China, having been established through a series of reforms beginning in the early 1980s.<sup>1</sup> Prior to this period, all property was publicly owned, and the state operated as both a developer and landlord; urban housing was allocated by employers on the basis of seniority and family size. From 1980, the government began to experiment with private property rights for individuals, and in 1988 the State Council (China's central legislative body) officially announced its intention to reform the sector by establishing a housing market. The national constitution was amended to allow land-use rights to be purchased and traded, and as part of state-owned enterprise reforms of the 1990s, many households were allowed to purchase the apartments formerly assigned by

work units.<sup>2</sup> In 1998, the State Council abolished employer-allocated housing and introduced a range of methods for households to finance the purchase of property. These reforms led to the transfer of a large proportion of the urban residential housing stock into private hands (Yang and Chen 2014).

Despite the continued development of private property markets, a considerable share of property constructed in China is not freely traded. In urban property markets, tradable, or 'commodity' properties, are constructed by developers on land acquired at public auctions.<sup>3</sup> Buyers of these properties have the transferable right to occupy, rent or sell the premises for a specified, lengthy leasehold period (although not, in theory, in perpetuity) (Wu, Gyourko and Deng 2012).<sup>4</sup> Around 70 per cent of residential property constructed is 'commodity',

\* The authors are from Economic Group. This work benefited from earlier internal work undertaken within Economic Group by Kelsey Wilkins.

1 Private property markets have largely been an urban phenomenon in China, and so this article focuses on the urban property sector.

2 Historically, a government-controlled work unit, or *danwei*, was responsible for providing members with employment, housing, social security, education and welfare.

3 Commodity property refers to property developed for sale to third parties, in the sense of Marx (1957).

4 All land in China is still publicly owned, and land rights refer to the right to lease and use the land, rather than to the land itself. Residential land rights are for up to 70 years, while leases for commercial purposes are generally limited to 40 years, or 50 years for industrial purposes.

while for other types of property, such as offices and factories, the share is around 30 per cent.

A considerable share of the recently constructed urban housing stock has been social housing. The Chinese Government's social housing program is designed to provide affordable housing to lower-income households. It includes both housing for sale below market prices and subsidised rental housing. In recent years, there were around 5 million social housing units completed per annum in urban areas, and around 7 million 'commodity' residential property completions.<sup>5</sup>

Households have historically purchased property using savings, rather than through credit, and the Chinese mortgage market is highly regulated. Down payment requirements for mortgages have varied over time, depending on government policy, but are typically 30 per cent for first homes and 60 per cent for additional properties. Interest rates on mortgages are quoted relative to a benchmark lending rate set by the People's Bank of China (PBC); banks can only offer rates above a certain multiple of the benchmark rate, as determined by the PBC. Mortgage rates also differ depending on whether the loan is for a first property.

Notwithstanding China's high home ownership rate, which was estimated at close to 90 per cent in urban areas in 2014 (Li 2014), in recent years there has still been considerable demand for new residential property development. This demand has been driven by a range of factors. First, although China's urbanisation rate has risen from 42 per cent to 55 per cent over the past decade, it is widely expected to rise further, and the Chinese authorities have announced a target of 60 per cent for 2020 (State Council 2014). Second, while population growth has been declining and is projected to slow further (UN 2013), the average household size has also been falling. This is consistent with the replacement of multigenerational households with

'nuclear family' households, and implies that more stock is required to house the population. Third, much of the existing housing stock is of low quality. A survey conducted as part of the 2010 census found that 16 per cent of urban households had no access to toilet facilities, and that 10 per cent lacked a kitchen. Demand for replacement and upgrading of housing is likely to provide some support to dwelling investment growth in coming years.

Another driver of demand for residential property has been household investment. Notwithstanding relatively low rental yields, the limited investment alternatives make residential property an attractive store of wealth for households. In addition, although the government levies taxes on property transactions, there are currently no recurrent taxes on residential property.<sup>6</sup> This preference for housing as a store of value may, however, change as China's financial markets deepen and opportunities for investment at home and abroad develop further.

Many of these same forces also drive the demand for non-residential property. As population centres have grown due to rising urbanisation, the influx of residents has underpinned demand for a range of non-residential property, such as factories, offices, shopping malls and other forms of retail space. Although the costs of holding commercial property are higher than for residential property (with recurrent taxes levied on commercial properties), commercial real estate assets can also be attractive to institutional investors. Some financial institutions and their subsidiaries are permitted to hold commercial property, and insurers may hold up to 10 per cent of their assets as office and retail property.

Rapid growth over the past decade has meant that real estate development now makes up a large share of investment in China, accounting for around one-quarter of total fixed asset investment (FAI) in 2014 and around 12 per cent of GDP in

<sup>5</sup> There is likely to be some overlap between these two categories of property completions.

<sup>6</sup> Some property tax trials have been implemented in Shanghai and Chongqing, and a recurrent tax may be expanded to more regions of China in the future.



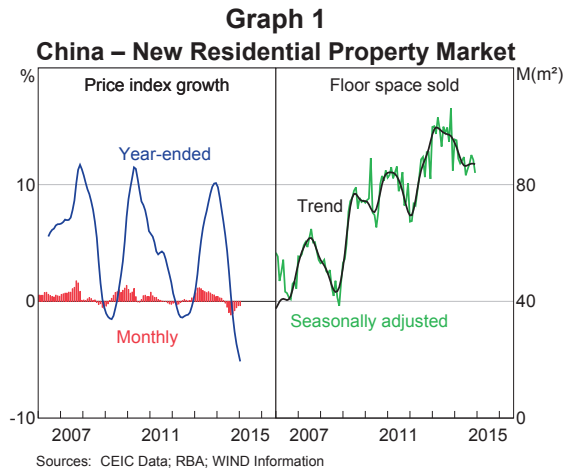
2013 (and higher according to some estimates).<sup>7</sup> About two-thirds of this investment was directed to residential property, with the remainder going to commercial and retail buildings (15 per cent), office buildings (6 per cent) and other types of buildings (11 per cent).<sup>8</sup> According to the 2010 census, persons employed in the real estate and construction sectors accounted for around 8 per cent of urban employment.

### Trends in the Property Market

Historically, property prices in China have displayed a strong cyclical pattern (Graph 1). Despite the price falls seen during cyclical downturns, the national average residential property price has risen by at least 50 per cent over the past decade.<sup>9</sup> This growth has led the authorities to become more concerned about housing affordability. Although prices in most major cities have followed broadly similar cycles, the rates of price growth have varied across cities of different sizes. Until recent months, residential property price growth had been particularly strong in the very large 'first-tier' cities of Beijing, Guangzhou, Shanghai and Shenzhen (Graph 2). Growth in 'second-tier' cities and 45 other smaller cities had not been as strong. First-tier, second-tier and these other cities have populations averaging around 17, 9 and 5 million

persons, respectively.<sup>10</sup> Notwithstanding the large size of first-tier and second-tier cities, the majority of urban property sales, as measured by floor space sold, occur outside of those cities (Graph 3).

Based on data available for 10 cities, price growth cycles for office and retail buildings exhibit somewhat similar patterns to that observed for



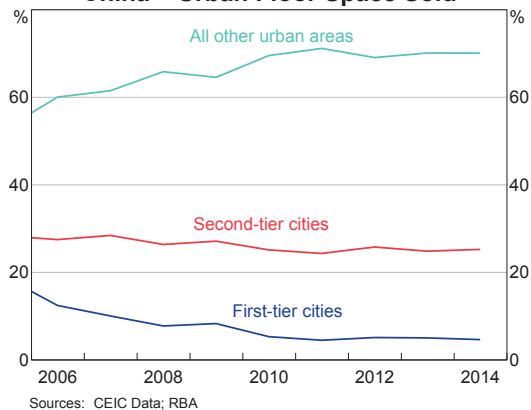
7 This calculation is subject to considerable uncertainty, as real estate FAI includes land sales and asset transfers, which would not normally be included in a national accounts measure of investment. Multiplying the ratio of real estate industry FAI to total FAI by the overall investment-to-GDP ratio suggests that real estate investment could make up around 12 per cent of GDP. Some authors report higher estimates: for example, the International Monetary Fund reports a share of 13 per cent of GDP in 2013, and 33 per cent if related upstream and downstream sectors (e.g. real estate services and materials suppliers) are included in the calculation (IMF 2014).

8 These shares are mirrored in the Chinese construction activity statistics, which suggest that 68 per cent of floor space constructed in China in 2014 was for residential property, 7 per cent for commercial and service buildings, 5 per cent for office buildings, 13 per cent for factories, and the rest for other types of buildings.

9 The National Bureau of Statistics (NBS) residential property price measures are useful as indicators of cyclical developments, but are likely to be subject to downward bias, suggesting that the 50 per cent growth seen over the past decade is an underestimate. For more information on the sources of this bias, see Deng, Gyourko and Wu (2012) and Chen and Wen (2014).

10 These figures are based on broad population estimates that include persons other than urban residents. Here, second-tier cities are defined to be Changchun, Changsha, Chengdu, Chongqing, Dalian, Fuzhou, Hangzhou, Harbin, Hefei, Jinan, Nanchang, Nanjing, Ningbo, Qingdao, Shenyang, Suzhou, Taiyuan, Tianjin, Wuhan, Xiamen, Xi'an and Zhengzhou.

**Graph 3**  
China – Urban Floor Space Sold

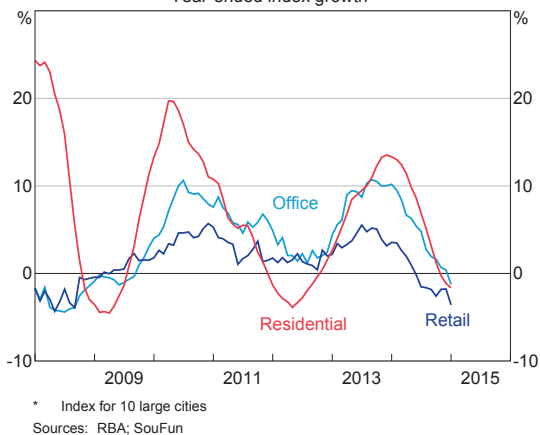


residential property prices (Graph 4).<sup>11</sup> However, recent cycles have been more subdued than those seen in the equivalent residential property markets. Investment in residential and non-residential property also tend to follow a similar cycle, although growth of non-residential investment is more volatile (Graph 5).

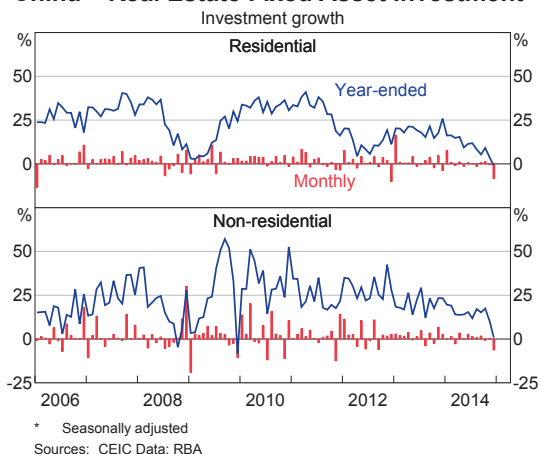
The Chinese property market entered its most recent downturn in 2014, with a broad-based decline in prices across the country. Between April and December, average residential property prices in major cities fell by 5 per cent, to be 4 per cent lower in year-ended terms.

The three major price cycles over the past decade have coincided with a range of government policies aimed at stimulating or dampening activity in the residential property market (Table 1). These policies have attempted to constrain demand when prices have been rising rapidly, and to support demand when price growth has weakened. The authorities have also implemented measures aimed at boosting supply during times of strong demand. While many of these policies are directed by the central authorities, over the years the State Council has instructed local governments to take more responsibility for ensuring the stable and

**Graph 4**  
China – New Property Prices  
Year-ended index growth\*



**Graph 5**  
China – Real Estate Fixed Asset Investment\*  
Investment growth



healthy development of local property markets (State Council 2011, 2013). Continued challenges faced by the Chinese authorities include improving housing affordability and discouraging speculative activity in the property market. Property cycles are also affected by broader economic conditions, for example the global financial crisis, during which prices, sales volumes and investment all weakened (see Graph 1 and Graph 5).

<sup>11</sup> Retail and office price index data are for 10 cities: Beijing, Guangzhou, Shanghai and Shenzhen (first-tier); and Chengdu, Chongqing, Hangzhou, Nanjing, Tianjin and Wuhan (second-tier).

**Table 1: Chinese Residential Property Market Cycles**  
Major policy measures

Cycle	Date	Measures	Goal
2006–2009	Late 2007	Increase benchmark interest rates Increase minimum down payment requirement for second home mortgage Increase minimum interest rate for second home mortgage	Tighten
	Late 2008 and early 2009	Lower minimum down payment requirement Lower interest rate for first home mortgages Provide interest rate discounts for borrowers with a good credit rating Lower several property transaction-related taxes Allow some second home mortgages to be treated as first home mortgages (which have more favourable terms)	Stimulate
2010–2012	2010	Increase benchmark interest rates Increase minimum down payment requirement for first, second and third home mortgages, and later suspend third mortgages Increase interest rate for second mortgage 78 state-owned enterprises whose core business is not property ordered to exit the market Local governments in around 50 cities introduce limits on the number of properties people can purchase based on their existing holdings In some cities, purchases by non-residents banned	Tighten
	2011	Increase benchmark interest rates Increase minimum down payment requirement for second home mortgages Increase interest rate for second mortgage	Tighten
	2012	Lower minimum interest rates Some local governments ease first home buyers' access to finance, such as lowering of mortgage down payment requirements	Stimulate
2013–	2013	Increase minimum down payment requirement for first and second home mortgages, ban on mortgages for third homes Local authorities given more autonomy to manage local mortgage conditions as needed	Tighten
	2014	Local authorities unwind house purchase restrictions, allow investors to buy additional properties and non-residents to purchase housing; by the end of the year, restrictions remain in only the four 'first-tier' cities Redefine first home buyers to include those who have already paid off their first mortgage, to meet lower down payment requirements Lower minimum interest rates for mortgages	Stimulate

Source: RBA

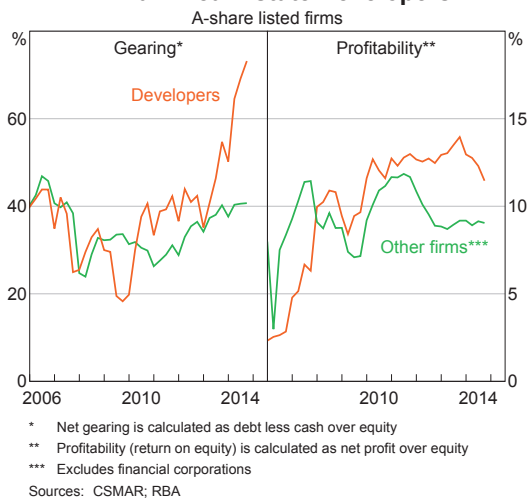
## Implications for Developers

Property market conditions can have a substantial impact on real estate developers and their activities. Data from the NBS show that there were over 91 000 real estate enterprises in China in 2013. Collectively, these firms had total assets worth 72 per cent of the value of GDP. However, it is likely that this includes a range of firms, such as real estate services providers, as well as developers, and limited information is available about the financial health of most of these individual enterprises.

Financial reports of listed property developers are one of the most detailed sources of information on the impact of current conditions on the real estate developer sector.<sup>12</sup> These listed firms account for around 10 per cent of total sales and around 6 per cent of total assets of developers, so they are not necessarily representative of the sector. Nevertheless, for these listed firms, the current property cycle is differentiated from previous cycles by the unprecedented rise in leverage, which has coincided with a decline in profitability and a rise in inventories. Aggregate gearing for listed real estate developers in 2014 was considerably higher than for listed firms outside the sector (Graph 6). This has largely been driven by higher levels of long-term debt, which constitutes three-quarters of debt outstanding; the level of cash holdings remains high, but has grown very little since the start of 2013.

Over the past decade, the profits of listed developers have grown strongly, with a sharp rise in aggregate profitability over 2006 and 2007 (Graph 6). Profitability declined a little following the 2007–08 downturn, although it quickly recovered. Profitability improved again in 2013, but has since fallen. Despite this, the share of firms facing losses remains around its average since 2010. Listed developers appear to have suffered less than listed firms in other sectors in the period after the global financial crisis and to have

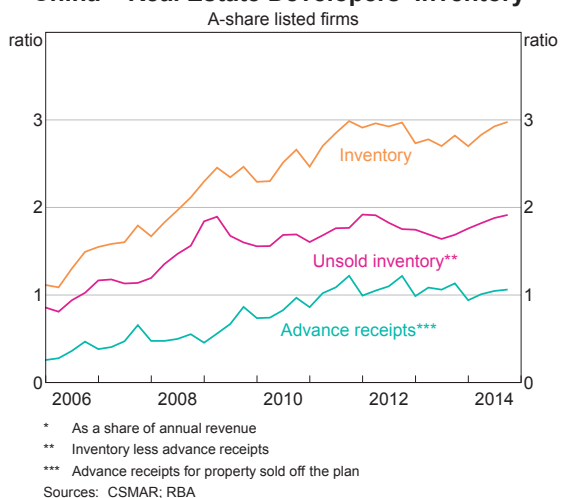
**Graph 6**  
**China – Real Estate Developers**



been more profitable than other firms in China since 2012, although the gap in profitability is narrowing.

The value of listed developers' inventories as a proportion of revenue increased significantly in the years prior to 2011, and has fluctuated at around those levels since (Graph 7). A large share of residential property is sold 'off the plan' in China, which provides developers with advance cash flow in the form of prepayments. Adjusting for

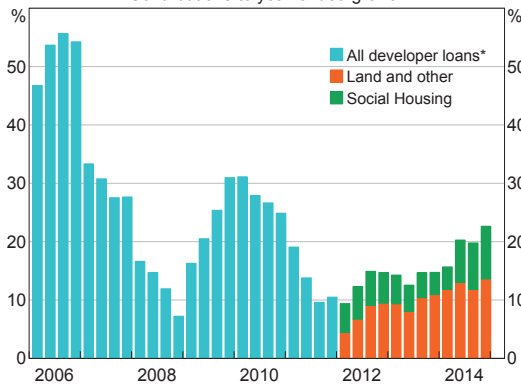
**Graph 7**  
**China – Real Estate Developers' Inventory\***



<sup>12</sup> We use information from around 130 real estate developers listed on the Shenzhen and Shanghai stock exchanges.

this, the ratio of 'unsold' inventories to revenue is considerably lower. While the unsold inventory ratio has risen somewhat over 2014, it has been at similar levels previously. Rising inventories among listed property developers are consistent with reports of a growing number of unsold properties in urban areas. Such reports suggest that the ratio of housing inventory to sales in 2014 was greatest in the smaller cities of China, with excess inventory problems not as large in the first- and second-tier cities (IMF 2014). Rising leverage among listed developers has coincided with a broad-based weakening of funding sources available to developers. Authorities have attempted to curb loan growth by limiting developers' access to bank lending since 2010 (Graph 8). However, there has been an increase in the growth of credit to developers since 2012, largely due to loans intended for the development of social housing, which coincides with the authorities' expressed support for the construction of social housing (State Council 2013).<sup>13</sup> Reports suggest that informal restrictions on lending to developers were tightened in 2010 in response to concerns

**Graph 8**  
China – Real Estate Developer Loans  
Contributions to year-ended growth

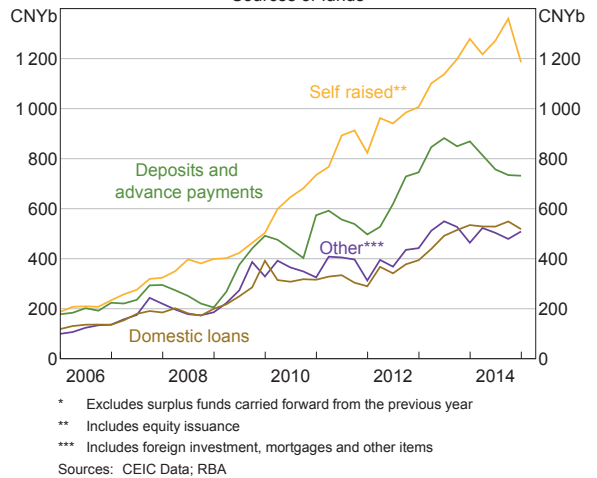


\* Individual contributions are not available prior to 2012  
Sources: CEIC Data; RBA

<sup>13</sup> See *China Daily* (2010). These measures coincided with wider attempts to restrict the activities of developers, for example ordering 78 state-owned enterprises to exit the market in 2010, requiring developers to submit funding plans for review and auditing developers' land holdings (to prevent land hoarding and speculation).

about credit risk and that lending to developers has continued to be monitored closely.<sup>14</sup> Indeed, data on the sources of funds used for real estate investment show that growth of domestic loans has been much slower than for some other sources of funding over the past few years, particularly 'self-raised' funds, which include a range of non-bank funding sources (Graph 9). A considerable share of funds raised by property developers comes from outside the formal banking sector, including from trust companies and entrusted lending (bank-intermediated intercompany finance), the bond market and other lending channels.<sup>15</sup> Over the past few years, the second largest source of funds for real estate investment has been deposits and advance payments, growth of which follows a somewhat similar cycle to property prices.

**Graph 9**  
China – Real Estate Investment Funding\*  
Sources of funds



\* Excludes surplus funds carried forward from the previous year  
\*\* Includes equity issuance  
\*\*\* Includes foreign investment, mortgages and other items  
Sources: CEIC Data; RBA

<sup>14</sup> For more detail, see *China Daily* (2010), IMF (2013) and State Council (2013).

<sup>15</sup> Trust loans to developers amounted to about CNY1.3 trillion in 2014. However, some trusts classified as investing in financial institutions may also ultimately be financing real estate projects. In addition, funding of the construction industry in 2013 by trust companies amounted to around CNY400 billion, although not all of this would have been related to real estate construction.

## Potential Risks

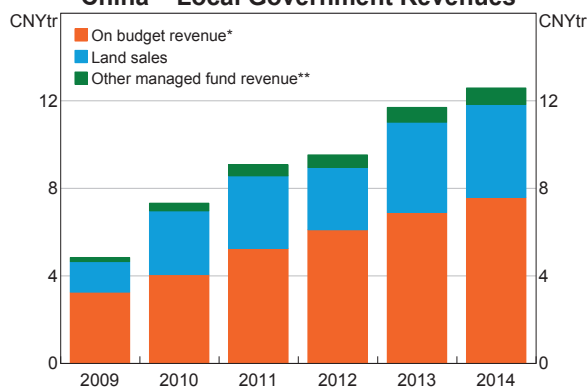
As construction investment represents a sizeable share of China's economic activity, weaker conditions in the property market, and particularly the residential market, are likely to exert downward pressure on economic growth. Weakness in the property market has the potential to affect not only property investment, but also activity in sectors that supply building inputs such as steel and cement. Weaker demand for steel could influence imports of raw materials such as iron ore and coking coal, which account for a significant share of Australia's trade with China.<sup>16</sup> In addition to direct effects on the Chinese construction industry and associated imports of commodities, subdued property market conditions could also affect the downstream consumption of real estate services and complementary goods, such as white goods and furniture. To the extent that a decline in property prices affects the wealth of households, it could also have an impact on the growth of household consumption.

The direct exposure of the banking sector to the real estate market is moderate; household mortgages and loans to property developers represent about 14 and 7 per cent of banks' lending, respectively. China's high savings rate and the large minimum down payment requirements for mortgages mean that households are not highly leveraged. However, weakness in new residential property sales can place pressure on real estate developers' balance sheets, and there is a greater chance of financial losses in the event of a sharp decline in the housing market. Although property developers raise sizeable funds outside the banking sector, the banks are ultimately intermediating much of this lending and so are also exposed to this risk indirectly. To the extent that regulatory supervision and internal risk assessment is weaker for some of these funding channels than for the formal banking sector, there is a greater chance

of financial losses in the event of a sharp negative correction in the property market.

A more general risk to the financial system relates to the correlation between residential property prices and land values. Local governments have been responsible for much of the infrastructure investment and construction spending in China. Moreover, most have relied heavily on revenue from land auctions, and proceeds of land rights auctions account for about a third of combined local government revenue (Graph 10).<sup>17</sup> To the extent that weaker conditions in the property market lead to reduced expenditure on land and falls in land prices, this could reduce overall fiscal revenues and constrain local government-led investment in infrastructure and property. Much of this investment is conducted on behalf of the authorities by local government financing vehicles, which rely on land as collateral when they borrow funds. Land is also an important source of collateral for financing in China more generally, so widespread and sustained declines in land prices could have broader implications for financial stability. Available measures of land price

**Graph 10**  
**China – Local Government Revenues**



\* Such as revenue from lotteries  
\*\* Excludes central government transfers  
Sources: RBA; WIND Information

<sup>16</sup> Australia's exports to China of iron ore and coking coal have grown significantly in recent years, comprising around 16 per cent and 3 per cent, respectively, of total Australian exports by value in 2014.

<sup>17</sup> Local governments in China raise their own revenue, but also receive transfers from the central government. For example, in 2014, local government budgets collectively included CNY5.23 trillion in transfers from the central government.

growth suggest that the market is in a downturn phase of the cycle (Graph 11).<sup>18</sup>



The Chinese authorities have responded to the latest downturn with a range of policies intended to support the market. These have included relaxing restrictions on the purchase of residential property, easing lending policies for borrowers and actively encouraging banks to lend to financially sound development projects. Naturally, policymakers also have the scope to ease credit conditions for developers, which could be expected to provide further support for activity in the sector, although this would run counter to broader efforts to slow the accumulation of economy-wide leverage. The Chinese Government has repeatedly expressed a desire to manage the risks associated with reliance on debt as a source of economic growth and to avoid excessive stimulus that might increase leverage and worsen structural distortions (PBC 2014). Authorities have also reiterated a need for steady, sustainable and ‘higher-quality’ growth (Li 2015). These concerns suggest that there may be limits to the scale of any additional policy response to the current weakness in the property market.

<sup>18</sup> The Wharton/NUS/Tsinghua Chinese Residential Land Price Indexes, described by Wu *et al* (2012), is a constant quality index that measures the changes in the real value of land in 35 major cities. The methodology used to construct this series and the coverage achieved are very different to that of the Ministry of Land and Resources index, which may explain why the two series show different growth rates.

## Conclusion

Conditions in the Chinese property market, including the outlook for new property construction, are relevant for Australia given that sector’s use of raw materials such as iron ore and coking coal that Australia exports to China. The latest slowdown in the property market has coincided with a pronounced increase in property developer leverage and remains a key risk to Chinese economic growth, financial stability and imports of resource commodities. While the process of urbanisation in China is continuing and will provide a level of support for construction activity in coming years, the property market is likely to remain weak for a time. Various levels of government have taken actions to support activity and confidence in the market. If needed, there is scope for the authorities to respond with further support, but the goals of deleveraging and achieving sustainable growth may limit the extent to which policymakers are willing to provide further stimulus to the sector. ❖

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# Developments in Banks' Funding Costs and Lending Rates

Eduardo Tellez\*

This article updates previous Reserve Bank research on how developments in the composition and pricing of banks' funding have affected their overall cost of funding and the setting of lending rates. The main finding is that the spread between the major banks' outstanding funding costs and the cash rate narrowed a little over 2014. This was due to slightly lower costs of deposits combined with a more favourable mix of deposit funding. The contribution of wholesale funding to the narrowing was marginal as more favourable conditions in long-term debt markets were mostly offset by a rise in the cost of short-term debt. Lending rates declined a little more than funding costs, reflecting competitive pressures.

## Introduction

In setting lending rates, banks consider a number of factors. Banks take into account risk premiums, including the credit risk associated with loans, and the liquidity risk involved in funding long-term assets with short-term liabilities. Banks' growth strategies, competitive pressures and the desire to provide a return to equity holders also affect banks' lending rates. In addition to these factors, a key consideration is their cost of funding, which is a function of the composition and price of different liabilities (Fabbro and Hack 2011).

An important element in determining the overall cost of banks' funding is the level of the cash rate, which acts as an anchor for the broader interest rate structure of the domestic financial system. Nevertheless, changes in the level of compensation demanded by investors to hold bank debt, competitive pressures and non-price factors can exert significant influences on banks' funding costs. There is typically some delay before the full effect of changes in these factors flows through to funding costs and lending rates. In part, this reflects the time that it takes for balance sheet liabilities to be repriced, particularly those with longer terms to maturity.

The Reserve Bank Board takes developments in banks' funding costs and lending rates into account when it determines the appropriate setting of the cash rate. The Board aims to ensure that the structure of interest rates faced by households and businesses is consistent with the desired stance of monetary policy.

The analysis presented in this article updates previous Reserve Bank research.<sup>1</sup> The article focuses on developments in banks' funding costs and lending rates over 2014.<sup>2</sup> It does not cover more recent developments following the reduction in the cash rate in February 2015.

## Banks' Cost of Funding

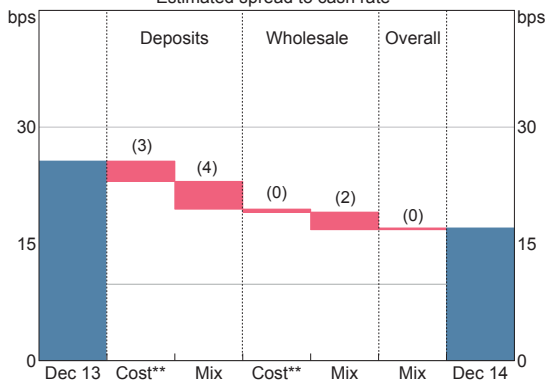
The spread of banks' funding costs to the cash rate is estimated to have narrowed by about 9 basis points in 2014 (Graph 1). With the cash rate unchanged over the past year, the slight narrowing in the spread was entirely due to changes in the absolute cost and mix of funding liabilities. In particular, the narrowing was driven by a lower cost of deposit funding and changes in

\* The author is from Domestic Markets Department.

1 For details, see Berkelmans and Duong (2014).

2 The Reserve Bank uses a wide range of information to derive the estimates presented in this article. It supplements the analysis with detailed discussions with financial institutions.

**Graph 1**  
**Major Banks' Funding Costs**  
Estimated spread to cash rate\*



\* RBA estimates; bracketed numbers represent negative contributions to the overall change in the spread and may not add to the total due to rounding

\*\* Includes the cost or benefit of interest rate hedges

Sources: APRA; Bloomberg; RBA; UBS AG, Australia Branch

the composition of deposits. Changes in the costs and composition of wholesale funding (i.e. bonds and bills) contributed only marginally to the fall in funding costs. Nonetheless, funding costs relative to the cash rate remain significantly higher than they were before the global financial crisis in 2008.

### Deposit funding

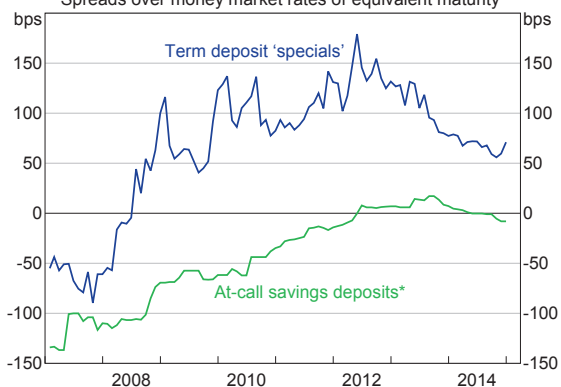
Over 2014, lower deposit costs and changes in the mix of deposits contributed in similar measure to a small narrowing in the overall spread of banks' funding costs to the cash rate. Deposit costs contributed 3 basis points to the narrowing, as competition in the deposit market moderated over the year. This is consistent with the deposit share of banks' funding stabilising through the year and an easing in funding conditions in wholesale markets. Changes in the deposit funding mix also contributed 4 basis points to the overall fall in banks' funding costs, as funding shifted from relatively expensive term deposits to transaction and at-call accounts.

### Deposit interest rates

Interest rates offered on some types of deposits declined over the year. The cost of outstanding term deposits is estimated to have fallen by about 40 basis points as deposits issued at higher rates

matured and were replaced by new deposits at lower rates.<sup>3</sup> Similarly, the major banks' advertised 'specials' on new term deposits fell by about 40 basis points over the past year. The decline outpaced equivalent market benchmark rates over most of the year, although the spread widened at the end of the year due to a sharp decrease in benchmark rates (Graph 2).

**Graph 2**  
**Major Banks' Deposit Rates**  
Spreads over money market rates of equivalent maturity

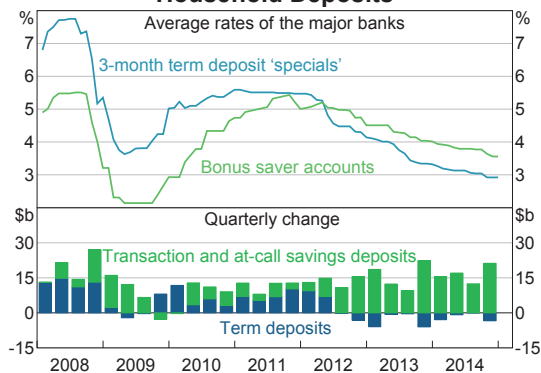


\* Spread to cash rate; existing customers only; excludes temporary bonus rates

Sources: Bloomberg; CANSTAR; RBA

The interest rates offered on at-call savings deposits declined by a similar amount to term deposit specials over 2014. However, interest rates on some at-call accounts, such as bonus or reward savings accounts, have been higher than rates on term deposit 'specials' for some years and this continues to be the case (Graph 3). Banks are willing to pay a premium on bonus savings accounts because they are a relatively stable source of funding. This owes to their contractual requirements for minimum monthly deposits or limitations on withdrawals in order to receive a higher interest rate for that month. Moreover, depending on their particular features, these deposits may qualify for a more favourable treatment than other types of deposits under the new liquidity standards recently implemented by the

<sup>3</sup> As a result of the introduction of the Liquidity Coverage Ratio, most banks have changed or are changing the conditions of term deposits to make them explicitly unbreakable.

**Graph 3****Household Deposits**

Sources: APRA; CANSTAR; RBA

Australian Prudential Regulation Authority.<sup>4</sup> These standards provide a strong incentive for banks to encourage customers to move into deposit products with more stable characteristics.

Interest rates on traditional online savings accounts remained broadly unchanged. These accounts typically offer an interest rate close to the cash rate and are generally repriced in line with movements in the cash rate. To attract new deposit funding without increasing the cost of their existing deposit base, some banks continue to offer an additional bonus of over 100 basis points to new online customers. These bonus rates are generally for a short period of time, such as four months, after which the customer receives the standard online rate.

In an effort to further increase their stable funding base, a few banks also offer notice of withdrawal accounts. These accounts require depositors to provide advance notice (generally a minimum of 31 days) of their intention to withdraw funds from the account. Advertised interest rates for these accounts have been lower than those available for bonus saver accounts and similar to those offered on term deposit 'specials'. Nonetheless, notice of withdrawal accounts only represent a small share of banks' total deposit funding.

As in previous years, many traditional transaction accounts continue to offer zero interest rates. As

they are essentially fixed-rate liabilities, their relative cost depends on the level of the cash rate. Since the cash rate was unchanged over the past year, the contribution of transaction deposits costs to changes in banks' funding costs was negligible (see below for the contribution from changes in the deposit mix).

Banks often attempt to mitigate changes in the cost of transaction deposits relative to the cash rate by using interest rate hedges, which transform these deposit liabilities into a portfolio of variable-rate liabilities. Over the past year, these hedges have contributed a little to the decline in banks' funding costs. Due to the recent sustained low interest rate environment, longer-term fixed rates have fallen, diminishing the benefit to the banks from these hedges. This has resulted in estimates of net payments to banks on new hedging contracts to be lower than net payments on expiring contracts.

Offset deposit accounts, which are linked to a housing loan, continue to grow at a faster rate than other transaction and at-call savings deposits. These accounts are popular with mortgage holders since they reduce the interest calculated on the loan. Their contribution to major banks' funding costs, however, is minor since they only represent a small share of total deposits.

### Deposit mix

Since mid 2012, the level of funding from transaction and at-call savings deposits has continued to grow, while the level of term deposits has been little changed (Graph 4). Because the cost of outstanding term deposits is higher than most at-call savings deposits and all transaction deposits, this shift in the mix has lowered the cost of deposit funding. Nonetheless, term deposits are still an important source of deposit funding, representing close to 40 per cent of banks' total deposit liabilities.

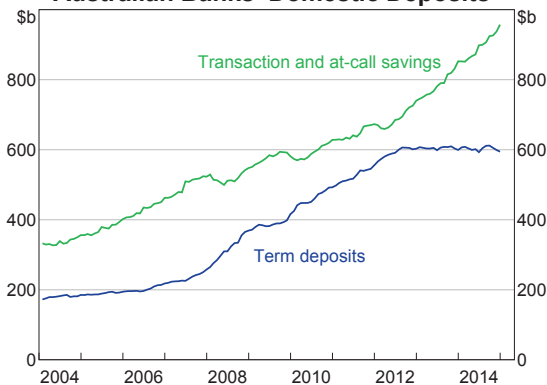
### Wholesale funding

Over 2014, the direct contribution of changes in wholesale funding costs to changes in banks' funding

4 For details on the new liability standards, see APRA (2014).

**Graph 4**

**Australian Banks' Domestic Deposits\***



\* Break-adjusted; not seasonally adjusted; excludes foreign currency deposits and certificates of deposit

Sources: APRA; RBA

costs was negligible despite significant changes in wholesale funding interest rates. A decline in the cost of long-term debt was broadly offset by an increase in the cost of short-term debt. Similarly, the composition and level of wholesale funding made a marginal contribution to the fall in banks' funding costs. Interest rate hedges on wholesale funding also had a minimal influence on funding costs. Overall, the mix of wholesale debt in banks' funding was little changed over the past year (Graph 5).

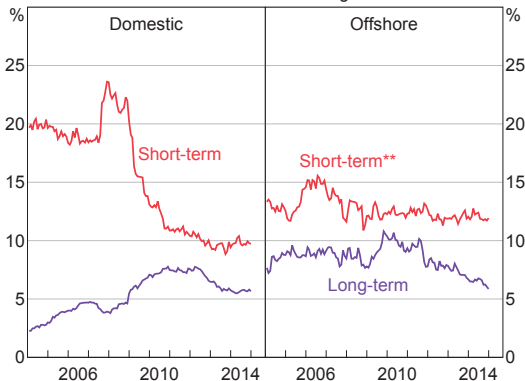
The absolute cost of issuing long-term wholesale debt declined substantially over the past year. The fall in yields for major banks' senior unsecured debt was broadly similar to the decrease in benchmark risk-free rates (Graph 6), with a narrowing in spreads over the first half of 2014 reversed in the second half. While spreads are wider than their levels prior to 2007 they remain much narrower than they were during 2008–12. For lower-rated (single A) issuers, conditions improved over the year more than for higher-rated (double A) issuers, with the difference between the two narrowing.

Consistent with more favourable conditions in long-term wholesale markets over 2014, bank bond issuance was higher than in 2013. This partly reflected greater issuance by lower-rated banks as access to a range of funding markets improved significantly over the year. The average cost of outstanding

**Graph 5**

**Wholesale Funding\***

Share of total funding



\* Adjusted for movements in foreign exchange rates; wholesale debt is on a residual maturity basis

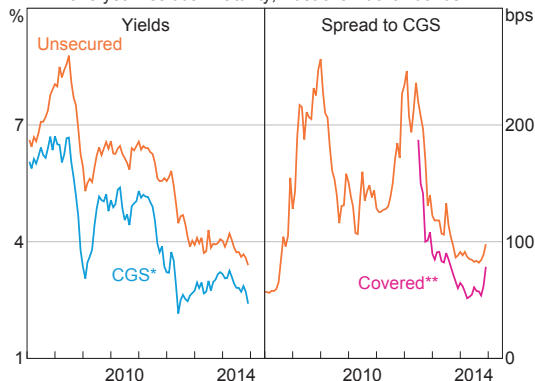
\*\* Includes deposits and intragroup funding from non-residents

Sources: APRA; RBA

**Graph 6**

**Major Banks' Bonds**

3–5 year residual maturity; Australian dollar bonds



\* Commonwealth Government securities

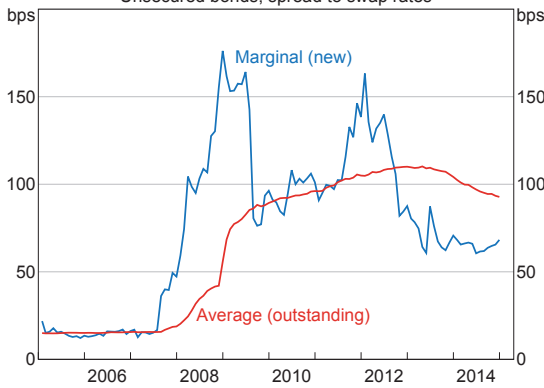
\*\* Covered bond pricing interpolated to a target tenor of 4 years using bonds with a residual maturity between 2 and 10 years

Sources: Bloomberg; RBA; UBS AG, Australia Branch

bonds continued to decline over the year, as bonds previously issued at higher rates matured and were replaced with bonds issued at lower rates (Graph 7). If spreads on new issuance remain around current levels, the average spread is likely to continue declining for the next few years.

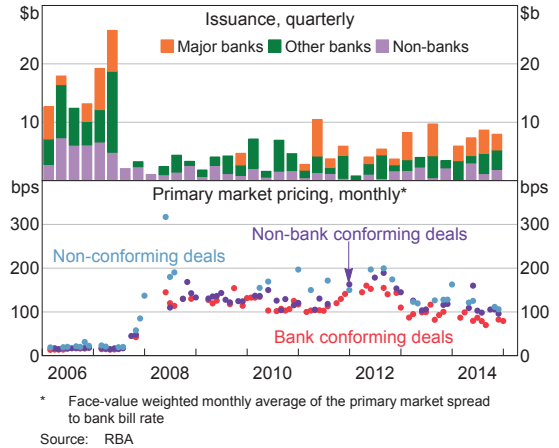
Banks' issuance of covered bonds over 2014 was modest, and similar to 2013 (Graph 8). Covered bonds generally attract lower interest rates than unsecured bonds due to the additional security

**Graph 7**  
**Major Banks' Domestic Bond Spreads**  
Unsecured bonds, spread to swap rates



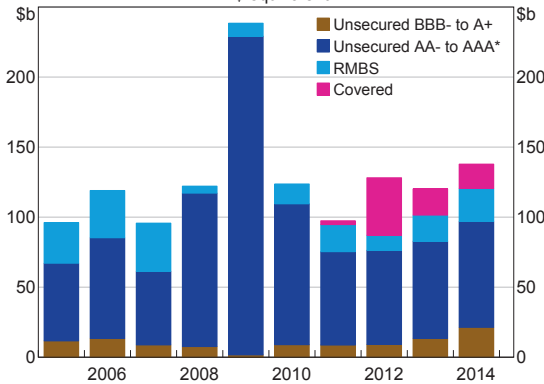
Sources: Bloomberg; RBA; UBS AG, Australia Branch

**Graph 9**  
**Australian RMBS**



\* Face-value weighted monthly average of the primary market spread to bank bill rate  
Source: RBA

**Graph 8**  
**Australian Banks' Wholesale Issuance**  
A\$ equivalent



\* Includes a small share of unrated issuance  
Source: RBA

offered to investors from their dedicated pool of collateral, as well as the expanded investor base to which these securities appeal. While Australian banks' covered bond issuances are capped at 8 per cent of domestic assets, banks continue to maintain some spare capacity to issue covered bonds in the event of heightened stress in global financial markets.<sup>5</sup>

In 2014, activity in the securitisation market – particularly for residential mortgage-backed securities (RMBS) – continued its gradual recovery after declining sharply in 2007 (Graph 9). Both major and non-major banks recorded stronger issuance

over the year. In contrast, issuance by non-banks remained weak. RMBS spreads to the bank bill rate continued to narrow a little, with some bank conforming RMBS deals pricing at the tightest spreads since 2007.<sup>6</sup>

Banks' use of short-term wholesale funding (i.e. with maturity less than a year) was little changed over 2014. The composition of short-term debt remains fairly evenly split between domestic and offshore sources. However, ahead of the introduction of the new prudential liquidity regulations, banks increased the term of their domestic short-term issuance and reduced the issuance of 1-month securities.

Relative to expectations of the cash rate (as implied by the 3-month overnight indexed swap rate) the cost of short-term wholesale debt increased over 2014. The widening in the spread between bank bills and overnight indexed swaps was most pronounced at the longer bank bill maturities. In part, this reflected the new prudential liquidity regulations for banks. Under the new regulations, issuing bills with a maturity shorter than 30 days carries a higher relative cost for banks since they would have to hold an equivalent amount of high-quality liquid assets (Debelle 2014).

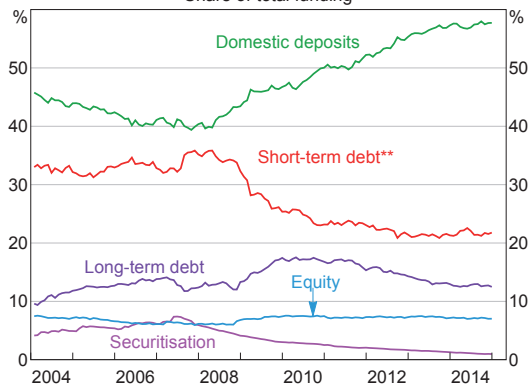
5 For further details on covered bonds, see Aylmer (2013).

6 Conforming mortgage loans are those made to borrowers who meet the normal eligibility requirements of the mainstream lenders.

### Funding composition

The trend toward a greater use of deposit funding that has been evident over the past five years moderated in 2014 (Graph 10). A small rise in the share of deposits and short-term debt was largely accommodated by a small fall in the share of long-term debt. These changes in the overall funding composition are estimated to have had a negligible effect on the major banks' funding costs relative to the cash rate.

**Graph 10**  
**Funding Composition of Banks in Australia\***  
 Share of total funding



\* Adjusted for movements in foreign exchange rates; tenor of debt is estimated on a residual maturity basis

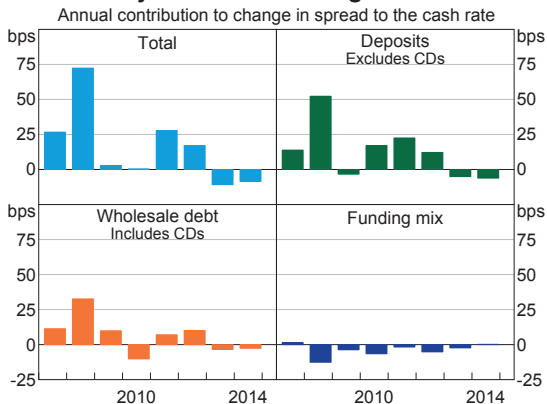
\*\* Includes deposits and intragroup funding from non-residents

Sources: APRA; RBA; Standard & Poor's

### Overall cost of funding

As mentioned previously, there are a number of factors that influence banks' total debt funding costs, including changes in risk sentiment and competition for funding sources. These factors affect both the price of banks' funding liabilities and the composition of their balance sheets. Taking the cost of the individual funding sources noted above and weighting them by their share of total bank funding provides an estimate of banks' overall funding costs. Following this approach, over the past year the major banks' funding costs decreased by an estimated 9 basis points, due to a lower cost of deposits and a more favourable mix of funding *within* both deposits and wholesale debt (Graph 11). The small changes in

**Graph 11**  
**Major Banks' Funding Costs\***  
 Annual contribution to change in spread to the cash rate



\* RBA estimates

Sources: APRA; Bloomberg; RBA; UBS AG, Australia Branch

the mix of funding *between* deposits and wholesale debt made no discernible contribution to the decrease in banks' funding costs.

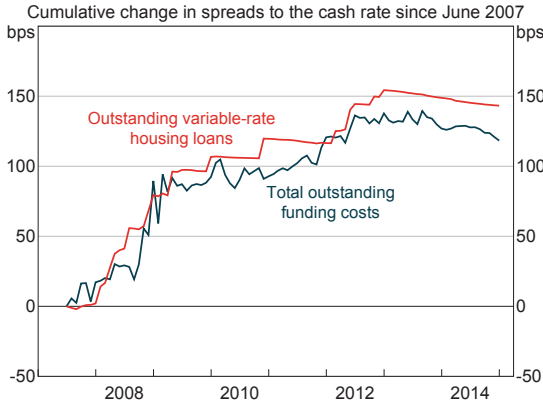
### Banks' Lending Rates

In setting lending rates, banks take account of the cost of funding liabilities and the desired return on equity, as well as the margin designed to cover expected losses from making a loan. After the global financial crisis, increases in the cost of some of these factors – predominantly an increase in banks' funding costs – contributed to a widening of the spread between lending rates and the cash rate. Over the past two years, however, lending spreads have narrowed, driven by decreases in funding costs and competitive pressures in lending markets.

During 2014, the estimated average interest rate on outstanding variable-rate housing loans continued to drift lower relative to the cash rate (Graph 12). The overall outstanding rate declined as new or refinanced loans were written at lower rates than existing and maturing loans. This reflected a sizeable reduction in fixed rates over the year and an increase in the level and availability of discounting below advertised rates.

**Graph 12**

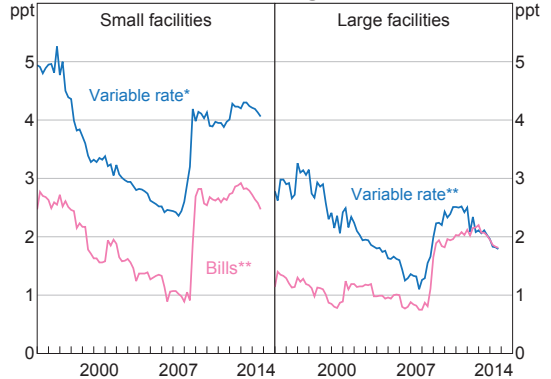
**Major Banks' Lending and Funding**



Sources: ABS; APRA; Bloomberg; Perpetual; RBA; UBS AG, Australia Branch

**Graph 13**

**Spreads on Outstanding Business Loans**



\* Spread to the end-quarter cash rate  
 \*\* Spread to the 3-month trailing average of the 90-day bank bill rate  
 Sources: APRA; RBA

The interest rates on around two-thirds of business loans are typically set at a margin over the bank bill swap rate rather than the cash rate. While these spreads remain wider, reflecting the reassessment of risk since the global financial crisis, they have generally trended down over the past two years (Graph 13). Much of the narrowing of spreads over 2014 was due to average business lending rates declining by over 20 basis points, with outstanding rates for small business decreasing by more than rates for large businesses.

Over the past few years, banks' funding and lending rates have moved together closely, with declines in funding costs contributing to declines in lending rates. Over 2014, competition in lending markets resulted in the overall outstanding lending rate falling a little more than funding costs, with the spread between the two narrowing by about 10 basis points. ↗

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# Market Making in Bond Markets

Jon Cheshire\*

In November 2014, the Committee on the Global Financial System (CGFS) published a report on developments in market making and proprietary trading in fixed income and related derivative markets (CGFS 2014). The aim of the report was to facilitate a better understanding of how ongoing changes in these activities may affect liquidity in markets and to assess whether these changes are driven by market or regulatory forces. The report found that there have been changes in liquidity conditions across markets, including in Australia, with market activity becoming more concentrated in the most liquid instruments and declining in less liquid ones. These changes in market-making activity have been driven by both market-based developments and regulatory change. To the extent that liquidity risks were underpriced in the period prior to the global financial crisis, many of the subsequent changes in market structure and the increase in liquidity premiums are welcome. However, with the changes still ongoing, bond issuers and investors will be likely to have to make further adjustments to the way in which they operate in fixed income markets and manage liquidity risks.

## Introduction

Market makers are providers of liquidity in financial markets, serving as the intermediary to facilitate transactions between buyers and sellers. In performing this role, they contribute to the efficient functioning of financial markets, which is critical for the allocation of capital in the economy. Changes in liquidity conditions in these markets can have implications for the transmission of monetary policy and financial stability.

The CGFS report on market making and proprietary trading provides a framework for understanding the role of market makers as liquidity providers in fixed income markets (CGFS 2014). The report outlines the trends and drivers of changes in the supply of, and demand for, market-making services and the implications of these changes for the functioning of markets. It draws on information

from all major financial markets, and was informed as well by interviews and an informal survey of market participants. This article summarises the main observations highlighted in CGFS (2014) and provides an Australian perspective.

## Market Makers in Bond Markets

Most bond trading takes place in over-the-counter (OTC) markets rather than on exchanges. One of the main reasons for this is that the large number of different bonds issued means that there is only a small chance of finding matching orders to buy or sell a particular security, unlike equity or currency markets where products are more standardised. The role of matching demand and supply orders is performed by market makers – typically the fixed income units of banks and securities trading firms. These firms fill orders either by finding matching orders or by acquiring the position themselves. If they do the former they are acting like an agent or broker, whereas if they assume the position, they are

\* The author is from Domestic Markets Department. The author would also like to acknowledge the valuable input to this article from a number of colleagues and market participants, and in particular Kateryna Kopyl.

## MARKET MAKING IN BOND MARKETS

committing their own capital and taking on risk for which they expect to earn an appropriate return.<sup>1</sup>

Most countries have regulations defining market making.<sup>2</sup> A core element of these definitions is that market makers simultaneously quote prices at which they are prepared to buy and sell securities (i.e. two-way prices) on a regular basis. There are often more detailed contractual arrangements between market makers and trading venues or issuers. Some countries (although not Australia) restrict access to central government debt issuance markets (primary markets) to primary dealers (PDs). PDs must meet specific requirements, which include making markets in these securities. In return, PDs have preferential access to debt auctions and other debt management operations. This arrangement typically results in market makers competing strongly in secondary markets, and in some cases these operations can be loss making. Other issuers may have similar but less formal arrangements with market makers in order to ensure that there is a sufficiently active secondary market. However, smaller issuers, such as most corporations, are generally more concerned with ensuring that they can issue in the primary market and typically do not make arrangements to promote secondary market liquidity.

### An operating model

There are a number of requirements to be a market maker in a bond market including: capital and other types of funding; an appropriate risk management framework, which, among other things, details the amount of risk that a market-making desk can assume; access to hedging instruments; expertise in quoting prices and managing financial risks in all market conditions; and a sufficiently large client base. The market maker's interaction with the various internal units and the market more generally

is illustrated in Figure 1. A market maker generates income from facilitating transactions and earning revenue on the inventory of securities it holds.

Facilitation revenues are based on the difference between the price at which a market maker is prepared to buy a security and the price at which they are prepared to sell that security (the bid-ask spread), net of the cost of transacting. Transaction costs include trading fees (such as broker fees, custodial fees and clearing costs) and funding, hedging and capital costs. A market maker's bid-ask spread will be narrower, and quoted volumes larger, in markets where they can offset the position quickly with a high degree of certainty and if funding costs are low. During times of heightened volatility, the risk of a given position increases and market makers tend to quote wider spreads, or smaller quantities, in order to reflect this. A market maker's bid-ask spread may also change in response to shifts in underlying factors, such as market conditions in funding or hedging markets, internal governance arrangements, capital costs, and their client base. Regulation and compliance costs will also have an influence on these factors.

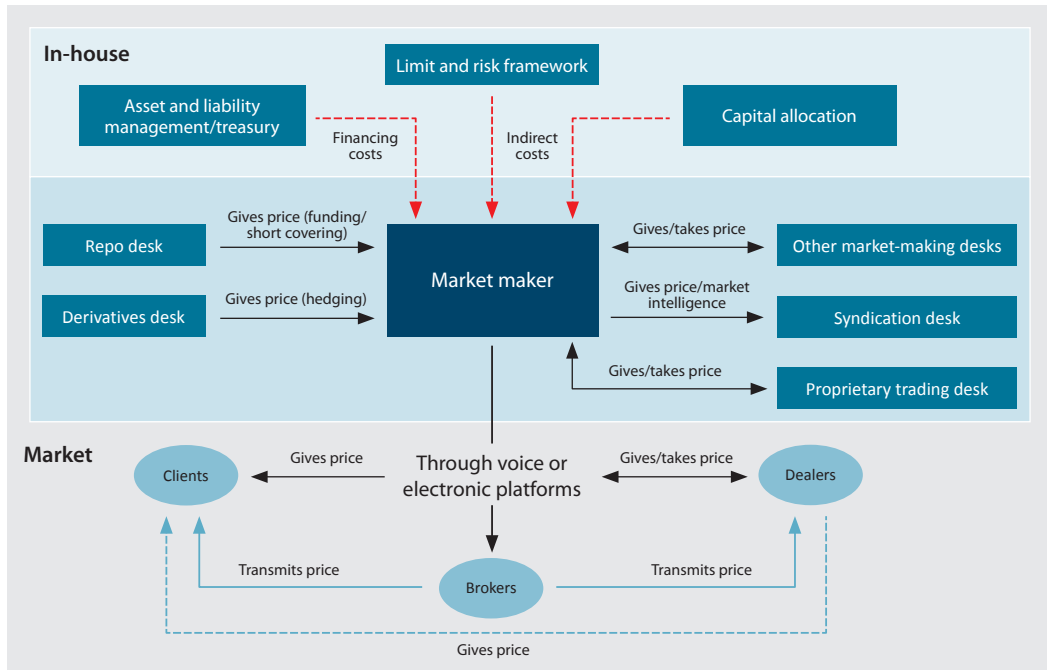
Revenue generated by holding inventory results from changes in the value of a position, reflecting movements in the market price of the warehoused asset as well as accrued interest. This revenue is offset by the cost of holding a position in a security, including funding costs such as the cost of borrowing or lending a security in a repurchase agreement and costs associated with hedging risks in derivative markets.

In the past, many global banks ran large internal proprietary trading teams that were closely tied to market-making teams. Market making and proprietary trading activities may be distinguished by their different objectives. Market making is based around providing a service to customers (for a fee) and the importance of the client relationship. This means that intermediaries continue to provide market-making services in less profitable markets or conditions. In contrast, the objective of proprietary

1 Typically, market makers look to hedge most of the credit and market risks from the positions acquired. Acquired positions may also partially or fully offset another position on their books.

2 In Australia, a market maker is defined in the *Corporations Act 2001*. For other countries, see Appendix 2 in the CGFS report (CGFS 2014).

**Figure 1: Market Making – Internal and External Linkages**



Source: CGFS (2014)

trading activities is to make profits for the firm’s own account. As such, they do not need to protect a client relationship and are more likely to withdraw from markets if conditions are unlikely to deliver a profit to them. Despite this distinction, the two activities may appear fairly similar including in their risk profiles, particularly in less liquid markets where market makers may hold positions for an extended period of time.

### Trends in Market Liquidity and Market Making

The CGFS report presented analysis of recent developments in market liquidity and the demand for, and supply of, market-making services based on a variety of metrics and feedback from market participants.<sup>3</sup>

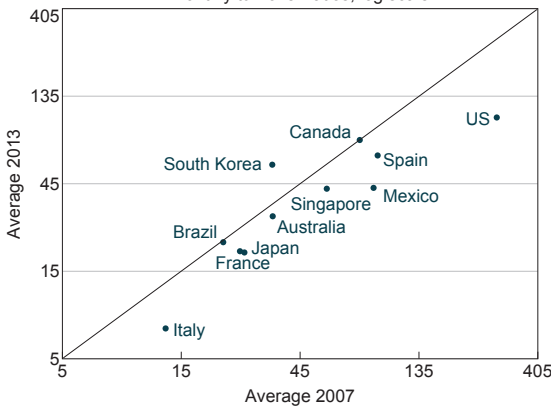
<sup>3</sup> The CGFS report looked at a selection of market liquidity measures including bid-ask spreads, trade and quote sizes, market depth, yield spreads, price impact coefficients and turnover ratios (CGFS 2014). Dealer data included measures of gross and net positions, leverage and capital ratios, and value-at-risk limits.

### Market liquidity

The analysis confirms a picture of lower market liquidity in many bond markets during crisis periods in the United States and Europe, followed by a recovery. This is evident in many of the measures of market liquidity, including turnover ratios and bid-ask spreads. Liquidity in sovereign bond markets, as measured by turnover ratios, has now generally recovered to the levels seen prior to the global financial crisis (Graph 1), unlike liquidity in many corporate bond markets (Graph 2). Of note, the US corporate bond market, which is the largest in the world, has seen a marked decline in its turnover ratio. Feedback from many market participants emphasised a general theme of market activity becoming more concentrated in more liquid instruments and deteriorating in less liquid instruments.

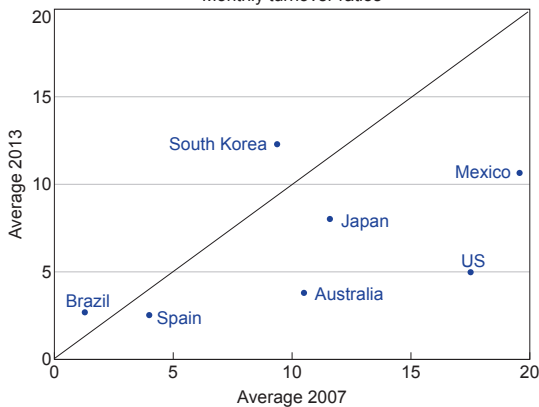
Developments in Australian markets have been consistent with this picture, with liquidity in the Commonwealth Government securities (CGS)

**Graph 1**  
**Sovereign Bond Market\***  
Monthly turnover ratios, log scale



\* Turnover ratios are calculated by dividing the monthly aggregate trading volume by the amount of outstanding issues; yearly average of monthly ratios; the diagonal black line represents the bisecting line  
Source: CGFS members

**Graph 2**  
**Corporate Bond Market\***  
Monthly turnover ratios



\* Turnover ratios are calculated by dividing the monthly aggregate trading volume by the amount of outstanding issues; yearly average of monthly ratios; the diagonal black line represents the bisecting line  
Source: CGFS members

market recovering more strongly after the peak of the financial crisis than activity in the semi-government or corporate bond markets.<sup>4</sup> Local dealers report that the CGS market remains highly competitive in comparison to semi-government and corporate securities markets, where liquidity has generally deteriorated. While there are several reasons

for this, some market makers indicate that the securities markets receiving lower levels of support from market makers are those with a relatively undiversified or concentrated investor base.<sup>5</sup>

In derivative markets, market makers in Australia suggest that activity has been increasing in instruments that are centrally cleared, and falling in many bilateral derivative markets that face higher capital charges and margin requirements. A comparison of activity in interest rate swaps markets (which have been moving to centrally cleared solutions) with cross-currency swap markets (which remain bilateral) is consistent with this, with turnover in interest rate swaps above pre-crisis levels and turnover in cross-currency swaps slightly below. The cross-currency swap market is particularly important for the Australian financial system and the Reserve Bank continues to monitor developments in this market (see Arsov *et al* (2013)).

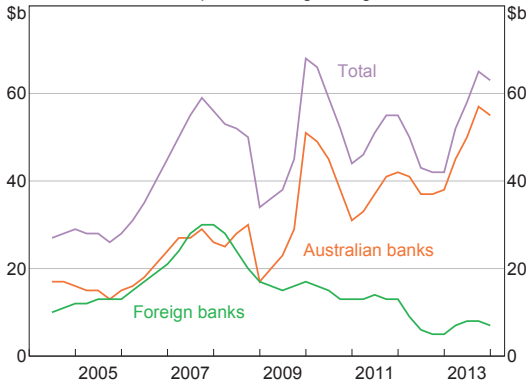
### Supply-side developments

Market makers in many developed markets have changed their business models in the past few years, effectively reducing the supply of market-making services. This reduction is reflected in some metrics, including estimates of dealer inventories and warehoused risk positions. These show a steep decline in inventories held by US and European banks in the crisis years. Inventories remain below their pre-crisis levels, in part because of the closure of several proprietary trading desks. In contrast, there has been strong growth in inventory levels held by emerging market banks. In Australia, an estimate of the aggregate level of inventories has been broadly steady over this period, although there has been a fall in the level of corporate bond inventories and in the share held by foreign institutions (Graph 3). While some foreign market makers have scaled back operations in some Australian markets, other foreign and local participants have seen this as an opportunity to expand.

4 See Lien and Zurawski (2012) for a discussion of developments in the bond futures market.

5 See Debelle (2014) for a discussion of developments in the investor base of the Australian bond market.

**Graph 3**  
**Net Debt Trading Securities\***  
 Four-quarter moving average



\* RBA estimates  
 Sources: APRA; RBA

Feedback from market participants provides more detail on how market makers have changed their business models. These changes have seen market makers allocate less capital, risk and balance sheet capacity to market-making activities. Market makers have focused their activities in core, often domestic, markets and in less capital-intensive markets. Many are also tiering the level of service they offer across clients to better reflect the cost of resources allocated to the client. This has required a more granular assessment of the value of a transaction, often on a per trade per client basis. Many participants are also less willing to hold large inventory positions, particularly in illiquid securities or derivatives. Market makers are turning over their inventory more rapidly and operating more brokerage and order-driven business models. This will be likely to result in dealers earning less from inventory revenues than they have in the past.

One feature of this change highlighted by many Australian market makers is that the liquidity offered by a market maker is now more dependent on its client base than its risk warehousing capacity. As a result, there has been a general move by market makers to broaden their client bases and enhance their connectivity. This has contributed to growth in the use of electronic trading platforms in many bond markets, although overall use of these

platforms remains low compared with foreign exchange and equity markets. Part of the reason is that the electronic platforms are only used for a limited range of standardised and smaller-sized transactions. However, multi-dealer electronic trading platforms generally improve price transparency and competition by allowing market participants to access pools of liquidity. This competition can lower the cost of transacting in a security. Furthermore, the move toward greater electronic trading enables market makers to lower the cost of providing their services, potentially offsetting the need to earn greater returns through, for instance, wider bid-ask spreads.

### Demand-side developments

In contrast to the fall in supply of market-making services, the demand for such services appears to have been rising. This is particularly evident in countries where there has been a rapid expansion in the size of their government and non-government bond markets, and is the case in Australia. Globally, much of the increased issuance has been absorbed by investment funds, which offer investors daily liquidity and depend to at least some degree on market liquidity to fulfil this commitment. The CGFS report also highlighted that the increasing concentration of global bond market assets under management would bring greater sensitivity of market liquidity conditions to investment decisions of these market players (CGFS 2014).

Some asset managers have reduced their demand for market-making services by adopting more medium-term portfolio management strategies that require less turnover. These strategies include adjusting their portfolio composition to reflect changing liquidity risks, becoming more opportunistic in the timing of trades and seeking to facilitate trades by leveraging inventory data provided by market makers. Furthermore, longer-term investors, such as pension funds and life insurers, remain well positioned in many markets to mitigate the effects of reduced market-making capacity. This reflects the fact that increased volatility may provide these investors with more

opportunities to take advantage of mispriced deals. However, it is likely that not all asset managers have adjusted their portfolio allocations or modified their internal liquidity risk management strategies to take account of the reduced market liquidity and changing market structure.

### Market and Regulatory Drivers of Change in Market Making

The financial crisis revealed that liquidity risks had been underpriced. Also, funding models for many market makers proved vulnerable to changes in market liquidity conditions and capital requirements for many trading activities were insufficient to absorb losses. The next section discusses how the change in supply of market-making services reflects the reaction of market makers to developments in markets and new regulatory standards.

#### Market drivers

According to feedback from market participants, a reassessment of the risk-return trade-off as a result of market turbulence during the financial crisis has been a key driver of the decline in the provision of market-making services. This reassessment of risk has seen dealers seek higher returns from operating in some markets, reflecting increased funding costs and a desire to earn a higher and more stable return on equity. The focus on generating an appropriate return has come from shareholders, creditors and internal management. Where returns are insufficient to compensate for the risk incurred, banks have scaled back their activity.

One of the key ways in which market forces weighed on market-making capacity was through a rise in funding costs. This rise contributed to a weakening in the relationship between many derivative and physical markets and a deterioration in the effectiveness of hedging strategies. This led many banks to reassess the size of the positions they could hold. For instance, market makers continue to show a greater reluctance to sell bonds that are difficult or costly to source, such as those issued by

supranationals and corporations. Another constraint on market makers' capacity to operate is their ability to hedge or net off positions through other markets. The decline in liquidity in some derivatives markets, and certain credit default swap (CDS) markets in particular, affected the ability of dealers to redistribute risks, further increasing the cost of warehousing positions.

For some banks, the reassessment of risk has resulted in an overall reduction in risk tolerance through tighter risk limits. This is likely to have been the case for some European and US banks, including their operations in Australia. These institutions have scaled back their operations through smaller capital and balance sheet allocations, tighter and more binding value-at-risk (VaR)<sup>6</sup> limits and increased charges for holding inventory. However, even for banks that have not reduced risk limits, the focus on generating an appropriate return from market-making activities has seen their tolerance for warehousing risk reduced if a return hurdle is not achieved. As indicated above, many banks are focusing on assessing the return from each trade or from each customer to ensure a market-making business is generating an appropriate return on equity. The data on bid-ask spreads show that market makers have generally been unable to generate wider spreads (at least for small volumes), and instead have reduced or rationed levels of activity (see CGFS (2014, Section 3.1)).

#### Regulation

Just as banks have adjusted their exposures to market risks through their market-making businesses, regulators have initiated a range of reforms to improve the robustness of the financial system. Table 1 outlines how various regulations are likely to affect market-making activities, based on information gathered from feedback with market participants.

<sup>6</sup> Value at risk (VaR) is a measure of the level of risk that is tolerated and can be expressed at a firm or trading desk level. If a trading bank has a VaR limit of \$1 million with a confidence level of 5 per cent then it expects to lose \$1 million or more once every 20 days.

**Table 1: International Market Participants' Feedback on the Impact of Regulatory Reforms<sup>(a)</sup>**

Area	Regulation	Impact on P&L <sup>(b)</sup>	Potential impact on market making
Solvency	Basel 2.5 market risk framework	Capital costs	Reduction in banks' inventories, in particular for traded credit instruments (e.g. corporate bonds, bespoke credit derivatives).
	Basel III and global systemically important banks capital regulation	Capital costs	Decline in banks' inventories, particularly for assets with high risk weights and limited hedging/netting options.
	Basel III, Leverage Ratio (LR)	Capital costs	Reduction in low-margin/high-volume business, such as market making in highly rated sovereign bonds and repo. Shift towards riskier activities or businesses exempted from LR exposure measure (e.g. central counterparty).
Liquidity	Basel III, Liquidity Coverage Ratio	Funding costs	Reallocation of inventory in favour of eligible high-quality liquid assets at the expense of non-eligible assets.
	Basel III, Net Stable Funding Ratio	Funding costs	Rise in the relative cost of short-term funding reduces the incentive to trade in securities and derivatives.
OTC derivatives reform	Central clearing of standardised derivatives	Clearing costs, other fixed costs (e.g. central counterparty membership fees, compliance)	Shift in market-making activity from non- to centrally cleared derivatives as well as from OTC to exchange-traded derivatives, reinforcing liquidity bifurcation.
	Margin requirements	Capital and hedging costs	Decline in inventories given higher cost of hedging. Reduced market making in derivatives, in particular for non-centrally cleared instruments.
	Market transparency <sup>(c)</sup>	Pricing, compliance costs	Reduction in market making in less liquid instruments if firm quotes need to be made available to multiple parties (pre-trade) and large transactions require timely disclosure (post-trade).
Structural reforms	Prohibition of proprietary trading (e.g. US Volcker rule)	Compliance costs	Impact on desks where banks see risks of failing to prove near-term client demand for market-making activities.
	Separation of banking activities (e.g. EU, UK, US)	Capital and funding costs	Withdrawal from less profitable market-making activities due to rise in cost of doing business at the unconsolidated entity level.
	Short-selling restrictions on government debt and CDS (EU)	Hedging costs	Decline in inventory as hedging costs rise; potentially mitigated by exemptions for market makers.
Taxation	Financial Transactions Tax (e.g. part of EU)	Facilitation revenue	Cascading effect of taxation risks depressing trading volumes in low-margin market-making transactions.

(a) Summary of feedback from interviews conducted with the private sector

(b) Only lists the regulation's expected primary impact on market makers' profit and loss statement – that is, does not account for changes in general cost factors (e.g. compliance, IT infrastructure investment) or feedback effects (e.g. reduced leverage could lower banks' funding costs by reducing the risk of default)

(c) These include US rules for swap execution facilities and EU rules for markets in financial instruments

Source: CGFS (2014)

## MARKET MAKING IN BOND MARKETS

Participants in the CGFS survey were also asked about the impact of the regulatory reforms on their overall profit from market-making activities, inventory levels, facilitation activities and hedging activities. The survey indicated an expectation that there would be a moderate decline in overall market-making activity as a result of regulations.

There was significant variation in responses across countries and markets. The impact of regulations on market makers in developed markets was expected to be larger than on those in emerging markets. In Australia, the impact appears to lie in between these two groups. This may reflect the fact that Australian banks do not have large trading operations in comparison to some US and European banks, so there is less scope for them to be affected. On the other hand, a significant proportion of market-making services in Australia are supplied by foreign banks, which have faced greater pressures from some regulations. Furthermore, Australian financial markets are more integrated into global capital markets than many emerging markets, meaning that changes in conditions in overseas markets are more likely to be transmitted into domestic markets.

The responses to the CGFS survey are summarised below.

- **Leverage ratio:** Survey respondents indicated that the leverage ratio, which limits the build-up of excessive leverage in the banking system, would have the largest impact on their fixed income business. This was also true in Australia, although the size of the impact was expected to be much smaller with Australian banks indicating that the impact would be moderate whereas some foreign banks with operations in Australia indicated that the impact on them would be significant.
- **Capital requirements:** More stringent capital requirements were seen as having a moderate impact on market-making activity overall but with a more pronounced impact on inventory levels of more risky assets and derivatives. A similar impact is expected in Australia and this is

consistent with the reduction in inventory levels of riskier securities such as corporate bonds and some derivatives.

- **OTC derivatives reforms:** Mandatory clearing of standardised OTC derivatives was expected to have a limited impact on market-making activity. Some banks indicated that these reforms would have a mildly positive effect on facilitation and hedging activities because banks faced reduced costs from operating in these markets. Regulations on margin requirements for non-centrally cleared derivatives were expected to have a moderately negative impact on overall market-making activity and have caused some pricing fragmentation.
- **Liquidity regulations:** The impact of these regulations is seen to be modest for most banks, although more complicated in Australia due to the limited supply of high-quality liquid assets (HQLA) and the introduction of a committed liquidity facility. Banks noted that the effect of these regulations was for banks to hold higher levels of HQLA in their home jurisdictions.
- **Proprietary trading:** Whereas around half of global respondents indicated a moderate impact on market-making activity from regulations restricting proprietary trading, Australian banks indicated that there would be very little impact. Since the financial crisis, some regulatory effort has gone into distinguishing market making from proprietary trading in order to limit the amount of proprietary trading undertaken by banks. Large proprietary trading desks have not been a feature of the Australian dealer market for some time, with a few ceasing operations in the past few years.

Participants were also asked to indicate how much progress they had made in adjusting their market-making business to the various regulatory reforms. Reflecting the different pace at which regulatory reforms are being implemented in different jurisdictions and differences in the amount of adjustment required by banks across jurisdictions, there is some variation in the progress Australian



banks have made compared with that of overseas banks. For instance, liquidity coverage ratio arrangements came into effect on 1 January 2015 in Australia, ahead of the United Kingdom, United States and many European countries, although some banks in these jurisdictions are also already compliant. Fewer banks globally and in Australia have fully adjusted their businesses to the leverage ratio, which banks are required to disclose this year but only fully comply with from 2018. However, some global banks have made significant adjustments in order to comply with this measure by the disclosure date whereas most Australian banks indicated that less adjustment was necessary. Meanwhile, most banks have made progress in adjusting to the new risk-weighted capital requirements and proprietary trading rules, and at least some progress in moving to mandatory clearing arrangements. Most global and Australian banks indicated that there is more work to do to adjust to the rules on margin requirements. Overall, this indicates that there may be further effects on market-making businesses from the new regulations.

## Market Implications

### Cost of transacting and issuing debt

A steady increase in demand for market-making services and flat or falling supply could cause both trading costs to rise and market liquidity to fall. The evidence compiled in the CGFS report suggests that there has not been a widespread increase in the cost of trading, although there have been at least some changes in market liquidity across instruments (CGFS 2014). It is likely that there has been an increase in the time taken to trade large amounts, particularly in less liquid instruments. There has also been some rationing in the supply of market making across customers. In some markets, the rise in trading costs has been constrained by the level of competition among market makers and lower operating costs that have been achieved through rationalisation of business models and greater use

of electronic platforms. In Australia, for instance, CGS and centrally cleared derivatives markets have remained more competitive than some other bond and non-centrally cleared derivatives markets. Unlike the CGS market, where market-making capacity lost through the withdrawal of some players has been replaced by the entry or expansion of others, the corporate bond market has seen an overall decline in market-making capacity and an increase in transaction costs. The CGFS report also notes that the current stance of monetary policy in some jurisdictions is contributing to compressed liquidity premiums and is likely to be delaying some of the adjustments that could be made (CGFS 2014). As such, greater trading costs may only be revealed as monetary policy is normalised in some countries.

Higher liquidity costs could result in bond issuers, particularly corporate issuers, paying a higher liquidity premium at issuance. In Australia, credit spreads have compressed sharply over the past few years (though they remain above pre-crisis levels), mainly reflecting the repricing of credit and liquidity risk. In response, corporate issuers could structure issuance to enhance the liquidity of their securities by, for example, reopening lines of issuance rather than creating bespoke (i.e. non-standardised) securities to limit the number of distinct securities. They could also standardise maturity dates to align them with derivative expiry dates (though this could accentuate cash flow mismatches for the issuer). However, there is little evidence that corporate issuers have made any significant adjustments beyond making greater efforts to sell securities to 'buy-and-hold' investors that do not value secondary market liquidity.

### Market robustness

A likely implication of a reduction in the supply of market-making services is that many markets are less liquid and more volatile, on average. To the extent that market liquidity was previously oversupplied and incorrectly priced, this is a desirable outcome. Furthermore, while both market and regulatory

forces have driven change, it was the intention of many regulations to reduce the risk of systemic stress by limiting the extent to which banks could be a source of contagion in markets. That is, in order for the markets to be more robust many banks need to play a different role.

While these developments should decrease the likelihood that banks will be a source of contagion in times of stress, it also means that banks are less likely to cushion large order imbalances that may cause market volatility.<sup>7</sup> The role of absorbing these imbalances may therefore be taken on by other market participants. In effect, therefore, limits on the amount of risk that banks can or are willing to absorb has resulted in a transfer of liquidity and market risks to investors. Nevertheless, many of these investors are better placed to manage these risks because they are less sensitive to short-term price movements than banks.

That said, many markets and market participants are still adapting to the structural changes. For instance, the CGFS report noted that there is little overall evidence that asset managers and other institutional investors have raised their liquidity buffers or altered the redemption terms of their funds to better reflect their liquidity risks (CGFS 2014). A consequence of this is that funds that rely heavily on market liquidity (such as those that make explicit or implicit promises of daily liquidity) may contribute to a stressed market sell-off, rather than dampen it. The CGFS report also outlined other factors that could increase the probability of an order imbalance, including:

- the compression of liquidity premiums to very low levels in many markets, comparable to those prevailing prior to the crisis and insufficient to compensate for the risks
- a reduction in the diversification of bondholders through an increase in the market share of large

<sup>7</sup> Analysis of dealer positioning and market liquidity in times of stress revealed that US dealers contributed to the bond market sell-off in May 2013 through a reduction in inventories. The analysis concluded that the reduction in inventories was caused by internal risk preferences, not regulatory constraints.

asset managers and greater correlation among investment strategies

- the increased concentration (and therefore less diversification) in the supply of market-making services in many markets.

## Ongoing Developments

In emphasising that the markets are still undergoing a process of change, the CGFS report outlined a number of initiatives that should support more robust market liquidity conditions. Initiatives that market participants or industry bodies could adopt (supported by the relevant authorities) include:

- improving the transparency and monitoring of market-making capacity and market liquidity with a view to keeping track of the impact of regulatory and other structural changes
- improving liquidity risk management by other market participants such as managed and pension funds, and financial and non-financial corporations to ensure that their risk management frameworks account for the transfer of liquidity risk
- supporting the robustness of hedging and funding markets through, for example, the use of central counterparties or tri-party repo
- ensuring that market makers are resilient and can withstand stressed market conditions, and that capacity is not overly concentrated
- improving market-making arrangements by expanding incentive schemes for market makers and through greater standardisation of debt securities by less frequent non-sovereign issuers.

One of the most important issues for Australia is the transfer of liquidity risk from market makers to other investors. This is likely to result in increased volatility, although the current stance of monetary policy in major regions may be dampening this change. Nevertheless, liquidity risk management presents an ongoing challenge for market participants, particularly for managed and superannuation funds.

Another issue of importance for Australia is the cost of transacting in and access to non-centrally cleared derivatives markets, such as the cross-currency swap market. This has important implications for the financial and non-financial sectors that seek to hedge risks using these instruments. One element of controlling the costs of transacting in these instruments and improving market liquidity may be finding a centrally cleared solution for them. Work on this front is ongoing (see CFR (2014)). ❖

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# Shadow Banking – International and Domestic Developments

Josef Manalo, Kate McLoughlin and Carl Schwartz\*

One of the lessons from the global financial crisis is that systemic risk to the financial system can arise from outside the regular banking system, in so-called ‘shadow banking’. This article reviews post-crisis international and domestic trends in shadow banking, and regulatory efforts to better understand and address potential risks that may arise. In Australia, systemic risks arising from shadow banking appear limited given its relatively small size and minimal links to the banking system, but it remains an area for regulators to monitor and better understand.

## Background and International Regulatory Developments

The Financial Stability Board (FSB) defines shadow banking as credit intermediation involving entities and activities (fully or partially) outside the regular banking system (FSB 2013). Such intermediation can support economic activity by providing additional funding sources for the economy, including for riskier market segments that may find it relatively difficult to access bank funding.

However, these activities can pose risks to financial stability, which became clear during the global financial crisis. In a number of countries, a range of incentive problems in securitisation and structured finance markets undermined lending standards and asset quality. A general lack of transparency concealed an associated build-up in leverage and maturity mismatch, and the extent of linkages back to the banking system. When asset quality problems materialised, investors withdrew or tightened the conditions on short-term funding. This prompted financial difficulties in investment vehicles such as money market funds (MMFs) and led to some destabilising asset ‘fire sales’. In the aftermath, credit intermediation in many countries was significantly curtailed, both through the shadow banking system and the banking system given various interlinkages.

Addressing shadow banking risks has therefore been a core part of the international post-crisis regulatory response. As reported to the G20 Leaders’ Summit in Brisbane in November 2014, the FSB has adopted a two-pronged strategy to transform shadow banking into resilient market-based financing (FSB 2014a).

First, the FSB has developed a system-wide international monitoring framework to increase oversight of shadow banking for potential risks. The data generated through this increased monitoring and the refinement of measurement concepts to focus more closely on risk are discussed in the section below.

Second, the FSB has worked with the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions to improve oversight and regulation across five areas:

- mitigating the risks posed by banks’ interactions with shadow banking entities
- reducing the susceptibility of MMFs to runs
- assessing and mitigating risks posed by shadow banking entities other than MMFs
- improving transparency and aligning incentives in securitisation
- dampening procyclicality and other financial stability risks in securities financing transactions.

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Policy development potentially affecting non-bank finance remains under consideration in a number of areas: for example, a recent international focus is to better understand the potential for systemic risk arising from the asset management industry, and possible risk mitigants. However, with a large number of shadow banking policy recommendations from the five workstreams listed above now released, the focus is appropriately shifting to implementation by national authorities and peer review of these actions.

Since the crisis, Australian regulators have taken a number of actions and completed reviews of various aspects of the shadow banking sector. In particular:

- Council of Financial Regulators (CFR) agencies regularly conduct reviews of shadow banking risks; since 2010, the Reserve Bank has reported annually to the CFR on high-level developments in shadow banking and the Australian Securities and Investments Commission has conducted a number of targeted reviews covering possible systemic risk outside the banking sector.<sup>1</sup>
- In April 2014, the Australian Prudential Regulation Authority (APRA) released a discussion paper on its proposals to simplify the prudential framework for securitisation for authorised deposit-taking institutions (ADIs). One of the objectives of the proposals was to ensure that any new prudential regime incorporates the lessons from the crisis, including those specifically associated with agency risk, complexity and mismatched funding structures.
- In November 2014, APRA released final changes relating to the Exemption Order under the *Banking Act 1959* that applies to registered financial corporations (RFCs). The changes are designed to strengthen the regulation of finance companies that issue debentures to retail clients, by making a clearer distinction between products offered by RFCs and those offered by ADIs.

With international reforms now largely finalised, CFR agencies are considering their potential application to Australia. Areas of interest and potential collaboration among the agencies include the following:

- The FSB's framework for managing risks from shadow banking entities other than MMFs, which sets out risks on an 'economic-function' basis and proposes tools for possible action. National authorities' use of this framework will be reviewed by peers in 2015.
- The FSB's information sharing process, which seeks to address some of the data shortcomings in measuring and assessing risks from shadow banking.
- FSB recommendations to strengthen regulation of securities financing transactions, such as the regulatory framework for minimum haircuts, and data collection and aggregation standards.
- BCBS rules that address risks arising from banks' links with shadow banks, such as its framework for banks' equity investments in funds, as well as its large exposures framework, which deals with exposures to single counterparties or groups of connected counterparties (including shadow banks). APRA intends to consult in due course on proposals to appropriately implement these reforms in Australia.

To ensure that any policy actions are proportionate to the risks, the Australian authorities will closely examine how these newly developed risk assessment methods and international standards should apply in Australia. These steps, and any necessary actions arising, will also help to assure the international regulatory community that risks are being addressed appropriately, thereby limiting the risks of spillovers to the international financial system and promoting a level playing field.

<sup>1</sup> Public reporting by agencies on these topics includes RBA (2012) and ASIC (2013).

## International and Domestic Shadow Banking Trends

Part of the FSB's post-crisis response has been to conduct annual monitoring exercises to assess global trends and risks in the shadow banking system.<sup>2</sup> These exercises mainly focus on trends in the asset size of 'other financial intermediaries' (OFIs) in FSB members' economies, a residual measure of total domestic financial system assets that excludes the assets of banks, insurers, pension funds and public financial institutions. This broad approach aims to capture all non-prudentially regulated entities where shadow banking risks could arise. The FSB acknowledges, however, that this broad measure is likely to capture some assets that are unrelated to credit intermediation, and so work is ongoing to refine a more risk-oriented narrow measure of shadow banking (discussed further below).

According to the most recent exercise, at the end of 2013, the absolute size of the shadow banking sector on the broad measure basis was larger than it was prior to the crisis, though its size relative to the global financial system and GDP remained below pre-crisis levels (FSB 2014b; Table 1). Growth rates in the assets of shadow banking entities have been

subdued overall relative to pre-crisis rates, though they have picked up a little in recent years in some FSB member economies, particularly in emerging markets.<sup>3</sup>

Relatively strong growth in shadow banking in emerging markets in part reflects stronger economic growth and the smaller base for some of these markets. Argentina, China, India, Russia, South Africa and Turkey have all experienced strong growth, with the Chinese shadow banking sector a particular focus internationally given the broader rise in borrowing in China and China's growing importance in the global economy (IMF 2014). Despite relatively subdued growth overall in recent years, advanced economies continue to account for the vast majority of shadow banking assets. Notably, the OFI sector in the United States, which was a particular source of instability during the crisis, has fallen substantially as a share of US financial system assets.

Using the broad measure, 'OFIs', Australia's shadow banking sector is small relative to the global average, and has declined since the crisis, both in terms of its share of domestic financial system assets and compared with the size of the economy. Banks' share of total Australian financial system assets has

**Table 1: Other Financial Intermediaries<sup>(a)</sup>**

	Global <sup>(b)</sup>		Australia	
	2007	2013	2007	2013
Size (US\$tr)	62	75	0.8	0.7
Share of financial system (per cent)	26	25	21	14
Size relative to economy (per cent of GDP)	123	120	80	53
Growth in preceding years (per cent) <sup>(c)</sup>	18 <sup>(c)</sup>	3 <sup>(d)</sup>	13 <sup>(c)</sup>	-2 <sup>(d),(e)</sup>

(a) Financial intermediaries excluding banks, pension funds, insurers and public financial institutions; measured at December

(b) The 'global' measure includes 20 non-euro area jurisdictions and the euro area as a whole

(c) Compound annual growth rate 2003–07

(d) Compound annual growth rate 2008–13

(e) The FSB reports positive growth in Australia for 2013, but this reflects exchange rate movements; the growth rates for Australia are calculated using assets measured in Australian dollars

Sources: FSB; RBA

2 The 'global' report includes data from FSB member economies as well as some data on the euro area as a whole. The FSB estimates that this covers around 90 per cent of global financial system assets. Most of the broad measures of the size of the global shadow banking market reflect aggregates for 20 non-euro area jurisdictions plus the euro area as a whole.

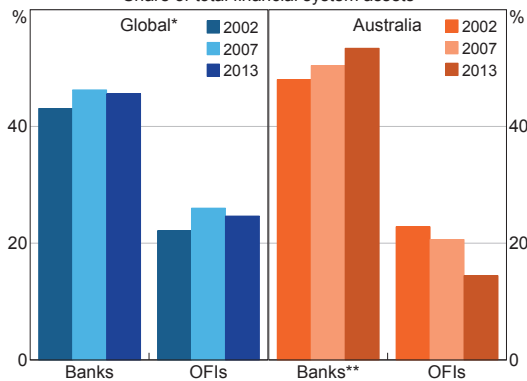
3 Large variation in global growth rates was apparent in 2013. Major advanced economies in the euro area saw negligible or negative annual growth in the assets of OFIs, while Argentina and China saw the strongest growth among reporting jurisdictions at 50 and 34 per cent, respectively.

increased since 2007, reflecting substantial growth in banks' total assets and little change in OFIs' total assets (Graph 1). The strong post-crisis growth in the banking sector in Australia relative to international peers partly reflects efforts to repair banking sector balance sheets in some of these other countries. Also, during the crisis, Australian banks acquired some of the non-bank credit providers reliant on securitisation. Consequently, some structured finance vehicles' (SFV) assets – principally assets underlying residential mortgage-backed securities (RMBS) of (non-bank) mortgage originators – that were previously classified as 'non-bank assets' are now funded on banks' balance sheets and thus subject to prudential scrutiny.

**Graph 1**

**Bank and OFI Assets**

Share of total financial system assets



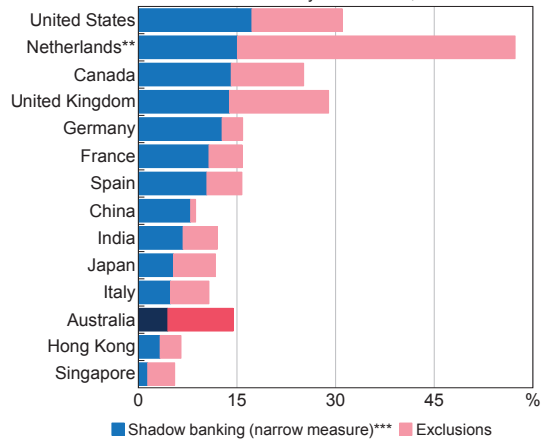
\* 'Global' includes 20 non-euro area jurisdictions and the euro area as a whole  
 \*\* For Australia, 'banks' is authorised deposit-taking institutions (ADIs)  
 Sources: FSB; RBA

The FSB has also begun publishing a narrower measure of 'shadow banking', which endeavours to isolate OFIs' assets relating to *credit* intermediation. The FSB considers this 'narrow measure' to be more relevant to financial stability, but the measure is considered a work in progress, partly due to lack of data. Under the narrow measure, the global shadow banking sector is considerably smaller than under the broad measure (Graph 2), but appears

**Graph 2**

**Other Financial Intermediaries\***

Share of domestic financial system assets, as at December 2013



\* Financial assets of all non-prudentially regulated financial institutions; selected countries  
 \*\* 'Special financial institutions' account for two-thirds of Netherlands' OFI assets; most of these are part of non-financial groups and are not involved in credit intermediation outside of the group  
 \*\*\* Narrow measure of shadow banking excludes self-securitisation, subsidiaries of prudentially regulated banking groups, equity funds and equity real estate investment trusts  
 Source: FSB

similar to its pre-crisis size.<sup>4</sup> Around three-quarters of global assets excluded by the narrow measure are assets held in equity funds (with no direct link to credit intermediation), or are part of consolidated banking groups and therefore subject to prudential regulation.

Narrowly defined, Australia's shadow banking sector looks even smaller on an international comparison. The main exclusions from the broad measure are: self-securitisation, which is, by definition, bank-owned and therefore within the prudential net; and equity real estate investment trusts (REITs) and equity funds, which are not bank-like credit intermediation.<sup>5</sup> The sector's share of the Australian

4 The measures are not strictly comparable on a global aggregate basis in that the broad measure captures 20 non-euro area jurisdictions and the euro area as a whole, whereas the narrow measure captures 23 reporting jurisdictions. The time series for the narrow measure is currently subject to review, with a number of jurisdictions having changed their methodology in 2013.

5 Self-securitisation (or retained securitisation) is securitisation solely for the purpose of using the securities created as collateral with the central bank in order to obtain funding, with no intent to sell them to third-party investors. All securities issued by the SFV are owned by the originating bank and remain on its balance sheet.



financial system is also well below pre-crisis peaks on the narrow measure, having fallen over most of the past seven years (Table 2).<sup>6</sup> A contributing factor is that a number of finance companies and money market corporations (MMCs) – which are the OFI entities most readily considered to be shadow banks in Australia due to their credit intermediation activities – have scaled back their activities or exited the industry over recent years. The ‘other investment funds’ industry – which includes mortgage REITs and cash management trusts (the domestic equivalent of MMFs) – has also contracted since the crisis.<sup>7</sup> Investors may have reduced their demand because they now better recognise the credit and liquidity risks posed by these products. Another driver may be that bank deposits have become more

competitively priced than in the past, as well as now being government guaranteed, up to a limit, under the Financial Claims Scheme.

A key lesson from the crisis for regulators globally was that distress in the shadow banking system may be transmitted throughout the broader domestic and international financial system via direct and indirect linkages. In terms of funding interdependencies within the Australian financial system, banks’ funding from, and lending to, the OFI sector is quite low and has declined in recent years. Banks’ funding from, and lending to, finance companies and money market corporations are equivalent to less than 1 per cent of banking system assets, having fallen over recent years (Graph 3).

**Table 2: Australian Financial Sector Composition by Entity Type<sup>(a)</sup>**  
Share of financial system assets, per cent

	December 2002	December 2007	September 2014
<b>Total prudentially regulated</b>	<b>76</b>	<b>79</b>	<b>85</b>
Banks, credit unions and building societies (ADIs)	49	52	55
Superannuation funds <sup>(b)</sup>	23	24	27
Insurers	4	3	3
<b>OFIs (shadow banking broad measure)</b>	<b>24</b>	<b>21</b>	<b>15</b>
Structured finance vehicles	6	6	7
Finance companies	4	3	2
Money market corporations	4	2	1
Cash management trusts (MMFs)	1	1	0
Other investment funds <sup>(c)</sup>	8	9	5
<b>Shadow banking (narrow measure)</b>	<b>11</b>	<b>10</b>	<b>4</b>
Excludes			
– <i>Self-securitisation</i>	0	0	5
– <i>Equity REITs</i>	3	4	2
– <i>Equity funds</i>	4	4	2
– <i>Prudentially consolidated assets<sup>(d)</sup></i>	6 <sup>(e)</sup>	4	2

(a) Excludes central bank assets; totals may not equal the sum of components due to rounding effects

(b) Includes self-managed superannuation funds that are regulated by the Australian Taxation Office

(c) Includes equity funds, bond funds and equity and mortgage REITs

(d) Assets that are consolidated as part of a prudentially regulated banking group

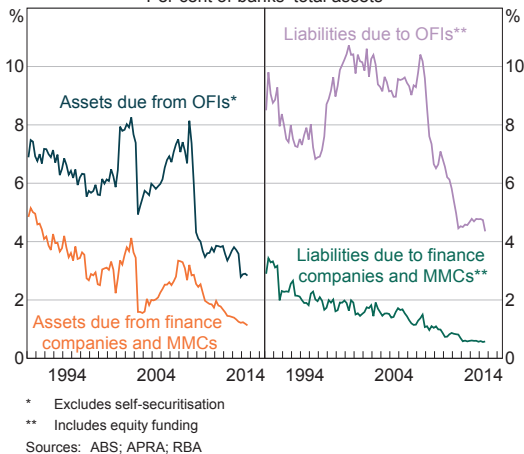
(e) Estimate based on data from March 2003

Sources: ABS; APRA; FSB; RBA

6 More detail on post-crisis developments in the shadow banking sector can be found in Schwartz and Carr (2013).

7 Mortgage REITs generate revenue from holding property-related debt. In contrast, equity REITs invest in and own physical properties.

**Graph 3**  
**Banks' Connections to OFIs**  
 Per cent of banks' total assets



## Securitisation and Repo Financing in Australia

Financing activities in securitisation and repo markets have been a particular focus of regulators in the wake of the crisis. These activities span banking and shadow banking markets, though the use of these methods for financing by shadow banks is of particular interest from a risk perspective.<sup>8</sup> Whereas banks are subject to a well-developed system of prudential regulation and other safeguards, the shadow banking system is typically subject to less stringent oversight. As a result, shadow banks are often more reliant on these secured funding methods than prudentially regulated institutions to meet the credit risk tolerance of investors, and are more susceptible to funding pressure if credit concerns arise. This section briefly looks at the securitisation and repo markets in Australia, with a focus on risks arising from their use in the shadow banking sector.

<sup>8</sup> The International Monetary Fund reviewed various approaches to measuring shadow banking and highlights the different advantages and drawbacks of each approach. One issue their analysis highlights is that some shadow banking activities may be liabilities of a consolidated banking group (and therefore largely outside the remit of the FSB's shadow banking measure), thus emphasising the importance of comprehensive prudential supervision. Securitisation and repo arrangements are discussed in their analysis; see IMF (2014).

## Securitisation

Securitisation, the practice of transforming pools of non-tradable assets into securities that can be traded in financial markets, is a form of non-traditional credit intermediation used by banks and shadow banks. The crisis highlighted numerous examples where securitisation activity resulted in misaligned incentives, often aggravated by opacity and complexity. For example, in the United States a number of banks relaxed their lending standards as securitisation enabled them to transfer credit risk to investors in securitisation products. As became evident during the financial crisis, reliance on securitisation for funding can also expose financial institutions to liquidity pressures when there is a sudden flight to perceived quality, particularly for non-prudentially regulated institutions. In a number of cases, these risks flowed back to the banking system and broader financial system through various interlinkages.

In Australia, non-ADI mortgage originators are the largest non-prudentially regulated issuers of securitised funding. Securitisation activity by mortgage originators can also involve some risk to the banking system via banks providing:

- warehouse facilities, which allow mortgage originators to fund mortgages until they have originated a sufficient amount to issue new securities
- liquidity facilities, which enable structured finance vehicles to meet senior expenses and interest payments on notes in case of a temporary shortfall in income
- a variety of swaps, including interest rate swaps, exchange rate swaps and, most importantly, basis swaps (which convert the variable-rate mortgage interest payments from the collateral pool to floating-rate interest payments linked to money market reference rates).

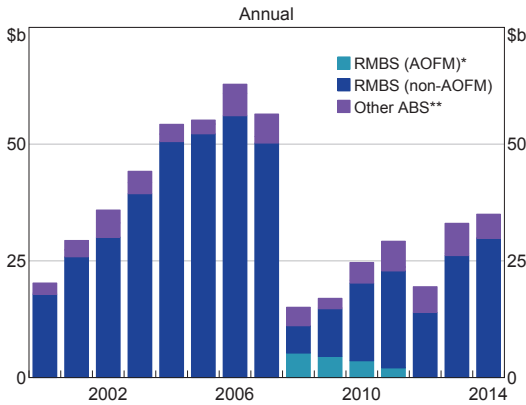
However, the scale of mortgage originators' activities is quite small, and much reduced since the crisis. Though asset quality of the Australian securitisation

market held up well throughout the crisis, there was a sharp post-crisis fall in overall issuance of asset-backed securities (ABS) (Graph 4) as investors avoided the asset class, and mortgage originators' issuance of RMBS declined markedly (Graph 5). Outstanding RMBS issued by mortgage originators accounted for around 1 per cent of Australian mortgages at December 2014, down from 4 per cent at September 2007. Over this period, broader reliance on RMBS has also declined: the share of outstanding Australian residential mortgages

funded through securitisation was 8 per cent at December 2014, compared with a peak of 23 per cent at September 2007. RMBS issuance has picked up somewhat in recent years as spreads have narrowed, although the increase has been led by the banking sector; issuance by the major banks in 2014 was on par with their issuance prior to the global financial crisis.

Given securitisation is connected to both the banking system and the housing market, Australian regulators remain alert to potential risks from this activity. Since the crisis, APRA has used its liquidity framework to limit funding risks to the banking sector. If implemented, APRA's proposed reforms to the prudential framework for securitisation should help reduce complexity in issuance by regulated lenders, as well as better align their incentives with those of RMBS investors. APRA has also proposed to limit the concessional capital treatment on warehouse facilities to those of up to one year in duration, which if implemented should encourage banks to hold sufficient capital to cover rollover risks associated with funding warehouse facilities.

**Graph 4**  
**Issuance of Australian ABS**

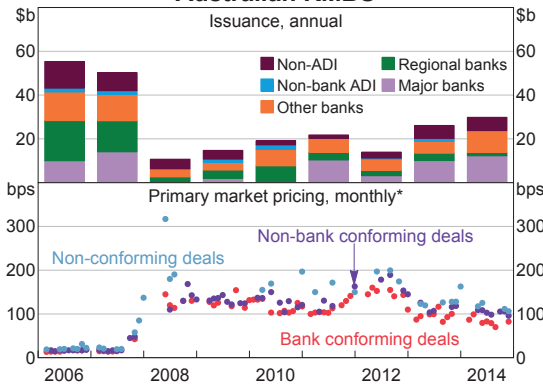


\* Deals supported by Australian Office of Financial Management purchases

\*\* Includes commercial mortgage-backed securities and other asset-backed securities

Source: RBA

**Graph 5**  
**Australian RMBS**



\* Face-value weighted monthly average of the primary market spread to bank bill rate

Source: RBA

**Repurchase agreement activity**

Repurchase agreements, or repos, are contracts in which the issuing party agrees to sell securities to a counterparty and buy them back in the future at a specified price, thereby providing collateral against the funding obtained. Once again, the crisis highlighted a number of risks arising from this form of financing, including the build-up in leverage and subsequent funding pressures faced by US shadow banking entities – particularly broker-dealers, such as Lehman Brothers.

Using securities lending and repos, entities outside the banking system could potentially create significant system-wide leverage and maturity transformation that is not readily apparent to investors or regulators. In normal times, investors may consider these secured liabilities safe and liquid, but they may be vulnerable to runs in periods of stress if investors worry about the underlying

counterparty risk and/or uncertainty about the underlying value of the collateral. These fears can be compounded if: the underlying collateral is of low credit quality; ‘haircuts’ offering protection from falls in collateral value are too low given volatility; and there is uncertainty about whether the underlying collateral will be returned, given the practice of recycling collateral through a chain of repo agreements – a process known as ‘rehypothecation’. Resulting forced sales of assets whose values are already under pressure can accelerate an adverse feedback loop, in which all firms with similar assets suffer mark-to-market losses, which in turn can lead to more fire sales.

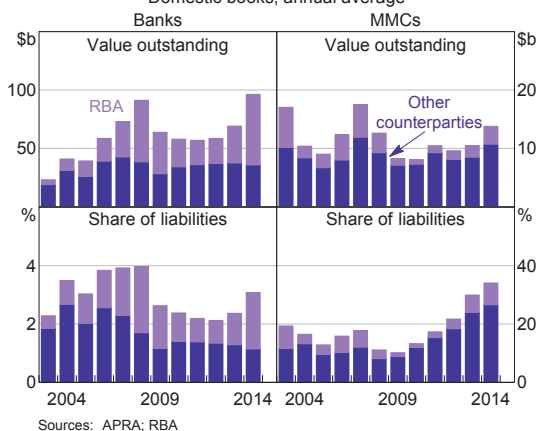
As with securitisation, the bulk of repo activity in Australia is within the prudentially regulated sector. Banks dominate the sector, with a large share of these liabilities with the Reserve Bank rather than private counterparties. Repos are a relatively small source of funding for banks, constituting around 3 per cent of total liabilities (Graph 6). These exposures are subject to regulatory scrutiny as part of APRA’s overall prudential liquidity requirements. Another factor supportive of repo funding stability is that the vast majority of repo transactions in Australia use

high-quality Commonwealth or state government bonds as collateral. The high quality of the collateral pool, which contrasts with some countries where riskier forms of collateral are more prevalent, reduces the potential for credit quality fears and disruptive fire sales into illiquid markets.

Outside the prudentially regulated sector, MMCs are a major user of repo funding. MMCs operate with higher leverage than banks and are relatively more reliant on repo funding. As explained above, however, size is a factor limiting the systemic importance of these MMCs: they account for less than 1 per cent of the overall financial system and have limited connections with the banking system. In comparison, prior to the financial crisis, US broker-dealers – the closest equivalent to MMCs and heavy users of repo financing – accounted for 5 per cent of US financial system assets.

Consistent with the international reform effort, however, risks from repos are being actively considered by Australian regulators. In March, the Bank published a consultation paper seeking views on the costs and benefits of a potential central counterparty for clearing repos in Australia (RBA 2015). And a CFR working group on shadow banking is, among other aspects, evaluating the case for implementing international standards on securities financing transactions.

**Graph 6**  
**Gross Repo Liabilities**  
Domestic books, annual average



## Conclusion

Addressing shadow banking risks remains one of the core post-crisis reform areas of international regulators. The FSB’s aim is to subject shadow banking to appropriate oversight and regulation to address bank-like risks to financial stability, while not inhibiting sustainable non-bank financing activity that does not pose such risks. One motivation is to ensure that regulatory reforms in the prudentially regulated sector do not result in systemic risks migrating ‘into the shadows’.

The Australian shadow banking sector remains relatively small by international standards, and this should limit potential systemic risk. However, data in this sector are not comprehensive, and there is some potential for aggregate data to mask concentrations and interlinkages that could be problematic in a stressed environment. Australian regulators will remain engaged with international regulatory work in assessing risks and considering safeguards. In line with the FSB's overall objective, regulators need to strike a balance so that the regulatory approach should be proportionate to financial stability risks, focusing on those activities that are material to the financial system. ✎

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# The IMF's 'Surveillance': How Has It Changed since the Global Financial Crisis?

Emily Poole\*

The International Monetary Fund (IMF) is mandated by its members to oversee the international monetary system. One of the key ways it does this is through bilateral and multilateral 'surveillance' – monitoring, analysing and providing advice on the economic and financial policies of its 188 members and the linkages between them. This article discusses three broad issues identified with the IMF's pre-2008 surveillance by the IMF and IMF watchers – analytical weaknesses (though these were not confined to the IMF alone), ineffective communication of key surveillance messages in public reports, and governance issues and practical constraints – and examines the steps taken by the IMF to address them. Significant improvements have been made in addressing analytical weaknesses, and efforts to improve the effectiveness of the IMF's communication are ongoing. However, issues around governance remain unresolved, which risks reducing the credibility and influence of IMF surveillance.

## Introduction

At its most basic level, surveillance provides information on economic developments and the outlook for growth in individual countries and the global economy. But the higher-level aim of surveillance is to influence the decisions of national policymakers in a direction that fosters stability by exposing them to external scrutiny. This ongoing influence would ideally make countries and the global economy more resilient to economic and financial shocks (Krugman 2014). In practice, the extent to which surveillance prompts the desired changes in domestic policy decisions depends on factors such as the strength of the established global policy consensus, the quality and appropriateness of recommendations, the effectiveness of communication to both policymakers and the public, and the degree of trust between the government and the surveillance entity (Pisani-Ferry, Sapir and Wolff 2011; IEO 2013). Of course, there may be a strong case for policymakers to resist external

policy advice – national authorities are likely to be better informed about the economic and political constraints facing their country and, as stated by Mussa (1997, p 28), 'policy advice is limited by the accumulated wisdom of the economics profession, which is continually advancing and being revised'.

The IMF has a special role among the many entities conducting various types of surveillance. With 188 members it has near-global membership, and a condition of membership is regular consultations on domestic policies known as Article IV consultations. This combination, plus the technical expertise of the IMF's staff in conducting surveillance, gives the IMF the potential to be a powerful forum for discussing and influencing members' policies. While questions have been raised over the extent to which this potential has been realised for the policies of advanced and large emerging economies, low-income and smaller emerging market economies typically view the quality and effectiveness of the IMF's surveillance and technical assistance more favourably (Lombardi and Woods 2007; IEO 2009).

\* The author is from International Department.

## Surveillance by the IMF

The IMF's Articles of Agreement set out the obligations of the IMF and its members, with Article IV providing the basis for the IMF's surveillance activities.<sup>1</sup> In summary, members have agreed that:

- The IMF has general oversight of the international monetary system to ensure its effective functioning and 'firm' surveillance over the exchange rate policies of members.
- Individual members will seek to undertake policies that foster orderly economic and financial conditions. This includes avoiding the manipulation of exchange rates that would prevent effective balance of payments adjustments or give them an unfair competitive advantage.

Countries' observance of these obligations is assessed through both bilateral and multilateral surveillance. Bilateral surveillance refers to the regular, typically annual, Article IV consultations between IMF staff and relevant stakeholders in member countries. The aim of these consultations is to identify risks and vulnerabilities that may threaten domestic (and potentially global) stability and provide advice on policy adjustments. These consultations culminate in a staff report prepared for discussion by the IMF's Executive Board.<sup>2</sup> With the permission of the government, this report is then released to the public along with a summary of the Executive Board's discussion. The scope of policies covered by these reports has shifted over time as views have evolved on the role that various economic and financial policies play in fostering domestic and global stability.

The IMF's bilateral surveillance is a key source of policy advice for low-income countries and for those emerging market countries with constrained local policymaking capacity and where alternative information sources tend to be limited (Lombardi 2005; IMF 2014c). The IMF's significant cross-country experience in providing policy advice, capacity building and financial assistance to countries facing similar macroeconomic and financial challenges puts it in a unique position to support macroeconomic and financial stability in these countries. IMF policy advice is also sought outside of the Article IV cycle, with a 2014 survey conducted by the IMF finding that nearly 90 per cent of low-income country respondents and 60 per cent of emerging market respondents had approached the IMF for ad-hoc advice over the past three years, compared with 40 per cent of advanced economy respondents (IMF 2014c).

Members also engage in other types of consultations with the IMF aimed at complementing the Article IV process. For example, following the Asian financial crisis, members agreed to voluntary assessments of the stability of their financial sectors (the Financial Sector Assessment Program (FSAP)) and their observance of selected international standards (the Report on the Observance of Standards and Codes (ROSC)).<sup>3</sup> Following the global financial crisis, FSAPs every five years were made mandatory for jurisdictions with systemically important financial sectors (including Australia), with the aim of better safeguarding global financial stability.

Multilateral surveillance aims to identify trends, risks and vulnerabilities at the regional or global level. It focuses on the interlinkages between systemically important countries at the global or regional level and the spillovers of these countries' policies to the rest of the world. The IMF uses a constantly evolving

1 The current version of Article IV was incorporated into the Articles of Agreement in 1978 following the collapse of the Bretton Woods system of fixed (but adjustable) exchange rates in the early 1970s.

2 The Executive Board is responsible for overseeing the day-to-day business of the IMF. Composed of 24 Executive Directors, who are appointed or elected by member countries or by groups of countries (known as constituencies), the Executive Board is chaired by the IMF's Managing Director and usually meets several times each week. Australia is in a constituency with 14 other countries, including Korea and New Zealand.

3 The IMF has the sole responsibility for the FSAPs of advanced economies, while the FSAPs of emerging and developing market countries are the joint responsibility of the IMF and World Bank. The 12 areas of the ROSC are related to policy transparency, financial sector regulation and supervision, and institutional and market infrastructure.



set of reports and tools to conduct multilateral surveillance. Examples of publicly available multilateral surveillance reports currently produced by the IMF include the biannual *World Economic Outlook* (WEO) and *Global Financial Stability Report* (GFSR) and the annual *Spillover Report*. The IMF also conducts a number of confidential internal and external exercises aimed at identifying and informing policymakers of risks and vulnerabilities and ideally influencing them to act to mitigate these risks.<sup>4</sup>

## The IMF's Response to Issues Identified in its Pre-crisis Surveillance

The IMF has openly acknowledged that it provided few clear warnings about the build-up of risks and vulnerabilities in the global financial system leading up to the global financial crisis – although it is important to note that it was not alone in this (IEO 2011, 2014a; IMF 2011). According to various internal and external reviews, insufficient attention was paid to vulnerabilities in advanced economies amid the strong belief that their financial institutions were in a strong position and that financial markets were fundamentally sound. Contagion and spillover risks were overlooked, and any warnings that were made were too scattered and unspecific to generate a policy response. The IMF has subsequently put significant effort into overhauling its surveillance activities and recognises that this is an ongoing process (IMF 2014a).

This article groups the issues with IMF surveillance identified in these and earlier reviews into three main types – analytical weaknesses, ineffective communication of key surveillance messages, and governance issues and practical constraints. Of these, significant progress has been made by the IMF in addressing analytical weaknesses since the crisis, arguably at the expense of some conciseness in public communication. However, long-identified

governance and practical constraints on the IMF's surveillance remain.

## Strengthening the IMF's analysis

The global financial crisis exposed widespread analytical weaknesses across the economics profession and surveillance entities (such as the IMF, the Organisation for Economic Co-operation and Development (OECD) and Bank for International Settlements). Analytical weaknesses identified by the IMF as being particularly important include knowledge gaps around the interaction between the macroeconomy and the financial sector ('macrofinancial' linkages), the lack of a global risk assessment framework, and insufficient analysis and discussion of spillovers and low probability but high impact ('tail') risks. Data gaps were also a constraint. According to the IMF's Independent Evaluation Office (IEO), 'silos' within the IMF further hampered its staff's ability to develop a complete picture of the key risks and vulnerabilities facing the global economy (IEO 2011).

In response, the IMF has introduced several new publicly available multilateral reports and confidential internal exercises aimed at facilitating the identification and discussion of baseline and tail risks and spillovers. New multilateral reports include the annual *Spillover* and pilot *External Sector* reports, and the biannual *Fiscal Monitor*. To strengthen the early identification of risks, the IMF's staff regularly updates an internal global risk assessment matrix and the existing confidential exercise aimed at identifying vulnerabilities in emerging markets was expanded to cover advanced and low-income countries. To facilitate the discussion of tail risks to the global economy by finance ministers and central bank governors, a semiannual presentation is put together by the IMF and the Financial Stability Board (FSB). According to the IMF, efforts have also been made to break down internal silos and foster more interdepartmental collaboration.

Gaps in the IMF's legal framework around surveillance have been addressed through the

<sup>4</sup> The WEO was introduced in an internal background paper in 1969, and was first released publicly in 1980. The GFSR was introduced in 2002 (replacing the annual *International Capital Markets Report*), and the *Spillover Report* was introduced in 2011.

adoption of the Integrated Surveillance Decision (ISD) in July 2012.<sup>5</sup> Prior to the ISD, the bilateral Article IV consultations were legally restricted in their ability to discuss spillovers from a member's policies and the scope and modalities of multilateral surveillance were not defined. The ISD gives the IMF the ability to discuss spillovers arising from the policies of individual members that may undermine global financial or economic stability as part of Article IV discussions. For example, recent Article IV reports for the United States include discussions on potential negative spillovers from the unwinding of the US Federal Reserve's unconventional monetary policy to vulnerable economies. While the IMF may suggest alternative policy actions, the ISD does not give the IMF the power to require that a member change its policies. In addition to greater discussion of spillovers, all Article IV reports now include risk assessment matrices and the framework for debt sustainability analysis was reformed.

These changes have improved the IMF's processes around identifying risks and examining potential spillovers. Remaining priorities identified by the IMF in the 2014 Triennial Surveillance Review include continuing to improve the integration between bilateral and multilateral surveillance, integrating macrofinancial analysis into Article IV discussions, strengthening the surveillance of macroprudential policies, expanding policy advice to cover selected structural issues, reviving 'balance sheet analysis' and strengthening the assessment of external balances (IMF 2014a, 2014b). Significant work remains to be undertaken by the global academic and

policy-making community in developing the models and economic theory to underpin this analysis. The debate over the size and type of spillovers from unconventional monetary policy is an example of where theory is currently lagging behind practice. In addition, even as the models and tools available to examine interconnections and spillovers become more sophisticated, it will be important to keep in mind the limitations of data and technical analysis and for IMF staff to be open to alternative views. It will also be important to draw on their experiences of past crises to keep an eye out for vulnerabilities affecting multiple countries that are being generated by distorted incentives, such as moral hazard.

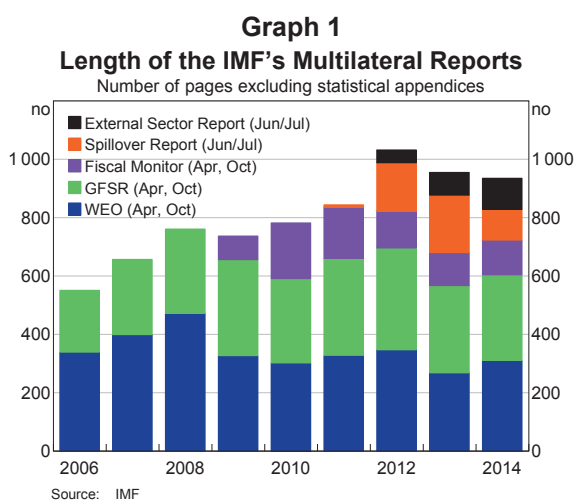
### Improving the communication of key surveillance messages in public reports

In order to gain traction with policymakers, key surveillance messages need to be clearly communicated. Communication can take place behind closed doors during Article IV discussions and subsequent IMF Executive Board discussions, and also publicly through the published Article IV and multilateral surveillance reports. While it is not possible to judge the candour and effectiveness of the IMF's bilateral discussions with policymakers from the outside, the published surveillance reports have been criticised both before and since the financial crisis for lacking clarity, having weak links between policy recommendations and the analysis presented, suffering from insufficient follow-up on previously identified risks or recommendations, and providing a laundry list of risks rather than highlighting the risks of most concern (IEO 2006; IMF 2014b).<sup>6</sup> The new multilateral reports introduced since the financial crisis have further increased the amount of information for policymakers to absorb

5 The Articles of Agreement are operationalised through 'decisions' taken by the IMF's Executive Board. This has allowed the IMF's approach to implementing its mandate to evolve over time. Prior to the ISD, the IMF's surveillance activities focused on members' obligations under Article IV, section 1 – 'to collaborate with the Fund and other members to assure orderly exchange arrangements and to promote a stable system of exchange rates'. In order to expand the scope of IMF surveillance beyond bilateral surveillance, the ISD drew on the obligation of the IMF under Article IV Section 3(a) to 'oversee the international monetary system in order to ensure its effective operation', which it was agreed is only possible in an environment of global economic and financial stability.

6 As discussed in the next section, some of these criticisms may reflect self-censorship by IMF staff, with countries having to agree to the public release of their Article IV report. It is also possible that the report may be less candid on risks than in discussions with policymakers for fear of precipitating a market response. According to the IMF, 90 per cent of countries agreed to the publication of their Article IV reports in 2013.

and digest, with complaints expressed in the 2014 Triennial Surveillance Review that the volume of IMF reports are 'overloading' policymakers. A simple page count of the main text of the IMF's multilateral reports shows that the total volume of material has increased by around one-third since 2006, with key surveillance messages now also spread over more reports (Graph 1). The IMF has also acknowledged that the increase represents a challenge for ensuring consistency across reports.



In response to these challenges to effective public communication, improving the cohesion and clarity of published policy advice in both bilateral and multilateral surveillance has been identified as a priority by the IMF. In particular, from April 2015, the main views on the global outlook, risks and vulnerabilities, and key policy messages from all the multilateral reports will be summarised in a single report, the 'Managing Director's Global Policy Agenda'. Also, Article IV reports will now explicitly discuss the policy mix rather than discussing various policy measures in separate sections. These changes should help improve the clarity and consistency of the Fund's public communication of key surveillance messages, but a more fundamental streamlining of the number and length of multilateral reports seems worth considering in the future. IMF staff will also

seek to strengthen the bilateral policy dialogue with member countries through staff visits and other less formal channels than Article IV missions, as well as aim to deliver more candid and practical advice.

### Governance issues and practical constraints on surveillance

As a member-owned and financed global organisation, the IMF faces practical constraints related to surveillance of its members. These issues are longstanding and are mostly not within the power of IMF management and staff to address. First, the IMF does not have the power to compel its members to change their policies. Attempts by IMF staff to push for reforms in this direction over the past decade have been firmly resisted as a threat to members' sovereignty (Legg 2013). Second, the credibility and influence of surveillance is intertwined with perceptions of even-handedness in the IMF's treatment of members and the governance structure of the IMF. Third, members may have a different view from IMF staff on the risks and benefits of publicising vulnerabilities that may precipitate market volatility.

Regardless of the quality and clarity of the IMF's surveillance messages, under the IMF's current legal framework national authorities can still choose to ignore them; or in the words of Fischer (2008, p 382), '[s]ometimes advice is valued less for its quality and more for its agreeableness, and this is simply a fact of life with which the IMF has to contend'.<sup>7</sup> Members do have some legal obligations under the IMF's Articles of Agreement, such as the provision of data (Article VIII) and avoiding the manipulation of exchange rates to gain an unfair advantage over other members (Article IV), but the enforcement mechanisms for even these few obligations are weak. The IMF's Executive Board must agree to enforce any breach and members have historically been quite unwilling

<sup>7</sup> Even countries in IMF programs subject to conditionality are not legally required to adjust their policies. However, a failure to comply with the agreed package of policy measures is likely to lead to the IMF suspending payments due under the program and a potentially negative reaction from financial markets.

to expend the required political capital.<sup>8</sup> Calls to strengthen the IMF's power to compel members to change their policies meet strong resistance, as this would effectively undermine members' sovereignty.

A persistent criticism of the IMF by some members is that it has not treated members with similar circumstances in a similar manner – that is, it has not been 'even-handed' in its surveillance and lending activities. IEO (2014b) identifies three areas of asymmetric treatment of members – asymmetry in analysis, asymmetry in the influence of members (where political influence was exercised in a non-transparent way) and asymmetry in the candour of surveillance. Some of these are of more concern than others. The existence of asymmetries in analysis does not necessarily mean that the IMF is not being even-handed; for example, more analytical resources should be devoted to the more systemically important countries. However, justifications for asymmetries in influence and candour are less clear. On candour, the IEO raised concerns over self-censorship by IMF staff, reporting that 'many staff members believed that there were limits as to how critical they could be regarding policies of the largest shareholders' (IEO 2011, p 20). Perceptions of a lack of even-handedness in influence and candour have the potential to undermine the credibility of Fund surveillance and members' willingness to engage in policy discussions with IMF staff. This risk is heightened when combined with concerns about the continued under-representation of emerging market countries in the IMF. Reforms agreed to by members in 2010 that would have shifted more than 6 per cent of voting and quota shares and two Executive Board seats away from advanced economies towards dynamic emerging market

economies are yet to be completed, with the United States, which has an effective veto power, failing to ratify them.<sup>9</sup>

This self-censorship also reflects a deeper problem with IMF surveillance identified by James (1995). As an institution owned by, and responsible to, member governments, the IMF sometimes faces challenges in openly discussing risks and vulnerabilities when governments are fearful that acknowledging the existence of these vulnerabilities will trigger a self-fulfilling market response. A counterargument to this is that a government may, on occasion, want the IMF to expose risks and vulnerabilities in order to provide the government with a political mandate to address them rather than allowing them to continue to build.

Recognising the threat to the credibility, legitimacy and effectiveness of the IMF and its surveillance posed by the continued delay in completing the 2010 reforms, IMF management remains publicly committed to advancing quota reforms, while most of the Executive Board changes have already been agreed voluntarily. In late January 2015, a resolution was submitted for agreement by the IMF's Board of Governors calling on the Executive Board to agree on interim steps towards the outcomes of the 2010 reforms by 30 June 2015, while also stressing that any agreed interim step is not a substitute for the 2010 reforms, the ratification of which remains the highest priority for member countries. In the meantime, the IMF is addressing concerns over even-handedness in its surveillance, including by increasing the

8 A member deemed not to be fulfilling its obligations under the Articles of Agreement may be declared as ineligible to use the resources of the IMF, and at the extreme can be required to withdraw from membership. Czechoslovakia is the only country to have been expelled from the IMF (in 1954 for failing to provide required data), although several other countries have withdrawn from IMF membership at various points in time. Czechoslovakia was readmitted in 1990, with the Czech Republic and Slovak Republic succeeding Czechoslovakia's membership in 1993.

9 The key elements of the 2010 quota and governance reforms include: a doubling of IMF quotas to SDR476.8 billion, which facilitates a shift in quota shares to under-represented, dynamic emerging market economies of more than 6 per cent while preserving the voting shares of the poorest members; advanced European members agreed to reduce their representation on the Executive Board by two seats after the quota increase comes into effect (this shift has already substantially come into effect via voluntary actions); and the five appointed Executive Director positions will be abolished, meaning that the Executive Board will consist of 24 elected Executive Directors. Although the 2010 reforms were agreed in December 2010, they do not come into effect until they are ratified by members and require 85 per cent of the voting shares. The US voting share is currently 16.75 per cent, giving the US effective veto power over the 2010 reforms.

transparency of how decisions are made regarding inputs into surveillance and establishing a process for investigating and reporting on even-handedness concerns raised by members. Delivering more candid and practical advice, particularly to systemic countries, has also been identified as a priority by the IMF.

One potential way for the IMF to mitigate some of these constraints is through harnessing their interactions with international groups, such as the G20, and other international organisations, such as the FSB, OECD and World Bank. It becomes more politically difficult for domestic policymakers to ignore surveillance messages when similar warnings are being issued by several international organisations with a reputation for quality analysis and policy advice. The G20 is potentially a particularly powerful forum for peer pressure, with representatives of countries collectively accounting for around 85 per cent of global GDP sitting around a table with a range of invited international organisations. Since the crisis, the IMF, along with the OECD and World Bank, has played a key analytical role in supporting G20 members' assessment of each other's policies through exercises such as the Mutual Assessment Process and peer review of members' growth strategies. At the same time, the IMF must be careful that it continues to represent the interests of all its members, not just those involved in forums such as the G20.

## Conclusion

As acknowledged by the IMF, the IMF's bilateral and multilateral surveillance suffered from analytical weaknesses and deficiencies in communication prior to the global financial crisis. These gaps were compounded by longstanding constraints around the IMF's ability to influence domestic policymakers. Since then, the IMF has put significant efforts into improving its capacity to identify and discuss risks and vulnerabilities facing member countries. These efforts are ongoing, with the IMF's 2014 Triennial Surveillance Review identifying a number

of areas for continued improvements, including the communication of key surveillance messages. However, since the power of the IMF's surveillance lies in its ability to convince domestic policymakers to adjust their policies, these efforts risk being undermined by concerns over the IMF's governance and the even-handedness of its advice. Given this, discussions in 2015 aimed at progressing the stalled quota reforms, as well as ongoing efforts to ensure that IMF advice is even-handed, will be crucial. ✎

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