

Australia: Financial System Stability Assessment

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AUSTRALIA

Financial System Stability Assessment

Prepared by the Monetary and Capital Markets and Asia and Pacific Departments

Approved by José Viñals and Anoop Singh

October 26, 2012

This report summarizes the findings of the Financial Sector Assessment Program (FSAP) Update for Australia. The assessment was undertaken over the course of two missions, April 23–May 15 and July 9–July 24, 2012. The team comprised Cheng Hoon Lim (Head), Nancy Rawlings (Deputy), Xiaoyong Wu (Deputy), Su Hoong Chang, Luc Everaert, Eija Holttinen, David Parker, Kiran Sastry, and Katharine Seal (all MCM); Niamh Sheridan (APD); Iryna Kaminska (ICD); Dinah Knight (LEG); and the following IMF external consultants: Richard Britton, Michael Deasy, and Michael Hafeman. The main FSAP findings are as follows:

- *Australia's financial system is sound, resilient, and well-managed.* Major banks are conservatively run, well capitalized and profitable, and they are likely to withstand severe shocks.
- *However, a number of risks will need to be closely managed,* including risks from a combination of high household debt and elevated house prices, reliance on offshore funding, and a highly concentrated and interconnected banking system. A higher minimum capital requirement for systemically important institutions may be desirable.
- *The financial regulatory and supervisory framework exhibits a high degree of compliance with international standards.* Nevertheless, there is some room for improvement in certain areas of supervision, such as on-site supervisory review of banks' liquidity risk management.
- *Commendable steps have been taken to strengthen crisis management.* Crisis preparedness can be further enhanced by conducting regular simulations, and continued efforts are warranted for recovery and resolution planning. Arrangements are in place to manage cross-border risk.

The main authors of this report are Cheng Hoon Lim, Nancy Rawlings, and Xiaoyong Wu with contributions from the FSAP team.

FSAP assessments are designed to assess the stability of the financial system as a whole and not that of individual institutions. They have been developed to help countries identify and remedy weaknesses in their financial sector structure, thereby enhancing their resilience to macroeconomic shocks and cross-border contagion. FSAP assessments do not cover risks that are specific to individual institutions such as asset quality, operational or legal risks, or fraud.

Contents	Page
Glossary	4
Executive Summary	5
I. Introduction	8
A. Handling the Crisis.....	8
B. But Global Uncertainty Persists.....	9
II. Financial System Stability.....	10
A. Managing Risks and Vulnerabilities.....	10
B. What Are the Key Sources of Risks?.....	10
C. Testing the Resiliency of the Banking System.....	18
D. Addressing Systemic Banks: A Case for Higher Loss Absorbency	20
III. Enhancing Financial Sector Oversight.....	24
A. Prudential and Conduct Supervision.....	24
B. The Standards Assessment	24
C. Systemic Oversight	27
IV. Crisis Management and Resolution.....	29
Table	
1. High Priority FSAP Recommendations	7
Figures	
1. Growth and Demand for Commodities.....	8
2. Bank Capital and Asset Quality	8
3. Credit Growth and Net Interest Margin.....	11
4. Overseas Claims of Australian Banks.....	11
5. Banking Sector Concentration	12
6. Bank Funding Structure and Cost.....	13
7. Off-shore Funding.....	14
8. Household Debt and Housing Loans	17
9. Non-Financial Corporate Sector Heat Map	18
10. GDP Growth Trajectories Under Different Growth Scenarios.....	19
11. Impact of Alternative Scenarios on Bank Capitalization.....	19
12. Systemically Important Financial Institutions	21
13. Additional Tier 1 Capital Requirements for Systemic Banks.....	22
Boxes	
1. Hedging Foreign Currency Risks.....	15

2. Australia's Superannuation System	16
3. Reducing Systemic Risk through Higher Loss Absorbency	23

Appendixes

1. Australia: Risk Assessment Matrix	33
2. Economic and Financial Indicators	34
3. Australia FSAP Update Stress Test Matrix	38
4. Stress Test Methodologies and Assumptions	39

GLOSSARY

ACCC	Australian Competition and Consumer Commission
AML/CFT	Anti-Money Laundering/Combating the Financing of Terrorism
ADI	Authorized Deposit-taking Institutions
AFSL	Australian Financial Services License
APRA	Australian Prudential Regulation Authority
ASIC	Australian Securities and Investments Commission
AUSTRAC	Australian Transaction Reports and Analysis Centre
BCP	Basel Core Principles
BCBS	Basel Committee of Banking Supervision
BIS	Bank for International Settlements
CFR	Council of Financial Regulators
DICP	Deposit Insurance Core Principles
D-SIBs	Domestic, Systemically Important Banks
DTI	Debt to Income Ratio
EDF	Expected Default Frequency
FCS	Financial Claims Scheme
FIU	Financial Intelligence Unit
FSAP	Financial Sector Assessment Program
FX	Foreign Exchange
GDP	Gross Domestic Product
GFC	Global Financial Crisis
IAIS	International Association of Insurance Supervisors
ICFT	Implied Cash Flow Test
IOSCO	International Organization of Securities Commissions
HLA	Higher Loss Absorbency
LGD	Loss Given Default
LTV	Loan to Value Ratio
MOU	Memorandum of Understanding
NPL	Non-performing Loans
PAIRS	Probability And Impact Rating System
RBA	Reserve Bank of Australia
RBNZ	Reserve Bank of New Zealand
RWA	Risk-Weighted Assets
ROSC	Reports on the Observance of Standards and Codes
SCV	Single Customer View
SOARS	Supervisory Oversight And Response System
TTBC	Trans-Tasman Council of Banking Supervision

EXECUTIVE SUMMARY

- 1. Australia's financial system is sound, resilient, and well managed.** Australia is one of the few advanced economies to avoid a recession during the global financial crisis (GFC), supported by strong economic fundamentals at the onset of the crisis, a well-coordinated response as the crisis unfolded, and a mining investment boom fueled by a surge in China's demand for commodities. Five years on, both the economy and the financial sector continue to outperform most of their peers. The authorities' timely response to the fallout from the GFC, their prudent economic management, and strong supervision of the financial sector, has kept Australia on the dwindling list of AAA rated countries.
- 2. The global outlook, however, remains uncertain and Australia's financial sector is not immune to persistent volatility in global markets.** Recent developments, including the unresolved European debt crisis, the anemic recovery in the United States, and the growth slowdown in China, suggest that the international environment will remain unfavorable for an extended period. This could exacerbate the vulnerabilities of a country with a structural current account deficit. The banking sector also faces challenges. The prospect of higher funding costs and slower credit growth, as businesses and households deleverage and become more conservative in their borrowing decisions, may encourage banks to take on greater risks to maintain profitability.
- 3. Against this backdrop, a number of risks will need to be closely managed (see RAM).** The financial sector, which has assets more than three times the size of GDP, is dominated by four large banks, which have broadly similar business models and rely on wholesale funding. Residential mortgages are the banks' single largest asset, and a combination of high household debt and elevated house prices increases the risk in this portfolio. These are long standing structural issues that will remain key sources of risk over the medium-term. Nevertheless, these risks are mitigated by the fact that the authorities have considerable policy space to respond to negative shocks given low public debt, a flexible exchange rate, some scope for monetary easing, and a well capitalized banking system.
- 4. Stress testing by APRA and the IMF shows that the banking system is likely to withstand severe shocks.** The banks' capital positions seemed capable of withstanding a range of adverse scenarios ranging from slow growth to severe macroeconomic shocks, even after taking into account banks' cross-border-exposures. Under the most severe scenario, aggregate Tier 1 capital remains above the minimum threshold, although total capital of some banks falls slightly below the threshold after two years. The liquidity stress test, which simulated a bank-run type scenario, indicates that banks would be able to withstand a severe liquidity shock with support from the RBA under a new Basel-approved facility, and withdrawals of funding from banks in the United States, United Kingdom, and Japan would have the largest impact.
- 5. While the results are satisfactory, the exercise has suggested that there is room for improvement in the authorities' own stress testing processes.** APRA, which applies its

own analysis, consistency checks, and judgment in interpreting stress testing results generated by banks, needs to devote more resources to stress testing. The RBA should consider establishing its own macro-financial stress testing framework, which could enhance its ability to identify and monitor emerging systemic risks.

6. **A higher capital threshold for the systemically important institutions may be desirable to further bolster financial system stability.** The four major banks are systemically important, which imposes a negative externality on the domestic financial system. Significant and protracted difficulties in any one of them would have severe repercussions for the entire financial system and, in turn, the real economy. To address this externality, the Basel Committee considers it appropriate for supervisory authorities to conduct more intensive supervision and require additional capital of systemically important institutions. Given the already strong supervision and progress in recovery and resolution planning, a higher minimum capital requirement would provide higher loss absorbency and would seem a natural next step to take. In addition, the four major banks enjoy a funding cost advantage derived from an implicit government guarantee, and should bear some of the cost of mitigating systemic risk.

7. **The financial regulatory and supervisory framework exhibits a high degree of compliance with international standards.** The principles-based and outcome-oriented supervisory approach of APRA is effective, with notable strengths in risk analyses embedded in the PAIRS and SOARS system, industry-wide risk assessments, and a focus on bank boards' responsibility for risk management. ASIC is also a highly regarded enforcer of market regulation. Yet, there is some room for improvement in certain areas of supervision, such as further enhancing APRA's formal on-site supervisory review of banks' liquidity risk management. The adequacy and stability of ASIC's funding is crucial for it to carry out proactive supervision, so it is important to increase its core funding.

8. **Systemic oversight and the arrangement for policy and supervisory coordination are effective.** The Council of Financial Regulators plays a key role in coordinating financial regulation and stability issues. The coordination arrangement under the Council works well, as demonstrated by the quick and appropriate response to the unfolding crisis during the GFC. Given the Council's important role, it is beneficial to further highlight its work and enhance the transparency of its deliberative processes. A more explicit report of the Council's deliberations in the Financial Stability Review would be a first step toward achieving these objectives.

9. **Impressive steps have been taken to strengthen the financial safety net and crisis management framework in recent years.** Progress since the 2006 FSAP includes the establishment of the Financial Claims Scheme (FCS) to protect depositors and general insurance policy holders, and strengthening APRA's powers. Going forward, a key priority should be to continue to enhance crisis preparedness through early planning. In addition, some form of *ex-ante* funding could help mitigate the moral hazard inherent in a highly concentrated banking sector. Of the several options available, *ex-ante* funded deposit

insurance, which ensures that the banking industry bears at least part of the cost of bank failures, and higher loss absorbency requirements for systemically important institutions would seem to represent the best options since the infrastructure is already in place. The authorities have also enacted laws and signed Memoranda of Understanding with New Zealand and other jurisdictions to facilitate cross-border cooperation on financial stability and supervisory matters.

10. **The FSAP’s high priority recommendations are noted in Table 1.** These recommendations are expected to have a near-term implementation timeframe.

Table 1. High Priority FSAP Recommendations

Recommendations	Responsible Authority
<i>Financial Stability</i>	
1. Develop a top down stress testing framework and publish top down stress test results in the Financial Stability Review	RBA
2. Devote more resources to stress testing	APRA
3. Introduce higher loss absorbency (HLA) for systemic banks	APRA
<i>Financial Sector Oversight</i>	
4. Intensify on-site supervision of bank liquidity and upgrade daily liquidity reporting requirements to ensure consistency	APRA
5. Improve the effectiveness of conduct of business supervision for insurance companies (note recommendation 6 below)	ASIC
6. Ensure sufficiency and stability of ASIC core funding	Treasury
7. Extend risk based capital requirements, large exposure rules, and reporting requirements to ensure that AFSL holders are appropriately covered	ASIC
<i>Crisis Management</i>	
8. Re-evaluate the merits of ex-ante funding for the FCS with a view to converting it to an ex-ante funded scheme	Treasury/CFR
9. Introduce HLA for systemic banks (see recommendation 3 above)	APRA
10. Ensure ADI implementation of single customer view (SCV) on, or where possible, ahead of the agreed timetable	APRA
11. Conduct frequent and focused crisis simulations and other forms of resolution testing	APRA/CFR
12. Continue recovery planning and introduce resolution planning	APRA

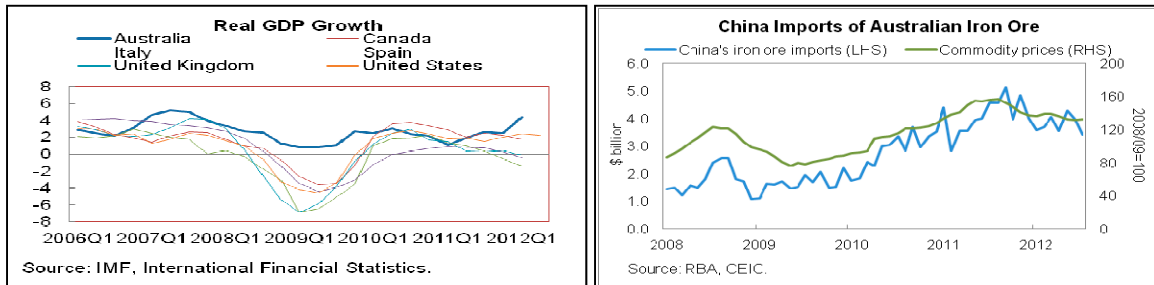
1/ Medium- and low-priority recommendations are noted elsewhere in the main report.

I. INTRODUCTION

A. Handling the Crisis

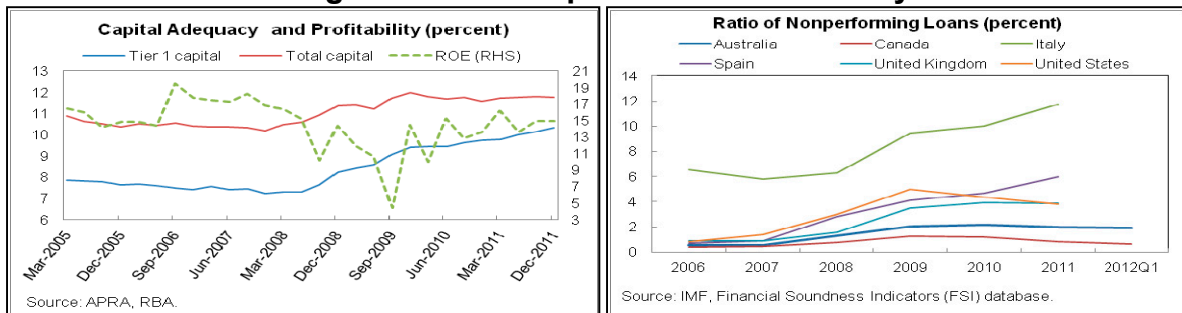
11. **Five years after the U.S. sub-prime debacle triggered the global financial crisis (GFC), the Australian economy continues to thrive.** Australia is one of the few advanced economies to avoid a recession, in part because of strong fundamentals at the onset of the crisis. Growth dipped only briefly below trend during the crisis and rebounded quickly, supported by robust demand for commodities from China, which fueled a mining boom and pushed the terms of trade to 60-year highs (Figure 1). As a result, the current account deficit fell to about 2½ percent of GDP in the first half of 2011 from an average of 4½ percent for the previous 15 years. Australia looks set to continue its two decades of uninterrupted expansion, with the economy expected to grow close to trend at 3-3.5 percent annually in 2012 and 2013. Inflation, meanwhile, is expected to remain subdued and well within the authorities' target band of 2-3 percent over the medium-term.

Figure 1. Growth and Demand for Commodities



12. **Australian banks performed well during the GFC and their performance has since improved.** Although banks did experience some funding pressure during the crisis, there was no bank failure and only a small increase in nonperforming loans (NPL). Banks have emerged with stronger capital positions. Their capital adequacy ratio rose to 11.8 percent in June 2012 from 11.4 percent in December 2008, accompanied by a rising share of Tier 1 capital in total capital and reflecting both new capital raising and a shift toward lower-risk assets such as mortgages (Figure 2). Profitability has also improved after a drop during the crisis, with annualized after-tax return on equity rising to 15 percent in the fourth quarter of 2011 from 4.5 percent in the third quarter of 2009. In fact, Australian banks are currently among the most profitable in the world (Appendix 2).

Figure 2. Bank Capital and Asset Quality



13. **Sound economic management, a proactive approach to supervision and a well-coordinated crisis response have helped maintain financial system soundness and stability.** The authorities responded quickly to the GFC with a sizable fiscal stimulus and substantial cuts in the policy rate to support domestic demand. To bolster market and consumer confidence, the government introduced the Financial Claims Scheme (FCS) in October 2008 guaranteeing deposits up to A\$1 million per account holder per Authorized Deposit-taking Institution (ADI).¹ A separate fee-based, unlimited, guarantee was introduced at the same time for wholesale funding instruments and large deposits above A\$1 million. These guarantee schemes reassured depositors and investors and helped keep Australian banks' access to offshore funding open.² The authorities' adept handling of the fallout from the GFC, their prudent economic management, and strong supervision of the financial sector, has kept Australia on the dwindling list of AAA rated countries.

B. But Global Uncertainty Persists

14. **Prospects for the global economy remain uncertain and Australia is not immune to further volatility in global markets.** The uncertainty stems mainly from the unresolved European debt crisis. Growth in the United States remains anemic, with business and consumer confidence kept weak by bouts of turmoil in international financial markets and an unclear fiscal outlook. China's economy has also slowed, reducing demand for commodities and putting downward pressure on the terms of trade. The confluence of negative developments suggests that the unfavorable international environment will persist for an extended period, which could slow the global economy with knock-on effects for Australia.

15. **Financial institutions around the world are adjusting to greater scrutiny and tighter regulation.** Under Basel III and G-20 commitments, national regulators will improve the quality of supervision, impose more stringent capital and liquidity requirements, including higher loss absorbency for systemically important institutions, and establish a sound resolution framework to ensure a safer financial system. Many countries are also embracing macroprudential policy as an additional tool to manage systemic risk in their financial systems. With a changing regulatory environment, markets are also demanding higher standards, putting greater scrutiny on financial institutions.

¹A separate Policyholder Compensation Facility was established under the FCS for general insurers. The FCS had been under development when the crisis brought forward the legislation and the deposit coverage was set at a higher level than originally envisaged in response to the crisis.

²While the wholesale funding guarantee is no longer in place, the government has since confirmed the FCS as a permanent feature of Australia's financial system and reduced the cap from A\$1 million to A\$250,000 per account holder per ADI. The new permanent cap has applied since February 1, 2012.

II. FINANCIAL SYSTEM STABILITY

A. Managing Risks and Vulnerabilities

16. **Australia's financial sector is large and mature with assets totaling 340 percent of GDP.** The financial sector has grown rapidly mainly owing to the expansion of home mortgages and superannuation funds (a retirement scheme comprising mandatory contributions by employers and voluntary and tax-concessional contributions by employees). ADIs, mostly banks, are the dominant group of financial institutions with 60 percent of financial sector assets, followed by superannuation funds (including investment-linked superannuation written by life insurance companies) with 25 percent. The non-life insurance sector is relatively small with 3 percent of financial sector assets, and non-superannuation managed funds have another 6 percent. The stock market had a capitalization of 80 percent of GDP at end-2011, although this was below the peak of 150 percent in mid-2007.

17. **Australia's financial sector faces a unique set of risks.** Its banking sector is concentrated, dominated by four large banks, and their broadly similar business models and reliance on offshore funding leave them exposed to common shocks and disruptions to funding markets. Against a still worrying global environment, these risks will need to be closely monitored, particularly if the domestic economy slows sharply.

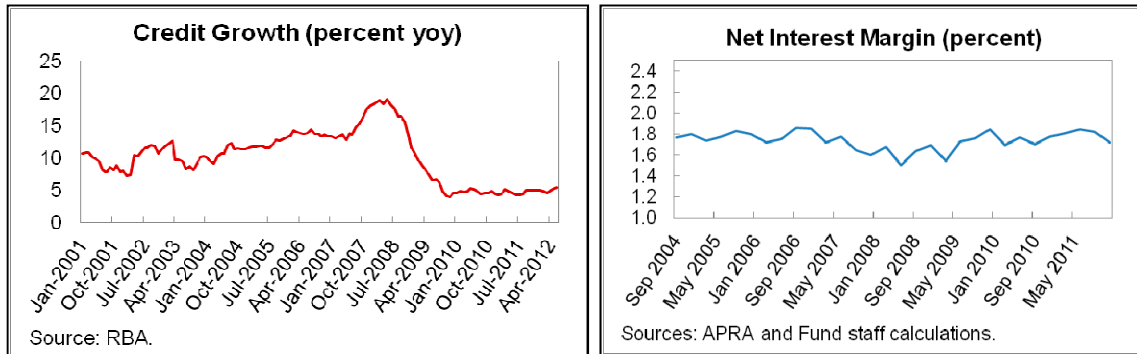
18. **Fortunately, Australia is well positioned to respond to negative shocks.** A combination of low public debt, flexible exchange rate, scope for monetary easing, and a well capitalized banking system should give the authorities ample policy space to respond. As a G-20 member and committed to financial reforms, Australia intends to implement new Basel III standards for capital from 2013, well ahead of schedule, and broadly follow the timetable for liquidity. The authorities are also implementing recovery planning requirements for large and medium-sized ADIs and considering resolution planning. These steps, as well as the FCS as a complement to long-established depositor preference provisions, should place Australia in a position of strength to deal with down-side risks.

B. What Are the Key Sources of Risks?

19. **Banks may not see the same level of profitability as they have become accustomed to.** The mining boom in recent years has contributed to the appreciation of the Australian dollar and created a multi-speed economy (Appendix 2). While the mining sector is growing fast, its contribution to credit demand is small, accounting for less than 1 percent of total lending. The non-mining sector generates most business credit demand but has faced pressures from the strong exchange rate and weak confidence. Moreover, households are saving more, putting an end to two decades of rapid retail credit expansion. Just as weaker credit demand limits revenue growth, funding costs are increasing as banks compete for retail deposits to replace wholesale funding. Pressure on the net interest margin, which accounts

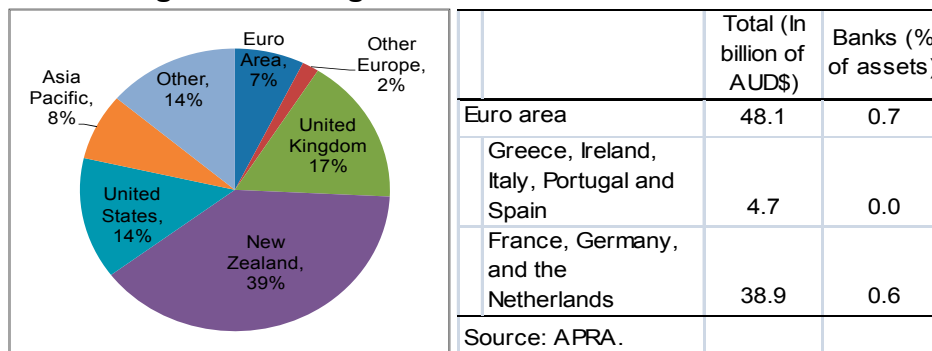
for almost two-thirds of operating income, has the potential to encourage more risk-taking by banks in order to preserve profitability (Figure 3).³

Figure 3. Credit Growth and Net Interest Margin



20. **Difficult conditions in the global financial environment may affect banks' overseas asset performance.** The total foreign claims of the banking system amount to 22 percent of consolidated assets of which 6 percent are cross-border claims. About 40 percent of these claims are on New Zealand and a combined 26 percent on the UK and Europe, a part of the world that is under financial pressures (Figure 4). A growth slowdown in New Zealand, which is also a net importer of capital, or an escalation of the sovereign debt crisis in Europe, could impair the quality of banks' overseas assets. Currently, banks' non-performing overseas assets are manageable at about 0.3 percent of consolidated assets, a slight decline from the peak of 0.4 percent in mid-2010. Asset performance for banks' New Zealand operations has improved in recent quarters in line with better economic conditions in the country. However, performance remains weak for their operations in the UK. Their exposure to Euro Area banks is less than 1 percent of their consolidated assets.

Figure 4. Foreign Claims of Australian Banks^{1/}



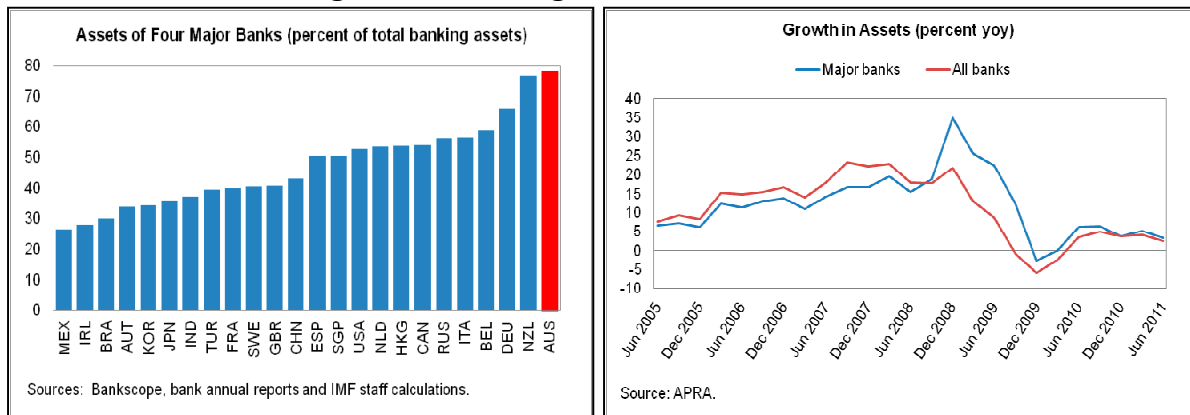
Sources: BIS, March 2012 and RBA Financial Stability Review, September 2012.

^{1/} Measured on a consolidated, ultimate risk basis.

³Riskier activities could include, for example, loosening underwriting standards or expanding too quickly into new business or geographic regions.

21. **The concentration and interconnectedness in the banking sector mean that idiosyncratic risks may have a systemic impact.** Australia's four major banks hold 80 percent of banking assets and 88 percent of residential mortgages (Figure 5).⁴ The major banks are highly interconnected, as they are among each other's largest counterparties, and their expected default frequencies (EDFs) from Moody's KMV are highly correlated. They have grown faster than the banking sector as a whole since the GFC, partly due to the acquisition of smaller banks and deleveraging by some foreign-owned banks. The major banks are highly profitable, enjoying a funding cost advantage derived partly from implicit government support and earning larger net interest margins than smaller banks and international peers. While their pricing power and greater risk diversification help sustain profitability, their size implies that, in the event of a failure, the impact on the financial system and the economy would be potentially substantial. Given their systemic importance, special risk mitigation arrangements, including more intensive supervision, higher loss absorbency, and robust recovery and resolution plans, will help prevent the failure of major banks and, should one occur, limit its impact and fiscal costs.

Figure 5. Banking Sector Concentration



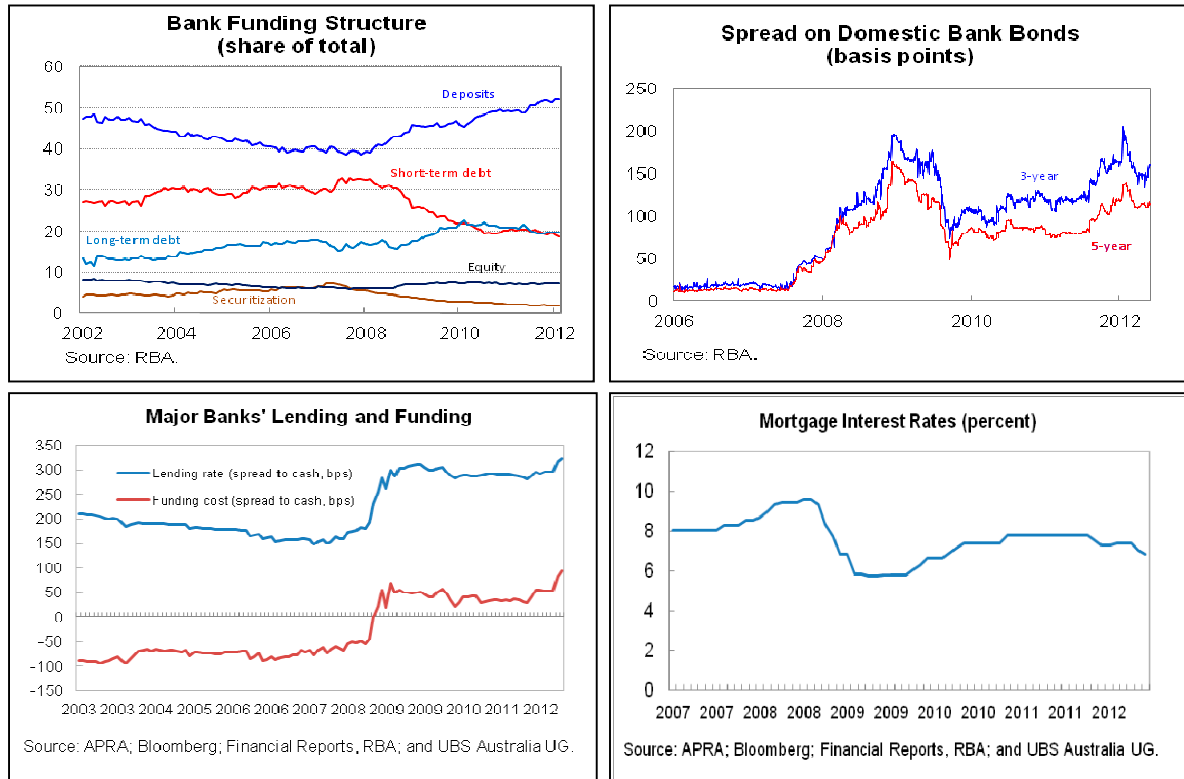
22. **The banking sector continues to rely on wholesale funding, although banks are making efforts to change their funding structure.** In particular, banks are reducing short-term wholesale borrowing and attracting retail deposits. The share of deposits has risen to 53 percent of total liabilities from 40 percent in mid-2008, while the share of short-term wholesale debt declined to 19 percent from 33 percent (Figure 6).⁵ The shift in the funding structure, however, has been accompanied by increased funding costs. The higher funding

⁴Data from Bankscope are used for coverage and consistency. Other data sources and metrics produce different results in terms of ranking, but a banking system with four banks holding 80 percent of the assets is considered concentrated regardless of the ranking.

⁵Offshore short-term wholesale funding used by Australian banks is below 10 percent of liabilities, with a considerable proportion of this in the form of deposits.

cost is due to competition for retail deposits and larger spreads on wholesale debt and cross currency swaps since the GFC—most of the increase has been passed on to borrowers.

Figure 6. Bank Funding Structure and Cost



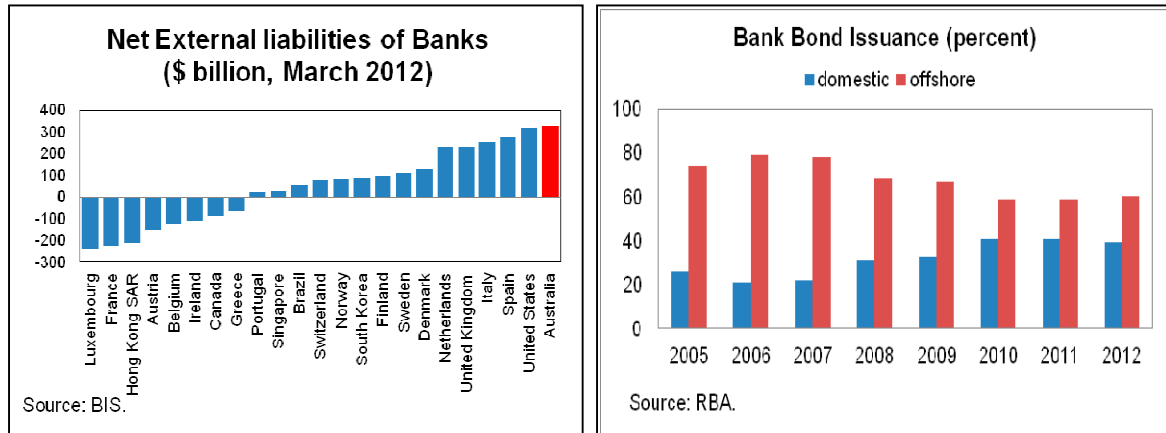
23. **Offshore foreign currency funding is still large.** The turmoil in international financial markets has prompted Australian banks to borrow more domestically. The share of bank bonds issued off-shore fell from 78 percent of the total in 2007 to 60 percent in 2011 (Figure 7). The maturity of off-shore bonds has also lengthened, with those maturing in less than a year falling from 80 percent in 2007 to 56 percent in 2011. However, banks' net foreign liabilities, denominated mostly in foreign currency, are still sizable at 24 percent of GDP.⁶ While almost all foreign currency positions are hedged, in the extreme event that counterparties failed to deliver, banks might have to obtain foreign currency in the spot market, possibly at unfavorable exchange rates until they find a replacement hedge (Box 1).⁷ In addition, the banks could be exposed to rollover risk during times of stress. To lessen the risk from international financial market turmoil, banks should be encouraged to continue

⁶Gross foreign liabilities of the Australian banking system are not large compared to many other developed banking systems, but banks in Australia use a larger amount of offshore funding domestically than banks in most other advanced economies.

⁷Replacement hedges might not be difficult to obtain, though, as clients on the other side of the trade would also be looking for replacement hedges.

lengthening the maturity of offshore funding and increasing their domestic funding. As a longer-term solution, increased domestic savings would be important. The authorities' plan to increase the contribution rate to the superannuation funds from 9 percent to 12 percent will help boost the pool of domestic savings that might be tapped for bank funding (Box 2).

Figure 7. Off-shore Funding



24. **The combination of high household debt and elevated house prices is a risk to banks' large mortgage portfolio.** As a ratio to household disposable income, Australia's household debt, of which 90 percent are housing loans, is above the average of advanced economies in the G20 (Figure 8). Strong house price gains over much of the past two decades have made Australia's house prices relatively expensive now. This combination exposes banks to negative income shocks generated by a sharp increase in unemployment. Moreover, around 30 percent of new mortgages are interest-only, a potentially riskier type of lending than regular mortgages, and 55 percent of those mortgages are interest-only investor loans. However, the risk is mitigated by a number of factors, including much larger household assets that dwarf household debt,⁸ relatively low household leverage with an average loan-to-value (LTV) ratio of about 50 percent on outstanding owner-occupied loans and increased household savings over recent years. While about 30 percent of mortgages, primarily to first-time buyers, have an LTV of 80 percent or more at origination, these are generally covered by private mortgage insurance. In addition, there is no tax incentive for owner-occupier debt, and prepayment on housing loans is prevalent and sizable.⁹ Mortgages are full recourse loans, giving borrowers an incentive to continue making payment even under stress.

⁸Household housing debt represents only about 30 percent of their housing assets, and household financial assets (non-housing) account for about 40 percent of household assets. The value of financial assets is more than double the value of housing debt. Moreover, interest-only-loans include mortgages with 100 percent off set accounts.

⁹Prepayments of indebted home owners are, on average, equivalent to 18 months of scheduled repayments.

Box 1. Hedging Foreign Currency Risks

Given major banks' use of foreign currency funding, it is necessary to hedge their positions against foreign exchange rate risks. Like their international counterparts, Australian banks hedge foreign currency risks through cross currency basis swaps and FX swaps. Cross-currency basis swaps are usually used in conjunction with term borrowing of more than one year in maturity, either matching the amount and maturity of a particular bond or loan or in a portfolio of such transactions hedging the overall value of the portfolio. FX swaps, on the other hand, are used on a pooled basis for short-term borrowing of less than a year.

A cross-currency basis swap agreement is a contract in which one party borrows one currency from, and simultaneously lends the same value of another currency to, another party. The contract specifies a price of the basis swap, which is usually expressed as a spread over the local money market interest rate. At the start of the contract, the principal amounts are exchanged at the prevailing spot exchange rate; during the contract term, the counterparties exchange interest payments at the agreed-on swap spread with a pre-determined frequency; and when the contract expires, the principal amounts are returned at the same spot rate as at the start of the contract. The transactions are collateralized under credit support annexes (CSAs). FX swaps operate in much the same way except for the exchange of interest payments during the contract term.

Banks' Funding Liabilities (March, 2012)

	AUD-denominated	FX-denominated	Total	FX-denominated share
	\$b	\$b	\$b	Per cent
Total Funding Liabilities				
Minimum FX estimate	2178	456	2634	17.3
Maximum FX estimate	2074	560	2634	21.3
Residents	2050	31	2081	1.5
Non-residents				
Minimum FX estimate	128	424	553	76.8
Maximum FX estimate	24	529	553	95.6
- Deposits				
Minimum FX estimate	104	35	139	25.0
Maximum FX estimate	0	139	139	100.0
- Short-term wholesale	3	88	91	96.8
- Long-term wholesale	21	302	323	93.4

Sources: APRA and RBA.

The swaps worked well for Australian banks during the GFC in that they generated collateral inflows as the Australian dollar depreciated. In cases where the hedge had to be replaced, banks were able to do so in a short period of time. From the banks' perspective, a weaker exchange rate also reduces the amount of foreign currency needed to fund a given amount of domestic assets. When the exchange rate appreciates, the swap transactions require Australian banks to post more collateral, and limit the amount of foreign currency available to fund a given amount of domestic assets.

The main currency-related risk for Australian banks is counterparty risk. Since the GFC, many of the traditional counterparties of Australian banks have been downgraded as a result of the deterioration in asset quality, indicating increased counterparty risk. Should a party to the swap transactions fail, the other party would have to find replacements for the swaps or be forced to obtain foreign currency on the spot market at potentially unfavorable exchange rates. The downgrades have prompted major Australian banks to tighten counterparty risk standards by requiring two-way CSAs, lowering collateral thresholds or adopting a strategy that focuses on a limited number of highly rated large internationally active commercial and investment banks. Of the outstanding notional principal amount of foreign currency related derivatives the four major Australian banks have with 40 counterparties, 44 percent are with the top five, i.e., Deutsche Bank, Citibank, JPMorgan, UBS and Barclays.

Box 2. Australia's Superannuation System

Superannuation is an important part of Australia's retirement income system that also includes a tax payer funded age pension. The superannuation system is predominantly defined contribution in nature with compulsory contributions made by employers on behalf of employees as well as voluntary contributions made by employees, both supported by concessional tax arrangements. The compulsory contribution rate is currently set at 9 percent of ordinary earnings and scheduled to increase incrementally to 12 percent between 2013 and 2019. The superannuation funds hold a significant amount of household savings representing about 60 percent of household financial assets. Assets of the superannuation funds total more than A\$1.3 trillion, or close to 100 percent of GDP. Prudentially regulated superannuation funds manage about two-thirds of the assets (over A\$800 billion), and the rest are held in self-managed funds (SMSF) that is a rapidly growing sector.

The current asset allocation is tilted toward equities, reflecting both personal preferences and the default investment strategy of many funds. As a result, the exposure to the banking sector is relatively small, at 17 percent of their total assets or 13 percent of banks' liabilities. Although most funds allow members to make their own investment choices, some 42 percent of assets are in the default investment strategy determined by fund managers.

The preference for equities reflects the strong performance of equities over the long run as well as favorable tax provisions that offer a tax credit on dividend income from Australian companies. As a result, more than half of superannuation assets are held in equities, with a slightly larger proportion in domestic than in international equities (see figure). The share of fixed income securities held in the funds, by contrast, is relatively small, reflecting in part the limited amount of high quality debt securities available. In recent years, there has been a gradual shift in the funds' allocation away from equities and towards deposits. Since 2007, the aggregate allocation to cash and deposits has grown from 10 percent to 17 percent.

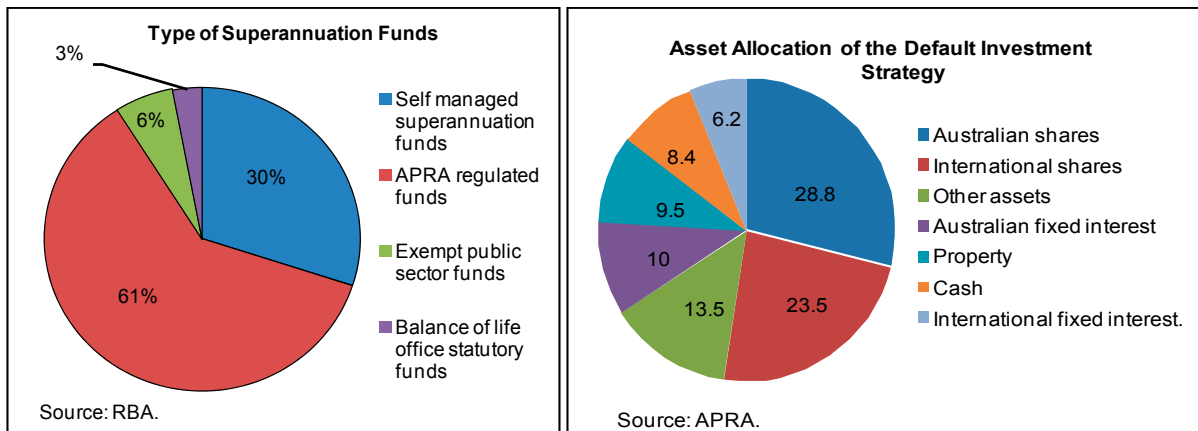
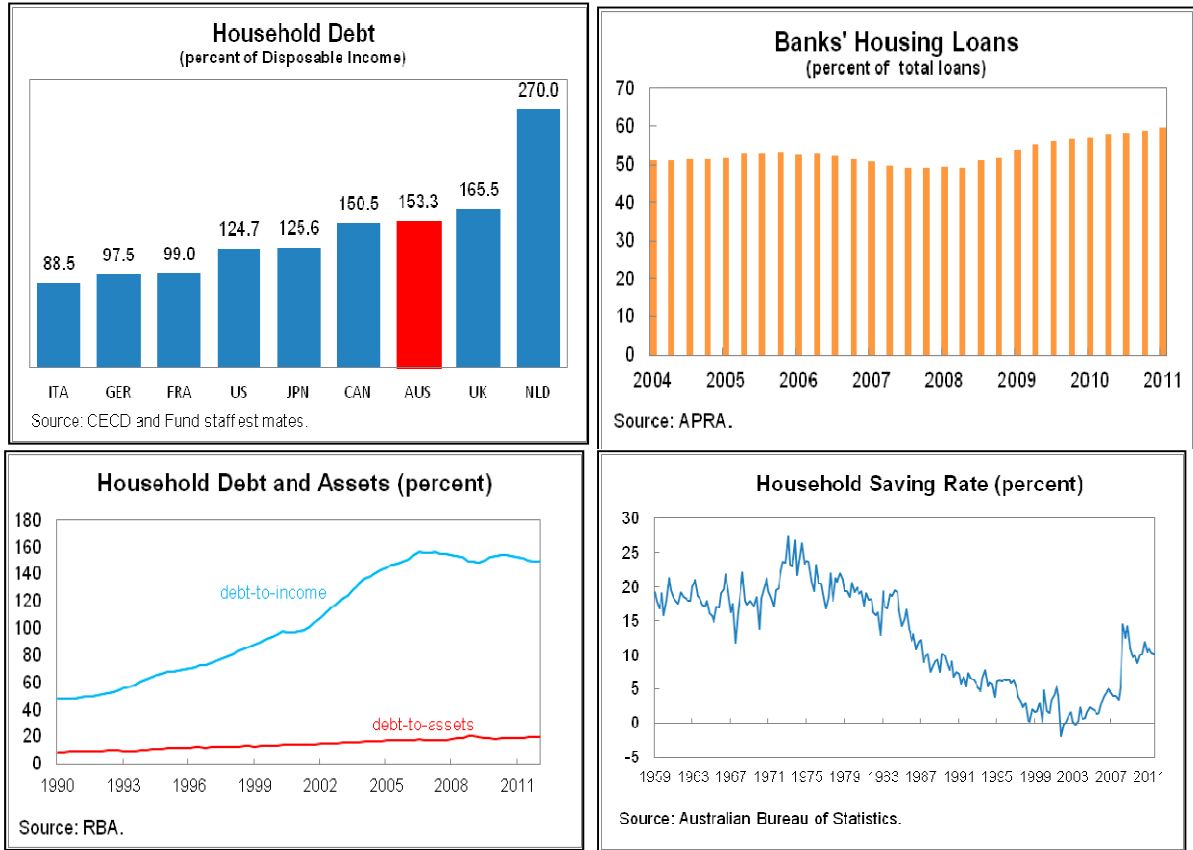


Figure 8. Household Debt and Housing Loans

25. **While some parts of the non-financial corporate sector have deleveraged, others remain under pressure.** Business credit, which accounts for approximately one third of total lending, has declined by 4.1 percent since peaking in the fourth quarter of 2008. The steepest declines, 14 percent and 11 percent, respectively, have been in construction and manufacturing. Although deleveraging has been largely voluntary, resulting from a reduced appetite for debt and accompanied by increased equity raising and retained earnings, it has also been a reflection of weakness in many parts of the corporate sector. The mining sector is booming—with investment expected to surge to 8 percent of GDP—but below-trend growth elsewhere is hurting profitability, where equity valuations for most sectors are below average (Figure 9). Expected default frequencies from Moody's KMV show weaker firms are now more susceptible to failure than before the crisis. The commercial real estate sector, which receives almost one-third of banks' lending but accounts for almost half of banks' current loan impairments, shows early signs of stabilization in vacancy rates and pricing. However, the leverage in agriculture, manufacturing, and services is still above the long-term historical average.

Figure 9. Non-Financial Corporate Sector Heat Map¹

	Leverage				Liquidity		Profitability		Valuation	Default Prob.	
	Debt to Equity	Debt to Assets	Short-term Debt to	Total Liabilities to Total	Quick Ratio	Cashflow to Sales	ROA	ROE	PE Ratio	Median	75th percentile
Agriculture	+	-	+	+	+	+	-	-	-	0.00	1.1
Mining	-	-	+	-	+	-	-	-	-	0.00	0.8
Construction	-	-	+	-	+	-	-	-	-	0.00	49.6
Manufacturing	-	+	+	-	+	-	-	-	-	0.01	42.4
Trans., Comm., Utilities	-	-	+	-	+	-	-	-	-	0.00	0.1
Wholesale Trade	-	-	+	-	+	-	-	+	-	0.04	18.4
Retail Trade	-	-	-	-	+	-	-	-	+	0.00	0.0
Services	+	+	+	-	+	-	-	-	-	0.00	2.8

Sources: Worldscope database and IMF Staff Calculations.

Note: The default probability is the Black-Scholes-Merton (BSM) probability of default one-year ahead.

¹Indicators for 2011 are compared to their average for the same sector between 1990 and 2011. + indicates above average; - below average; red shading indicates more than 2 standard deviations away from average in a weaker direction; orange indicates more than one but less than two standard deviations away from average.

C. Testing the Resiliency of the Banking System

26. **Stress testing focused on credit, contagion and liquidity risks and covered five of the largest banks.** The exercise combined individual bank stress tests under the guidance of APRA (bottom-up) and systemic macro-financial stress tests performed by the FSAP team (top-down).¹⁰ The top-down approach modeled credit risk in three different scenarios—a slow growth scenario, a mild recession scenario and a severe recession scenario, while the bottom-up approach used only the severe recession scenario. In addition, the FSAP team supplemented solvency and liquidity stress tests with a network analysis of the impact of an external funding shock using BIS data on international banking exposures. The stress tests were conducted using consolidated data and included banks' cross-border exposure.

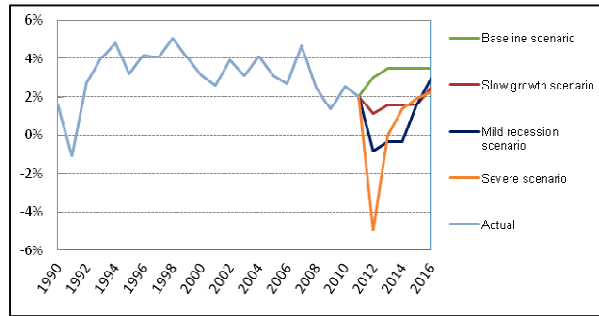
27. **The different scenarios under the top-down approach are designed to capture a wide range of possible outcomes.** In the slow-growth scenario, there is a one standard deviation shock to real GDP growth from the baseline, and in the mild recession scenario, the shock to real GDP is increased to two standard deviations.¹¹ In the severe recession scenario, annual GDP growth swings from 2 percent to -5 percent during the first year, representing a shock of more than 4 standard deviations (Appendix 3). By comparison, using shocks of 1-3 standard deviations is standard practice in stress testing exercises. The severe recession

¹⁰The balance sheet approach of Schmieler et al (2011) is used as the top-down stress testing framework. See Schmieler, Puhr, and Hasan, 2011, "Next Generation Balance Sheet Stress Testing," IMF Working Paper 11/83.

¹¹The standard deviations are based on the volatility of annual GDP growth from 1960, and the shocks are over the first three years of a five-year horizon with positive adjustment dynamics during the subsequent two years.

scenario represents an extreme tail event as the lowest recorded Australian GDP growth in the last fifty years was only -3 percent (Figure 10). However, it is comparable to the experience during the GFC of the United States with a swing in GDP growth from 1 percent to -5 percent, and of the United Kingdom with a swing from 4 percent to -5 percent.

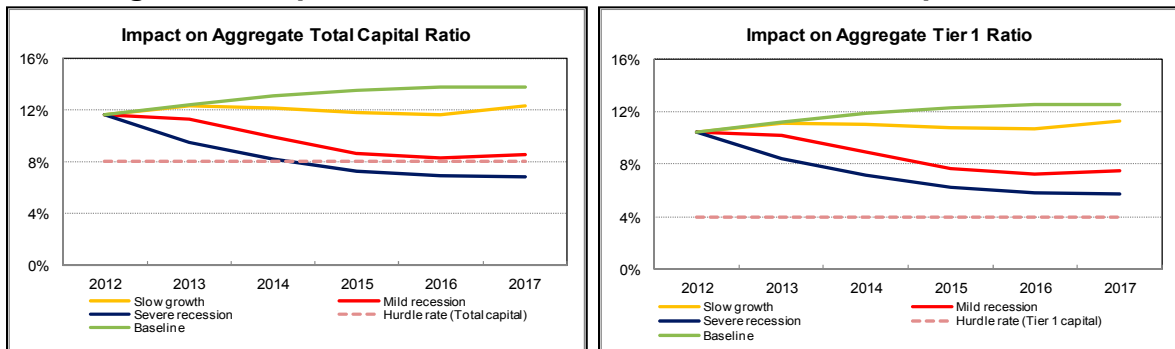
Figure 10. GDP Growth Trajectories Under Different Growth Scenarios



Source: IMF Staff calculations.

28. **Results of the top-down stress tests show that major banks are generally well capitalized.** Their capital ratios, both total and Tier 1, remain above the minimum thresholds in the low growth and mild recession scenarios. The system-wide Tier 1 capital ratio would also remain above the threshold in the severe scenario. However, system-wide total capital would fall below the threshold of 8 percent after the second year of stress in the severe recession scenario before eventually stabilizing from the fourth year (Figure 11). Credit loss is the largest driver of capital loss, reflecting the contraction in GDP. The top-down stress test results are broadly consistent with those of the bottom-up approach. In particular, the sudden deterioration in the macro-economic environment results in a rapid loss of capital in years one and two in both cases.

Figure 11. Impact of Alternative Scenarios on Bank Capitalization



Source: IMF Staff calculations.

29. **The liquidity stress tests include an Implied Cash Flow Test (ICFT) and the risk of contagion from the withdrawal of offshore funding.** An ICFT assesses banks’ capacity to cope with a bank-run type of scenario, simulating a gradual outflow of funding for a period of five weeks. Not surprisingly, banks do not have sufficient liquid assets to withstand such a shock because of the limited availability of highly-rated nonbank (mainly

government) domestic securities. However, all banks are able to offset the outflows with liquidity support from the RBA, even under stringent haircut assumptions. To complement the liquidity stress test, a network analysis of international funding shocks is conducted to identify the main sources of risk. The analysis, based on bilateral exposures of 27 banking systems, shows that the withdrawal of funding by banks in the United States, United Kingdom and Japan represents the biggest potential risk for the Australian banking system.

30. **The RBA will create a committed liquidity facility (CLF) in 2015 to help ADIs meet the proposed liquidity coverage ratio (LCR) under Basel III.** The LCR measures the amount of liquid assets on a bank's balance sheet which, for many countries, would consist of government debt. Given the very limited amount of government debt in Australia, the Basel III framework has explicitly recognized the CLF as an alternative, under which ADIs will be able to access a specified amount of liquidity using repurchase agreements of eligible securities outside the RBA's normal market operations. ADIs will be required to pay fees for this assistance, currently set at 15 basis points. The use of the facility will be at RBA's discretion, and an ADI must have first received approval from APRA on the amount of liquidity requirement that can be met through the CLF.

31. **There is room for improvement in the authorities' stress testing process.** Individual banks utilize different stress testing models, different approaches to estimate losses given defaults (LGDs) and probabilities of defaults (PDs), and use data of different levels of granularity. While they are required to apply APRA-determined credit migration matrices, PDs and LGDs for different portfolios, which APRA develops based on its judgment, the dispersion in banks' practice makes analysis difficult for APRA. Hence, there is a need for APRA to devote more resources to bottom-up stress testing to validate and cross check individual bank results and to ensure overall consistency. In addition, the RBA does not have its own top-down stress testing framework, which could be a useful tool to further enhance its capacity to identify and monitor systemic risk. The stress testing framework and models should be developed to assist the next ADI industry stress test.

D. Addressing Systemic Banks: A Case for Higher Loss Absorbency¹²

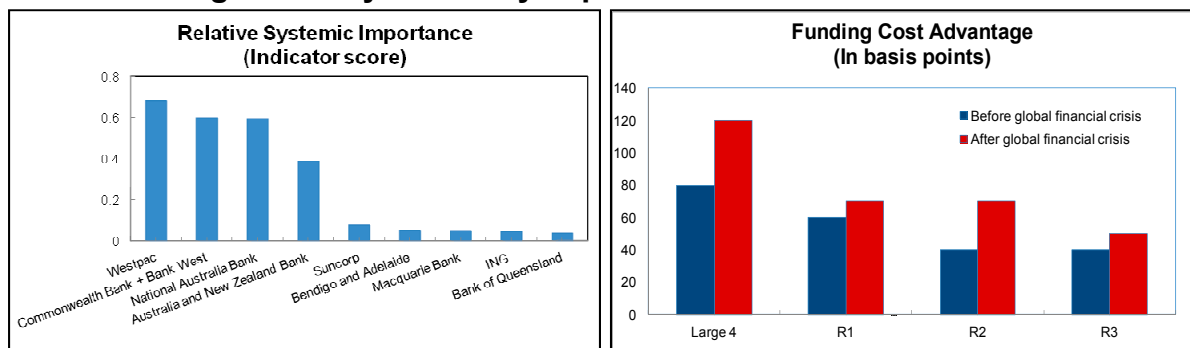
32. **The major banks enjoy implicit government support because of their systemic importance.** A variety of indicators, including size, interconnectedness, and complexity, show clearly that the major banks are systemically important domestically (Figure 12). Their systemic importance causes a negative externality as significant and protracted difficulties in any one of them would undermine confidence and impinge on other banks with severe repercussions for the entire financial system and the real economy. As a result of their systemic importance, rating agencies reflect implicit government support in their ratings of major banks, which gives them a funding cost advantage. According to Fund staff estimates

¹²See Technical Note "Addressing Systemic Risk through Higher Loss Absorbency" for more details.

detailed in the Banking Sector technical note, this funding cost advantage rose from 80 basis points to 120 basis points during the GFC, when government support for the banking system was made more explicit.¹³

33. **Addressing the externality resulting from their systemic importance requires a multi-pronged approach.** Following international consensus, a number of countries have moved ahead with a comprehensive framework that includes more intensive supervision, recovery and resolution planning, and higher loss absorbency. The recent BCBS final paper on the policy framework for domestic systemic banks noted that the assessment and application of policy tools should allow for an appropriate degree of national discretion to accommodate structural characteristics of the domestic financial system. In Australia, the supervisory approach embedded in the PAIRS/SOARS system already incorporates more intensive supervision for systemically important institutions and recovery planning for these institutions is also moving ahead. To complement efforts on these two fronts, a higher loss absorbency requirement for systemic institutions should also be considered.

Figure 12. Systemically Important Financial Institutions



Source: IMF staff calculations.

Note: Index combines size, interconnectedness, and complexity; total financial system = 3

Source: Ueda and Weder di Mauro (2012) based on Fitch support ratings

Notes: Large 4: ANZ, Commonwealth, NAB, Westpac; R1: Suncorp; R2: Bendigo/Adelaide and Macquarie; R3: Bank of Queensland

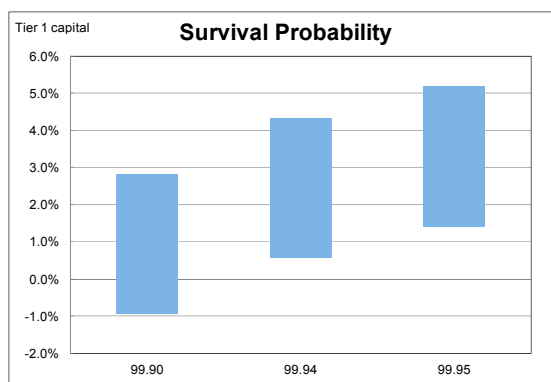
34. **Higher loss absorbency for systemic institutions helps align incentives and protect taxpayer resources.** The impact of failure of a systemic institution imposes a higher cost on the broader economy than that of a non-systemic institution. To mitigate this externality, systemic institutions should have a much higher probability of survival; higher than the solvency benchmark implied by the Basel metrics that currently apply to both systemic and non-systemic institutions. Some countries, including Austria, Singapore, and Sweden have already established higher loss absorbency requirements of 3 percentage points,

¹³Estimates of implicit support based on ratings are by their nature subjective and need to be interpreted with care. Alternative estimates based on the contingent claims analysis could yield different results (Noss and Sowerbutts, 2012 http://www.bankofengland.co.uk/publications/Pages/fsr/fs_paper15.aspx).

2 percentage points, and 5 percentage points, respectively, for their domestically important banks.

35. **APRA’s current application of Basel II goes some way to meeting this objective through higher risk weights and a more conservative definition of risk absorbing capital.** This approach could be complemented by explicitly requiring systemic institutions to hold a higher minimum capital requirement to ensure a greater probability of survival commensurate with their size and interconnectedness. In this regard, the Expected Default Frequency (EDFTM) of Moody’s KMV provides a method for gauging the desired level of capital consistent with a certain probability of survival (Box 3). As an illustration, this method suggests that, as of end-2011, maintaining a one-year ahead probability of 99.9 percent of not defaulting on any payment would require the four major banks to hold additional Tier 1 capital ranging from -0.9 to 2.8 percent of RWA (Figure 13).¹⁴ Alternatively, achieving a 99.95 percent probability of not defaulting on any payment would require the major banks to hold additional Tier 1 capital ranging from 1.4 to 5.2 percent of RWA. This would require all large banks to hold more capital: some by a trivial amount, others more substantially. How much additional capital may be ultimately required will depend on APRA’s risk tolerance.¹⁵

**Figure 13. Additional Tier 1 Capital Requirements for Systemic Banks
(in percent of Risk-weighted Assets)**



Source: IMF Staff calculations.

¹⁴The result is based on pooled data of the four major banks. A negative figure means some banks already have sufficient capital to achieve this probability of survival. See Technical Note “Addressing Systemic Risk through Higher Loss Absorbency” for more details.

¹⁵It should be noted that there is no internationally agreed “benchmark” and the BCBS’s D-SIB policy framework gives national authorities discretion in determining the actual amount of additional capital to be required of domestic systemic institutions <http://www.bis.org/publ/bcbs233.htm>.

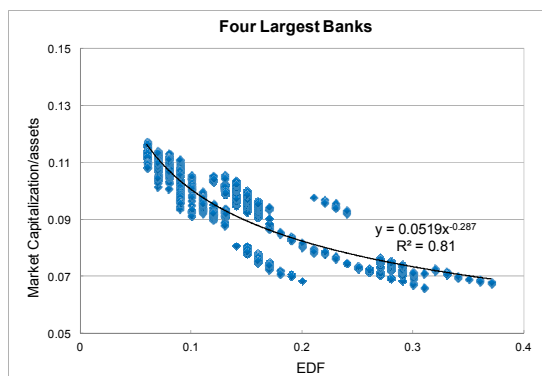
Box 3. Reducing Systemic Risk through Higher Loss Absorbency

Preventing insolvency of systemically important banks or at least securing the continuation of their systemically important functions is essential to safeguard financial stability. While heightened supervision and credible resolution and recovery planning can mitigate systemic risk, higher loss absorbency reduces the probability of insolvency of a bank.

How much supplementary capital should be required from systemically important institutions depends on the desired probability of survival of the institutions. This probability could be set in absolute terms or with reference to non-systemic institutions. For example, if the impact of failure of a systemic institution is deemed to be ten times as large as that of a non-systemic institution, capital requirements for the systemic institutions could be set in such a way that its probability of insolvency is ten times less than that of a non-systemic institution.

Moody's KMV's Expected Default Frequency (EDF) can be used to quantify the relationship between capitalization and the likely survival of a bank. The EDF is the probability that a company will default within a given time horizon, where default means the failure to make a scheduled payment. The EDF depends on equity return volatility, equity values, and the distress barrier from the book value of liabilities (e.g., the point at which the value of assets of a company falls below the present value of promised payments on debt). The exact methodology for the computation of the EDF is confidential, but it is based on a large real world database of default probabilities and has a proven track record in predicting default.

EDFs were calculated for the Australian banks for which the information was available and plotted against their market capitalization/asset ratio. For the four largest banks this yields the relationship shown in the figure below. Given the non-linearity of this relationship, a power function was fitted to the data for the purpose of computing the level of market capitalization corresponding to a given expected default frequency. For example, if one would like to ensure a (very high) probability of survival of 99.95 percent (EDF=0.05), total Tier 1 capital would need to be 12.3 percent of risk-weighted assets (compared to an actual average of 10 percent during the first half of 2012). The EDF is computed from the default rate for a given distance-to-default, which in turn is a function of the asset value and asset volatility and the book value of liabilities.



Source: IMF Staff calculations.

III. ENHANCING FINANCIAL SECTOR OVERSIGHT

A. Prudential and Conduct Supervision

36. **Australia has a “functional” model of financial regulation and supervision with separate agencies in charge of prudential regulation and conduct of business.** Prudential oversight of ADIs, insurers and all large superannuation funds rests with APRA while ASIC is responsible for market conduct and consumer protection.¹⁶ The RBA has the responsibility for overseeing financial system stability and the payments system. The Treasury is also involved in financial regulation by providing policy advice to the government. The Minister has the legal power to give policy direction to APRA and ASIC, although this power has not been used in the case of APRA and only used once in the case of ASIC. Other regulators include the Australian Competition and Consumer Commission responsible for promoting competition and fair trade in the market place, and the Australian Transaction Reports and Analysis Centre (AUSTRAC), a financial intelligence unit (FIU) responsible for anti-money laundering and combating the financing of terrorism (AML/CFT).

37. **APRA maintains a conservative supervisory approach.** It is super-equivalent to the Basel standard on capital. In particular, APRA imposes more stringent requirements on the quality of capital where at least 75 percent of Tier 1 capital is to be accounted for by common equity compared with at least 50 percent under Basel II. For smaller banks that use a standardized approach, higher risk weights than typical for Basel II are required for important asset classes, including equities, certain residential mortgages and retail loans; advanced (internal-ratings based) banks must maintain higher minimum LGDs for some portfolios than Basel II rules require. APRA intends to keep its conservative stance when adopting Basel III.

B. The Standards Assessment

38. **The banking, insurance and securities sectors are assessed under revised principles that are more rigorous and comprehensive.** These revised principles are Core Principles for Banking Supervision, 2006; Insurance Core Principles, 2011; and IOSCO Objectives and Principles of Securities Regulation, 2011. These principles have a heightened focus on risk management and are evaluated in the context of a financial system’s sophistication, complexity, interconnectedness, size, risk profile and cross-border operation. In addition, the rigor of the assessments has significantly increased since the GFC with more

¹⁶However, ASIC is also responsible for the overall supervision of a significant number of market intermediaries which includes monitoring their compliance with obligations of a prudential nature, including those relating to capital requirements and risk management. With regards to the most important market intermediaries (ASX Clearing Participants), ASIC shares its regulatory responsibility with ASX that sets and monitors their capital requirements.

emphasis placed on the quality of supervisory practices. For Australia, the assessments show a high degree of compliance in all three sectors.

39. **APRA takes a proactive, risk-based approach to bank supervision.** The approach is principles based and outcome oriented, relying more on directors and management to interpret and apply regulatory principles than on prescriptive regulations. APRA does not prescribe simple regulatory limits, such as LTV ratios or debt-to-income (DTI) ratios; preferring internal regulatory guidance such as on collateralization and serviceability that takes all loan contract terms into account. APRA's notable strengths are demonstrated by its strong risk analysis embedded in the PAIRS and SOARS system,¹⁷ its focus on bank boards' responsibility for risk management, and its assessment of banks on a system wide basis. APRA's on- and off-site supervision is well planned and executed; credit risk management is well developed; and its provisioning requirements typically result in higher reserves than required under IFRS. Moreover, APRA conveys its expectations for the management of specific risks to banks through engagement with bank boards, regular contacts by supervisors and risk specialists, and letters and speeches delivered to the industry. This approach has been broadly effective.

40. **APRA has made significant progress in updating the insurance regulatory regime since the 2006 FSAP.** Achievements include implementing Stage II reforms and supervision of general insurance groups;¹⁸ broadening enforcement powers; imposing restrictions on unauthorized foreign insurers; and providing greater legal clarity in the Treasurer's role in specific supervisory matters. The risk-based supervision framework is comprehensive with established internal policies and processes to promote prompt and consistent supervisory actions. More importantly, APRA has adequate resources and technical capacity to conduct effective supervision.

41. **ASIC has rightfully earned its reputation as an effective and credible enforcer of market regulation, but would benefit from increased resources and budgetary flexibility.** ASIC's oversight of the exchanges is effective. A series of high profile and successful prosecutions, along with good shareholder protection and high accounting and auditing standards, have contributed to its standing in the market. ASIC has also recently expanded its surveillance of hedge funds and market intermediaries. However, ASIC is hampered in its ability to fully carry out proactive supervision because of the lack of budgetary resources. A significant amount of ASIC's funding is non-core funding earmarked for specific projects, and the share of non-core funding has been increasing in the last few

¹⁷Probability and Impact Rating System (PAIRS) and Supervisory Oversight And Response System (SOARS).

¹⁸Stage II reforms involved a program of revised prudential requirements covering a wide spectrum of issues including risk and reinsurance management, audit and actuarial reporting and valuation, governance, fit and proper, capital and assets standards.

years. To supervise a large number of financial services licensees, ASIC uses desk-top, rather than on-site, reviews for initial risk-based assessments, reflecting in part its resource constraints. In determining the target and intensity of its supervisory actions, ASIC relies heavily on its initial risk-based assessments, self-reporting of breaches of regulatory requirements and third party notifications. It is important that ASIC be given more resources and flexibility over its operational budget.

42. **The assessments have identified a number of areas that would benefit from greater emphasis or improvements.** Notable gaps include the amount of time devoted to on-site supervision for certain risk areas or entities; and the extent to which supervisors perform due diligence on senior executive management, directors, controllers, or significant shareholders at the time of licensing of certain entities. Specifically:

- In order for APRA to have comfort that an institution has in place the policies, practices and governance necessary to ensure effective liquidity risk management, the amount of time allocated to formal on-site review needs to increase from the current 3-4 days.
- ASIC should conduct more proactive surveillance of insurers and insurance intermediaries, and devote more attention to the proactive supervision of collective investment schemes and those market intermediaries that are not exchange members.
- ASIC should bridge regulatory gaps, and prevent potential risks, by extending risk-based capital requirements, periodic capital adequacy reporting and large exposure rules to some of the AFSLs not regulated by APRA.
- ASIC should be empowered to make or enforce regulation to ensure the fair treatment of insurance customers and the protection of policyholders (e.g., on group-wide market conduct, insurer's claims handling and the servicing of life policies). The current regulatory regime dilutes the effectiveness of the conduct of business supervision.
- ASIC and APRA should coordinate more closely to address shortcomings in public disclosure requirements for insurers, including the exemption of small and unlisted insurers from many disclosure requirements; the limited disclosure on capital adequacy for life insurers; the lack of disclosure of sources of earnings analyses; and the lack of comprehensive disclosures of corporate governance risks and risk management.

43. **The legal framework contains features that could potentially undermine the relevant agencies' regulatory independence.** The Minister has the legal power to give

policy direction to both APRA and ASIC and decide on the change in significant ownership of an ADI.¹⁹ Although such power has rarely been used and may not be used in relation to a given regulated entity, its existence could potentially diminish the ability of APRA and ASIC to carry out their supervisory and regulatory functions effectively. Therefore, it is important for APRA to have the legal power to veto, on prudential grounds, any decision on changes in significant ownership. However, the authorities do not view the Minister's power as undermining the independence of the regulatory agencies. Instead, they view it as providing a mechanism for transparent interaction with the government on policy grounds, and as an important check and balance on the powers of the regulatory agencies, for holding them accountable to Parliament, and ultimately, to the people of Australia.

44. **An AML/CFT assessment of Australia was last conducted by the Financial Action Task Force (FATF) on Money Laundering in March 2005.** A full AML/CFT reassessment is required every five years according to the IMF Board decisions regarding the incorporation of AML/CFT into the FSAP. Country authorities have approximately 18 months from the date of the last FSAP to undergo the FATF assessment. The new FATF assessment methodology will not be published until February 2013, with the evaluations commencing in late 2013. Australia is scheduled to be one of the first jurisdictions reviewed under the revised standards in early 2014 which will fit within the policy of the FSAP. A ROSC will be forwarded to the Fund and subsequently circulated to the Board upon adoption of the mutual evaluation report by the FATF Plenary.

C. Systemic Oversight

45. **Maintaining financial stability is a shared responsibility.** The RBA has long been responsible for financial stability, although the mandate is not provided in law. The government reaffirmed this responsibility for the RBA in 1998 when the financial regulatory structure was changed significantly, and APRA was established. Promoting financial stability is also one of APRA's mandates, which is carried out through prudential regulation and supervision. APRA's PAIRS and SOARS system has an element of systemic oversight in that supervisors take a financial institutions' systemic importance into consideration. The system is complemented by APRA's industry risk registers, which identify emerging risks and necessary supervisory actions in each industry.²⁰ ASIC and the Treasury also have roles in promoting financial stability, the former through its oversight of capital markets, and the latter through its advisory role to the government on financial stability issues and on the legislative and regulatory framework underpinning financial system infrastructure.

¹⁹Such policy direction is subject to certain controls and there are restrictions on the Minister's right to approve a change in significant ownership of an ADI.

²⁰These registers relate to four financial sectors: banking, life insurance, general insurance and superannuation.

46. **Coordination among the agencies is effective in a largely informal arrangement.** The Council of Financial Regulators (CFR), comprising the RBA, APRA, ASIC, and the Treasury, is the primary coordinating body for the main regulatory agencies. It is chaired by the RBA Governor. The CFR is an advisory body with no powers separate from its member agencies, but it works to coordinate the activities of the agencies in exercising their own powers; cooperation is governed by a series of bilateral MOUs between the agencies. The authorities do not believe that formalizing the current arrangement under a single “macroprudential authority” is necessary. Their current arrangement, built on a “culture of cooperation, dialogue and mutual respect” has served Australia well.²¹ Indeed, the CFR played a key role in shaping the government’s response to the GFC. The recommendation to offer a deposit guarantee and establish the Financial Claims Scheme (FCS), for example, was made at the CFR. Working groups led by different agencies analyze key issues facing the financial system and formulate policy stance for discussion at the CFR. While the CFR has been effective, there is scope to make its role more prominent by highlighting its work and enhancing the transparency of its deliberative process. A more explicit report of the CFR’s deliberations in the Financial Stability Review would be a first step toward this goal.

47. **There is a well-established mechanism for systemic risk identification and monitoring.** The RBA has a central role in monitoring financial system soundness and warning of potential risks, which are carried out through the publication of its half-yearly Financial Stability Review. The Review assesses the health of financial institutions, corporations and households and the performance of financial markets, serving as a useful tool of communication with financial institutions and the general public. The Review’s production requires interagency coordination, and its regular discussion at the CFR before publication keeps its members up to date on global financial market developments and their implications for domestic financial stability. The Review has been a useful financial stability tool, but it could be further improved by incorporating regular stress testing results on the financial system once the RBA establishes its own stress testing framework.

48. **While there is a macroprudential overlay in the authorities’ approach to systemic risk monitoring, they do not generally prescribe simple regulatory limits to dampen the credit cycle.** Tools such as caps on LTV, DTIs, and leverage have been used in many developing countries as macroprudential instruments to counter the credit cycle and been proven effective, particularly in countries where a managed exchange rate regime

²¹See speeches by Malcolm Edey, “Macroprudential supervision and the role of central banks” September 2012 <http://www.rba.gov.au/speeches/2012/sp-ag-280912.html>; and Luci Ellis, “Macroprudential Policy: A Suite of Tools or a State of Mind?” October 2012 <http://www.rba.gov.au/speeches/2012/sp-so-111012.html>.

prevents full deployment of monetary policy in response to domestic conditions.²² A few advanced countries have also recently adopted these tools. In the authorities view, the efficacy of the use of rules or a model-based-application of such instruments has yet to be fully tested in countries with a similar level of financial development and structure to Australia. They prefer to focus on judgments about the ability of borrowers to repay and the quality of bank lending standards, and adjusting, for example, risk weights or pillar II capital as necessary, to respond to rising systemic risk. For Australia, this approach appears to have been broadly effective.

IV. CRISIS MANAGEMENT AND RESOLUTION²³

49. **Commendable steps have been taken to strengthen the legal framework for bank resolution and crisis management over the last several years.** Significant legislative changes since 2008 have established the FCS, enabled APRA to appoint a statutory manager to an ADI before the point of insolvency had been reached, and strengthened APRA’s powers to facilitate the resolution of ADIs and insurers. A number of these areas were identified by the 2006 FSAP as weaknesses in the framework for bank resolution and crisis management.

50. **Responsibilities for bank resolution and crisis management are shared among the CFR agencies.** The RBA serves as the lender of last resort, APRA is the resolution authority for prudentially supervised institutions and administers the FCS, and the Treasurer is responsible for making declarations that the FCS applies to a particular ADI. In addition to bilateral MOUs, an MOU on Financial Distress Management among the CFR agencies signed in 2008 facilitates coordinated responses to stress in the financial system. Given the history of few bank failures, the FCS has never been activated for an ADI and the resolution powers in their current form have not been tested.²⁴ A key priority, therefore, would be to continue enhancing crisis preparedness through early planning with particular attention to formulating an effective communication strategy.

51. **Crisis preparedness can be enhanced by conducting regular simulations.** The CFR agencies have been actively engaged in developing crisis resolution strategies and policy guidance, undertaking crisis simulation exercises in 2009 and 2011. Further efforts

²²See “Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences” IMF Working Paper 11/238.

²³See Technical Note “Crisis Management” for further discussion of the issues. The authorities have also issued a public consultation paper on “Strengthening APRA’s Crisis Management Powers” in September 2012 <http://www.treasury.gov.au/~media/Treasury/Consultations%20and%20Reviews/2012/APRA/Key%20Docs/PDF/Discussion%20Paper.ashx>.

²⁴The FCS has been activated for a very small insurer.

should be directed at both broad and focused crisis simulations with regular frequency. Simulations testing the overall framework should occur about every two years while targeted testing should be done more frequently, with a simulation of a systemic liquidity shock conducted in the near term. Furthermore, APRA should ensure that ADIs adopt single customer view (SCV) recordkeeping as quickly as possible, which is imperative for determining the amount of guaranteed deposits.

52. The authorities should adopt measures to mitigate moral hazard inherent in a highly concentrated banking sector. The FCS is *ex post* funded, backed by a standing budgetary authorization of up to A\$20 billion per ADI, and enjoys a priority in claims on liquidation recoveries. An optional levy on the industry provides a mechanism to make up any shortfall in recouping guaranteed depositor payment.²⁵ However, *ex post* funding and the levy's optional feature are not consistent with international best practices requiring banks to bear the cost of their own failures.²⁶ An *ex ante* funded deposit insurance scheme is one of several methods that are available to mitigate the moral hazard by imposing costs on the industry.²⁷ An *ex ante* deposit insurance scheme should have a credible and adequate reserve fund built up from periodic flat-rate assessments on ADIs' deposits initially but changing to risk-based assessments over time, and the fund's investment objective should emphasize liquidity and safety over return.²⁸ An *ex ante* funded deposit guarantee scheme, together with higher loss absorbency requirements (as discussed above), appear to represent the best option for Australia since the infrastructure is already in place.²⁹

53. Continued efforts are warranted for recovery and resolution planning. Consistent with other jurisdictions, APRA initiated a pilot program in 2011 requiring the six largest ADIs to develop recovery plans. The planning exercise focused primarily on

²⁵Most *ex post* funded deposit guarantee schemes are pro-cyclical in that levies are imposed on the industry during a downturn. This is not necessarily the case with the FCS since the levy is optional and can be imposed, if and when the government deems appropriate.

²⁶Principle 11—Funding of the Deposit Insurance Core Principles (DICPs) and Principle 6 of the Key Attributes for Effective Resolution http://www.financialstabilityboard.org/publications/r_111104cc.pdf.

²⁷Other options include a financial institutions tax, higher loss absorbency through bail-in, and resolution or stability funds financed by the industry. These options are discussed further in the IMF's June 2010 report, "A Fair and Substantial Contribution by the Financial Sector" <http://www.imf.org/external/np/g20/pdf/062710b.pdf> and the IMF's 2012 Staff Discussion Note 12/-3, "From Bail-out to Bail-in: Mandatory Debt Restructuring of Systemic Financial Institutions" <http://www.imf.org/external/pubs/ft/sdn/2012/sdn1203.pdf>.

²⁸As a simple rule of thumb, a deposit insurance fund should cover deposits of two to three mid-sized banks.

²⁹To be fair, the authorities had carefully considered *ex-ante* funding in the design phase of the FCS but decided not to pursue it because of Australia's unique circumstances, including the lack of government securities and limited highly rated domestic corporate bonds for such a fund to invest in.

mitigating measures they could adopt to overcome impairments to their capital and liquidity positions in a severe scenario and re-establish their financial viability without official support within a realistic timeframe. APRA plans to extend recovery planning requirements to mid-sized ADIs (assets greater than A\$5 billion) in 2013. Eventually, such requirements should be extended to all ADIs and appropriately tailored to their size. APRA should also conduct annual checks to ensure that the recovery and contingency plans are up-to-date and adequate. In addition, APRA should introduce resolution planning requirements for at least the major banks, which will increase the efficiency of the resolution process and reduce potential losses should the need arise to resolve a systemic bank. APRA has had extensive discussions with the industry but no decision has been made so far.

54. **Concrete steps have been taken to facilitate cross-border cooperation between the Australian and New Zealand authorities on financial stability matters.** In 2005-2006, both the Australian and New Zealand parliaments enacted laws that imposed reciprocal obligations on APRA and the New Zealand prudential supervisor, the Reserve Bank of New Zealand (RBNZ), to support each other in meeting statutory responsibilities for prudential regulation and financial stability. As a result, APRA has an explicit statutory obligation: (i) to support the New Zealand authorities in meeting their statutory responsibilities for financial stability in New Zealand; (ii) to the extent reasonably practicable, avoid any action that is likely to have a detrimental effect on financial system stability in New Zealand; and (iii) to consult with and consider the advice of the New Zealand authorities, when practicable, before taking action that is likely to have a detrimental effect on financial system stability in New Zealand.³⁰

55. **The spillover effect from Australia to New Zealand is likely to be limited.**³¹ While subsidiaries of major Australian banks account for 90 percent of banking assets in New Zealand, these subsidiaries are ring-fenced. In principle, a subsidiary—as opposed to a branch—is better able to continue as a going concern should the parent fail or have to be resolved because they are locally incorporated and the host authorities would require the subsidiary to maintain sufficient capital and liquidity buffers in the country. The statutory obligations of both supervisors also help to limit the spillover effects. In addition, the Trans-Tasman Council on Banking Supervision (TTBC), which was formed in 2005 and comprises key representatives of Australian and New Zealand regulatory agencies, provides a mechanism for cooperation and coordination during financial stress. The TTBC has been developing crisis resolution strategies for trans-Tasman banks which include policy and operational guidance, and conducted crisis simulation exercises in 2011.

³⁰The primary obligations are set out in Section 8A of the APRA Act.

³¹This analysis is based on staff desk assessment as opposed to an investigation conducted in the field. Staff drew from the analysis in “Subsidiaries or Branches: Does One Size Fit All?” March 2011 by Fiechter et al <http://www.imf.org/external/pubs/ft/sdn/2011/sdn1104.pdf>.

56. **The authorities are encouraged to take steps to enhance cross-border coordination arrangements with other jurisdictions.** Other cross-border operations of Australian ADIs account for approximately 5 percent of banking sector assets. Australian operations of foreign banks (mainly in the form of branches) account for around 12 percent of domestic banking sector assets. At this point, APRA has in place bilateral MOUs on supervisory matters with a number of foreign supervisory agencies, including those in the U.S. and the U.K. Discussions for the development of other MOUs focused on bank resolution and crisis management with the U.S. and other relevant jurisdictions are ongoing.

Appendix 1. Australia: Risk Assessment Matrix

Nature/Source of Main Threats	Relative Probability of Realization of Threat (in the next two years)	Expected Impact on Financial Stability if Threat is Realized
Volatility in wholesale and external funding	<p><i>Staff assessment: MEDIUM</i></p> <p>Banks' funding profile has improved since the global financial crisis, but they continue to rely on wholesale and external funding. With an uncertain global outlook and an unsettled situation in Europe, these funding sources are likely to remain volatile.</p>	<p><i>Staff assessment: MEDIUM</i></p> <p>Banks' foreign currency liability positions are largely hedged and the explicit liquidity support from the RBA means that a reversal of capital flows would unlikely result in forced asset sales. Nevertheless, volatility in international funding markets could raise banks' funding costs and put pressure on profit margins.</p>
Terms of trade shock	<p><i>Staff assessment: LOW/MEDIUM</i></p> <p>Australia's terms of trade have benefited from exceptionally strong commodities demand from Asia, especially China. As China's growth slows, commodities prices are likely to become more volatile with increased probability of a major correction.</p>	<p><i>Staff assessment: HIGH</i></p> <p>A large decline in the terms of trade would reduce GDP growth, boost unemployment and widen the current account deficit.</p> <p>Slower growth and higher unemployment would undermine credit quality by constraining the ability of the household sector to service its debt, already among the highest (relative to disposable income) in advanced economies.</p> <p>Slower growth and a larger current account deficit may lead to a reversal of capital inflows, causing a funding shock.</p>
Collapse in housing or commercial real estate prices	<p><i>Staff assessment: LOW/MEDIUM</i></p> <p>House prices have declined gradually over the past year, but a collapse in house prices appears unlikely. No construction boom has accompanied the run-up in house prices, and supply remains quite tight. Commercial real estate prices have seen a large correction since 2008 but still appear high by international comparison</p>	<p><i>Staff assessment: MEDIUM/HIGH</i></p> <p>The household sector is not highly leveraged, and an average LTV ratio of 50 percent on mortgages provides a buffer against a large decline in house prices. Nevertheless, about a quarter of mortgages have an LTV of 80 percent or more at origination, borrowed mostly by first time home buyers and low income households. The buffer for this group is much smaller and a large decline in house prices would have an impact on asset quality. Commercial real estate represents about 10 percent of banks' exposures and a sharp fall in prices would impair banks' balance sheets.</p>
Contagion risk arising from bank concentration	<p><i>Staff assessment: MEDIUM</i></p> <p>Dominated by four major banks, the Australian banking system is one of the most concentrated in the world. The four banks have similar business models, and such similarities may be a source of contagion risk.</p>	<p><i>Staff assessment: HIGH</i></p> <p>The similarities in their lending and funding mean that stress in one bank could be quickly transmitted to others. The ex post funded deposit guarantee program (the Financial Claims Scheme) seems inadequate to address such a contagion risk, meaning that other resolution options would be needed, possibly involving the use of fiscal resources.</p>
Exposure New Zealand	<p><i>Staff assessment: LOW</i></p> <p>About 40 percent of Australian banks' cross-border-exposure is to New Zealand and a downturn there would hamper the asset quality of Australian banks.</p>	<p><i>Staff assessment: LOW</i></p> <p>The two countries are both net importers of capital and, due to their interconnected funding relationship, an external funding shock could get amplified.</p>

Appendix 2. Economic and Financial Indicators

Financial System Structure

	Total assets (In billions of AUD)				Total assets (In percent of GDP)			
	Dec. 2008	Dec. 2009	Dec. 2010	Dec. 2011	Dec. 2008	Dec. 2009	Dec. 2010	Dec. 2011
Authorized deposit taking institutions (ADIs)	2794.0	2704.9	2799.6	2954.0	226.6	215.8	206.7	204.9
Banks	2672.6	2582.0	2668.8	2818.2	216.7	206.0	197.1	195.5
Number of institutions	55	53	54	61
Building societies	21.0	22.7	25.2	21.1	1.7	1.8	1.9	1.5
Credit unions	45.4	47.2	51.6	53.7	3.7	3.8	3.8	3.7
Registered financial corporations (RFCs)	244.3	173.3	167.9	160.4	19.8	13.8	12.4	11.1
Money market corporations	108.5	67.5	64.8	57.2	8.8	5.4	4.8	4.0
Finance companies and general financiers	135.8	105.8	103.1	103.2	11.0	8.4	7.6	7.2
Managed funds	1036.3	1176.1	1221.3	1210.5	84.0	93.8	90.2	84.0
Superannuation funds	711.1	866.5	929.6	945.8	57.7	69.1	68.6	65.6
Public unit trusts	263.2	257.8	254.3	230.5	21.3	20.6	18.8	16.0
Cash management trusts	44.7	38.3	24.5	22.3	3.6	3.1	1.8	1.5
Common funds	11.8	7.7	7.4	7.2	1.0	0.6	0.5	0.5
Friendly societies	5.5	5.8	5.5	4.7	0.4	0.5	0.4	0.3
Insurance	314.3	327.9	331.6	336.8	25.5	26.2	24.5	23.4
					0.0	0.0	0.0	0.0
Other	383.4	246.9	214.6	221.6	31.1	19.7	15.8	15.4
Total financial system assets	4772.3	4629.1	4734.9	4883.3	387.0	369.3	349.6	338.7
Memorandum items:								
Total external debt	1159.3	1160.6	1150.7	1269.2	94.0	92.6	85.0	88.0
Long-term	664.8	693.1	700.7	777.5	53.9	55.3	51.7	53.9
Short-term	338.2	322.7	309.0	334.7	27.4	25.7	22.8	23.2
Direct investment liabilities	156.3	144.8	141.0	157.0	12.7	11.5	10.4	10.9
ADI external debt	625.7	670.5	624.2	633.5	50.7	53.5	46.1	43.9
Long-term	348.8	366.5	343.8	331.5	28.3	29.2	25.4	23.0
Short-term	276.9	304.0	280.4	301.9	22.5	24.3	20.7	20.9

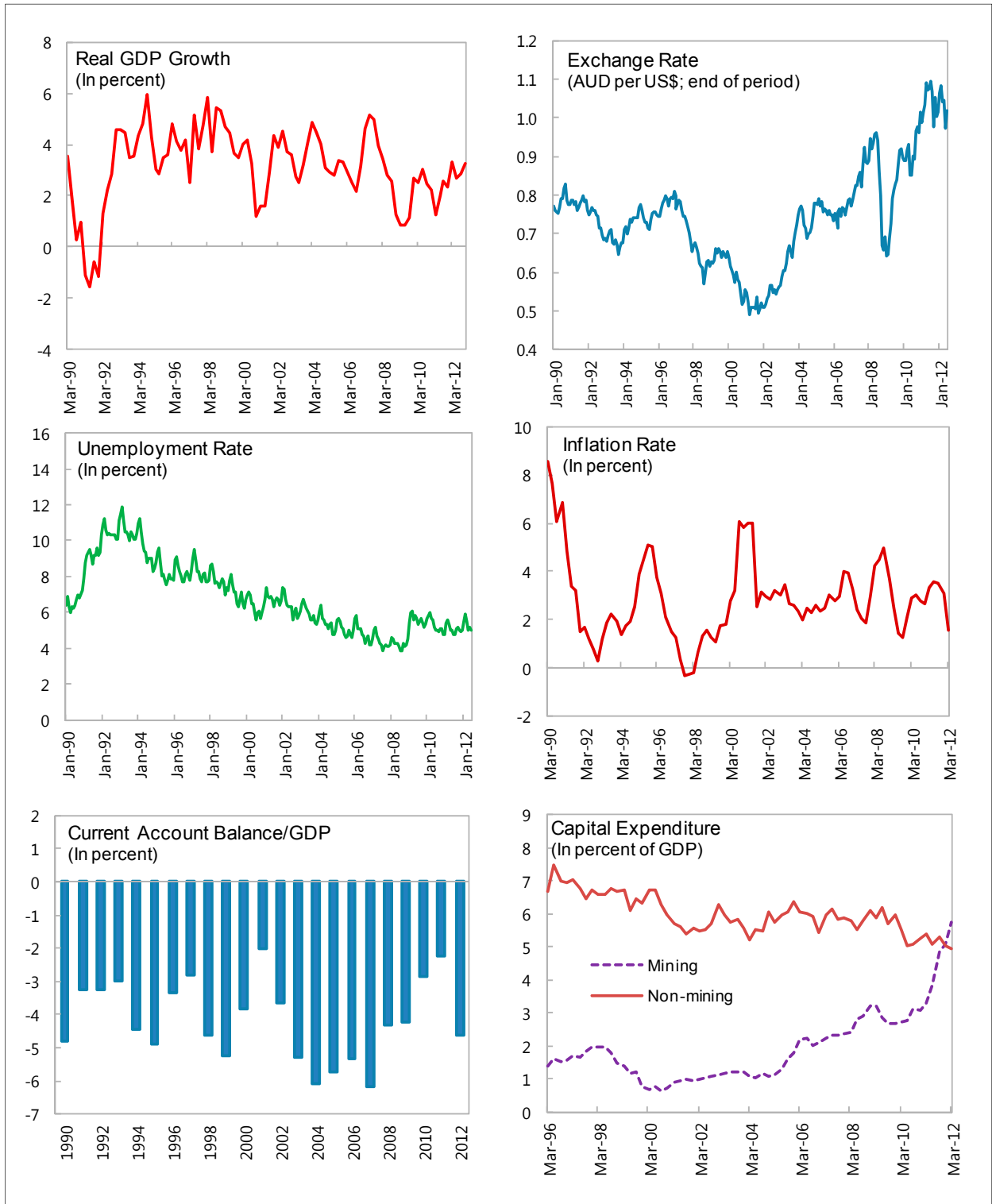
Sources: Australian Bureau of Statistics and Reserve Bank of Australia (RBA).

Financial Soundness Indicators

	2008	2009	2010	2011	2012Q1
Regulatory Capital to Risk-Weighted Assets	11.3	11.9	11.4	11.6	11.6
Regulatory Tier 1 Capital to Risk-Weighted Assets	8.5	9.3	9.6	10.2	10.3
Non-performing Loans Net of Provisions to Capital	11.2	17.2	20.4	19.3	18.3
Non-performing Loans to Total Gross Loans	1.3	2.0	2.2	2.0	1.9
Sectoral Distribution of Total Loans					
Residents	96.1	97.3	96.8	96.9	96.9
Deposit-takers	0.8	0.5	0.4	0.3	0.3
Other Financial Corporations	4.6	3.4	2.9	2.8	2.9
General Government	0.7	0.7	0.7	0.9	0.8
Nonfinancial Corporations	30.2	27.8	26.1	25.8	25.7
Other Domestic Sectors	59.8	64.9	66.7	67.1	67.2
Nonresidents	3.9	2.7	3.2	3.1	3.1
Return on Assets	0.9	1.0	1.1	1.3	...
Return on Equity	18.9	18.6	20.0	22.3	...
Interest Margin to Gross Income	65.3	52.6	54.8	71.2	...
Non-interest Expenses to Gross Income	47.4	56.8	57.2	45.5	...
Liquid Assets to Total Assets (Liquid Asset Ratio)	14.2	14.5	15.6	16.1	16.3
Liquid Assets to Short Term Liabilities	34.6	35.2	38.5	39.2	40.8

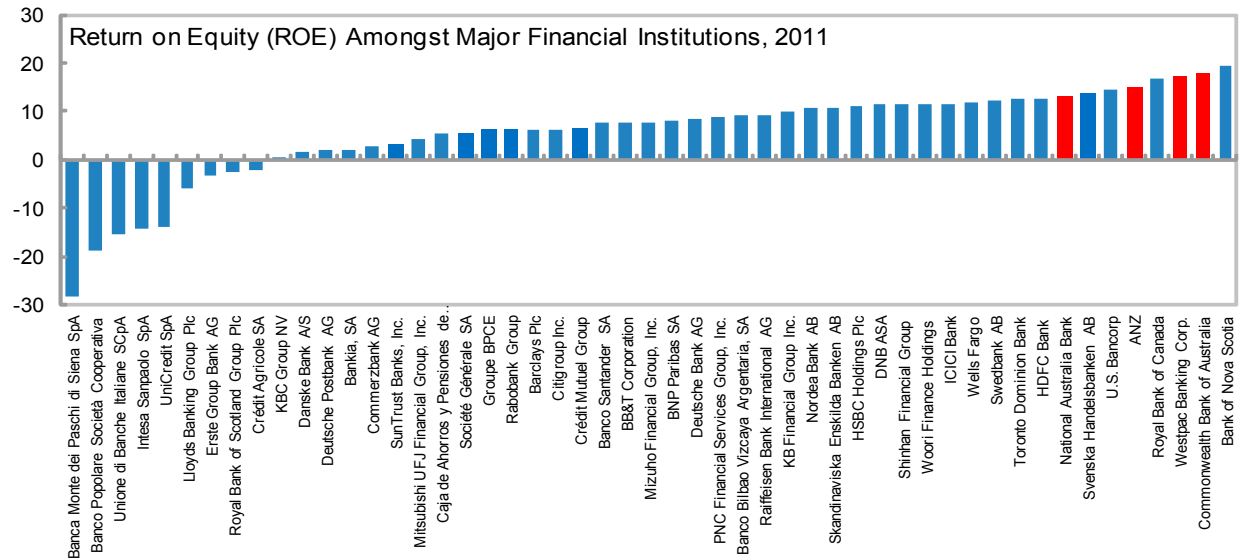
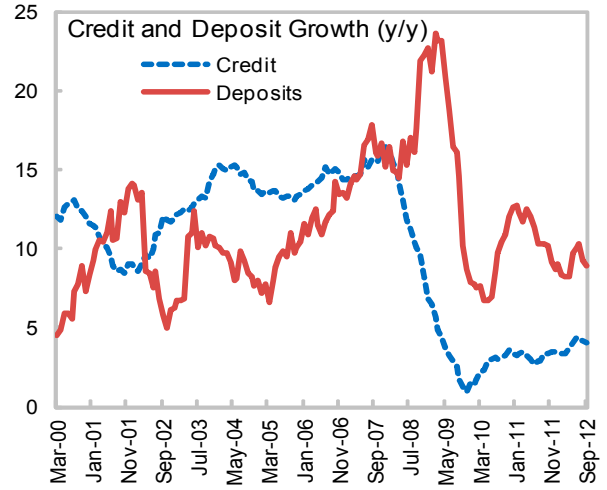
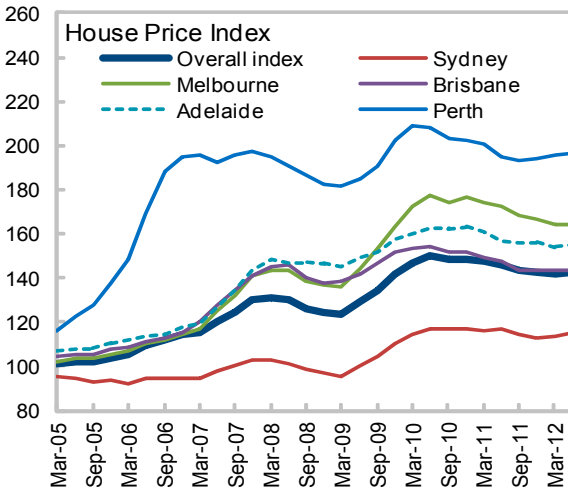
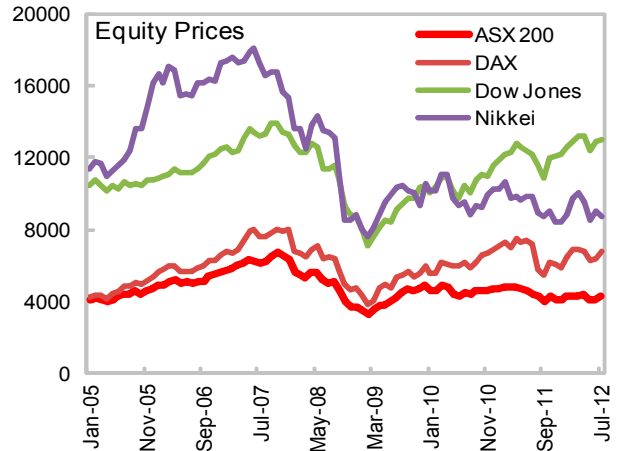
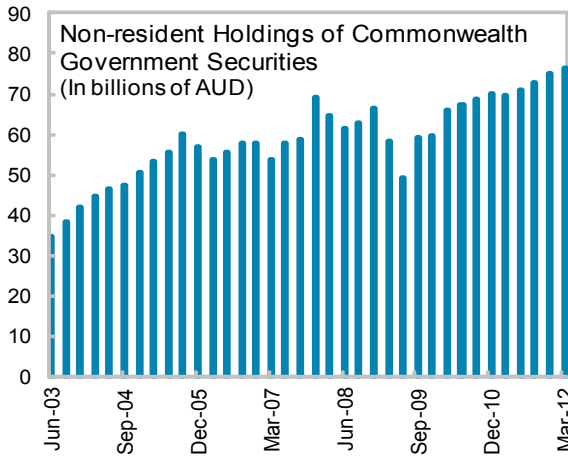
Source: IMF, Financial Soundness Indicators (FSI) database.

Selected Economic Indicators



Sources: Bloomberg; IMF International Finance Statistics; and IMF World Economic Outlook database.

Selected Financial Sector Indicators



Sources: Australian Bureau of Statistics; Australian Office of Finance Management; Bloomberg; IMF Financial Statistics; and IMF Financial Soundness Indications database.

Appendix 3. Australia FSAP Update Stress Test Matrix

	Solvency Stress Test	Liquidity Stress Test
Who performed the stress test	Two complementary approaches: FSAP team in conjunction with APRA (top down/bottom up).	FSAP team in conjunction with APRA.
Institutions covered	Five of the largest Australian banks (ANZ, CBA, NAB, Westpac and Macquarie).	Five of the largest Australian banks (ANZ, CBA, NAB, Westpac and Macquarie).
Severity of shocks	The bottom up stress tests was based on a scenario of disorderly resolution of the European debt problem that triggers a sharp downturn in advanced economies. As a result, the severe stress scenario includes a GDP growth decline to minus 5 percent (which is more than a 4 standard deviations shock), a 50 percent drop in commodity prices, a 35 percent decline in house prices and an increase in the unemployment rate from 5.25 percent to 12 percent. In addition to the severe shock scenario, the top down test considered slow growth and mild recession (one- and two- standard deviation shocks to GDP growth) scenarios.	Severe bank run type scenario, with a gradual outflow of funding and accounting for market illiquidity of assets in case of fire sales.
Data Used	Individual banks' and supervisory data	Individual banks' and supervisory data.
Risk horizon	Three years for bottom-up, five years for top-down	A gradual outflow of funding for a time frame of (a) 5 weeks and (b) fixed period (30 days).
Metrics	Expected losses (EL), Banks capitalization (CAR, Tier 1 Ratio).	Asset and Liability maturity profile. Asset and Liability gap.
Positions and Risk Factors	On-balance and off-balance sheet Credit risk and market risk	On-balance sheet.
Methodology	Banks models and APRA generated portfolio specific migration matrices, PDs and LGDs FSAP team: balance-sheet ST approach.	FSAP team and authorities: combination of models, including Implied Cash Flow balance-sheet ST approach.

Appendix 4. Stress Test Methodologies and Assumptions¹

1. **Stress testing was conducted jointly by the IMF and APRA as part of the 2012 FSAP Update for Australia.**² The exercise consisted of stress tests performed by individual banks under the guidance of APRA, (a bottom-up approach), and systemic macro-financial analyses undertaken by the IMF in close cooperation with APRA (a top-down approach). The tests assessed credit, market, funding and liquidity risks for five of the largest banks (ANZ, CBA, NAB, Westpac, and Macquarie), which together account for 80 percent of banking assets in Australia. The centerpiece of this exercise was the credit-risk-focused solvency tests, which covered a period of five years under the top-down approach, using financial and supervisory data as of March 2012. The stress tests were conducted on consolidated basis, and thus considered Australian banks' cross-border-exposure, and in particular its credit exposure to New Zealand. The top-down results were consistent with the outcomes of the bottom-up tests, which used data as of September 2011 and covered a period of three years.

Solvency stress tests

2. **The top-down stress tests simulated the impact of three different macroeconomic scenarios.** These included a slow growth scenario, a mild recession scenario and a severe recession scenario, which were designed to capture a wide range of possible outcomes. Using the IMF World Economic Outlook forecast of April 2012 as a baseline, shocks to real GDP growth produced by the slow growth, mild recession and severe recession scenarios were equivalent to one, two and four standard deviations, respectively. The standard deviations were based on the volatility of annual GDP growth since 1960. For the slow growth and mild recession scenarios, the shocks were applied over the first three years with positive adjustment dynamics during the subsequent two years. For the severe recession scenario, the path of adjustment was specified for key macroeconomic variables (see table below).

Severe Scenario Projections for Key Economic Variables

Variable	Year 0	Scenario
GDP year-ended growth	2½ percent	Trough is -5 percent (in Year 1)
Unemployment rate	5¼ percent	Peak is 12 percent (in Year 3)
Inflation year-ended change	3½ percent	Trough is ½ percent (in Year 4)
Cash rate	4¾ percent	Low is 1 percent (from Year 1)
Total credit year-ended growth	3 percent	Trough is -3½ percent (in Year 2)
Equity prices		Up to 47 percent decline (in Year 1)
House prices		35 percent decline (up to Year 3)
Commercial property prices		40 percent decline (up to Year 3)

Source: APRA, IMF and RBA.

¹The author of this appendix is Iryna Kaminska (ICD).

²There were no issues with data quality and data sharing in conducting this exercise.

3. **The severe recession scenario was designed by the authorities to evaluate the risk bearing capacity of the Australian banking system.** Compared to the standard practice of applying shocks of 1-3 standard deviations in recent stress testing exercises in other jurisdictions, the shock of 4 standard deviations is severe but plausible (see table below). The scenario is comparable to the experience of the United States and the United Kingdom during the global financial crisis when GDP growth in the United States swung from 1 percent to -5 percent, and from 4 percent to -5 percent in the United Kingdom. The severe recession scenario assumes a disorderly resolution of the fiscal problems in Europe, triggering dislocation in global debt and funding markets, and a sharp slowdown in China. The implied reduction in Chinese demand for minerals lowers commodity prices by over 50 percent from the peak, with a consequent depreciation of the exchange rate. Domestically, households and businesses respond to the external shock by reducing investment and consumption expenditure. As a result, output falls and unemployment rises substantially, which feeds back into rising defaults and sharp declines in house prices and commercial property prices. The subsequent recovery in the domestic economy is very weak, with unemployment remaining at high levels for several years.

The Severity of Shocks (scenarios in selected FSAP stress tests¹)

	Year 0	Year 1	Year 2	Year 3				Shocks in standard deviations
	GDP % (yoy)	GDP % (yoy), and deviation from baseline						
<i>Australia, 2012</i>	2.05	-4.96	-7.99	0	-3.5	1.36	-2.14	≈ 4 s.d. over last 50 years
USA, 2010	-0.5	2.3	-0.8	0.8	-1.7	2.6	0.2	≈ 1 s.d. over last 50 years
Germany, 2011	3.3	0.5	-1.5	-1	-3	2.7	0.9	≈ 2.6 s.d. over last 30 years
Spain, 2012	0.7	-4.1	-2.4	-1.7	-1.4	0.1	-1.1	≈ 1 s.d. over last 30 years

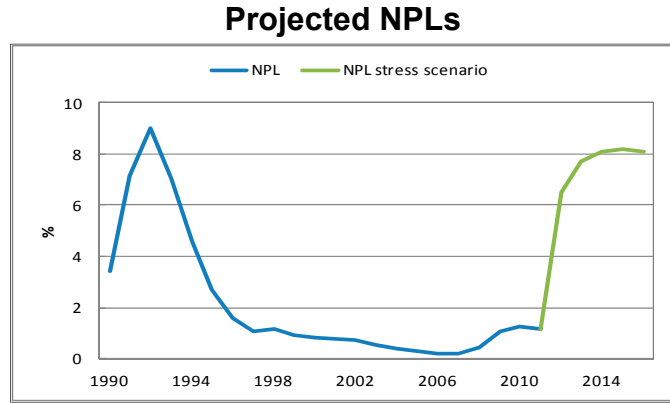
Source: IMF Staff calculations.

¹The 1-3 standard deviation scenarios assumed in recent FSAPs are in line with industry standards. For example, the 2011 EBA stress tests were based on 1.3–1.4 standard deviations, and the 2011 UK FSA stress tests were based on 2 standard deviations.

4. **The top-down stress tests were based on the balance-sheet approach of Schmieder et al.³** The approach provides a quantitative framework for assessing how macroeconomic shocks transmit to banks' balance sheets. Under this approach, the impact of the macroeconomic scenarios on each bank's profitability and capitalization is estimated through credit losses and changes in risk-weighted assets (RWAs). In particular, sector-specific credit losses were projected, based on stressed probabilities of default (PDs) and losses given default (LGDs) estimated by (relatively simple) satellite models, which link

³Schmieder, Pühr, and Hasan, 2011, "Next Generation Balance Sheet Stress Testing," IMF Working Paper 11/83.

non-performing loans (NPLs) and LGDs to a set of empirically relevant macro indicators, e.g., GDP growth, interest rates, and equity prices (see figure below).

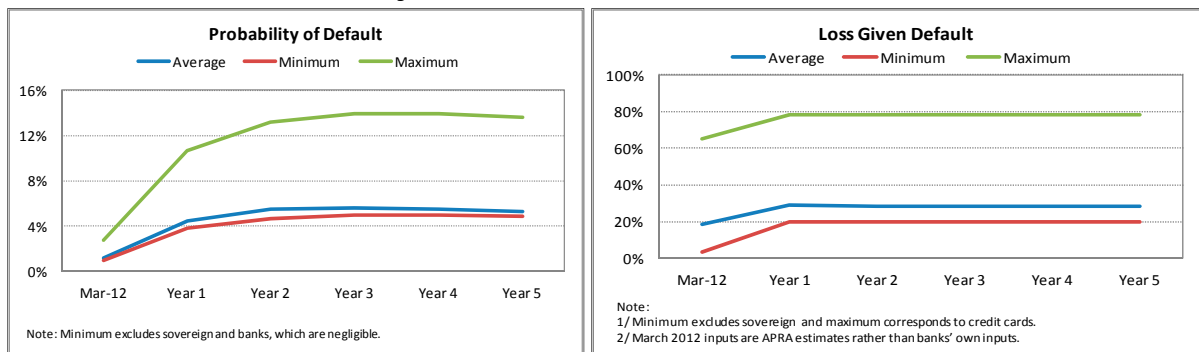


Source: IMF Staff calculations.

5. **The stress tests made a number of simple assumptions.** Banks’ RWAs under stress for credit risk were simulated to reflect corresponding changes in PDs, as required under Basel II, while RWAs for other risks were left unchanged. Dividend payout was assumed to be zero in cases of negative income and/or capital falling below the regulatory minimum. Banks’ portfolio allocation and income components were kept constant during the projection period. Basel II hurdle rates were applied in this exercise, 4 percent for Tier 1 and 8 percent for total capital, consistent with APRA’s minimum requirements.

6. **Inputs used for this exercise included data from standard supervisory returns and additional data provided by banks.** Banks provided starting impairment level positions and their own sector-specific risk estimates, such as LGDs and PDs. The data covered six major exposure types, including residential mortgages, credit cards, commercial properties, corporates, banks, and small and medium enterprises (SMEs). Some inputs, such as PDs and LGDs, differ considerably across banks because of different levels of risk appetite and business strategies. Applying the satellite models would result in the sector and bank specific PDs and LGDs (see figure below).

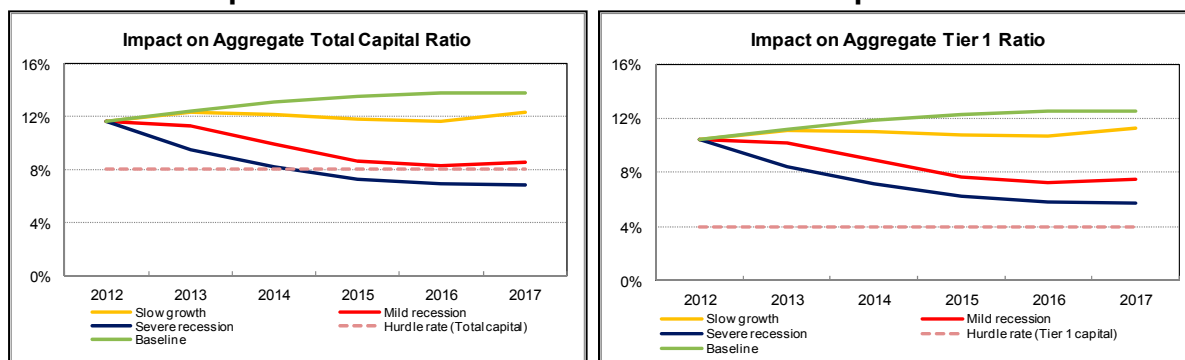
Projected Sectoral PDs and LGDs



Source: IMF Staff calculations.

7. **The results show that the Australian banking system appears to be resilient against substantial shocks.** Aggregate Tier 1 capital remained above the regulatory minimum under all three scenarios (see figure below). The Tier 1 capital ratio has increased 2.5 percentage points on average since 2008, and this capital buffer significantly enhances the resilience of the system. In contrast, total capital, which has not increased by as much, would fall slightly below the hurdle rate under the severe scenario. These results are consistent with the bottom-up stress test results, both in terms of the evolution of Tier 1 and total capital.

Impact of Alternative Scenarios on Bank Capitalization



Source: IMF Staff Calculations.

Liquidity stress tests

8. **The Implied Cash Flow Test (ICFT) was used to assess the ability of banks to withstand funding shocks.** In assessing banks' counterbalancing capacity in the event of a bank-run type scenario, a gradual outflow of funding was simulated for five consecutive periods within a 30 day timeframe, similar to the currently proposed Basel III Liquidity Cover Ratio (LCR) calculations.⁴ The need for asset fire sales was taken into account in the scenarios and the haircuts were asset specific. The test indicates which portion of banks' portfolios will remain liquid under a specific scenario, and how much liquidity shortfall will occur at the bank and system level. It should be noted that this test is equivalent to requiring banks to meet the Basel III LCR standard several years before it comes into effect, and without any use of the RBA Committed Liquidity Facility that the Basel III rules expressly allow. It is therefore a much stricter test than the Basel III LCR as presently drafted.

9. **The ICFT was based on liquidity data on March 31, 2012 collected by APRA on a 'Basel QIS Level 2 financial' basis.** The gradual five-week scenario assumed a Lehman-type of shock with the following liquidity outflows by the end of the stress testing period:

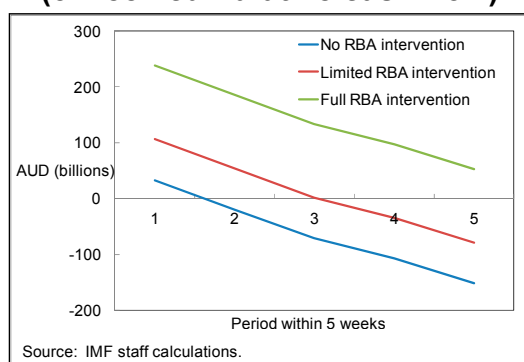
- 100 percent of unsecured short-term wholesale funding
- 20 percent of secured wholesale funding

⁴Note that the Basel III LCR requirement does not come into effect until 1 January 2015.

- 10 percent of retail term deposits
- 20 percent of retail demand deposits

10. **The test results show that the alternative treatments allowable under the LCR rules are crucial in a system with insufficient liquid assets.** Without such arrangements, or central bank repo operations in a broader range of collateral than the LCR rules assume, the five banks would be unable to withstand liquidity outflows of the levels observed in other countries after Lehman's failure, experiencing a substantial shortfall in liquidity within two weeks (see figure below). They would be able to counterbalance the liquidity outflows for an additional week if RBA operations occurred but were restricted to external assets for repo, with an assumed average haircut of 10 percent. If the RBA's current repo arrangements were assumed, including self-securitized residential mortgage backed securities (RMBS) accepted for repo, all banks would be able to counterbalance the funding outflows even with significant haircuts on the assets.

Outcome of Implied Cash Flow Stress Tests for Australian Banks (5-week cumulative cash flow)



11. **This outcome reflects specific assumptions on deposits as well as some peculiarities of the Australian financial system.** Reflecting APRA's conservative approach, most retail deposits were classified as demand deposits for this test, with only a negligible portion (0.1 percent) classified as term deposits that cannot be broken without penalty.⁵ Thus, the assumed shocks had a larger impact on Australian banks than on banks in other OECD countries with a smaller deposit base. Reflecting the strong fiscal position in Australia, government debt levels are low and as a result there is a shortage of high quality liquid assets available for banks to hold. The lack of liquid assets thus implies that liquidity support from the RBA would be necessary; although the RBA's current operational liquidity

⁵APRA's analysis of the Terms & Conditions of these products - allied with consumer protection wording currently in force as part of the Corporations Act - indicates that banks do not have the unequivocal right to refuse early redemption requests for term deposits. Product offerings could be expected to evolve in the lead-up to the introduction of the LCR; if so, the results presented here are a lower bound on the results that would apply once the LCR comes into effect.

arrangements are sufficient. The results of the ICFT tests were broadly consistent with the BCBS QIS tests conducted by APRA on a regular basis.

12. **The liquidity tests were complemented by an analysis of international contagion risks.** The analysis is intended to identify the effects of a *funding* shock, where the distress of one banking system leads to a liquidity squeeze and associated fire sale losses for other banking systems exposed to funding from the distressed system. The analysis is based on bilateral banking exposures across 27 countries and their capital level data at end-September 2011. Two simulations were explored: (i) interbank exposures only (Simulation 1); and (ii) with outstanding derivative contracts or contingent liabilities (guarantees, credit commitments) included (Simulation 2). Key assumptions for the funding shock included a withdrawal of 35 percent of interbank funding and a haircut of 10-35 percent on forced asset sales.

13. **Funding shocks from a few countries may have a potentially large impact on the Australian banking system.** Banks in United States, United Kingdom, and Japan have the largest claims on Australia, amounting to \$298 billion at end-September 2011 (see figure below). Derivatives and contingent claims from these countries totaled another \$199 billion. Germany, Switzerland and France are the next tier of countries to which Australian is exposed, but the exposure is much smaller. The impact of G7 countries withdrawing their funding all at once would be 4 percent of Tier I capital in Simulation 1 and 6 percent in Simulation 2, assuming a haircut of 10 percent on forced asset sales.⁶ The impact would grow to 20 percent of Tier I capital in Simulation 1 and 30 percent in Simulation 2 with a haircut of 35 percent on forced asset sales. Overall, the results were sensitive to the assumptions, but the relative importance of systemic countries would be the same.

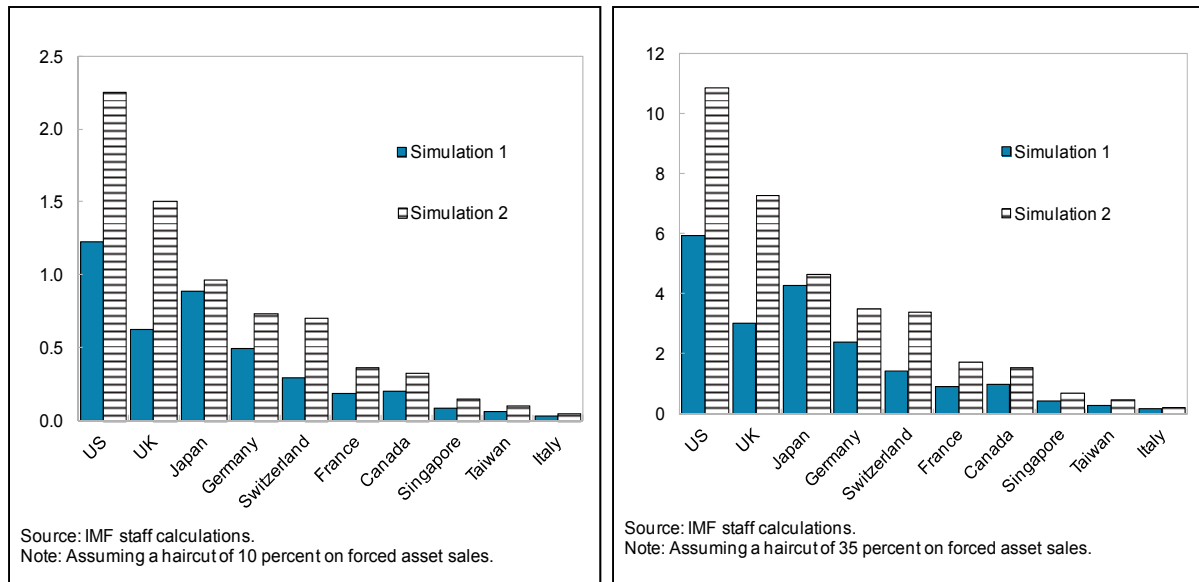
Market Risks

14. **Banks conduct single-factor stress tests on market risks regularly as required by APRA.** As part of quarterly reporting requirements, banks submit to APRA regular sensitivity analyses of their banking and trading books to movements in foreign exchange rates, interest rates and commodity prices. For interest rate risk, the tests include both the instantaneous impact of interest rate movements on the economic value (i.e., equity) and the delayed impact on next year's net interest income. For foreign exchange risk, banks estimate the impact on income (in AUD) of a range of foreign exchange spot rates and implied volatilities for all relevant currency pairs.⁷

⁶Assuming no funding from other sources, including central banks, would be available.

⁷A standard measure of FX risk is net open position for each currency. However, as the FX positions undertaken by the banks are in many cases very non-linear, APRA does not consider net open positions as an appropriate measure of FX risk.

Spillovers to Australian banking system: Funding Shock (impairments as percent of Tier 1 capital)



Note: 1/Prepared by S. Arslanalp according to Marco Espinosa-Vega and Juan Solé, 2010, "Cross-border Financial Surveillance: A Network Perspective," IMF Working Paper 10/105 (Washington: International Monetary Fund).

2/All bilateral exposure data come from the *BIS consolidated banking statistics* (Table 9C–E of BIS statistics).

15. **The results of the bottom-up stress tests show limited vulnerability to market risk.** Based on end-March 2012 data, the adverse impact of market risk reported by banks appears to be small (see table below). For foreign exchange risk, a 20 percent depreciation/appreciation against all major currencies has a negligible impact on the system capital adequacy ratio (CAR), reflecting, among other things, the banks' effective hedging of FX risk involved in offshore funding. The impact of interest rate risk appears slightly larger, although it remains small and is offset by higher capital requirements as APRA requires banks to hold capital for interest rate risk in the banking book as a Pillar 1 requirement. Banks' direct exposure to commodity prices is smaller than their exposure to interest rate and foreign exchange rate risk. Typically, different banks have significant exposures to different commodities and their positions vary from quarter to quarter, limiting the scope for any significant aggregate exposure across the five banks.

Sensitivity to Market Risk
(Largest adverse impacts on P&L as reported by banks)

Shock	Impact (% of CT1)
Appreciation in different currencies (+20 percent)	negligible
Depreciation in different currencies (-20 percent)	negligible
Parallel downward shift in the AUD yield curve by 250 basis points	negligible
Parallel upward shift in the AUD yield curve by 200 basis points	-0.9%
Steepening of the AUD yield curve, with long-term interest rates increasing by 200 bps	-1.2%
Inversion of the AUD yield curve (hump), with two-year rates shifting upwards by 200 bps and 10-year rates rising by 100 bps	-1.3%
Parallel upward shift of the USD (and other key currencies) yield curve by 100 bps	negligible
Downward shift of the USD (and other key currencies) yield curve by 100 bps (capped by zero)	-0.1%
40 percent rise in the copper price	negligible
40 percent rise in Chicago wheat futures, combined with a doubling of implied volatility	negligible

Source: APRA.