PARLIAMENTARY BRIEFING, 24 FEBRUARY 2012 – IMPLICIT GUARANTEES FOR BANKS

- The credit ratings of Australian banks do benefit to some extent from rating agencies' perceptions that the Government would support them if they got into trouble. The major banks and Macquarie receive a two notch credit rating uplift from S&P as a result of the rating agency's expectation that these banks will receive support from the government in a crisis. Other Australian banks do not receive any rating uplift, as S&P does not expect government support.

- While some people (like Andy Haldane) have tried to calculate the implicit funding subsidy that large banks receive from ratings uplifts, these kinds of calculations are not without their problems. Bank funding costs are affected by a large number of factors, and investors do not focus solely on ratings when pricing bonds. For example, there is a lot of variation in bond spreads across banks with the same credit rating. It is also interesting to note that Australian banks recently have paid higher spreads on their bond funding than some lower-rated Australian non-financial corporates.

- To the extent that there is any implicit funding benefit to large banks, then in a competitive banking market which we have, we might expect at least some of this benefit to show up in lower lending rates than would otherwise be the case rather than just showing up in bank profits.

- The introduction of the Financial Claims Scheme will also have helped reduce any implicit funding subsidy for the large banks because the deposits of all ADIs are covered by the Scheme in the same way. In fact, it should provide an even bigger benefit to smaller lenders as they have a higher deposit funding share than the larger banks. If the FCS was ever to be activated, the assets of the failed institution are used to cover the cost of the FCS and in the unlikely event that this was insufficient, the industry may be levied. This protects the Government and taxpayers from bearing the cost of the FCS.

Proposal: Do Systemically Important Banks Receive an Implicit Funding Subsidy in Australia?

Rodgers (2014) outlines a range of approaches that have been used internationally to assess the size of the implicit subsidy that systemically important banks (SIBs) may receive due to the perception they are 'too big to fail'. The following project outline for Australian banks is based on the approach of assessing **differences in bond spreads** between SIBs and other banks. The methodology draws on Acharya, Anginer and Warburton (2013) and Beyhaghi *et al* (2013).

Baseline Model

$$Spread_{i,b,t} = \alpha + \beta_1 DSIB_{i,t-1} + \beta_2 Other\_Domestic_{i,t-1} + \beta_3 Bond_{Controls_{i,b,t}} + \beta_4 Bank_{Controls_{i,t-1}} + \beta_5 Guarantee_t + FE_{bank} + FE_{time} + \varepsilon_{i,b,t}$$

where:

$Spread_{i,b,t}$	is the difference between the yield on bank *i's* bond *b* at time *t* and that on the corresponding maturity matched government bond. (Need to ask SMS whether banks' CD issuance could also be included, in addition to bonds).
$DSIB_{i,t-1}$	is a dummy variable which equals 1 if bank *i* is a D-SIB, and 0 otherwise.
$Other\_Domestic_{i,t-1}$	is a dummy variable which equals 1 if bank *i* is a non-DSIB Australian-owned bank, and 0 otherwise.
$Bond\_Controls_{i,b,t}$	are controls for bond characteristics, such as: time to maturity of the bond; issue rating; seniority of the bond (senior v junior, covered?); size of issuance; local or foreign currency issuance; fixed or floating (may need to run separate regressions for fixed vs floating?).
$Bank\_Controls_{i,b,t}$	are controls for bank characteristics (or risks), such as: stand-alone credit ratings; risk-weighted assets/total assets; impaired assets/total assets; price-to-book ratio; leverage or risk-based capital ratio; liquidity; return on assets; maturity mismatch of liabilities (ratio of short-term debt to total debt); deposits/total liabilities; efficiency.
$Guarantee_t$	is a dummy variable for the introduction of the wholesale guarantee in October 2008.
FE_{bank} *and* FE_{month}	are bank and time fixed effects. (Could use $FE_{bank} \times FE_{month}$ if we have another dimension of variation – e.g. different types of bond issuance. This could account for unobservable factors that vary by bank over time – e.g. lending standards).

The coefficient of interest is β_1 – whether there is a statistically significant inverse relationship between spreads and systemic importance, controlling for other factors. The subsidy can be computed over time by running rolling regressions.

Some Extensions

- Does a financial institution's size affect the relationship between spreads and risk? Could interact D-SIB dummy with some credit risk variables to see whether the spread-risk relationship diminishes for systemically important banks. i.e. are spreads less sensitive to risk for DSIBs?
- Could use event studies to see whether particular events changed investor expectations of government support. For example, use a dummy variable around dates of interest (e.g. collapse of Lehmann Brothers, D-SIB policy announcement) and interact this with D-SIB dummy to see if the estimate of the implicit guarantee changed significantly. Did spreads also become more sensitive to risk around these events?
- Beyhaghi *et al* (2013) investigate the impact of seniority of a debt instrument on its sensitivity to issuers' risk factors. Are junior debt spreads more sensitive to a bank's risk factors than more senior debt? Could interact seniority dummy variable with risk variable. Alternatively could have a junior debt FE.

Vanessa Rayner
19 June 2014

DO LARGE AUSTRALIAN BANKS RECEIVE AN IMPLICIT PUBLIC SUBSIDY?

Events in international financial systems during and after the global financial crisis have shown that governments are unlikely to allow large and systemic financial institutions to fail in times of stress. To the extent that private financial institutions are not required to pay ex ante for this support, the debt funding costs of these institutions might be lower compared with non-systemic institutions, introducing distortions into the banking system. This note attempts to estimate an implicit subsidy for the Australian major banks using data on primary and secondary market bond spreads. The bond price models find that the major banks did not receive a subsidy prior to the crisis, but the onset of the crisis did result in a sizeable subsidy. This subsidy has since declined and, on some measures, is no longer significant. However, a lack of bond issuance, particularly by non-major banks during the financial crisis, means that these results should be treated with some caution.

Introduction

Due to their size or systemic importance, some financial institutions are considered 'too big to fail' by markets or the general public in the sense that the government is likely to recapitalise them if they are threatened as a going concern, in order to prevent material damage to the real economy. The likelihood of public support for distressed systemically important banks may lead investors to accept a lower return for the credit risk associated with these institutions; in this case, the public sector is essentially providing an *implicit subsidy* to the banks' funding costs. This funding advantage may distort competition, allowing large institutions to grow larger and perhaps pressuring smaller banks to take greater risk. It may also create a risk of moral hazard if banks considered systemically important take excessive risks under the assumption that the public sector will cover downside risks, while the bank benefits from the upside risks. This could increase the cost to the taxpayer in the event of the failure of a large institution.[1]

In Australia, the four major banks can clearly be considered as systemically important and have been designated as domestic systemically important banks (D-SIBs) by APRA.[2] Indeed, credit ratings agencies give these banks, as well as Macquarie Bank, a two-notch uplift in their credit ratings due to perceived government support; the uplift to smaller banks' ratings is smaller or zero (Table 1). It is important to note that the Australian government and other public authorities have never stated that the major banks cannot be allowed to fail, nor ruled out resolution options in the event of a failure; the implicit subsidy stems from a market *perception* that the major banks would receive support in periods of financial distress.

Table 1: Australian Banks' Government Support Ratings

As at September 2014

	Standard & Poor's [(a)]	Moody's [(b)]	Fitch [(c)]
	Rating (uplift notches)	Rating (uplift notches)	Rating (support rating)
ANZ	AA- (+2)	Aa2 (+2)	AA- (1)
CBA	AA- (+2)	Aa2 (+2)	AA- (1)
NAB	AA- (+2)	Aa2 (+2)	AA- (1)
Westpac	AA- (+2)	Aa2 (+2)	AA- (1)
Macquarie Bank	A (+2)	A2 (+2)	A (3)
Suncorp-Metway	A+ (0)	A1 (+1)	A+ (1)
Bendigo and Adelaide	A- (0)	A2 (+1)	A- (3)
Bank of Queensland	A- (0)	A3 (+1)	A- (3)

(a) Long-term issue rating compared with Stand-alone Credit Profile.
(b) Long-term rating compared with Baseline Credit Assessment.
(c) Long-term rating; support rating is from 1 (extremely high probability of support) to 5 (cannot rely on support)
Sources: Fitch Ratings; Moody's; Standard & Poor's

During the financial crisis, however, the government did provide some assistance to the banking system. In October 2008, the government announced a guarantee scheme for wholesale funding, in order to assist

1 See RBA (2014), Submission to the Financial System Inquiry, Chapter 4
2 See APRA (2013), Domestic Systemically Important Banks in Australia.

ADIs to access funding at a reasonable cost during a period of market stress.[3] This guarantee was provided for a fee of 70 basis points for AA-rated institutions (the major banks), 100 basis points for A-rated institutions (Macquarie and the regional banks), and 150 basis points for BBB-rated institutions. The levels of the fees were set between the contemporary risk spreads, and those that were likely to prevail in more normal conditions, providing a natural mechanism for an exit from the scheme. The scheme ended in March 2010.

Other analyses of the implicit subsidy in Australia have found that the major banks do receive a funding advantage. For example, in its recent Financial System Stability Assessment, the IMF used credit ratings to estimate that implicit government support provided the four major banks a funding subsidy of around 70 basis points during the GFC. The too big to fail issue and implicit government support sparked a significant amount of discussion in submissions to the Financial System Inquiry (FSI). In particular, the regional banks posited that the major banks do receive a funding advantage because of perceived government support, citing S&P ratings, and the work by the IMF. Additionally, the Customer Owned Banking Association (COBA) commissioned work by consultants *Macroeconomics* that suggested the major banks received funding discounts in the range of 22 to 34 basis points, in 2013.[4] In contrast, CBA asserted in its submission that 'there is no implicit guarantee for the major banks but that there is general government support for the whole banking system.'[5]

The remainder of this paper includes a brief summary of the techniques used to measure the implicit subsidy, an outline of the bond price data used in this analysis, and the results of a bond price model that attempts to quantify the size (and existence) of the implicit subsidy in Australia.

Funding advantage literature

Previous research into the funding advantage received by 'too-big-to-fail' institutions is based on three main econometric techniques[6]:

- **Bond price models**: this approach attempts to estimate the funding advantage directly by comparing the bond spreads of systemically important banks to those of other banks, controlling for bond characteristics and bank risk. For example, Acharya, Anginer and Warburton (2013) find the existence of an implicit subsidy using bond price data for large US financials, and report that the sensitivity of price to risk is reduced for the largest institutions.
- **Ratings-based approach:** this method uses the ratings uplift given to banks due to perceived government support, as measured by credit ratings agencies. The estimated impact of government support, in terms of ratings uplifts, can be compared to spread differentials among different credit ratings. Ueda and Weder di Mauro (2011) use Fitch ratings to show that government support in the United States increased after the GFC, providing a funding advantage of 60 basis points in 2007 and 80 basis points in 2009.
- **Contingent claims models:** This approach uses option price theory to measure the value of the implicit subsidy to the banking system. In essence, banks can be seen as having a claim on the public, with the payoff equal to the necessary injection of funds in the event of a failure (i.e. an option to sell at a 'strike price' equal to the asset value at which the bank would fail) (see, for example, Noss and Sowerbutts (2012)). Alternatively, since equity holders would likely not benefit from government support in the event of distress, equity prices contain information on the probability of failure. In contrast, CDS spreads, which provide insurance against the credit risk of a bond, incorporate the possibility of government support. CDS spreads can be compared to 'equity-implied spreads' to assess the extent of perceived support (see IMF 2014).

Bond price data

Two sets of data are used in this analysis: a sample of new bond issuance in the primary market, and a sample of secondary market trades. Although secondary market prices do not directly affect the funding

3 See Schwartz (2010), for details.
4 Explaining the Implicit Subsidy Calculation Regarding Australia's Major Banks, COBA second round submission to the Financial System Inquiry 2014, Attachment A.
5 CBA's first round submission to the Financial System Inquiry 2014, p 49.
6 A summary of empirical evidence on implicit subsidies across countries can be found here.

costs of the bank, as pricing at primary issuance does, these prices should reflect the costs at which a bank could issue at that time. The primary issuance sample is not a complete set of the issuance of Australian banks, as price data are not available for all observations. The secondary market dataset includes only actively traded bonds that have an observable price. Government guaranteed bonds are excluded from the analysis, as the pricing of these bonds is unlikely to reflect the credit risk characteristics of the issuer, and so we may expect regression coefficients to differ.[8] Similarly, subordinated debt is also excluded, as the risk sensitivities are likely to be greater for these bonds.[9] The sample includes 13 Australian-owned banks, including the major banks, Macquarie Bank, the regional banks (Suncorp, Bendigo and Adelaide Bank, Bank of Queensland) and some smaller banks. The larger banks dominate the sample in most periods, with some of the smaller banks issuing just two or three bonds over the entire sample period.

In the primary market issuance sample, the number of observations varies greatly over time; in total there are 1 435 observations (Graph 1).[10] In particular, over the 2008–2009 period, there are few observations (non-guaranteed) for the smaller Australian-owned banks from 2009 to 2011, as the large majority of debt issued around this time was government guaranteed. Average spreads on issuance remained fairly stable over the first part of the 2000s before increasing sharply at the end of 2007 (Graph 2). Spreads fell slightly over the course of 2008 before peaking again in 2011-2012 in association with heightened risk aversion during the European sovereign debt crisis. Prior to the crisis period spreads are reasonably similar for the major banks and other Australian-owned banks, with spreads diverging in later years – although, as noted above, there are very few observations for the smaller banks during these years.

In the secondary market sample, there are data on 113 bonds, making up 1 393 bond-quarter observations. The number of included bonds increase over time until 2010, after which there are fewer new bonds added to the sample – in particular, there are few included bonds issued by non-major banks after 2010 (Graph 3). As with the primary issuance data, the secondary market observations also indicate that average spreads rose over the 2008–2009 period and peaked again in 2011-2012 (Graph 4). The average maturity of bonds in this sample also changes greatly over time. In particular, during the last few years of the sample the average maturity falls greatly, as the number of bonds approaching their maturity begins to outweigh the new issuances in the sample. Given that credit risk sensitivity is likely to change as bonds approach maturity, the difference in average maturity between the two bond samples may lead to differences in the results using each.

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8 This scheme was announced in October 2008 in order to assist ADIs to borrow at a reasonable cost during a period of heightened market volatility. The scheme closed in March 2010. See Schwartz (2010), for details.

9 Subordinated debt does receive a ratings uplift (although this was removed by Moody's in 2013) and is likely to be affected by an implicit subsidy, however, the size of the subsidy is likely to differ from senior debt. Data on the seniority of bonds in the primary issuance dataset are not always available, so some subordinated debt is likely to remain in the sample.

10 Some regressions involve fewer observations as some variables are not available for all bonds, in all periods, e.g. APRA data is only available from September 2003 onwards.

Model

In order to identify whether the major banks receive a funding advantage over other Australian banks due to perceived government support, we estimate the following model for bond spreads:

$$Spread_{b,i} = Major_i + Bond_{b,i} + Bank_{b,i} + QtrDum_b + \varepsilon_{b,i}$$

In the equation, $Spread_{b,i}$ is the bond yield over the Commonwealth Government Security (CGS) of the same maturity, for bond *b* issued by bank *i* (either the spread at issue, or the quarterly average spread in the secondary market). The variable of interest, $Major_i$, is a dummy variable indicating if the bank is a major bank. If the major banks do receive a funding advantage from a perception of implicit government support, then we should expect this dummy to be significantly less than zero.[11] $Bond_{b,i}$ is a vector of bond characteristics such as the maturity, issue rating, face value, and non-standard features such as call options or floating rate notes. $Bank_{b,i}$ is a vector of (quarterly) bank characteristics, used to control for differences in bank credit risk, as at the date of bond issue. Finally, $QtrDum_b$ is a series of year-quarter dummy variables that control for changing economic and financial market conditions over time.

The bond characteristics included in the regressions differ between the two samples due to the availability of data. The primary market regressions include information on: currency, whether the rate is fixed or floating, call options, face value, maturity and the S&P rating of the issue. The secondary market regressions include information on the face value and coupon payment of the bond, and its maturity. Bank characteristics data come from APRA, and include: impaired assets ratio, capital ratio, RWAs to total assets, return on assets, the share of deposit funding, the ratio of short-term debt to total debt, and the leverage ratio. Time dummies capture any additional variation over time that is constant across banks and bonds.

Results

Primary market issuance data

The results of the regressions using primary issuance data indicate that the major banks have received an unexplained funding advantage over smaller Australian banks of around 20 to 40 basis points on average since 2000 (Table 2). Model 1 regresses bank-level bond spreads on a major bank dummy and bond characteristics. The coefficient on the major bank dummy is significant and negative, suggesting that the major banks borrowed for 31 basis points less than other Australian banks on average over the sample period. Other variables have the expected signs: there is a maturity premium (this premium increases sharply in 2008 and remains elevated until 2012)[12], foreign currency and fixed rate bonds have higher

11 This of course assumes that all relevant characteristics affecting bond pricing (that are correlated with the major bank dummy) are adequately controlled for. This is discussed further in the results below.

12 The maturity premium accounts for the increase in risk from longer term lending. Alternatively, safer borrowers could issue more debt at longer tenors, but this effect is clearly outweighed here.

spreads (perhaps to account for exchange and interest rate risk)[13], and borrowers pay more for call options attached to their bonds.

Table 2: Spreads on banks' bonds – regression results

Primary issuance data – 2000 to 2013; dependent variable – spread to CGS [(a)]

	Model 1 Bond characteristics	Model 2 With bank characteristics
Major	-31.14***	-38.38***
Maturity (interacted with year) [(b)]	Multiple ***	Multiple ***
Foreign currency	5.25	6.98**
Fixed rate	20.65**	21.03**
Call option	43.39***	51.39***
Log (face value)	-1.67	-0.83
Impaired ratio		-11.43
Tier 1 capital		0.23
RWA ratio		92.87
ROA		7.41**
Cost-to-income ratio		0.78**
Price-to-book ratio		-19.38***
Deposits to total assets		-0.24
Short term debt ratio		-0.11
Leverage ratio		0.65
Number of observations	1 435	1 202
Adjusted R-squared	0.678	0.672

(a) All models include dummy variables for each quarterly period; standard errors are clustered by bank to account for correlated errors across a bank's bond issuances

(b) Coefficients for each year are not presented, but are jointly significant at the 1 per cent level.

Sources: APRA; Bloomberg; Moody's; RBA; UBS AG, Australia Branch

Model 2 attempts to control for the differing risk levels of banks by using various bank-specific data from APRA.[14] The bank characteristics are lagged by a minimum of one quarter to reflect the fact that these data are released publicly at a lag.[15] In this regression the estimated funding advantage for major banks remains about the same, at 38 basis points.[16] Banks with riskier assets (measured by the ratio of RWA to total assets) pay higher spreads; more efficient banks (as measured by lower cost-to-income ratios) pay lower spreads; and banks with higher price-to-book ratios (reflecting an expectation of future value growth) pay lower spreads. A higher return on assets is related to higher spreads, reflecting a risk-return relationship.

Secondary market data

Using the secondary market data, the magnitude of the estimated funding advantage received by the major banks is smaller, at around 18 to 25 basis points (Table 3). Looking at the bond characteristics, higher coupons generally result in higher spreads in each of the models. As above, a higher RWA ratio increases the spread paid by the borrower, and banks with higher price-to-book ratios pay lower spreads.

13 In fact, the spreads in this dataset include the cost of hedging which may be what these variables are capturing.

14 Another option would be to include banks' 'stand-alone' ratings, which provide a measure of the risk of a bank requiring external support (i.e. the ratings exclude the likelihood of government support). However, in Australia, Moody's 'bank financial strength ratings (BFSR) for the major banks are B or B- over the sample period, while all other banks receive BSFRs of C+ or below (apart from a very small number of periods). Hence, these ratings would be collinear with the major bank dummy.

15 Since APRA data begins in 2003, there are fewer observations in Model 2 than in the first model.

16 Macquarie bank also receives a two-notch uplift from credit ratings agencies. Including Macquarie in the '*Majors*' dummy variable, the coefficient for Model 2 falls to -28 basis points.

Table 3: Spreads on banks' bonds – regression results

Secondary market observed prices – 2000 to 2013; dependent variable – spread to CGS [(a)]

	Model 1 Bond characteristics	Model 2 With bank characteristics
Major	-18.36***	-25.38***
Maturity	Multiple***	Multiple***
Coupon	2.86	3.14**
Log (face value)	-4.42	-2.60
Impaired ratio		-8.61
Tier 1 capital		-2.27*
RWA ratio		40.04*
ROA		6.58
Cost to income ratio		0.37**
Price to book ratio		-13.30**
Deposits to total assets		0.02
Short term debt ratio		0.08
Leverage ratio		-1.29
Number of observations	1 393	1 084
Adjusted R-squared	0.813	0.805

(a) All models include dummy variables for each quarterly period; standard errors are clustered by bond issue, to account for correlated errors across the multiple observations for each bond.
Sources: APRA; Bloomberg; Moody's; RBA; UBS AG, Australia Branch

It is important to note that these results rely on the models fully capturing all of the risk characteristics of both the bonds and, more importantly, the banks. If some characteristic, which differed between the major and non-major banks, is omitted from the models, this would bias the estimates of the $Major_i$ dummy variable. Institution size is of course an obvious candidate. It is likely that larger institutions are safer, or at least perceived to be so, due to benefits obtained in diversification and economies of scale.[17] Unfortunately, size is clearly correlated with perceived government support. Further, in Australia, the major banks are much larger than the other Australian-owned banks, meaning that size is highly correlated with being a major bank, making the inclusion of this variable in the model problematic.[18] Santos (2014) compares the funding advantage received by large banks in the US financial system, to the funding advantage that large non-financial corporates receive, in an attempt to isolate the effect of any implicit subsidy.[19] He finds that the largest non-banks do pay less for funding than smaller firms, but that the effect is not significant. Further, AA-rated financials benefit from a discount that is 92 basis points larger than the discount received by non-banks with the same rating. In addition to size, market factors such as the liquidity of the bonds may play a role in their pricing and impact the results – for example, it is likely that major bank debt is more liquid than that of smaller banks, and so liquidity premiums may lead to higher yields on the debt issued by the smaller banks (this is briefly explored below).

Time variation in the implicit subsidy

The results above assume that the size of the subsidy is time-invariant – they are simply averaging estimates of the subsidy across the years of the sample, which includes the relatively stable early 2000s period, as well as the GFC and following years. In reality, if there is an implicit subsidy, it seems likely that it will be larger during stressed periods, when public support is more likely to be needed. It is also possible

17 This is perhaps partly controlled for by including the cost-to-income ratio of the banks.
18 In fact, the average assets of a major bank are over 5.5 times that of the next largest Australian bank, and more than 13 times the largest after that.
19 This analysis relies on an assumption that investors perceive financial corporations to be more likely to receive government support than large firms in other industries.

that the systemic importance of a particular bank could change over time – for example, because of a merger/acquisition.

To investigate whether the size of the implicit subsidy changed due to the financial crisis, the above regressions were re-estimated for both pre- and post-crisis periods. The pre-crisis period is defined as up to June 2007 – it was around mid to late 2007 that problems with subprime mortgages in the United States became apparent, and losses at large US banks began to occur. The models find that in the pre-crisis period, the implicit subsidy was small, or non-existent. In contrast, estimates from late-2007 onwards find that the subsidy was significant, at around 40 to 55 basis points (using the more reliable Model 2).[20]

Table 4: Estimated Implicit Subsidy – Pre- and Post-crisis
Split sample regressions

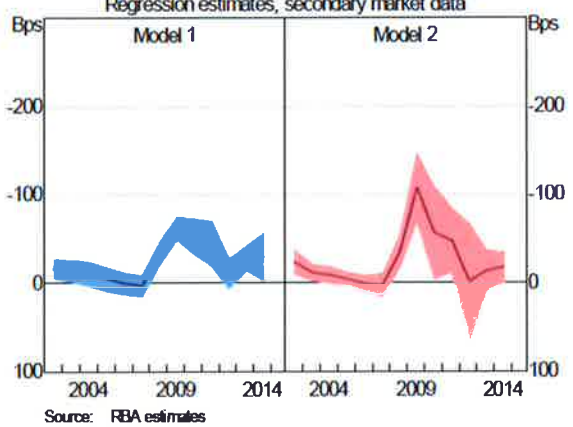
	Primary issuance data		Secondary market data	
	Pre-crisis period 2000 to June 2007	**Post-crisis period** July 2007 to 2013	**Pre-crisis period** 2000 to June 2007	**Post-crisis period** July 2007 to 2013
Model 1	-13***	-81***	-11***	-33***
Model 2	-7	-56***	-12***	-39***

Sources: APRA; Bloomberg; Moody's; RBA; UBS AG, Australia Branch

We can also estimate the subsidy separately in each year, to identify changes over time, by interacting the major bank dummy variable with year dummies. However, during the crisis period, the vast majority of bond issues by banks, particularly the non-major Australian banks, were government guaranteed (and hence explicitly subsidised). For instance, there is only one issue by a non-major bank in the sample in 2009.

Because of these data constraints, this exercise is only performed for the secondary market dataset. These estimates show that prior to 2008, there was no significant funding advantage for the major banks (Graph 5). The size of the implicit subsidy appears to peak in 2009, at just over 100 basis points (Model 2). The subsidy has since fallen; estimates indicate that the funding advantage fell to around 10 basis points at the start of 2014, a level that is not statistically significant. Despite a second peak in bond yields around 2011-2012, the model estimates that the subsidy at this time was around half the size of that existed during the GFC. It could be that this crisis simply had a smaller impact on Australia than the previous one, or it may simply be a reflection of the falling average maturity of the sample (discussed above) – the subsidy may be smaller for bonds nearing maturity as the probability that the bank will require government support during the bond's remaining life is lower.

Graph 5
Major Banks' Funding Advantage
Regression estimates, secondary market data



Source: RBA estimates

The estimates of the implicit subsidy over time, which follow the general shape of average spreads, may simply be capturing changes in general risk aversion. If market risk aversion is not fully captured in the model, and changes in risk aversion impact smaller banks more than the major banks (which is likely given their greater ex ante risk profile), this will be captured in the $Major_i \times year$ dummy variables.[21]

20 Similarly, ratings agency Moody began to provide the major banks with ratings uplifts for government support from 2007.

21 Other specifications were also tested, including some that included interactions between the major dummy and market risk variables such as spreads on non-financial corporate bond rates and a volatility index; these resulted in similar estimates of the implicit subsidy.

Comparison with other studies

The results presented above are broadly in line with some other estimates of the implicit subsidy in Australia, although differ in some ways. The IMF, using the ratings-based approach of Ueda and Weder di Mauro (2012), estimated the subsidy for the major banks to be 80 basis points before the crisis, rising to 120 basis points in 2009. However, the IMF also estimated that regional Australian banks received a subsidy of between 50 and 70 basis points in 2009. This results in a relative funding advantage for the major banks, over the smaller Australian-owned banks, of around 60 basis points, in line with estimates from the post-crisis sample, but somewhat smaller than the estimates for 2009 using the secondary market data. Consulting firm Macroeconomics, on behalf of the Customer-owned Banking Association (COBA) used a similar credit rating approach to estimate that the implicit subsidy received by the major banks was between 22 and 34 basis points in 2013. This is in line with the 2013 estimates from the secondary market model – around 14 basis points in 2013 (although this is not significant).

For other countries, estimates of the implicit subsidy during the financial crisis range from being smaller than Australia to being broadly in line. IMF estimates using the rating-based approach indicate that the implicit subsidy peaked in most countries around 2009, at around 40-80 basis points in the Euro area, 30-90 basis points in the United States and around 60 basis points in the United Kingdom. In addition, IMF contingent claims models estimate that the subsidy peaked again in the Euro area and the United Kingdom in 2013, at around 140 basis points, but has since reduced to around half this level.[22] Similarly, Acharya *et al* (2013) find the implicit subsidy for the United States to be around 20 basis points in the early 2000s, rising to 100 basis points in 2009. Relatively high subsidy estimates for the large Australian banks could possibly reflect a larger increase in perceived government support over this period (this was found to be true by Ueda *et al* (2013) using Fitch support ratings), as well as depositor preference in Australia, increasing the expected losses for bondholders in the case of default (although this also exists in some other jurisdictions).

As mentioned above, the estimates of the implicit subsidy for large Australian banks may be exaggerated due to differences in market factors, such as the liquidity of major bank debt compared with that of smaller banks. Running the above regressions again, but instead using the data on government guaranteed debt, provides a method to control for these factors. Since these bonds are explicitly guaranteed by the government, there should be no remaining funding advantage for the major banks. In fact, the model finds that even for guaranteed debt, there is an unexplained difference in the funding costs of major banks and smaller Australian banks (Table 5). This ranges from 22 to 48 basis points using the two datasets for Model 2. Subtracting this estimate from the previous estimate for the implicit subsidy in 2009 (108 basis points) results in a smaller funding advantage of 85 basis points, closer to that found in other studies. It should be noted that this estimate of non-government support, unexplained differences between the majors only applies to the period over which it was estimated, i.e. late 2008 to 2009. It is likely that the liquidity premium would be higher in this type of crisis period than in other periods.

Table 5: Estimated Funding Advantage – Government Guaranteed Debt

Issued between June 2008 to September 2009 [(a)]

	Primary market data Column subheading[(a)]	**Secondary market data** Column subheading
Model 1	-32.72***	-12.19***
Model 2	-47.62**	-22.38***

(a) Secondary market data includes observations for bonds up to December 2013
Sources: APRA; Bloomberg; Moody's; RBA; UBS AG, Australia Branch

Estimating the dollar value of the implicit subsidy

In order to estimate the dollar value of the subsidy to the major banks, we first need a measure of banks' liabilities that benefit from a funding advantage. The COBA's FSI submission estimates the subsidy to be worth between $2.9 billion and $4.5 billion dollars annually. Following their calculations of the major banks' unguaranteed liabilities[23], we can use the basis point estimates above to calculate similar numbers. The

22 See IMF (2014). Note, numbers were not quoted directly in text, but taken by 'eyeballing' graphs.
23 The data used is taken from banks' annual reports for 2013, as well as the APRA monthly banking statistics.

major banks' uninsured liabilities are estimated by subtracting an estimate of their deposits that are insured by the Financial Claims Scheme (FCS), from their total debt, deposits and other borrowings. The estimates for insured deposits are made by multiplying the total value of the FCS covered deposits by the banks' market shares for deposits. The dollar value estimate of the implicit subsidy to the major banks is estimated at around $1.9 billion dollars (Table 6). However, it is likely that the size of the implicit subsidy varies for different types of liabilities – it is potentially much smaller for (uninsured) deposits due to depositor preference, as well as subordinated debt due to the increased potential for bail-in.[24]

Table 6: Valuing the implicit subsidy to the major banks

Basis point subsidy of 14 basis points, as at 2013 [(a)]

	Debt issued	Deposits and other borrowings	FCS deposits [(b)]	Unguaranteed liabilities	Total subsidy
	$ million	$ million	$ million	$ million	$ million
Total	**397 784**	**1 512 326**	**571 011**	**1 339 098**	**1 875**

(a) Taken from 2013 annual reports. Data are to June for CBA, and September for other banks.
(b) Estimated by multiplying the total FCS liability ($722.8 billion) by the banks' market shares for deposits.
Sources: Banks' Annual Reports; Federal Government; Macroeconomics; Model Estimates

Note that these are estimates of the funding advantage received by the major banks, compared with the other Australian-owned banks in the sample. The majority of non-major bank observations are from banks that also receive a rating uplift, albeit a smaller one. Thus, the total value of the implicit subsidy to banks provided by perceived government support could be larger than these estimates.

Conclusions

The results of the models estimated in this paper suggest that the major banks do receive a funding advantage as a result of perceived government support, particularly in the crisis period. There is little evidence of a subsidy prior to the financial crisis, but the size of the subsidy peaked during the crisis in 2009. While the subsidy has reduced in size since then, the models suggest that there remains a small funding advantage. However, caution should be applied when interpreting these results. There is a lack of data on bond issuance from Australian banks, particularly from the smaller Australian banks. This problem is most acute during, and shortly after, the financial crisis where most bonds issued were government guaranteed, and hence received explicit support. Because of this, estimates from around these times (the periods where the subsidy was found to be largest) are likely inaccurate, relying on few data points.

Given these data limitations, it might be worthwhile comparing results from other methods of estimating the implicit subsidy in Australia – that is, using credit ratings and contingent claims analysis. That said, such an approach could yield a fairly wide window of estimates, especially given the lack of CDS premium data even for the major banks. Other extensions to this work also present themselves (although they are also not without their difficulties). Using difference in difference estimators may provide a way of estimating the impact of the financial crisis on the funding advantage of the major banks. Including non-bank financial and other non-financial corporate bond issuance in the sample may also be useful (see Santos 2014).

David Hughes
Analyst

24 In late 2012 APRA released new prudential practice guides that introduced the potential for the regulator to initiate non-viability triggers for the conversion or write-off of bank debt. In response to this, and other international trends in relation to bail-in, Moody's removed the government support ratings uplift for banks' subordinated debt in 2013.

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Appendix A – Sample statistics

Appendix B - Including subordinated debt

The pricing of subordinated debt is likely to differ from that of senior debt, given the greater expected loss-given-default. Similarly, the size of any implicit subsidy is likely to differ for different kinds of debt. However, although subordinated debt no longer receives ratings upgrades for government support, for much of the sample used in this analysis, junior debt is likely to have received an implicit subsidy. Given this, I now include these bonds (excluded in the main results) in regressions.

The results for the primary issuance model are largely the same; this is a result of a lack of data on bond seniority for a large number of observations, meaning that some subordinated debt was already included in the model. Using the secondary market data, for which seniority is available for all bonds, the estimated size of the implicit subsidy increases substantially, to 144 basis points in the post-crisis period. However, the subsidy remains small (and insignificant in Model 3) in the pre-crisis period. This seems to indicate that the funding advantage for the major banks is significantly larger for subordinated debt, perhaps due to the greater potential for losses in the event of a default.

Table B1: Estimated Implicit Subsidy – Pre- and Post-crisis

Split sample regressions, including subordinated debt

	Primary issuance data		Secondary market data	
	Pre-crisis period	**Post-crisis period**	**Pre-crisis period**	**Post-crisis period**
	2000 to June 2007	July 2007 to 2013	2000 to June 2007	July 2007 to 2013
Model 1	-13.31***	-82.59***	-11.42***	-58.08***
Model 2	-3.45	-53.96***	-10.73***	-143.78***

Sources: APRA; Bloomberg; Moody's; RBA; UBS AG, Australia Branch

DO LARGE AUSTRALIAN BANKS RECEIVE AN IMPLICIT PUBLIC SUBSIDY?

David Hughes

23 January 2015

Implicit subsidies

- Subsidy on banks' borrowing costs
- Market perception of government support
  - reinforced by a history of bailouts
- No ex ante commitment…
  - but some institutions seen as TBTF
- Function of:
  - likelihood of receiving support
  - likelihood of requiring support
  - expected loss imposed on creditors

Ratings uplift

	Standard & Poor's [a] Rating (uplift notches)	Moody's [b] Rating (uplift notches)
ANZ	AA- (+2)	Aa2 (+2)
CBA	AA- (+2)	Aa2 (+2)
NAB	AA- (+2)	Aa2 (+2)
Westpac	AA- (+2)	Aa2 (+2)
Macquarie Bank	A (+2)	A2 (+2)
Suncorp-Metway	A+ (0)	A1 (+1)
Bendigo and Adelaide	A- (0)	A2 (+1)
Bank of Queensland	A- (0)	A3 (+1)

Potential impacts

- Lowers funding costs
- Distorts competition
- Incentives to grow large (worsens TBTF)
- Increased risk taking (moral hazard)
- Risks to public finances (contingent liability)

Estimation methods

- Credit ratings
- Bond prices
- Contingent claims models

Australian studies

- IMF
  - 120 bp subsidy for major banks during crisis
  - 50 to 70 bp subsidy for regional banks
- Macroeconomics (COBA FSI submission)
  - 22 to 34 bp subsidy in 2013
  - Worth $2.9 – 4.5 billion annually

International studies

- Most studies find a substantial subsidy
- Generally estimates peak around 2009 and decline after this
- Currently estimates suggest either a small subsidy or premium
- Wide variation in estimates

Data

- Primary issuance
- Secondary market observations

- Exclude government guaranteed debt
- Exclude subordinated debt

- Bond characteristics, APRA data on banks

Model

- $Spread_{b,i} = Major_i + Bond_{b,i} + Bank_i + \Sigma Qtr_{b,i} + \varepsilon_{b,i}$

Primary issuance data – 2000 to 2013; dependent variable – spread to CGS [a]

	Model 1 Bond characteristics	**Model 2** With bank characteristics
Major	-31.14***	-38.38***
Maturity (interacted with year) [b]	Multiple ***	Multiple ***
Foreign currency	5.25	6.98**
Fixed rate	20.65**	21.03**
Call option	43.39***	51.39***
Log (face value)	-1.67	-0.83
Impaired ratio		-11.43
Tier 1 capital		0.23
RWA ratio		92.87
ROA		7.41**
Cost-to-income ratio		0.78**
Price-to-book ratio		-19.38***
Deposits to total assets		-0.24
Short term debt ratio		-0.11
Leverage ratio		0.65
Number of observations	1 435	1 202
Adjusted R-squared	0.678	0.672

Primary issuance data – 2000 to 2013; dependent variable – spread to CGS [a]

	Model 1 Bond characteristics	Model 2 With bank characteristics
Major	-31.14***	-38.38***
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Leverage ratio		0.65
Number of observations	1 435	1 202
Adjusted R-squared	0.678	0.672

Secondary market observed prices – 2000 to 2013; dependent variable – spread to CGS [a]

	Model 1 Bond characteristics	**Model 2** With bank characteristics
Major	-18.36***	-25.38***
Maturity	Multiple***	Multiple***
Coupon	2.86	3.14**
Log (face value)	-4.42	-2.60
Impaired ratio		-8.61
Tier 1 capital		-2.27*
RWA ratio		40.04*
ROA		6.58
Cost to income ratio		0.37**
Price to book ratio		-13.30**
Deposits to total assets		0.02
Short term debt ratio		0.08
Leverage ratio		-1.29
Number of observations	1 393	1 084
Adjusted R-squared	0.813	0.805

Primary issuance data – 2000 to 2013; dependent variable – spread to CGS [a]

	Model 1 Bond characteristics	Model 2 With bank characteristics
Major	-31.14***	-38.38***
Maturity (interacted with year) [b]	Multiple ***	Multiple ***
Foreign currency	5.25	6.98**
Fixed rate	20.65**	21.03**
Call option	43.39***	51.39***
Log (face value)	-1.67	-0.83
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Tier 1 capital		0.23
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Secondary market observed prices – 2000 to 2013; dependent variable – spread to CGS [a]

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Maturity	Multiple***	Multiple***
Coupon	2.86	3.14**
Log (face value)	-4.42	-2.60
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Leverage ratio		-1.29
Number of observations	1 393	1 084
Adjusted R-squared	0.813	0.805

Time variation in the subsidy

	Split sample regressions	
	Primary issuance data	
	Pre-crisis period 2000 to June 2007	**Post-crisis period** July 2007 to 2013
Model 1	-12.52***	-81.31***
Model 2	-7.32	-56.12***

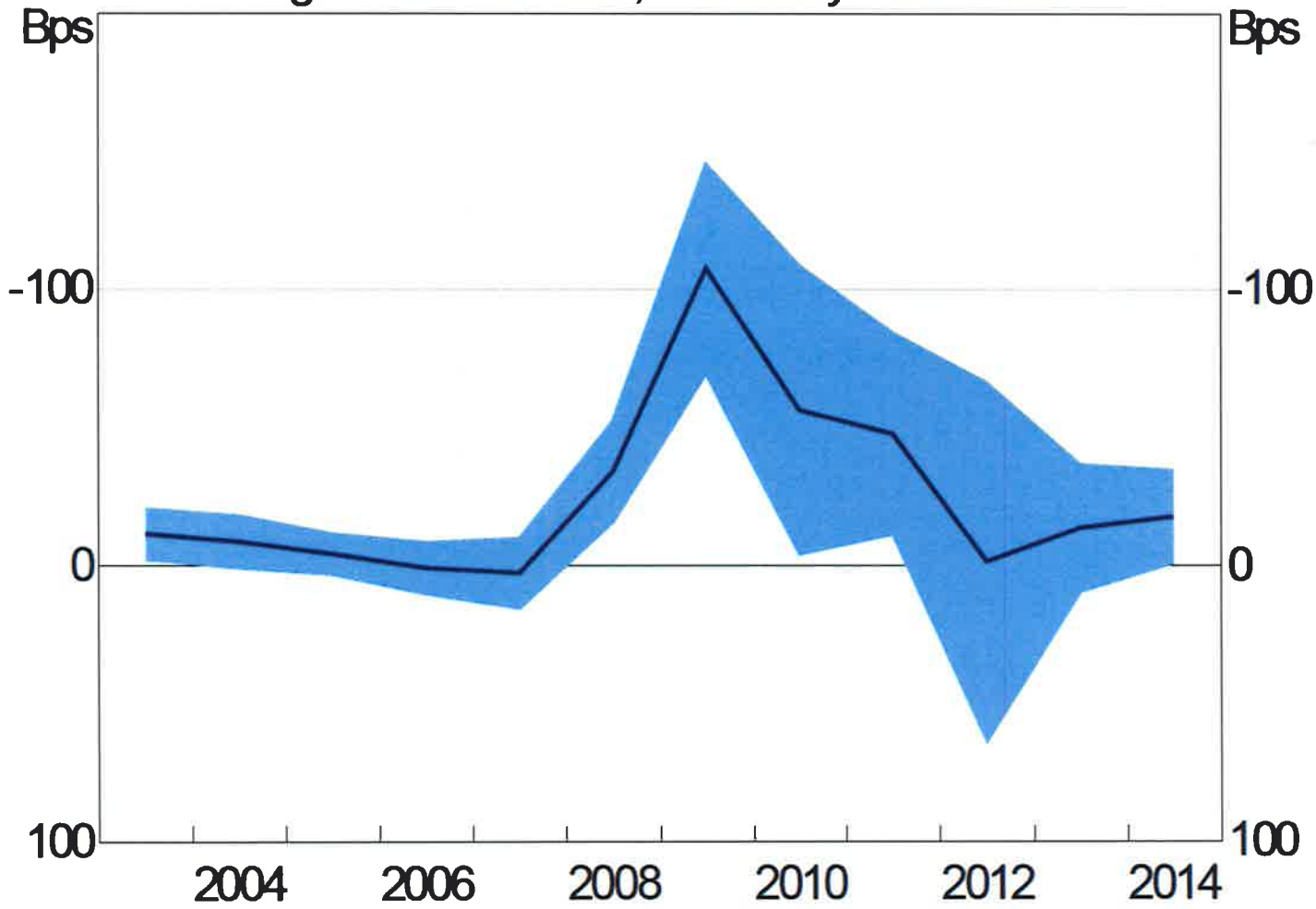
Time variation in the subsidy

Split sample regressions

	Primary issuance data		Secondary market data	
	Pre-crisis period 2000 to June 2007	**Post-crisis period** July 2007 to 2013	**Pre-crisis period** 2000 to June 2007	**Post-crisis period** July 2007 to 2013
Model 1	-12.52***	-81.31***	-11.60***	-32.88***
Model 2	-7.32	-56.12***	-12.15***	-38.75***

Major Banks' Funding Advantage

Regression estimates, secondary market data



Source: RBA estimates

Potential issues

- Models may not fully control for all risk characteristics
  - Size, diversification, management etc.
- Lack of data

Future work

- Difference in difference estimates
- Include corporate bonds
- Contingent claims analysis

Spares

Policy responses

- Improving bank resilience
  - Basel III
  - Additional capital for systemic banks
- Resolution measures
  - Bail-in
  - Ring-fencing
  - Living wills
- Communication of intent to impose losses

Including subordinated debt

Split sample regressions, including subordinated debt

	Primary issuance data		Secondary market data	
	Pre-crisis period 2000 to June 2007	**Post-crisis period** July 2007 to 2013	**Pre-crisis period** 2000 to June 2007	**Post-crisis period** July 2007 to 2013
Model 1	-13.31***	-82.59***	-11.42***	-58.08***
Model 2	-3.45	-53.96***	-10.73***	-143.78***
Model 3	-0.24	-60.48***	3.59	-143.78***

Dollar value of the subsidy

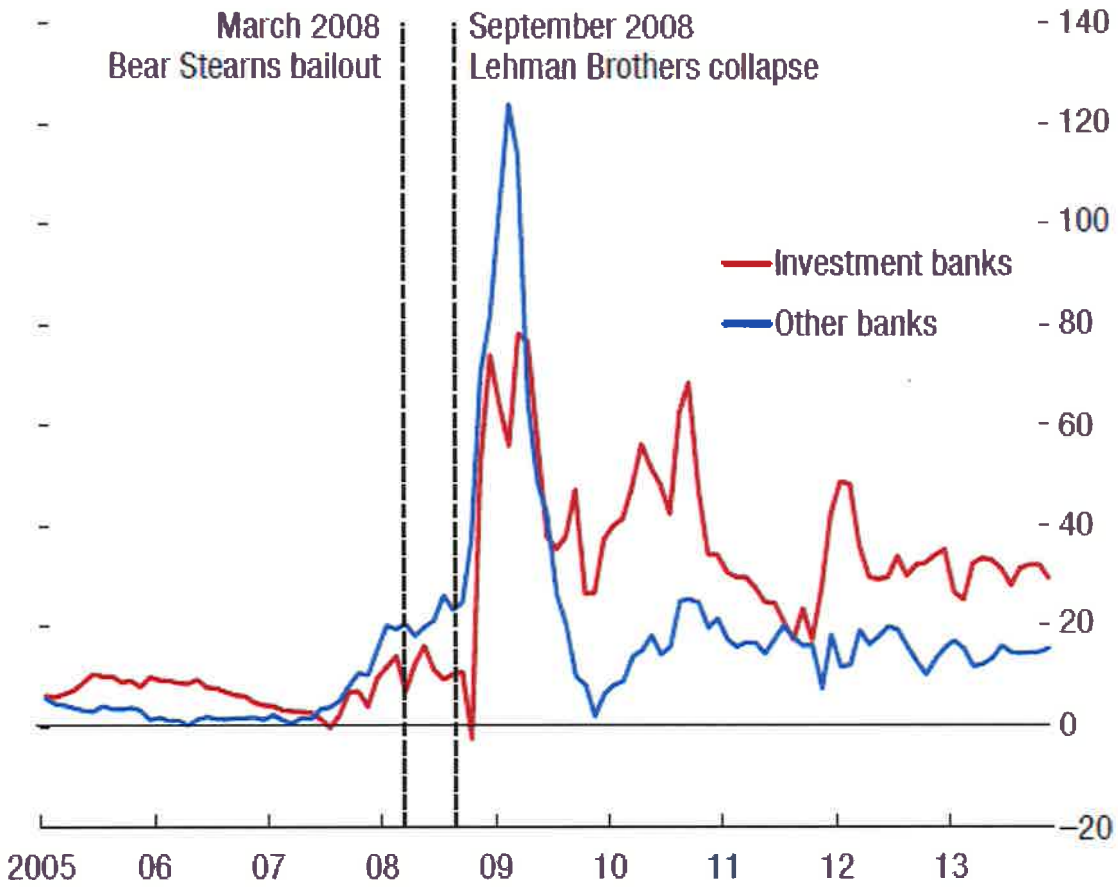
Table 4: Valuing the implicit subsidy to the major banks

Basis point subsidy of 14 and 28 basis points, as at 2013 [a]

	Debt issued	Deposits and other borrowings	FCS deposits [b]	Unguaranteed liabilities	Total subsidy
	$ million	$ million	$ million	$ million	$ million
Total	**397 784**	**1 512 326**	**571 011**	**1 339 098**	**1 875 – 3 749**

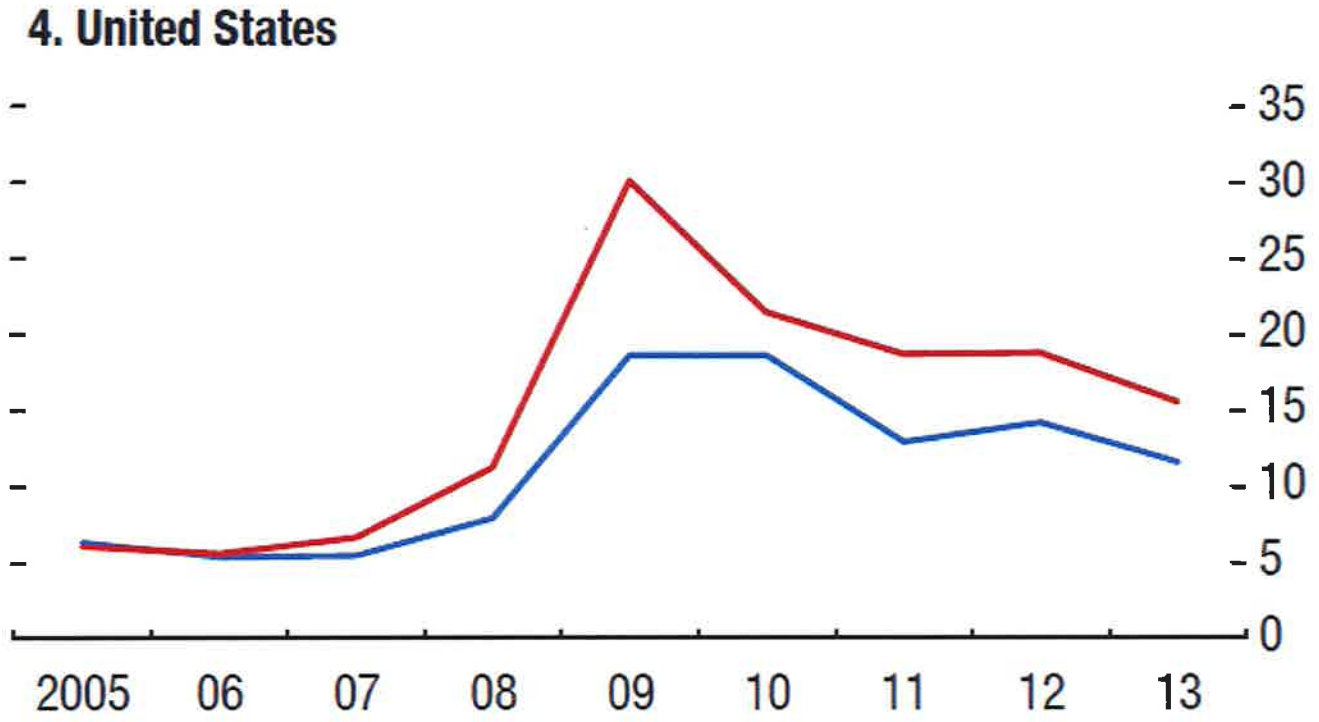
IMF: US – Contingent Claims

Basis points



IMF: US – Credit Ratings

Basis points



Background

- US bank bailouts
  - Continental Illinois (1984)
  - Bear Stearns vs. Lehman Brothers
- And in Europe…
  - Heaps
- Very few failures in Australia
  - State Bank of SA and State Bank of Victoria
  - Pyramid Building Society

FINANCIAL SYSTEM INQUIRY: THE IMPLICIT SUBSIDY ARISING FROM 'TOO BIG TO FAIL'

This briefing summarises the existing (mainly international) work assessing the size of the implicit subsidy that systemically important banks may receive due to the perception that they are 'too big to fail'. An implicit government guarantee creates an incentive for creditors to fund banks at rates below those justified by their financial health, thus providing an implicit subsidy. If of significant size, this subsidy has the potential to distort competition and increase systemic risk.

Australian results

IMF (2012) used the (ratings-based) results from Ueda and Weder di Mauro (2013) to assess the implicit subsidy to the Australian major banks. They found a subsidy of 80 basis points prior to the financial crisis and 120 basis points during the financial crisis. One submission to the financial system inquiry applied rates from the same study to the non-deposit liabilities of the major banks to estimate the dollar value of the implicit subsidy to these institutions at between $5.9 and $7.9 billion per year (Regional Banks 2014, p 65).