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We examine the effect of firm book-to-market equity values (BE/ME) on asset correlations which play an important role in determining risk weights under the current Basel capital requirements. Using firms in China, Hong Kong, Japan, Korea, Singapore and Taiwan over a sample period from 1988 to 2013, we find that BE/ME has a negative effect on asset correlations. This suggests a role for BE/ME as an additional factor in determining asset correlations, and thus risk weights, also potentially reducing incentives for regulatory capital arbitrage.

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Implementing Countercyclical Capital Buffer Schemes for Australian Banks
PO-HSIANG HUANG, SHIH-CHENG LEE and CHIEN-TING LIN
As part of the Basel III reforms, a countercyclical capital buffer (CCB) scheme requires banks to build up equity capital during periods of high credit growth against potential losses in subsequent economic downturns. According to Basel III, the extent of the deviations of the credit-to-GDP ratio from its long-term trend is a good indicator of the need to build up a capital buffer two to five years prior to a crisis. Based on a sample period from 1976 to 2011 during which two financial crises occurred, we show that Australian banks should begin accumulating their capital buffers when the credit-to-GDP ratio exceeds its long-term trend. The capital buffers should increase linearly to a maximum of 2.5 per cent of risk-weighted assets when the credit-to-GDP ratio is 8 per cent or above its long-term trend. Under this particular scheme, Australian banks would have four years to accumulate their capital buffers at the beginning of a financial crisis.

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Analyst Forecast Optimism and Market Reaction: Australian Evidence
M SHIBLEY SADIQUE and M ARIFUR RAHMAN
This paper examines whether earnings forecasts within the Australian context suffer from analysts’ optimism and under- or overreaction to new information in forecast revisions, and also whether and how investors respond to analysts’ bias in a given forecast. Our findings indicate that Australian analysts are optimistic and underreact both to positive and negative forecast revisions. We also find that when making investment decisions, investors are unable to distinguish the predictable component of forecast bias from the unpredictable component, although they are aware of the overall optimism in analysts’ forecasts and adjust for that.

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Evolution of Australian Financial Market Infrastructure
OLIVER HARVEY and CALISSA ALDRIDGE
The global world of financial market infrastructure is in an unprecedented state of transition. Spurred by significant developments in technology and regulatory frameworks, market infrastructure across modern economies is becoming increasingly integrated, competitive, global and complex. These considerations and rapidly changing dynamics in global financial markets are being acutely felt in the Australian marketplace. To deliver most effectively for those they are designed to serve, markets need to reliably and effectively provide the infrastructure for companies to raise capital and for investors to invest and allocate risk. Using the example of recent developments in the trading of ASX-listed securities, this paper highlights the challenges and opportunities in ensuring Australian financial markets continue to deliver these enduring benefits.
Into the Mainstream: The Australian Payday Loans Industry on the Move

JASMINE ALI and MARCUS BANKS

The Australian payday industry has experienced remarkable growth since the establishment of the first payday outlet on the Gold Coast (QLD) in 1998. Due to the industry’s prominence in the consumer finance market, criticism from some quarters including consumer advocates and the federal government resulted in regulation of the industry in March 2013. Since then, marked changes have taken place within the industry including the restructure of the domestic market, augmentation of the little-researched online small loans market and a widening of the customer base. As the industry moves towards the mainstream of consumer finance, we believe that traditional views about the role of the industry must be updated to better reflect these developments. This will be essential to inform the much-anticipated policy debate ahead of the federal government review of the industry set to commence in July 2015.

Challenges and Tools for Determining Public Infrastructure Projects and Priorities

EMILY POOLE and CARL TOOHEY

Governments, in their enthusiasm to expand investment in infrastructure, are keen to promote new models for financing public infrastructure. This focus on how to finance an infrastructure project presumes that a decision has already been taken that the investment is the best use of limited resources. We argue that policy makers should in the first instance aim to identify public infrastructure service needs, an appropriate role for government in meeting them, and priorities for public investment. These decisions are far from straightforward. However, given the scale and long-term nature of public infrastructure and the multitude of ways it can affect economic and social activity, there are significant benefits to be realised (and costs to be avoided) from getting these threshold decisions right. The central economic question then becomes how a project can be delivered most efficiently, including which financing mechanisms ought to be used.

Role of International Cooperation in Increasing Infrastructure Investment

MIKE CALLAGHAN

Increasing infrastructure investment has been identified as a priority for G20 countries in 2014 as part of their target of lifting G20 output by at least 2 per cent above existing projections in the next five years. This recognises the importance of infrastructure for sustained economic growth and the significant infrastructure ‘gap’ confronting many advanced and developing economies. The OECD has estimated that the global infrastructure gap will be US$70 trillion, 2.5 per cent of world GDP, by 2030.

Long-term Investment in Infrastructure and the Demand for Benchmarks

FRÉDÉRIC BLANC-BRUGE

In this paper, we argue that long-term investment in thinly traded assets like infrastructure projects increases investors’ demand for investment performance monitoring, which also increases the need for new performance measurement tools. Long-term investment benchmarks are critical in order to match the supply and demand of long-term capital, improve asset allocation outcomes for investors and support the development of the economy. We highlight significant methodological challenges to the development of performance measures that are both useful to long-term investors and prudential regulators, and consistent with modern asset pricing theory, and we propose several directions for new research.
KEVIN DAVIS SF Fin, Professor of Finance, University of Melbourne
Research Director, Australian Centre for Financial Studies and Professor of Finance, Monash University
Member of the Financial System Inquiry panel

With the ongoing integration of global financial markets and regulatory frameworks, several papers in this issue of JASSA focus on the implications for different sectors within the financial services industry, as well as specific issues arising from the Basel III reforms.

Following the G20 countries’ recent decision to identify increasing infrastructure investment as a priority, this issue also includes a special section examining a range of opportunities and challenges associated with long-term investment in infrastructure. While not subject to the usual double-blind process, each of these papers was reviewed by a member of the Editorial Board and by me prior to inclusion.

Shih-Cheng Lee, Chien-Ting Lin, Jiun-Lin Chen and Bang-Han Chiu examine the evidence from several Asian countries to determine whether asset correlation is related to a firm’s book-to-market equity value (BE/ME). The authors find that BE/ME, as a systematic risk related to a firm’s operating leverage, captures variations in asset correlations and they note that these results have important implications for the Basel capital requirements. The first is that calibrating average asset correlations in the current Basel ASRF framework for BE/ME may yield a more accurate estimate of asset correlations and thereby an improvement in bank regulatory capital adequacy requirements. Second, incorporating BE/ME as a systematic risk factor in estimates of asset correlations can reduce the procyclical impact of capital requirements, which is a key regulatory issue associated with the Basel III reforms.

Also focusing on issues related to the Basel III reforms, the paper by Po-Hsiang Huang, Shih-Cheng Lee and Chien-Ting Lin addresses the challenges for Australian banks in implementing a countercyclical capital buffer (CCB) scheme, a forward-looking mechanism that builds up sufficient bank capital during good times in preparation for bad times. The paper indicates that the CCB could be more cost effective than post-crisis measures in limiting the extent of a crisis and improving the stability of the Australian financial system. It suggests that Australian banks should begin accumulating their capital buffers when the credit-to-GDP ratio exceeds its long-term trend. The authors believe capital buffers should increase linearly to a maximum of 2.5 per cent of risk-weighted assets when the credit-to-GDP ratio is 8 per cent or above its long-term trend. They note that under this scheme, Australian banks would have four years to accumulate their capital buffers at the beginning of a financial crisis.

Next, M Shibley Sadique and M Arifur Rahman examine whether earnings forecasts within the Australian context suffer from analysts’ optimism and under- or overreaction to new information in forecast revisions, and also whether and how investors respond to analysts’ bias in a given forecast. They note that an understanding of forecast bias is important to researchers who use analysts’ earnings forecasts as a proxy for the market’s expectation of earnings. Also, regulatory bodies may be interested in an analysis of forecast bias as it will help them frame appropriate rules and regulations in order to improve the quality of analysts’ forecasts and help restore investor confidence in them. The authors find that Australian analysts are optimistic and underreact both to positive and negative forecast revisions. They also find that when making investment decisions, investors are unable to distinguish the predictable component of forecast bias from the unpredictable component, although they are aware of the overall optimism in analysts’ forecasts and adjust for that.

The paper by Oliver Harvey and Calissa Aldridge highlights the period of unprecedented change occurring within financial market infrastructure, both globally and within Australia. It notes that due to significant developments in technology and regulatory frameworks, market infrastructure across modern economies is becoming increasingly integrated, competitive, global and complex. The authors indicate that regulators and the industry need to embrace competition
and innovation if the Australian financial market is to remain relevant and attractive in a global context. They also suggest that we need to ensure our markets continue to support the abilities of Australian businesses to raise capital and the potential for Australian investors to invest and allocate risk.

Research by Jasmine Ali and Marcus Banks challenges popular notions about the payday loans industry, indicating that it has undergone remarkable growth and restructuring following the introduction of regulation in March 2013, including the rise of an online market and a widening in the customer base. The study shows that the industry is also responding to significant innovation in loan product and business technology. The authors believe that as the industry moves towards the mainstream of consumer finance, traditional views about the role of the sector must be updated to better reflect these developments. They see this as essential to inform the much-anticipated policy debate ahead of the federal government review of the industry set to commence in July 2015.

Mike Callaghan examines the role of international cooperation in increasing infrastructure investment. He indicates that international organisations can play an important role in identifying the specific steps that countries need to take to increase infrastructure investment, publicise these recommendations, and monitor countries' performance in addressing them. He believes that, to the extent that there is a collective increase in investment, there will be significant positive spillovers and the combined impact on global growth will be larger than if each country operated independently. Callaghan also says the international community can make a positive contribution to advancing infrastructure investment if forums such as the G20 emphasise the importance of making the selection of infrastructure projects fully transparent, as this will help not only improve the quantity but also the quality of infrastructure investments.

Emily Poole and Carl Toohey argue that although governments, in their enthusiasm to expand investment in infrastructure, are keen to promote new models for financing public infrastructure, policy makers should in the first instance aim to identify public infrastructure service needs, an appropriate role for government in meeting them, and priorities for public investment. They note that because investments in public infrastructure are typically made in the presence of real resource and funding constraints it is important to consider not only the costs of planning, building and operating the infrastructure, but also the opportunity costs of raising taxes or diverting public funds or resources from other uses. They indicate that this also highlights the importance of prioritising the best projects once infrastructure needs have been identified.

In the final paper, Frédéric Blanc-Brude argues that long-term investment in thinly traded assets like infrastructure projects increases investors’ demand for investment performance monitoring, which also increases the need for new performance measurement tools. He says long-term investment benchmarks are critical in order to match the supply and demand of long-term capital, improve asset allocation outcomes for investors and support the development of the economy. His paper highlights a roadmap of necessary steps towards the creation of such benchmarks, as well as significant methodological challenges to the development of performance measures that are both useful to long-term investors and prudential regulators, and consistent with modern asset pricing theory.

I strongly encourage you to consider submitting an article to JASSA so you can join our discussions about the important market-related and policy issues facing finance professionals, policy makers and academics. For anyone interested, please note that the guidelines for submission to the journal are available at www.finsia.com
BASEL RISK WEIGHTS, ASSET CORRELATIONS AND BOOK-TO-MARKET EQUITY: Evidence from Asian Countries

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CHIEN-TING LIN, Professor, School of Accounting, Economics and Finance, Deakin University
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BANG-HAN CHIU, Associate Professor, Faculty of Finance, College of Management, Yuan Ze University, Taiwan

We examine the effect of firm book-to-market equity values (BE/ME) on asset correlations which play an important role in determining risk weights under the current Basel capital requirements. Using firms in China, Hong Kong, Japan, Korea, Singapore and Taiwan over a sample period from 1988 to 2013, we find that BE/ME has a negative effect on asset correlations. This suggests a role for BE/ME as an additional factor in determining asset correlations, and thus risk weights, also potentially reducing incentives for regulatory capital arbitrage.

Based on the Basel II Accord finalised by the Basel Committee on Banking Supervision (BCBS 2006), asset correlation is a key parameter used in the internal ratings-based (IRB) approach to determine the minimum capital requirements for credit risk. Asset correlation measures the correlation between an obligor’s asset returns and the common risk factor that reflects general economic conditions. A higher value indicates higher systematic risk which requires a bank to keep more capital, ceteris paribus. The BCBS (2006) approach estimates asset correlations as a positive function of firm size, and a negative function of firm default probability after adjustment for obligor type.

In this paper, we extend the study of Lee and Lin (2012) and Lee et al. (2013) by examining whether book-to-market equity values (BE/ME) affect the asset correlations of firms in China, Hong Kong, Japan, Korea, Singapore and Taiwan. We choose these countries as Australian-owned banks (especially the big four banks) have significantly increased their activity in Asia and these countries include both the second largest economy in the world and most developed economies in Asia. Our finding that obligors with higher (lower) BE/ME are related to lower (higher) asset correlation has important implications for the Basel capital requirements. First, BE/ME can improve the calibration of asset correlations that are initially determined by the common risk factor (i.e. the market factor), yielding a more accurate estimate of a bank’s capital requirements. Incorporating BE/ME into Basel’s Asymptotic Single Risk Factor (ASRF) framework may capture any additional systematic risk of an obligor that is currently missing in borrower types, default probability and firm size. Second, incorporating BE/ME as a systematic risk factor in estimates of asset correlations can also serve as an automatic mechanism to smooth the cyclical impact of the business cycle. As BE/ME tends to decrease during economic upturns, banks will be required to hold a higher capital requirement due to increasing asset correlations, potentially reducing their lending activities during good times. Failure to incorporate BE/ME into estimates of asset correlations may lead to inadequate specification in the IRB framework and to potential regulatory arbitrage by banks.
The importance of BE/ME as another dimension of systematic risk for pricing equity has been documented by Fama and French (1992, 1993, and 1995) in the asset pricing literature. Indeed, BE/ME can be seen as an important proxy for systematic risk in estimating risk-adjusted returns. It follows that if BE/ME is a source of systematic risk on equity, it is also likely to be a source of systematic risk on assets.

A potential source of BE/ME on an obligor’s systematic risk can be traced to its operating leverage, just as default probability is linked to a firm’s financial leverage. Carlson et al. (2004) and Cooper (2006) show that high BE/ME firms, with more assets in place than growth options, tend to carry higher fixed assets relative to total firm value. If fixed production costs are proportional to irreversible capital invested, high BE/ME firms tend to have high operating leverage that leads to greater systematic risk. However, assuming production costs are variable, firms have options to lower costs by reducing capacity utilisation in response to falling demand. Aguerrevere (2009) shows that firms with high BE/ME may exhibit lower operating leverage, implying that BE/ME is negatively related to operating leverage. The aforementioned research indicates a potential linkage between BE/ME and operating leverage.

Our analysis yields the following results which improve the calibration of asset correlations and have important implications for the Basel capital requirements. First, after controlling for firm size, default probability and industry effects, firms with higher BE/ME are associated with lower asset correlations. This suggests a role for BE/ME as an additional conditional variable on asset correlations and risk weights. Second, asset correlations vary positively with firm size and negatively with firm default probability, as with the assumptions in the Basel approach. Our results are consistent with Lopez (2004) and Lee et al. (2011) but different from Dietsch and Petey (2004) and Lee et al. (2009) who report that asset correlations are higher on average for firms with higher default probability. Our evidence therefore supports the specifications of asset correlations in the ASRF approach in relation to firm size and default probability.

Our analysis yields the following results which improve the calibration of asset correlations and have important implications for the Basel capital requirements. First, after controlling for firm size, default probability and industry effects, firms with higher BE/ME are associated with lower asset correlations. This suggests a role for BE/ME as an additional conditional variable on asset correlations and risk weights. Second, asset correlations vary positively with firm size and negatively with firm default probability, as with the assumptions in the Basel approach.

Data and calibration methodology
Data for our sample firms in China (10,459 firm years), Hong Kong (10,337 firm years), Japan (16,596 firm years), Korea (8,993 firm years), Singapore (4,823 firm years) and Taiwan (7,477 firm years) are obtained from Datastream for the period from 1988 to 2013. All financial sector firms are excluded from the sample. We choose these sample countries because Australian-owned banks have significantly increased their activity in Asia to facilitate the large and growing trade and investment flows between Australia and this region.

According to the consolidated data in the International Banking Statistics (RBA 2013), the aggregate claims/exposures of all Australian-owned banks in Asia increased to $112 billion in December 2012, from $27 billion five years earlier. More specifically, the strong growth in Australian banks’ Asian exposure focuses on four economies: China, Hong Kong, Japan and Singapore. We add Korea and Taiwan into our sample countries since they are another two important developed economies in Asia. We believe Australian bank activity in this region will expand over the longer term as trade and investment between Australia and Asia continues to grow. Since our research enhances the estimation of asset correlation and relates to credit risk of companies in these countries, the results should be of interest to Australian banks and investors.
To have sufficient observations to calculate the standard deviation of equity returns $\sigma_E$ and equity beta $\beta_E$, we exclude firms with daily returns of less than 100 observations in each year. To calculate the standard deviation of asset returns, we also require firms to have five consecutive years of annual asset values. As our goal is to help banks assess possible credit losses, firms without debt are not relevant and are excluded from our sample. We estimate the asset correlation for each sample firm yearly using a final data sample which includes 58,685 firm-year observations, covering firms in 10 industrial sectors over a 26-year period. Specifically, we follow Lee et al. (2011) to estimate the correlation between the market rate of return and the implied rate of return on the firm’s assets, using an approach derived from Merton (1974) and described in the Appendix. The summary statistics of relevant variables are presented in Table 1.

### TABLE 1: Summary statistics of the sample firms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market value of assets ($millions)</td>
<td>1,118.13</td>
<td>3,003.24</td>
<td>10.90</td>
<td>97.69</td>
<td>257.15</td>
<td>740.74</td>
<td>59,656.46</td>
</tr>
<tr>
<td>Market value of equity ($millions)</td>
<td>533.82</td>
<td>1,374.90</td>
<td>5.17</td>
<td>43.85</td>
<td>125.60</td>
<td>382.55</td>
<td>15,658.69</td>
</tr>
<tr>
<td>Total liabilities ($millions)</td>
<td>595.25</td>
<td>2,007.58</td>
<td>1.34</td>
<td>35.84</td>
<td>102.20</td>
<td>331.9</td>
<td>47,387.08</td>
</tr>
<tr>
<td>Sales ($millions)</td>
<td>803.56</td>
<td>2,019.83</td>
<td>1.27</td>
<td>67.92</td>
<td>180.52</td>
<td>537.20</td>
<td>20,329.89</td>
</tr>
<tr>
<td>$\sigma_E$</td>
<td>0.4609</td>
<td>0.2235</td>
<td>0.0090</td>
<td>0.3108</td>
<td>0.4187</td>
<td>0.5625</td>
<td>4.8089</td>
</tr>
<tr>
<td>$\sigma_A$</td>
<td>0.2507</td>
<td>0.1769</td>
<td>0.0020</td>
<td>0.1323</td>
<td>0.2134</td>
<td>0.3223</td>
<td>4.7907</td>
</tr>
<tr>
<td>Book-to-market equity</td>
<td>1.1760</td>
<td>0.8884</td>
<td>0.2000</td>
<td>0.5261</td>
<td>0.9110</td>
<td>1.5453</td>
<td>4.9983</td>
</tr>
<tr>
<td>Default probability</td>
<td>0.0188</td>
<td>0.0584</td>
<td>0.0000</td>
<td>1.48E-07</td>
<td>2.22E-04</td>
<td>0.0083</td>
<td>0.9794</td>
</tr>
<tr>
<td>Asset correlations</td>
<td>0.1999</td>
<td>0.1752</td>
<td>7.37E-10</td>
<td>0.0488</td>
<td>0.1580</td>
<td>0.3145</td>
<td>0.9292</td>
</tr>
</tbody>
</table>

Note: This table presents the average values of market value of assets, market value of equity, total liabilities, sales, volatility of equity returns, volatility of asset returns, book-to-market, default probability, and asset correlations of sample firms from 1988 to 2013. All amounts are in US dollars.

**Empirical results**

Basel II assigns different weights for borrower types to estimate asset correlations. For instance, the asset correlation estimation for corporations (BCBS 2006) is:

$$\rho(PD) = 0.12 \left( \frac{1 - e^{-SPD}}{1 - e^{-50}} \right) + 0.24 \left( \frac{1 - e^{-SPD}}{1 - e^{-50}} \right) - 0.24 \left( \frac{1 - e^{-SPD}}{1 - e^{-50}} \right)$$

where $PD$ is the probability of default. According to Equation 1, the regulatory asset correlation of regular firms ranges from 0.12 to 0.24 and there is a negative relationship between asset correlation and default probability. As shown in Table 1, our calibrated average asset correlation for all samples is 0.199, which is within the specified range of regulatory asset correlations.

We perform the following regression analysis to investigate whether BE/ME captures additional variations in asset correlations,

$$AC_{ij,t} = \alpha + b_1 \ln(\text{BE} / \text{ME})_{ij,t} + b_2 PD_{ij,t} + b_3 \ln \text{Sales}_{ij,t} + \sum_j y_j D_{ij} + \sum_k y_k D_{ik} + \sum_l h_l D_{il} + \epsilon_{ij,t}$$

where $AC_{ij,t}$ is the asset correlation for $i$ firm at time $t$; $\ln(\text{BE} / \text{ME})_{ij,t}$ is the natural log of book equity to market equity; $PD_{ij,t}$ is the default probability; $\ln \text{Sales}_{ij,t}$ is the natural log of firm sales, as the proxy for firm size; $D_{ij}$ is the industry dummy for industry $j$; $D_{ik}$ is the dummy variable for year $k$; $D_{il}$ is the dummy variable for country $l$ and $\epsilon_{ij,t}$ is the error term. For a robustness check on the regression results, we also apply the inverse logistic function, $ILnAC = \ln(AC / (1 - AC))$, to transform the asset correlation such that the dependent variable can vary beyond the restricted range of 0 to 1.
Table 2 presents the regression result. Model 1 in Panel A shows that BE/ME alone is significantly and negatively related to average asset correlations. Firms with higher BE/ME are associated with lower asset correlations. Adding firm default probability and firm size along with BE/ME in models 2 and 3 has little impact. BE/ME continues to explain average asset correlations that firm default probability and firm size fail to account for.

To check whether BE/ME is a proxy for industry effect, we add industry dummies as shown in model 5. Again, the significance of BE/ME effect is unaffected. These results are also robust to the inverse logistic function of asset correlations, \( ILnAC = \ln\left(\frac{AC}{1 - AC}\right) \), reported in Panel B. Consistent with Lee and Lin (2012), the results indicate that incorporating BE/ME as an additional explainer of asset correlations may improve estimation for asset correlations of firms.

Results in Table 2 also suggest that incorporating firm size does not alter the effect of firm default probability on asset correlations as the coefficient of firm default probability in model 4 is largely insensitive to the presence of firm size. This confirms that the impact of firm default probability and firm size on asset correlations is consistent with the specifications in the ASRF framework.

### Table 2: Regression results of book-to-market equity, default probability, and size

#### Panel A: Dependent variable-AC

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.390 ***</td>
<td>0.382 ***</td>
<td>0.198 ***</td>
<td>0.198 ***</td>
<td>0.208 ***</td>
</tr>
<tr>
<td></td>
<td>(16.65)</td>
<td>(16.39)</td>
<td>(8.86)</td>
<td>(8.86)</td>
<td>(9.27)</td>
</tr>
<tr>
<td>BE/ME</td>
<td>-0.013 ***</td>
<td>-0.011 ***</td>
<td>-0.014 ***</td>
<td>-0.012 ***</td>
<td>-0.013 ***</td>
</tr>
<tr>
<td></td>
<td>(-18.38)</td>
<td>(-15.58)</td>
<td>(-19.82)</td>
<td>(-17.84)</td>
<td>(-19.15)</td>
</tr>
<tr>
<td>PD</td>
<td>-0.259 ***</td>
<td>-0.167 ***</td>
<td>-0.175 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-24.96)</td>
<td>(-16.87)</td>
<td>(-17.76)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln(Sales)</td>
<td>0.030 ***</td>
<td>0.029 ***</td>
<td>0.028 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(81.07)</td>
<td>(78.74)</td>
<td>(76.21)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry dummy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.34</td>
<td>0.35</td>
<td>0.41</td>
<td>0.41</td>
<td>0.42</td>
</tr>
</tbody>
</table>

#### Panel B: Dependent variable-Iln(AC)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.583 *</td>
<td>-0.696 **</td>
<td>-2.733 ***</td>
<td>-2.741 ***</td>
<td>-2.724 ***</td>
</tr>
<tr>
<td></td>
<td>(-1.97)</td>
<td>(-2.37)</td>
<td>(-9.57)</td>
<td>(-9.63)</td>
<td>(-9.50)</td>
</tr>
<tr>
<td>BE/ME</td>
<td>-0.110 ***</td>
<td>-0.082 ***</td>
<td>-0.114 ***</td>
<td>-0.093 ***</td>
<td>-0.101 ***</td>
</tr>
<tr>
<td></td>
<td>(-12.11)</td>
<td>(-9.00)</td>
<td>(-13.01)</td>
<td>(-10.61)</td>
<td>(-11.40)</td>
</tr>
<tr>
<td>PD</td>
<td>-3.652 ***</td>
<td>-2.642 ***</td>
<td>-2.721 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-27.95)</td>
<td>(-20.86)</td>
<td>(-21.58)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ln(Sales)</td>
<td>0.332 ***</td>
<td>0.320 ***</td>
<td>0.315 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(71.00)</td>
<td>(68.33)</td>
<td>(66.42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry dummy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.22</td>
<td>0.23</td>
<td>0.28</td>
<td>0.28</td>
<td>0.29</td>
</tr>
<tr>
<td>N</td>
<td>58,685</td>
<td>58,685</td>
<td>58,685</td>
<td>58,685</td>
<td>58,685</td>
</tr>
</tbody>
</table>

Note: This table presents the regression results of asset correlation on book-to-market equity, default probability, and firm size from 1988 to 2013. BE/ME is the natural log of book-to-market equity. PD is default probability. Ln(Sales), a proxy for firm size, is the natural log of sales. T-statistic is reported in parentheses. ** denotes statistical significant at 1 per cent level.
Conclusions
In the spirit of continuing improvements to the ASRF framework, we examine whether asset correlation is related to a firm’s book-to-market equity value (BE/ME). We find that BE/ME, as a systematic risk related to a firm’s operating leverage, captures variations in asset correlations. Our results have important implications for the Basel capital requirement. First, calibrating average asset correlations in the current Basel’s ASRF framework for BE/ME may yield a more accurate estimate of asset correlations and thereby an improvement in bank regulatory capital adequacy requirements. More specifically, banks with obligors having a lower BE/ME should hold higher capital as they potentially exhibit higher systematic risk. In addition to different weights for obligors’ size and default probability, different weights on asset correlations should also be imposed based on obligors’ BE/ME. This approach can potentially reduce banks’ incentives to engage in this aspect of regulatory capital arbitrage.

Second, incorporating BE/ME as a systematic risk factor in estimates of asset correlations can reduce the procyclical impact of capital requirement, one of the major regulatory issues in Basel III. As BE/ME tends to decrease during economic upturns, asset correlation will become higher, leading to a higher capital requirement. This automatic mechanism helps to smooth the cyclical impact of the business cycle as banks’ lending activities will decrease due to a higher capital requirement. Finally, consistent with the current specification, our results also confirm that asset correlations are positively related to firm size and negatively related to default probability.

Notes
1. We would like to thank Kevin Davis and the anonymous referee for providing valuable comments on an earlier version of this paper. All errors are our own.

2. Regulatory arbitrage may occur as the risk of assets is not priced properly, thus providing incentives for banks to engage in more risky lending or hold more risky assets without the requirement for additional capital. For example, banks may generate more risky loans by obligors with a lower BE/ME relative to those with a higher BE/ME under current Basel capital requirement, which fails to consider BE/ME a systematic risk factor.

References


We follow Lee et al. (2011) to estimate asset correlation as follows:

\[
\rho = \left( \frac{\beta^E V(t) \sigma_M N(-d_1(t,T))}{\sqrt{\sigma^E V(t) \sigma^N V(t)}} \right)^2, \quad (A1)
\]

where \( V(t) \) is the value of a firm's asset and \( E(t) \) is firm's equity. \( N(\cdot) \) is the cumulative normal density function; \( d_1(t,T) = d_2(t,T) - \sigma^E(t,T) \)

\[
d_2(t,T) = \ln \left( \frac{B(t)}{V(t)} \right) + \frac{1}{2} \sigma^2_L(t,T) \quad \text{and} \quad \sigma^2_L(t,T) = \sigma^2_V(T-t).
\]

\( \beta^E \) is the equity beta and \( \sigma^M \) is the standard deviation of the market returns.

Equation A1 shows that \( \rho \) can be estimated using well-known variables. However, since asset value and the standard deviation of the asset value are not observable, we need to estimate them before computing \( \rho \). According to Merton (1974), a firm's equity, \( E(t) \), can be viewed as a European call option,

\[
E(t) = V(t) N(-d_1(t,T)) - B(t) N(-d_2(t,T)), \quad (A2)
\]

Applying Ito's Lemma,

\[
\sigma^E = \frac{V(t)}{E(t)} N(-d_1(t,T)) \sigma^V, \quad (A3)
\]

Equation A3 relates the standard deviation of equity returns, \( \sigma^E \), to that of total asset returns, \( \sigma^V \). Together with Equation A2, we can solve the market value of total assets, \( V(t) \), and its standard deviation, \( \sigma^V \). From Equation A2, \( N(-d_1) \) is referred to the default probability of a firm. However, its measure relies on the risk-neutral assumption. To relax the assumption, we replace the risk-free interest rate with the instantaneous expected return on a firm's assets (\( \mu_A \)) before calculating the default probabilities under an objective probability measure. We follow Lee et al. (2011) who use an option-based method to estimate \( \mu_A \).
IMPLEMENTING COUNTERCYCLICAL CAPITAL BUFFER SCHEMES for Australian Banks

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As part of the Basel III reforms, a countercyclical capital buffer (CCB) scheme requires banks to build up equity capital during periods of high credit growth against potential losses in subsequent economic downturns. According to Basel III, the extent of the deviations of the credit-to-GDP ratio from its long-term trend is a good indicator of the need to build up a capital buffer two to five years prior to a crisis. Based on a sample period from 1976 to 2011 during which two financial crises occurred, we show that Australian banks should begin accumulating their capital buffers when the credit-to-GDP ratio exceeds its long-term trend. The capital buffers should increase linearly to a maximum of 2.5 per cent of risk-weighted assets when the credit-to-GDP ratio is 8 per cent or above its long-term trend. Under this particular scheme, Australian banks would have four years to accumulate their capital buffers at the beginning of a financial crisis.

In the aftermath of the global financial crisis (GFC), the Basel Committee on Banking Supervision (BCBS 2010a) introduced a number of new capital requirements to improve the safety and soundness of the global banking system. Under these reforms, known as Basel III, capital adequacy requirements will increase to include a minimum common equity capital ratio of 4.5 per cent of total risk-weighted assets and a further 2.5 per cent of risk-weighted assets for the mandatory capital conservation buffer. In addition, banks are required to hold a discretionary countercyclical capital buffer (CCB) during periods of excessive credit expansion against potential losses in subsequent economic downturns.

Table 1 shows the implementation timeline for the Basel III capital standards for Australian banks according to the Australian Prudential Regulation Authority (APRA 2012). The CCB scheme is scheduled to take effect in 2016. Given that the current minimum Tier 1 capital ratio is 6 per cent, and a capital conservation buffer of 2.5 per cent is to be added from 2016, the total Tier 1 capital including the CCB could amount to 11 per cent.

### TABLE 1: Timeline for implementing Basel III capital requirements

This table presents the implementation timeline for the Basel III capital standards for Australian deposit-taking institutions from 2013 to 2019 according to Australian Prudential Regulation Authority.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Min common equity Tier-1 (CET1)</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Capital conservation buffer</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Min CET1 + conservation buffer</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>7.0</td>
<td>7.0</td>
<td>7.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Min tier-1</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Min tier-1 + conservation buffer</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Countercyclical buffer</td>
<td>Up to an additional 2.5% of CET1 from 1 January 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Under the CCB scheme, banks are required to build up additional equity capital when an indicator exceeds its long-term trend by a certain margin. The accumulation of capital buffers continues until the maximum of 2.5 per cent of risk-weighted assets is reached. Credit-to-GDP is one of several indicators which the BCBS has recommended as a guide for the accumulation of capital buffers, with other indicators also including funding spread, CDS spreads, stock and real estate prices. As a result, we demonstrate the build-up of capital buffers using credit-to-GDP as the indicator for the CCB scheme.

While the CCB scheme is intended to improve bank capital adequacy, it also aims to reduce runaway credit growth during good times, which Schularick and Taylor (2012) argue is a precursor to financial crises. By requiring increased capital buffers during periods of strong credit growth, the countercyclical measure can reduce the pro-cyclical impact of Basel II capital standards by slowing down credit expansions and thereby reducing bank competition. Moreover, the increase in capital buffers may mitigate predatory or aggressive lending behaviour through a higher cost of funding during credit expansionary periods. Conversely, as systemic risk tends to be low after a financial crisis, the release of capital buffers should encourage increased lending and competition. Overall, the countercyclical nature of capital buffers should help to achieve the broader macro-prudential goal of protecting the banking sector and enhancing global financial stability by smoothing out the booms and busts across financial cycles.

It is also important to emphasise that the CCB is a forward-looking mechanism that builds up sufficient bank capital during good times in preparation for bad times. By contrast, most regulatory measures tend to be backward-looking because they only take effect after a crisis occurs. For example, convertible bonds used as countercyclical contingent capital can be converted to equity to boost core capital after a bank’s capital ratio falls below a certain threshold during poor macroeconomic conditions. However, these convertible measures may be less effective as Guidara et al. (2013) find that Canadian banks with larger capital buffers during expansionary periods have performed relatively well during the GFC.

Although BCBS has outlined a regulatory framework for CCB, it is not clear how the scheme should be implemented in individual countries. Given that the behaviour of credit-to-GDP varies between different countries prior to a financial crisis, the critical threshold to trigger a capital buffer add-on is likely to differ. Therefore, our aim in this paper is to develop a CCB regulatory regime that can be applied to Australian banks in 2016. In particular, we use the past two financial crises to estimate the critical threshold for accumulating a capital buffer four years prior to the crisis and reaching its maximum at the beginning of the crisis.

The countercyclical capital buffer framework
An effective CCB architecture should include the following three criteria. First, the positive correlation between bank capital buffers and financial cycles needs to be established. Earlier studies show that the capital buffers of European and US banks are negatively related to economic upturns (see Ayuso et al. 2004; Stolz and Wedow 2011; and Shim 2013). Second, the credit/GDP gap according to BCBS (2010a, 2010b) should be used as an underlying indicator to measure excessive credit growth. This leading indicator provides a signal to banks about the need to build up capital buffers during periods of credit expansion. Third, the build-up of CCB requirements needs to be completed at least two years prior to a financial crisis.
To implement CCB schemes for Australian banks, we first define the deviations of credit-to-GDP from its long-term trend (credit/GDP gap therefore) at time $t$ as follows,

$$
\text{Credit/GDP gap}_t = \left( \frac{\text{Credit}_t}{\text{GDP}_t} - \text{trend}_t \right)
$$

where $\text{Credit}_t$ is the credit to the household and private non-financial corporate sector including non-banks and lending from abroad, $\text{GDP}_t$ is the gross domestic product, and $\text{trend}_t$ is the long-term trend based on a one-sided Hodrick-Prescott (HP) filter that can be used to separate trends from cycles in credit/GDP. Since the focus of the CCB schemes is on credit expansions and contractions within Australia, we do not include international operations of Australian banks in our estimations. Using a smoothing parameter ($\lambda$) of 400,000 recommended by the BCBS, a trend can be estimated as follows:

$$
\min_{\text{Trend}_t} \sum_{t=1}^{T} \left( \frac{\text{Credit}_t}{\text{GDP}_t} - \text{Trend}_t \right)^2 + \lambda \sum_{t=1}^{T} \left( (\text{Trend}_{t-1} - \text{Trend}_t) - (\text{Trend}_{t-1} - \text{Trend}_{t-2}) \right)^2
$$

A low ($L$) threshold is required to trigger the capital buffer add-on. A high ($H$) threshold is also needed for the maximum capital buffer of 2.5 per cent of risk-weighted assets. The size of the buffer add-on increases linearly between these two thresholds. The level of the CCB can be classified into the following three regimes:

- **Regime 1:** If credit/GDP gap $< L$, CCB = 0
- **Regime 2:** If credit/GDP gap $\geq H$, Maximum CCB
- **Regime 3:** If $L \leq$ credit/GDP gap $< H$, CCB is proportional to $\max \left( CCB \frac{\text{Credit}_t}{\text{GDP}_t} - L \right) \frac{H - L}{(H - L)}$.

Figure 1 illustrates the relationship between the level of CCB and the credit/GDP gap.

**FIGURE 1: Countercyclical capital buffer as a function of credit/GDP**

This graph shows the relationship between countercyclical capital buffer (CCB) and the credit/GDP gap. L and H denote the low and the high thresholds respectively for CCB schemes.

Applying CCB schemes for a specific country, Borio and Drehmann (2009) suggest that the noise-to-signal (NTS) and predicted ratios should be used to determine the low threshold. The high threshold can, in turn, be obtained by adding 8 per cent of the credit/GDP gap to the low threshold. To estimate these two ratios, a signal is first assigned with a value of 1 if the credit/GDP gap exceeds the low threshold and 0 otherwise. A signal of 1 (0) is judged to be correct if a crisis (no crisis) occurs within a time period.
As shown in Table 2, there are four possible outcomes between the signal and the crisis. $X$ represents the number of correct signals for a crisis occurs within a time period. $Y$ represents the number of incorrect signals for a non-crisis. $Z$ represents the number of incorrect signals for a crisis. $W$ represents the number of correct signals for a non-crisis. The NTS ratio is then computed as $\left( \frac{Y}{Y+W} \right)/\left( \frac{X}{X+Z} \right)$ or the ratio of Type II error ($Y/(Y+W)$) and 1 − Type I error ($X/(X+Z)$). A lower NTS ratio indicates less errors or incorrect signals for the chosen threshold. The predicted ratio which can be calculated as $X/(X+Z)$ measures the proportion of correct signals (i.e. 1 − Type I error). Borio and Drehmann (2009) suggest that a desirable low threshold to trigger the build-up phase is to minimise the NTS ratio subject to a predicted ratio of at least two-thirds.

**TABLE 2: Possible combinations of signals based on the credit/GDP gap and occurrence of a crisis**

This table shows the four possible outcomes of whether a signal is true or false for a crisis or non-crisis. $X$ represents the number of correct signals for a crisis occurs within a time period. $Y$ represents the number of incorrect signals for a non-crisis. $Z$ represents the number of incorrect signals for a crisis. $W$ represents the number of correct signals for a non-crisis.

<table>
<thead>
<tr>
<th>Credit/GDP gap $(T)$</th>
<th>Crisis occurs</th>
<th>No crisis occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&gt; L$</td>
<td>$X$</td>
<td>$Y$</td>
</tr>
<tr>
<td>$&lt; L$</td>
<td>$Z$</td>
<td>$W$</td>
</tr>
</tbody>
</table>

Determining the low threshold of capital buffer for Australian banks

We obtained the annual credit/GDP gap data from the World Bank for the period of 1961 to 2011. The annual data was converted to quarterly data to comply with the supervision frequency of BCSC. We used a rolling window of 15 years beginning from 1961 to estimate the long-term trend of credit/GDP. Therefore, the estimates of the credit/GDP gap according to Equation (2) begin in 1976. The choice of a 15-year period for estimating the long-term trend is based on Drehmann et al. (2010) who report that the duration between two crises ranges from five to 20 years, with a median of 15 years.

There were two financial crises (in 1989 and 2008) in Australia over the sample period that we can use to determine the low threshold (see Reinhart and Rogoff 2009; and Pais and Stork 2011). The former crisis took place as two large failed banks were bailed out by the government. Non-performing loans rose to 6 per cent of assets in 1991-92 and the total bailouts of state-owned banks amounted to 2 per cent of GDP (Caprio and Klingebiel 1999). The latter crisis is the GFC which started from the subprime mortgage defaults that eventually led to bailouts of large banks in the US and Europe. Pais and Stork (2011) find that the crash risk of the Australian banking sector increases significantly during the GFC. Contagion risk also rises between the banking and property sectors. The impaired assets ratio in banks’ commercial property portfolios in 2008 is more than doubled from a year earlier and it is at the highest level in the previous 10 years. As a result, the return of capital (net income/capital and reserve) on Australian banks declines sharply from 8.11 per cent in 2007 to -2.16 per cent in 2008 (see OECD iLibrary).

Drehmann et al. (2011) suggest that the trigger for the build-up of CCB should be as early as three to four years prior to a crisis to provide sufficient time for early warnings to banks and regulators. Warnings issued two years after a crisis are not important as banks should focus on releasing capital buffers and/or reducing risky assets to weather the crisis. We choose four years prior to a crisis as the beginning of the build-up phase, allowing banks to accumulate capital with a sufficient lead time. Therefore, our estimates of the NTS and predicted ratios are based on the credit/GDP gap exceeding the low threshold four years prior to a crisis. By varying the low threshold from -2 per cent to 6 per cent, we can determine the ‘optimal’ low threshold for triggering a CCB according to the NTS and predicted ratios.

Table 3 shows that a low threshold of -2 per cent to 3 per cent of the credit/GDP gap meets the CCB specification of Basel III. The proportion of correct signals measured by the predicted ratios are well above two-thirds, varying from 100 per cent to 72.5 per cent. Meanwhile, the corresponding NTS ratios ranges from 74 per cent to 3.4 per cent. As we move the threshold from 3 per cent to -2 per cent, the predicted ratio improves (i.e. there is an increased probability of a Type I error) because more correct signals are issued ahead of crises. However,
the corresponding NTS ratio also rises as false signals for crises that fail to occur increase (i.e. there is an increased probability of a Type II error). Therefore, the ‘optimal’ choice for the low threshold is to strike a balance between the two ratios. Among the possible low thresholds, it appears that the 0 per cent threshold, with the predicted and NTS ratios of 90 per cent and 28.9 per cent, respectively, is a good choice for Australian banks. In comparison, other low thresholds tend to exhibit a considerably lower predicted ratio or higher NTS ratio. Our results therefore differ from those of the BCBS (2010) which suggest a low threshold of above 1 per cent and a high threshold of above 9 per cent for Australian banks. Our results, which are based on a longer sample period to estimate the long-term trend of credit-to-GDP and four years to build up capital buffers prior to a financial crisis, provide a more conservative estimate of the critical threshold.

**TABLE 3: Predicted and noise-to-signal ratios at various low thresholds**

This table presents the estimates of predicted and noise-to-signal ratios across different low thresholds to trigger the countercyclical capital buffer scheme. The predicted ratio is the proportion of correct signals predicted by credit/GDP gap. The noise-to-signal ratio is defined as the ratio of Type II errors over 1 – Type I errors.

<table>
<thead>
<tr>
<th>Threshold</th>
<th>-2%</th>
<th>-1%</th>
<th>0%</th>
<th>1%</th>
<th>2%</th>
<th>3%</th>
<th>4%</th>
<th>5%</th>
<th>6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted ratio (%)</td>
<td>100.0</td>
<td>97.5</td>
<td>90.0</td>
<td>80.0</td>
<td>77.5</td>
<td>72.5</td>
<td>40.0</td>
<td>30.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Noise-to-signal ratio (%)</td>
<td>74.0</td>
<td>49.3</td>
<td>28.9</td>
<td>14.6</td>
<td>3.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

To demonstrate how effective the zero per cent low threshold might be in accumulating the CCB prior to a crisis, Figure 2 shows the variations of the credit/GDP gap and CCB from 1976 to 2011 during which two financial crises occurred. As the credit/GDP gap exceeds the 0 per cent threshold in 1984 and 2002, banks begin to build up the CCB. For the first crisis (in 1989), the CCB build-up reaches its maximum of 2.5 per cent soon after 1988 as the credit/GDP gap continues to climb beyond the high threshold of 8 per cent. For the second crisis (in 2008), however, the CCB increases to 2 per cent in 2007, below the maximum CCB as the credit/GDP gap does not reach the high threshold of 8 per cent. Therefore, despite the severity of the GFC, Australian banks do not need to build up to maximum capital buffers to absorb subsequent losses under CCB schemes. This is largely because credit growth prior to the GFC is not as ‘excessive’ as those in Europe and the US, and thus the systemic risk in the financial sector is relatively low. Overall, the timing of the rise and fall of the CCB around the two crises is consistent with the objective of CCB schemes.

**Conclusion**

During the GFC, the Australian Government implemented a number of measures designed to reduce its impact on the financial system and the economy. These include the following measures. First, the Australian Government Guarantee Scheme guaranteed $18.7 billion of large deposits and $24.0 billion of wholesale funding (including long- and short-term debt) for financial stability reasons. Second, the government purchased $8 billion of Residential Mortgage-Backed Securities (RMBS) to maintain liquidity in the mortgage market. Third, the government announced an economic security strategy with a total value of up to $10.4 billion. Fourth, the $42 billion Nation Building and Jobs Plan measures were implemented to increase domestic demand. While these post-event measures are useful, the CCB is a preventive countercyclical measure that could be more cost effective in limiting the extent of a crisis, and therefore improving the stability of Australian financial system.
Although our results show that a CCB architecture with a low threshold of 0 per cent and a high threshold of 8 per cent of the credit/GDP gap can be desirable to boost bank capital buffers, there are several caveats associated with this. First, as discussed earlier, the credit-to-GDP gap is not the only indicator that should be relied upon in implementing CCB schemes. Other possible indicators can complement credit-to-GDP for a more comprehensive CCB framework. Second, the estimation of the long-term trend of credit-to-GDP prescribed by the BCBS may not necessarily produce reliable estimates at all times. Regulatory reforms and changing economic circumstances can cause structural breaks in the trend in credit growth. These structural shifts can distort gap measures that require a long-term trend. A more sophisticated technique that detects and incorporates switching regimes may therefore be desirable to improve the accuracy of the estimate of the long-term trend in credit growth.

**FIGURE 2: Variations of credit/GDP gap and countercyclical capital buffer from 1976 to 2011**

This figure illustrates the movements of the credit/GDP gap and the corresponding countercyclical capital buffer from 1976 to 2011 in Australia. The vertical shaded areas indicate periods of financial crisis or severe credit contraction. Credit/GDP gap is the deviation of credit/GDP from its long-term trend based on the Hodrick-Prescott filter with a smoothing parameter \( \lambda = 400,000 \). CCB is the countercyclical capital buffer based on the low and high thresholds of 0 per cent and 8 per cent, respectively.

**Notes**


ii See *Mid-Year Economic and Fiscal Outlook 2008–09*, Treasury of the Commonwealth of Australia
References

Australian Prudential Regulation Authority (APRA) 2012, Implementing Basel II capital reforms in Australia.


ANALYST FORECAST OPTIMISM AND MARKET REACTION: Australian Evidence

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This paper examines whether earnings forecasts within the Australian context suffer from analysts’ optimism and under- or overreaction to new information in forecast revisions, and also whether and how investors respond to analysts’ bias in a given forecast. Our findings indicate that Australian analysts are optimistic and underreact both to positive and negative forecast revisions. We also find that when making investment decisions, investors are unable to distinguish the predictable component of forecast bias from the unpredictable component, although they are aware of the overall optimism in analysts’ forecasts and adjust for that.

It is a common phenomenon that firms (media) mention in their earnings release (news reports) whether earnings of the firm have met or beaten analysts’ forecasts. Depending on the overall market expectations, claims made in these communications affect company stock prices. That is, investors also pay attention to such claims and reward those firms whose earnings meet or beat analysts’ estimates (Bartov et al. 2002). Given the importance attached to such claims by the company, the media and investors, it is natural to ask how reliable these forecasts are. Extant empirical evidence suggests that analysts are generally reluctant to issue negative recommendations for the firms they follow and their earnings forecasts are typically above the actual earnings.

Related literature suggests both strategic and behavioural (cognitive) reasons for such optimistic analyst bias. The strategy-related explanations indicate that the analysts tend to be optimistic to foster a cozy relationship with the companies they follow to enable easy access to management information and future investment banking business (Francis and Philbrick 1993; Eames et al. 2002). The behavioural explanations, on the other hand, posit that analysts’ under- and overreaction to predictive new information may also bias their earnings forecasts (Amir and Ganzach 1998; Easterwood and Nutt 1999). Motivated by these findings, this study examines potential bias in analysts’ earnings forecasts and its impact on marginal investors’ decision making within the Australian context.

Examining forecast bias is important for a number of reasons. First, recent studies indicate that market participants place substantial value on analysts’ forecasts. Viewing stock price as a function of future earnings, Beaver et al. (2008) show that analysts’ forecast errors and forecast revisions serve as proxies for market expectations. In addition, upgrades (downgrades) in analyst recommendations are associated with positive (negative) abnormal returns (Goff et al. 2008). From this viewpoint, an understanding of forecast bias is important to researchers who use analysts’ earnings forecasts as a proxy for the market’s expectation of earnings. Second, regulatory bodies may be interested in an analysis of forecast bias as it will help them frame appropriate rules and regulations in order to improve the quality of analysts’ forecasts and help restore investor confidence in them. They may also be interested in determining the extent to which the market is aware of forecast bias and whether investors can beat the market by adopting an earnings strategy based on this bias. Third, existing empirical evidence on analyst forecast bias in Australia is limited; relevant studies have only considered issues such as analyst optimism, anchoring and adjustment, and leniency heuristics (e.g. Aitken et al. 1996;
An understanding of forecast bias is important to researchers who use analysts’ earnings forecasts as a proxy for the market’s expectation of earnings. Regulatory bodies may be interested in an analysis of forecast bias as it will help them frame appropriate rules and regulations in order to improve the quality of analysts’ forecasts and help restore investor confidence in them.

Using data for Australian Securities Exchange (ASX) firms, we find that Australian analysts are optimistic in their earnings forecasts and they underreact to new information. Our findings indicate that Australian analysts underreact both to positive and negative forecast revisions. We also find that when making investment decisions, investors are unable to distinguish the predictable component of forecast bias from the unpredictable component, although they are aware of the overall optimism in analysts’ forecasts and adjust for that.

Methodology
Analyst forecast bias
Analysts’ forecast bias is usually characterised as the difference between the values of actual earnings and analysts’ forecasts of those earnings. As mentioned in the previous section, this forecast bias can be attributed to analysts’ general optimism about the firms they follow and/or their under- or overreaction to currently available predictive information.

The study by Amir and Ganzach (1998) is the first which emphasises examining the joint effect of optimism and under- or overreaction to news on forecast bias using the following regression framework:

\[
\text{Bias}_{t,n} = \alpha + \beta \text{FR}_n + \epsilon_n, \quad n = 1,2,...,10 \quad (1)
\]

In the above model, a positive (negative) value for \( \alpha \) implies optimism (pessimism) and a positive (negative) value of \( \beta \) implies overreaction (underreaction) to new information. Variables in equation (1) are defined as follows:

- \( \text{Bias}_{t,n} \) — Forecast error (overall bias) \( n \) months prior to the earnings announcement month in year \( t \), calculated as \( \text{FEPS}_{t,n} - \text{EPS}_{t} \), where \( \text{EPS}_{t} \) and \( \text{FEPS}_{t,n} \) are actual earnings per share in year \( t \) and the monthly consensus forecast (median) of \( \text{EPS}_{t} \) \( n \) months prior to earnings announcement, respectively.

- \( \text{FR}_n \) — forecast revision \( n \) months prior to the earnings announcement month in year \( t \), calculated as \( \text{FEPS}_{t,n} - \text{FEPS}_{t+n} \).

In order to test whether the pattern of forecast bias is different for positive and negative forecast revisions, Amir and Ganzach (1998) estimate equation (1) separately for subsamples of positive and negative forecast revisions. In this paper, however, we estimate the following specification on the full sample of forecast revisions to test the same predictions as those of Amir and Ganzach:

\[
\text{Bias}_{t,n} = \alpha_1 d_{1,n} + \alpha_2 d_{2,n} + \beta_1 d_{1,n} \text{FR}_n + \beta_2 d_{2,n} \text{FR}_n + \epsilon_n, \quad n = 1,2,...,10 \quad (2)
\]

In equation (2), \( d_{1,n} \) is the dummy variable which takes a value of 1 when forecast revisions \( \text{FR}_n \) are positive and otherwise zero and \( d_{2,n} = 1 - d_{1,n} \) takes a value of 1 when forecast revisions are negative and otherwise zero. In this equation, \( \alpha_1 \) and \( \alpha_2 \) capture analyst optimism or pessimism and \( \beta_1 \) and \( \beta_2 \) capture under- or overreaction in positive and negative forecast revisions, respectively.
Investor's ability to distinguish between predictable and unpredictable components of bias

Analysts' earnings forecasts are widely perceived to be informative to the market. Therefore, it is important to examine whether and how market participants factor the bias in earnings forecasts into their reaction to actual earnings announcements. For this purpose we divide total forecast bias into two components: predictable and unpredictable. Clearly, investors' reactions to these components of bias would depend on how much earnings information their information set contains. For example, if their information set contains only information from the time series properties of earnings (i.e. past earnings information and earnings forecast), they are expected to react only to the unpredictable component of bias. However, if investors are not efficient, or if they are slow in incorporating information embedded in past earnings and earnings forecasts, they are expected to react to predictable as well as unpredictable forecast bias.

Barnerd and Thomas (1990) show that a nontrivial portion of investors does not incorporate past earnings information and thus ends up reacting to the predictable portion of the bias. Lopez and Rees (2002), on the other hand, find that investors not only react to the unpredictable component of forecast error but also partially react to the predictable portion. More recently, Battallio and Mendenhall (2005) show that, while the investors initiating small trades react to both predictable and unpredictable components of bias, those initiating large trades properly discount predictable bias and only respond to the unpredictable bias. Following Battallio and Mendenhall, we divide analyst forecast error into predictable and unpredictable components as follows:

$$\text{Bias}_{t,n} = \text{FEPS}_{t,n} - \text{EPS}_{t} = \text{FEPS}_{t,n} - \text{EPS}_{t-12} + \text{EPS}_{t-12} - \text{EPS}_{t}$$ (3)

where \(\text{FEPS}_{t,n}\) is the latest consensus EPS forecasts \(n\) months prior to the actual earnings announcements in year \(t\) (\(\text{EPS}_{t}\)) and \(\text{EPS}_{t-12}\) is actual EPS 12 months before earnings announcement in year \(t\) (i.e. previous year's EPS). The predictable portion of the forecast error represents the amount that an efficient market could reasonably expect to predict given the historical forecast error of the firm. This component of bias should be known with certainty prior to the earnings announcement as it does not depend on announced earnings. The unpredictable portion of forecast error is the 'news' or 'surprise' aspect to which the market is expected to react. If investors are unable to undo the forecast bias, both components of bias should be associated with abnormal returns around the earnings announcement date.

We employ the following regression model to test whether investors can distinguish between the predictable and unpredictable parts of analysts' forecast bias:

$$\text{SCAR}_{t} = \alpha + \beta_1 \text{PB}_{t} + \beta_2 \text{UPB}_{t} + \beta_1 \ln(\text{MV}_{t}) + \beta_2 \ln(\text{TV}_{t}) + \beta_3 \text{ANA}_{t} + \epsilon_t$$ (4)

where \(\text{SCAR}_{t}\) denotes abnormal returns around the earnings announcement date (for the technically minded readers, calculation of \(\text{SCAR}\) is provided in the footnote of Table 2), \(\text{PB}\) denotes the predictable component of bias, and \(\text{UPB}\) denotes the unpredictable portion of bias. If the market responds to both the predictable and unpredictable components of forecast bias, then both \(\text{PB}\) and \(\text{UPB}\) should be statistically significant. In model (4), we have controlled for the size of the firm (\(\text{MV}\)), trading volume (\(\text{TV}\)), and number of analyst following (\(\text{ANA}\)).

Previous studies report that the firm size (measured as the natural log of the market value of common equity) is related to analyst forecast bias (Lim 2001). From the strategic reporting bias view, since there is less public information available for small firms, analysts have stronger incentives to issue optimistic forecasts for these firms to facilitate management communication. Trading volume (measured as the natural logarithm of annual dollar trading volume) is used to capture analysts' strategic incentive to generate brokerage commissions from increased trading of the stocks they cover (Francis and Willis 2000). Analyst following (measured by the number of analysts making forecasts) is also likely to be related to forecast bias. A greater number of analysts following a firm could lead to less informational uncertainty and thus may lead analysts to produce less biased earnings forecasts (Lim 2001).
Data and empirical results

Data
Our sample of 5,782 firm-year observations comprises 413 firms listed on the Australian Securities Exchange (ASX), spanning the period from 1994 to 2007. To save our results from the effects of unusual market circumstances such as the global financial crisis, we restrict our sample to 2007. While an analysis with special focus on the periods of market stress may itself be an interesting topic of inquiry, our goal in this paper is limited to examining analyst bias and its effects on investor behaviour focusing only on usual market circumstances. A focus restricted to the typical market environment improves the comparability of our results with that of the other related studies. In this study, unadjusted actual and forecasted earnings per share and analyst following data are collected from Institutional Brokers Estimate System (IBES) via Wharton Research Data Services (WRDS). Data for other variables such as share price, firm size and trading volume are collected from Datastream.

Empirical results
Table 1 reports the results of the regression of forecast bias on forecast revisions $n$ months prior to actual earnings announcement. These results indicate that earnings forecasts by Australian analysts suffer from clear biases with a strong tendency towards both optimism and underreaction. Specifically, positive and significant estimates of $\alpha_2$ suggest that earnings forecasts are generally optimistic for negative forecast revisions. On the contrary, although negative estimates of $\alpha_1$ suggest pessimism, these estimates are generally statistically insignificant except when $n = 7$. The test results of the hypothesis that $\alpha_1 = \alpha_2$ bolster our finding that analysts are systematically optimistic in relation to negative forecast revisions. In addition, we find that the values of $\alpha_2$ are generally higher for the longer forecast horizons than for the shorter forecast horizons. This finding supports the idea that analysts tend to show more optimism when issuing their longer-term earnings forecasts. Table 1 also shows that the parameter estimates of both $\beta_1$ and $\beta_2$ are generally negative and statistically significant. This finding clearly suggests that, irrespective of the nature of earnings information (good or bad), Australian analysts tend to underreact when revising their previous forecasts. In addition, we observe that the analysts’ tendency to underreact gets stronger as the forecast horizon increases, particularly when forecast revisions are negative. It is notable that our evidence of analysts’ underreaction in both positive and negative forecast revisions is consistent with extant theory and some experimental research outcomes in behavioural decision making. For example, Amir and Ganzach (1998) argue that, in the presence of a potent anchor upon which to base predictions, it is more likely to observe underreactions than overreactions in forecast revisions. Naturally, in forecast revisions, previous forecasts are likely to serve as a powerful anchor on which to base new forecasts. Czaczkes and Ganzach (1996), on the other hand, experimentally demonstrate systematic underreaction to both positive and negative information signals when there is a salient anchor on which predictions are based. Stevens and Williams (2004) also document similar phenomenon and attribute that to human decision bias.

Having established that Australian analysts are generally optimistic and tend to underreact to new information, we test the hypothesis that they underreact more when processing negative information (negative forecast revisions) as opposed to positive information (positive forecast revisions). Assuming optimism as given, Amir and Ganzach (1998) argue that analysts are less (more) likely to depart from previous forecasts when processing negative (positive) information and, as a result, more (less) underreaction is likely to be observed in negative (positive) forecast revisions. However, our results in Table 1 do not seem to support their prediction. Although the absolute values of most of the $\beta_2$ coefficients are higher than that of $\beta_1$ coefficients, we fail to reject the null hypothesis that $\beta_1 = \beta_2$ over the forecast horizons considered in the analysis. This finding therefore further corroborates the fact that Australian analysts symmetrically underreact to positive as well as negative forecast revisions.
TABLE 1: Regression of forecast bias on forecast revisions $n$ months prior to actual earnings announcement

$$
\text{Bias}_{t-n} = \alpha_1 d_{1n} + \alpha_2 d_{2n} + \beta_1 d_{1n} FR_{n} + \beta_2 d_{2n} FR_{n} + \varepsilon_n, \quad n = 1, 2, ..., 10
$$

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Significant at: †1, *5, ‡10 per cent levels, respectively. (.) Indicates robust t-statistics and [.] indicates p-values.

Notes: This table reports the results of the regression of forecast bias on forecast revisions, $n$ months prior to actual earnings announcement. Here $d_{1n}$ and $d_{2n}$ is the dummy variable which takes a value of 1 when forecast revisions are positive and otherwise zero, and $d_{2n} = 1 - d_{1n}$. Zero forecast revisions are not included in the regression.

Table 2 reports the results of the regression of abnormal returns on predictable and unpredictable components of bias and a set of control variables comprising firm size, trading volume, and number of analysts following. Statistically significant coefficients on both predictable and unpredictable bias imply that the investors are unable to distinguish between these two components of bias in earnings forecasts. The finding that investors react to the predictable part of analyst bias suggests that a significant portion of investors do not exploit past earnings information in a timely fashion when making trading decisions. Bernard and Thomas (1990) also report similar findings and show that this type of investor behaviour gives rise to post-earnings announcement drifts in stock prices (see Hong et al. 2003 for Australian evidence on post-earnings announcement drifts). This result, however, is in contrast with that of Battalio and Mendenhall (2005) who find that a subset of investors correctly distinguishes between the predictable and unpredictable components of the forecast bias and adjusts trading behaviour accordingly. Reported results in Table 2 also show that investors’ response to both the predictable and unpredictable components of bias is negative. This may reflect the fact that, despite having difficulty in unwinding the components of forecast bias, investors do perceive the existence of persistent optimism in analysts’ forecasts and thus adjust for that with an earnings expectation discount (optimism discount). In other words, although marginal investors are not smart enough to disentangle the predictable component of bias from the unpredictable component, they appear to recognise the overall optimism in analysts’ forecasts and reflect this accordingly in their stock price reactions.
When financial analysts tend to be biased in their earnings forecasts and forecast revisions, it is of great interest to see if investors in the market react rationally to these publicly available pieces of information. One way to judge investors’ efficiency in processing such information would be to assess their ability to distinguish between the predictable and unpredictable components of forecast bias. Our analysis indicates that the marginal investors are not able to distinguish between these two components of bias in earnings forecasts. Interestingly, investors’ response to both components of forecast bias eventually translates into a negative price reaction around the earnings announcement.

**Conclusion**

Empirical evidence on analysts’ forecast optimism in Australia is limited. This study contributes to the existing literature by providing extra insights into analyst forecast bias in Australia. Specifically, we seek to determine: whether these forecasts are optimistic and whether analysts under- or overreact to forecast revisions; and whether investors are smart enough to distinguish between the predictable and unpredictable components of bias when making investment decisions.

Our results indicate that analysts, on average, issue optimistic forecasts in Australia. Such optimism could originate from the analysts themselves; they could simply be optimistic about the firm they follow or have other motivations for being optimistic (e.g. an investment banking relationship). Our results also indicate that Australian analysts show systematic underreaction to both positive and negative information and, hence, they are less likely to depart from their previous forecasts when processing new information. These results are in line with the existing experimental evidence on behavioural decision theory which suggests that previous forecasts are likely to serve as powerful anchor for new forecasts (Czaczkes and Ganzach 1996; Amir and Ganzach 1998; Stevens and Williams 2004).

Our results also indicate that Australian analysts show systematic underreaction to both positive and negative information and, hence, they are less likely to depart from their previous forecasts when processing new information.
earnings announcement period, which may suggest that the investors indeed suspect an element of optimistic bias in earnings forecasts and tend to adjust for that. Given this scenario, it remains an empirical question as to whether investors can beat the market by adopting an earnings strategy based on optimism in analysts’ forecasts.

Acknowledgements
We are grateful for helpful comments and suggestions from an anonymous referee, Kevin Davis (Managing Editor), Madhu Veeraraghavan, Dan Dhaliwal, Sugato Chakravarty and Ron Balvers.

Notes
1. Overreaction/underreaction results from analysts’ disproportionate response to new information in forecast revisions. Analysts are said to overreact when they overrate recent information and neglect or attribute less importance to past information in updating their forecasts. This type of cognitive response leads to excessive optimism over good news and extreme pessimism over bad news. On the other hand, analysts underreact to new information when they fail or are reluctant to set aside their pre-existing perceptions in updating their forecasts. Therefore, underreaction results from overemphasising prior belief and underemphasising new information.

2. Anchoring is a human tendency to make decisions on the basis of the first piece of information. A classic example of anchoring is the case of a used car salesperson who starts negotiating with a high price and then works downwards. As a result, the customer becomes anchored on a high price and when the salesman offers a lower price, the customer thinks that the lower price represents good value.

3. Leniency is the human tendency to be overly optimistic in judgments and hence it leads to positive errors in predictions.

4. The regulatory environment of a market may have a bearing on analysts’ forecast bias. For instance, the continuous disclosure regime introduced in Australia in 1994 requires companies to communicate any price-sensitive information to the market through the Australian Securities Exchange (ASX) whenever it becomes available. This requirement is expected to create a better information environment, increasing analysts’ ability to accurately project earnings.

5. The tendency for a stock’s returns to drift for a long period in the direction of the difference between actual and expected earnings.

References


Markets play a central role in the growth and prosperity of any economy. To perform this role, markets need to reliably and effectively provide the infrastructure for companies to raise capital and for investors to invest and allocate risk. While these traditional purposes of markets are well accepted, markets are in a constant state of evolution. They need to adapt and embrace political, sociological, ideological and technological developments to ensure they continue to deliver enduring prosperity for the economies they serve.

Spurred by developments in technology and regulation, market infrastructure around the world is in a period of rapid and unprecedented transition. Arguably, it has become more integrated, competitive, global and complex than at any other time in history.

Clearly, each of these dynamics provides the potential for exceptional benefits for the traditional and most important users of markets — those looking to raise capital to support their business enterprises and those looking to invest and manage risk. Greater integration and global access provides greater investment and capital raising opportunities. Greater competition has the potential to drive down costs and drive up service standards, and greater complexity provides opportunities to exploit niche markets and drive innovative ideas.

It is also important to recognise, however, that while innovation traditionally delivers benefits, there can sometimes be risks attached. The commercial realities of innovation mean that it is typically driven by a subset of market users and providers who stand to receive a direct financial benefit from that change or initiative, while the externalities of that change are of less interest to the proponent.

Frequently the interests of those proposing the changes and the interests of the wider market are tightly aligned. That is, innovation benefits all market users. However, history is also marked by changes that have not delivered this wider benefit and where they have in fact had a detrimental impact on the broader market by hindering capital raising or otherwise shaking the confidence of investors and their willingness to invest.
Where those changes create path-dependencies, history has also shown that negative externalities can be difficult and sometimes impossible to unwind. For these reasons, an assessment of any change and innovation needs to be undertaken with a focus on ensuring that the direct benefits and collateral consequences of those initiatives, continue to foster an environment that also supports fair and efficient markets more broadly for the issuers, investors and consumers they serve.

The changes and considerations facing financial markets around the world are also being acutely felt in the Australian marketplace. Given the ongoing shift in Australia towards greater reliance on market-based financing, these changes have the potential to profoundly shape the future prosperity of businesses and investors in this country. Like elsewhere, competition and innovation in the Australian marketplace is intensifying at every level of our market infrastructure — from capital raising and secondary trading through to post-trade infrastructure, and across and between the exchange-traded and over-the-counter (OTC) markets. There has been enormous change across the entire spectrum and there is more change on the horizon.

The following diagrams highlight the wave of innovation that has been unleashed on Australia’s financial market infrastructure in the past few years. Figure 1 illustrates the landscape in 2010.

**FIGURE 1: Market infrastructure 2010**

At that time, infrastructure for public capital raising was largely confined to the Australian Securities Exchange (ASX), with brokers trading ASX-listed securities almost exclusively on ASX’s secondary trading platform and otherwise being internalised in a small number of broker-operated crossing systems (‘dark pools’). Domestic futures trading took place on ASX, and clearing and settlement was provided by its post-trade infrastructure. Unlike the infrastructure for the exchange-traded market, market infrastructure in Australia for the OTC market was largely non-existent.

Perhaps most interestingly, the illustrative depiction of Australia’s financial market infrastructure in 2010 in Figure 1 broadly reflects the rather static state of this market at most points in the prior decade. Figure 2 illustrates the extraordinary change in the past few years.
New listings markets have launched, with a view to competing directly with ASX, and developing niche target markets among small-to-medium enterprises and pan-Asian issuers. Other listing and quotation markets are likely to develop, and other forms of capital raising such as crowdfunding are gaining traction overseas. While ASX is still the clearly dominant Australian listings market, the trading of those ASX-listed securities now takes place on an increasing range of platforms, including ASX’s own dark pool. These developments are explained in more detail in the case study section.

The domestic infrastructure for futures trading is still predominantly provided by ASX, but a new domestic competitor is entering the fold. At the same time it’s worth remembering that the world’s largest futures exchanges such as the Chicago Mercantile Exchange and Eurex hold licences to operate in Australia and have the scale and efficiency to compete effectively in any market. Given the revenues generated by futures trading for ASX (around double the revenue for equities trading) it is reasonable to anticipate that competition for that revenue stream will only increase.

At the same time, the distinction between the futures market and the OTC derivatives market is starting to blur. The ‘futurisation’ of the OTC market and the prospect of standardised OTC contracts being increasingly traded on deeply liquid ‘non-traditional’ trading platforms are unfolding tensions and dynamics. More broadly, regulatory decisions and commercial incentives are increasingly drawing the OTC market onto financial market infrastructure traditionally associated with ‘exchange’ type activity. In the clearing of OTC products for instance, ASX launched its OTC clearing service last year, where it competes directly with global monoliths such as LCH, and with other global competitors eyeing off a stronger foothold in the Asian region and looking to leverage their international scale to compete in this marketplace.
The significant capital investment required to successfully operate financial market infrastructure means that further competition is more likely to come from an offshore base, where the scale of those foreign markets can be leveraged to compete with our home-grown operators. This offers the promise for Australia to import efficiencies and practices from the global marketplace more quickly than ever before. The benefits of this to Australian companies looking to access cheaper capital and investors looking for new ways to invest are clear. The associated risks of having critical market infrastructure primarily regulated offshore are arguably less so.

A case study: Secondary trading of ASX-listed equities

This section of the paper focuses on just one of the areas that has experienced remarkable recent change and innovation in the Australian marketplace. The area shaded in yellow is the financial market infrastructure that supports secondary trading of ASX-listed equities.

FIGURE 3: Market infrastructure for trading of ASX-listed equities

Source and author: ASIC

The trend globally has been for governments and regulators to adapt regulatory settings to facilitate competition in securities between secondary trading venues. This has occurred, for example, in Canada, Europe, the United States and now in Australia. These regulatory decisions coupled with dramatic reduction in technology costs have opened the way for start-ups to compete effectively with incumbent exchanges.

Prior to Chi-X’s launch in October 2011, ASX had a vertically integrated monopoly in cash market products. Market operators, market participants, investors, issuers and ASIC have since had to adapt to a multi-market environment. This has included acquiring the tools and developing processes to identify and access liquidity across multiple markets. Market data from multiple sources must be collected and consolidated to create a single view and ASIC now supervises activity across all markets with cutting-edge technology and data mining surveillance systems.

In the past, the choice for brokers was essentially limited to manual internalisation of client orders or to route orders to the ASX central limit order book (CLOB). They now also have the choice to route orders to Chi-X’s CLOB, ASX’s dark pool (‘CentrePoint’) or to one of a large number of broker-operated dark pools.

As a result, the Australian market now has competition in equity trading between exchange markets, between exchanges and dark pools and more intensive competition between dark pools themselves. Figure 4 illustrates, at a high level, the equity market today.
In the three months to June 2014, trading on the Chi-X order book accounted for 8 per cent of the total market share in ASX-listed securities, while ASX had 71 per cent across its order books. The remaining 21 per cent was matched away from ASX and Chi-X order books and reported to these venues, with a portion of this ‘matching’ taking place in broker-operated dark pools.

These innovations have coincided with a stimulation of additional investment, which has included exchanges improving the speed and efficiency of their matching engines, and the introduction of new market structure and order types. The emerging threat of competition also coincided with a fall in trading fees (e.g. around that time ASX reduced fees on its CLOB from 0.28 bps to 0.15 bps).

In addition to having an apparent impact on fee levels, competition has also had an impact on market operators’ fee models. Rather than a basic symmetrical pricing model (i.e. where price makers and takers pay the same fees), Chi-X introduced a form of maker-taker pricing where the price maker pays less than the price taker. This pricing model is commonplace in some overseas jurisdictions and, unlike in Australia, has evolved to the point where price makers are paid for their orders and price takers continue to pay to take liquidity. While fees are normally a commercial issue, many overseas regulators are increasingly concerned about their impact where positive rebates are paid by market operators to participants, citing considerations around distorted trading incentives and their inconsistency with the notion of a fair and efficient market. ASIC has expressed opposition to these fee models being used in Australia.

In addition to having an apparent impact on fee levels, competition has also had an impact on market operators’ fee models. Rather than a basic symmetrical pricing model (i.e. where price makers and takers pay the same fees), Chi-X introduced a form of maker-taker pricing where the price maker pays less than the price taker.
Broker-operated dark pools in Australia

While advances in technology have facilitated competition between exchanges, these advances have also made it easier to trade away from central order books, and to trade instead on broker-operated dark pools (or ‘crossing systems’). This has resulted in significant growth in the number of these venues, which are competing more directly with exchange markets for liquidity. The result is a blurring of the lines between these exchanges and those brokers (market users).\(^7\)

The first crossing system was launched in Australia in 2005, UBS PIN. Prior to 2010 there were five in Australia and a further 17 have since been launched.\(^8\) In addition, ASX also has its own dark pool\(^9\) and Chi-X has hidden orders on its CLOB. We expect this to be an area of continued growth and innovation.

Some market participants also operate ‘aggregator’ algorithms that enable orders from one market participant or crossing system to be transmitted to other participants and crossing systems. This creates a virtual web of links designed to improve dark liquidity discovery and may mean many dark venues are prioritised by brokers before pre-trade transparent and publicly accessible exchange markets (see Figure 5).

**FIGURE 5: Dark liquidity links**

![Diagram showing dark liquidity links](image)

*An ‘aggregator operator’ is a participant that operates an aggregation algorithm

Source and author: ASIC

ASIC initiated a taskforce in 2012 which conducted an in-depth review of dark liquidity and dark pools. Key concerns identified were the lack of transparency about the existence and operation of these venues and the need to ensure these venues operate fairly for users. Rules were introduced to address these concerns.

Rules were also introduced in May 2013, which require dark trades, other than large block size trades, to receive meaningful price improvement when compared with the price that would otherwise be available in the lit market. These rules were intended to curb the growth of dark liquidity in smaller size trades and to prevent smaller dark orders from trading ahead of pre-trade transparent (lit) orders at the same price. There has been a significant reduction in below block-size dark liquidity as a result (down 30 to 40 per cent on where it was in the months leading up to the introduction of the rules).
Automated and high-frequency trading
Market environments with a number of competing trading venues are associated by some with a higher prevalence of high-frequency trading as these traders seek to take advantage of information asymmetries and different trading prices that might momentarily prevail on different venues.

ASIC also recently initiated a taskforce on high-frequency trading in Australia and found its prevalence to be overstated. For example, the taskforce found no evidence of front running or that there were excessive order to trade ratios — particularly when compared with some other jurisdictions. Over the past 12 months, the average order to trade ratio in Australia has hovered around 7:1 whereas in other marketplaces order to trade ratios can be multiples of this. For instance, Canada has seen ratios of 50:1 and ratios in the US can be higher still.

Nonetheless, we cannot ignore the fact that many institutional and retail investors in ASX-listed securities continue to be concerned by high-frequency trading and a number are changing their behaviour to avoid interacting with these traders. This means that regulators need to continue to monitor automated and high-frequency trading and the impact it has on investor confidence. It also emphasises the importance of remaining vigilant to incremental changes in the marketplace overseas, which can be imported here with increasing ease and which may have long-term implications for the Australian market.

Other new types of trading venues emerging overseas
In this context, it is interesting to observe other developments overseas such as venues starting to provide for the buying and selling of privately held illiquid securities, for example, Nasdaq Private Capital Market (formally Sharespost) and SecondMarket in the United States, which offered trading in Facebook, Twitter and LinkedIn shares. These venues attract a wider investor base for private companies, enabling early investors to liquidate their stakes more easily than privately sourcing counterparts. They also allow the companies to avoid the complexities of a public capital raising and large shareholder base. It has meant that some companies that would otherwise have been destined for the public market can remain in private hands for longer.

That said, there are risks with private markets compared to public markets. They are lightly regulated, lack transparency and may be vulnerable to price manipulation due to the low trading volumes. The lack of public disclosure makes investing in companies on these markets more risky than publicly-traded companies. These are all issues being considered by regulators in the United States, and are naturally exercising the minds of market regulators and policy setters in Australia.

There are other types of trading venues also emerging overseas which have innovative trading technology and operating principles. Some are based on social networking technology. Squawker in Europe, for example, is an equity sell-side negotiation platform that allows for personal interaction between users and is reportedly free of algorithms and high-frequency trading.

The use of social networking technology is innovative and may be suitable for the institutional segment of the market. However, if used more widely by public markets, it may raise fairness concerns if some types of investors or market users are favoured over, or exclude, others in so-called ‘liquidity clubs’. These operate as markets-within-markets, accessible only to a subset of users that meet certain ‘preferred’ criteria. Along these lines, some overseas trading venues are starting to offer alternatives to the current market structure, to combat concerns in those jurisdictions about matters such as algorithmic and high-frequency trading. For example:

- IEX Trading in the United States has certain features designed to be unattractive to high-frequency traders, such as a 350 microsecond delay.
- The Canadians have also seen proposals from the Aequitas market, which have included an alteration of the traditional price-time queue priority to favour some users (i.e. institutional investors) over others (i.e. high-frequency traders). This proposal raises questions of fairness.

ASIC is watching closely as similar models may emerge in Australia.
Conclusion

Both regulators and the industry need to embrace competition and innovation if the Australian financial market is to remain relevant and attractive in a global context. This is a key finding of the Johnson report on building on our strengths to establish Australia as a financial centre in the region. In fulfilling this goal, it is equally important to ensure that the Australian financial market remains fair and efficient, and that it continues to operate with a high degree of integrity.

While these goals remain constant, Australia’s financial market infrastructure is in a period of unprecedented change. Arguably, it is subject to greater competitive pressures than at any other period in history and, like financial market infrastructure all around the world, it has become more globally integrated and complex than ever before. For the Australian financial industry and its regulators, the goal must always be to ensure our markets continue to support the abilities of Australian businesses to raise capital and the potential for Australian investors to invest and allocate risk. Developing a roadmap to success has rarely been more challenging or exciting.

Notes

1. The views expressed in the paper are those of the authors, and not of ASIC. The authors would particularly like to thank Adam Judd, Senior Manager of ASIC’s Strategic Intelligence team and Dr William He, Senior Analyst, ASIC’s Market & Participant Supervision team.

2. In 2009, the G20 stated its commitment to (inter alia) clearing all standardised OTC derivatives through central counterparties.

3. In late August 2009, the government made the decision to transfer frontline market supervision from Australia’s domestic markets to ASIC. This was a precondition to considering Chi-X Australia’s application for a licence to offer a competing platform for secondary trading of ASX-listed securities. ASIC delivered the transfer of supervision in 10 months and then put in place a considered framework for competition between platforms in 11 months. The framework alone took other major regulators closer to five years.

4. CLOB and CentrePoint.

5. For example, Chi-X hidden and pegged orders, ASX CentrePoint broker preferencing and sweep orders.

6. For example, the United States, Canada and Europe.

7. In some other jurisdictions these venues are licensed as forms of markets (e.g. as alternative trading systems in the United States).

8. A small handful has also ceased operating, with 16 now currently in operation.

9. CentrePoint.

10. For instance, by placing minimum fill sizes with their orders or avoiding the use of venues where there is a known or suspected high-frequency trading presence.

11. It is attractive to market participants that are seeking high levels of liquidity and want to avoid smaller transactions. This technology is also being used in other product classes such as foreign exchange.

The common expression ‘payday lender’ refers to credit providers who offer small, short-term, unsecured loans. A payday loan is referred to in legislation as a Small Amount Credit Contract (SACC), and this term is extensively used within the industry. The Australian market is comprised of lenders that are purely dedicated to the SACC loan product and others offering a wider array of loan options. These include $2,000 to $5,000 Medium Amount Credit Contract (MACC) loans, other unsecured and secured personal and specific purpose loans, as well as pawn-broking services.

This paper provides an overview and discussion of the industry post-regulation and summarises the initial findings of a research project into the growth of the Australian online SACC lender sector. Our research has involved both qualitative and quantitative research methodology including interviews with industry stakeholders and lenders from shop-front and online sectors as well as analysis of available secondary data such as market research reports from financial databases. We have produced a ‘snapshot’ of online payday providers that was captured in May 2014. This database was generated through an internet search of websites offering SACC loans. Terms such as ‘payday loan’, ‘quick cash’, ‘easy cash loan’, ‘cash advance’, and ‘emergency money’ were used to search for providers. Links to our online survey of borrowers were recently displayed on a number of lender websites. An analysis of the survey data will be published later this year.

As it expands, the industry is progressively moving from the fringe into the mainstream of consumer finance in Australia. Despite the recent introduction of restrictive government regulation in 2013, our research shows that the industry has recovered through innovation in product design, marketing and delivery. This expansion can be seen in emerging trends including: the decline of some small independent providers; the consolidation of major payday providers; the emergence of a split market between low-income high street borrowers and a little known, yet thriving, online sector which caters for somewhat higher income earners; greater internationalisation; and integration of the payday sector with banking capital and retail finance. As such, the popular perception of the twentieth-century ‘loan shark’ operating at the margins...

INTO THE MAINSTREAM:
The Australian Payday Loans Industry on the Move

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of society is out of step with the new position occupied by SACC loan providers in the Australian consumer finance market. With the government set to conduct an extensive review of this market in July 2015 (National Consumer Credit Protection Act 2009 (Cth) s 335A), informed policy formulation in this area requires a reassessment of the notion that the industry remains on the margins of consumer credit.

Growth of international markets
By all measures, the industry is on the rise, internationally and domestically, and it is positioning itself as a significant component of consumer credit. For example, the number of loan outlets in the United States rose from 200 in 1990 to 25,000 in 2007 — more than McDonald’s and Starbucks combined (Bianchi 2012). Fourteen million Americans access these loans each year, generating $4.7 billion in revenue for the industry (Trihouse Enterprises 2014; Burtzlaff and Groce 2011). Total revenue of the US payday industry is currently valued at $11 billion (IBISWorld 2014a). Across the Atlantic, a million households take out at least one loan per month in the United Kingdom, with loan volumes projected to be worth $4.2 billion to $5.5 billion by 2014 (Datamonitor 2010; Populus 2013). The industry has experienced similar growth patterns in Canada, New Zealand and Australia (Cagney and Cossar 2006; CPLA 2013; Marston and Shevellar 2014).

Growth and diversity in the Australian payday loans market
After an explosion in the number of lenders over the past decade from virtually non-existent levels, the industry has undergone a recent consolidation in Australia. In the 1950s many money lenders in Australia saw their businesses close as they struggled to secure financing from banks and employment increased after the Great Depression. However, by the 1990s, payday lenders in Australia re-emerged, rapidly responding to shifting economic conditions including, but not limited to, greater financial deregulation (Anderson 2013). In 2001, only 12,800 loans were being written per month by the 82 lending businesses operating at the time (Packman 2014). The subsequent decade has witnessed a twenty-fold increase in these numbers. By 2011, one study valued the sector at $800 million and estimated that 1.1 million Australians (15 per cent of the adult population) were taking out three loans per year on average (Banks et al. 2012). Figure 1 illustrates the market size of payday loans, measured as annual growth rates, compared with other related financial industries in Australia.

FIGURE 1: Annual revenue growth rate (2009–14)

Sources: Data derived from: IBISWorld Market Research Reports 2014a, b, c, d, e & g; Australian Payday Industry data retrieved from IBISWorld 2014f — Cash Converters Company Report Industry Average section.
The industry is characterised by heterogeneity in terms of operational size, product diversity and customer markets. Some lenders have a national chain of shop-front outlets, such as Cash Converters (141), City Finance (146), Money3 (70) and Cash Stop Financial Services (30). A shrinking number of standalone lenders run one or two shopfronts. Revenue growth for the two ASX-listed lenders (Cash Converters and Money3) has been robust, while other shop-front networks such as Cash Stop Financial Services have been stagnant. Nimble, an emerging online-only lender, increased revenue in their second year of operation by 46 per cent to $12.7 million.

**FIGURE 2: Total revenue of selected payday loan companies, 2008–13**

![Figure 2: Total revenue of selected payday loan companies, 2008–13](image)

*Sources: Data retrieved from: IBISWorld Market Research 2014f; Dun & Bradstreet 360 Reports 2014a, b, c; Cash Converters and Money3 Annual Reports.*

All of the larger firms in the payday industry have significant business operations outside the SACC loan area, and new, as well as many established lenders, see the SACC product as an entry point rather than the mainstay of their business. For example, Cash Converters, despite maintaining significant business in the SACC loan markets, dedicates only 40 per cent of their franchise to financial services, with the rest directed towards retail sales of second-hand goods (IBISWorld 2013f). This heterogeneity and product diversification also extends to the expanding online sector. Of all online lenders identified as providing SACC loans, nearly half (33) also offered MACC loans, 14 advertised commercial loans, and personal loans of up to $10,000 were available through 12 sites.

The online Australian SACC market appears to be dynamic and growing. Our research found that in May 2014, SACC products were directly available through 65 sites, while six sites promoted links to other providers. Of all identified online companies offering SACC loans, 22 also had a shopfront presence. Cash Converters, a major shop-front lender, reported that the value of their approved online cash advances in the March 2014 quarter was 160.9 per cent higher than in the corresponding period in 2013 (Cash Converters 2014a).

Our study suggests that the continued development of the online sector is changing the traditional borrower demographic profile. Research conducted prior to the recent regulatory changes and the rapid increase of online lending found that most shop-front customers were not employed and had very low incomes (Banks et al. 2012; Connolly et al. 2011). However, data collected from online databases and our interviews with lenders strongly suggest that there has been segmentation in the market between higher-income customers who take out loans online and lower-income income borrowers of high street SACC products. All online-only lenders in our study require applicants to be employed whereas most shop-front outlets do not. Previous studies had similar findings, with reports that customers had an average salary of $65,000, a similar figure to other online companies who reported customer average annual incomes of $55,000 (Kitney 2014a). Data soon to be published by the National Financial Services Federation will clarify the extent of this market segmentation trend.
Interviews conducted with lenders also strongly indicate that market efficiency has been gained in the online segment through new technology, such as the use of loan management software (LMS). These technologies electronically process applications and give online providers a competitive edge. Our research interviews also disclosed the three main types of loan management software used in Australia as Min-IT, LAPS and FIN power, with some lenders developing their own unique models.

The key differences between these systems appear to be how the risk-assessment of borrowers is undertaken. In the Min-IT system, the borrower applies for a loan online, and then the lender decides on the suitability of the applicant. If approved, the borrower’s details and contract details are placed within the system. This process is unlike the LAPS system, which was imported from the UK, where after applying for a loan, a credit check is carried out by software accessing third-party databases such as VEDA (a data analytics business that assesses creditworthiness) and reviewed by separate software programs to determine the suitability of the applicant. One lender disclosed how software has been created to check bank statements of borrowers electronically, such as Bankstatements.com.au, to review overdraft frequency. Figure 3 provides a breakdown of each lender in the study and which method was utilised for borrowers’ applications.

**FIGURE 3: Online SACC application processes**

Complementing the online sphere is the emergence of mobile device access to SACC loans, a major innovation which the online-focused lenders we interviewed claim increases borrowing frequency. In our study, a leading online-only lender reported that 60 per cent of their organisation’s borrowers use an iPhone, and that four in every five computer-based purchases come from an iPad instead of a traditional desktop. As a result, the industry is developing a range of new SACC lender ‘Apps’ as a mechanism to consolidate borrowers. One online-only lender considered that they dealt with a more ‘sophisticated customer’ compared to the typical high street patron, one who was highly adept at online banking and online retail purchasing. These claims complement other financial studies on online payday lenders such as Nimble, who reported that two-thirds of its online loans are attained through mobile devices, and that they expected app-based loan requests to rise by 74 to 80 per cent in the next year (Kitney 2014a).

**Discussion: Discontinuation, consolidation and growth in online markets**

The growth of the payday industry has been accompanied by a highly charged policy debate between consumer and welfare advocates and the industry. In Australia, the debate centres on two connected issues: cost and risk. Consumer advocates argue that loan fees are too high and low-income customers risk becoming caught in a cycle of repeat borrowing (Ali et al. 2013). The industry maintains that the higher costs are commensurate with the greater risks of default in this segment of the market and that they are simply meeting strong demand (Infosys Technologies Ltd 2008).
The ongoing debate has resulted in two phases of legislative reform of the industry; the National Consumer Credit Protection Act (NCCP) 2009 and, more recently, amendments of the NCCP by the Consumer Credit Legislation Amendment (Enhancements) Act 2012. The NCCP, seen as a watershed by industry, instigated a shift from state-based to Commonwealth law, and a national credit licensing regime overseen by sole regulator Australian Securities Investment Commission (ASIC). By 2013, the later Act capped interest rates on payday loans at 4 per cent per month, restricted establishment fees to 20 per cent of the principal, and prohibited concurrent loans and the refinancing of any existing loan. These regulations also included more stringent risk assessment measures such as enhanced eligibility requirements, necessary provision of borrower bank statements, and mandatory borrower notices (NCCP s 117). If a borrower received the majority of their income through Centrelink payments, repayments on a SACC loan could not exceed 20 per cent of their income, referred to as the ‘protected income amount’ (National Consumer Credit Protection Regulations (Cth) reg 28S).

It seems many providers that existed prior to the changes in legislation, which were rolled out during 2013, have been unsuccessful at readjusting their business models in line with the new regulatory environment. An industry body representative we interviewed reported a trend towards membership discontinuations of smaller operators, with their records showing that as of 7 May 2014, the number of small independent lenders had dropped from 248 prior to the 2013 regulations to 31. As part of the July 2015 review, discussion will focus on the whether a creation of a national database of small amount credit contracts should be pursued as a means of tracking these and other industry developments (NCCP s 335A).

Our study also shows that the second trend to emerge in the payday industry concerns the consolidation of larger companies within the market. These providers have acquired struggling payday companies, created new franchises, or expanded internationally. Companies that exhibit this trend include large players such as Cash Converters. For example, in 2013 Cash Converters reported a 46.4 per cent slump in net profit to $9.8 million (Cash Converters, 2013) but have subsequently been reported to have regained momentum (Cash Converters, 2014a). Despite more restrictive regulation, over the past year they have: acquired eight new stores locally within Australia, taking its shopfront offices from 56 to 64; acquired a 25 per cent stake in NZ Cash Converters; and expanded internationally to establish new stores in Mexico and Latin America (Cash Converters 2014b). As Peter Cummins, Managing Director of Cash Converters said, ‘The UK market remains tough but now it seems we are emerging from the transitional issues resulting from the new Australian regulatory requirements and our loan products are once again seeing good rates of growth’ (Cash Converters 2014b). Similarly, Money3 struck a deal with Cash Store Australia to acquire the rights of 41 out of its 60 outlets, including 30,000 customers (Kitney 2014b).

Although pre-dating the latest regulatory restrictions, the listing of two larger SACC provider companies, Cash Converters (1997) and Money3 (2007) on the ASX, signals both an acceptance of these companies as mainstream investment vehicles as well as a potential future consolidation within the market. Money3 advised the ASX in 2014 that its profit before tax of $4.4 million was up 100 per cent, and it was expecting ‘strong earnings growth in the immediate future’ (Money3 2014). These developments again reflect trends taking place internationally, most strikingly in the US where EZ Corp (Nasdaq), Cash America (NYSE), QC Holdings (Nasdaq), First Cash Financial Services (Nasdaq) and Advance America Cash Advance (NYSE) are publicly-listed companies (Trihouse Enterprises 2014).

Although pre-dating the latest regulatory restrictions, the listing of two larger SACC provider companies, Cash Converters (1997) and Money3 (2007) on the ASX, signals both an acceptance of these companies as mainstream investment vehicles as well as a potential future consolidation within the market.
The continued growth of the online SACC category has challenged prevailing assumptions about borrower demographics in consumer credit markets. Providers in the credit industry are traditionally grouped into one of two categories, ‘mainstream’ and ‘fringe’ lenders. The former include the traditional mechanisms for credit such as banks, building societies, credit unions and national finance companies, with strong bank affiliations or ownership. The latter category has traditionally referred to the provision of small personal loans, to those people who have less ability to borrow from mainstream credit facilities (Infosys Technologies Ltd 2008). A 2014 report by National Australia Bank and the Centre for Social Impact concluded that 16.4 per cent of the adult Australian population are without access to mainstream financial services (Connolly 2014), providing an insight into why disproportionately high levels of low-income Australians borrow from ‘fringe’ lenders.

However, our research indicates that a striking feature of the online sector appears to be the continued rise in the higher-income market as distinct from the traditional low-income, shop-front SACC borrower. Some of the lenders we interviewed reported that the legislative changes required an extension in both the amount and loan period of new SACC loans, compared with previous lending practices. The common practice of writing short-term loan contracts of less than 16 days was banned under the Consumer Credit Legislation Amendment (Enhancements) Act 2012. Consequently, the new SACC loan period (16 days to a year) has somewhat encroached on previous medium-term loan structures — an issue raised by some lenders as a key reason why SACC loans have begun to attract a wider consumer market.

The emergence of online product offerings has accelerated this trend of penetration into a higher income segment of the market. Despite the innovative use of a range of data sources, the capacity of online-only systems to assess risk — especially for low-income customers seeking smaller loans — remains inferior to the highly interpersonal risk evaluations and loyalty attachments which occur at shop-front stores. One executive of a large company we interviewed considered that online-only lenders have yet to develop a profitable risk assessment business model that can cater for the lower-income segment of the small loan market. The increasingly innovative use of big data, however, may reverse this trend. For example, one online lender discussed how large retailers were building richer customer profile databases which they were progressively leveraging as a way to enter the online market for consumer finance, and similar risk-based products like insurance. This is a business trend previously documented about US payday companies (Consumer Federation America 2009).

Although online providers can avoid the rental and operational costs associated with shop-front outlets, the lenders we interviewed did not see this reduction in costs as the main driver of the online sector. Rather, the acceleration in growth relates to the reduction in processing times for risk-assessment, approval times, and electronic funds transfer; the combination of these factors appears to have delivered a dynamic business model. One online-only lender reported that borrower data is collected from third-party sources, processed within 15 minutes, and then approved or declined, with money being transferred directly into the borrowers account within an hour. Foregrounding trends likely to occur in Australia, the ease of applying and receiving online loans in the UK, especially among employed and younger borrowers, has led to seven out of 10 customers only ever taking out an online loan (TNS BRMB and Competition Commission 2014).

One facet of the payday industry that has not been widely discussed is the continued growth of ‘lead generation’ websites as an adjunct to the online sector. Lead generators often market themselves as online payday lenders or present as loan comparison sites, but they do not lend and as such do not require a credit license. Instead they sell the information of applicants, using a bidding platform, to lenders in the market. Some lenders also act as lead generators, monetising declined applicants by referring them to other lenders. Leads are processed through the lender’s LMS software to determine suitability, such as a customer’s credit rating and default history. The ‘quality’ of the lead generates higher prices, but determining the exact basis and measure of ‘quality’ is difficult as there is considerable variation between lenders on risk allocation and other lending criteria. According to a leading online-only lender, the average price for a lead is $90 to $120, though successful lead bids range from $2 to $350.
Our study found that the big players in lead generation include 9global (a US-based company), Vibration media, and finder.com.au. In the US, lead generation business has biannual conferences of up to 15,000 participants, indicating that it is a significant industry in its own right. Our research on lead generators operating in the Australian online SACC sector found 55 sites. Most lenders we interviewed expect the lead generation sector to grow rapidly in Australia.

New frontiers: Banking, retail and increased internationalisation
As small lenders specialising in SACC loans are attempting to gain economies of scale, established businesses already operating on the basis of scale, in particular mainstream retailers, are moving into the small amount personal loans market. Teaming up with GE Money, Australian retail chain Coles recently announced its entry into the personal loans market, preparing to offer small loans and credit cards (Lynch 2014). This development mirrors what has already taken place in America, with family group retail giant Wal-Mart partnering with Progress Financial Corp, a supplier of unsecured credit (Dudley 2013).

Alongside these changes, the SACC loan market has become more integrated with mainstream banking through finance capital and shareholdings in listed companies. The major shareholders of Cash Converters International at 2013 include Colonial First State Investment, Commonwealth Bank, JP Morgan and HSBC. In addition, out of the two major bank service providers of Cash Converters, one is part of the ‘big four’ commercial banks in Australia, Westpac Banking Corporation. HSBC, another substantial shareholder over the past few years, is itself heavily integrated as a major shareholder in all big four Australian banks, showing the integration of these two areas of finance.

Finally, the process of internationalisation is accelerating both here and overseas. For example, Cash Converters has acquired a franchise license in Scotland to assist expansion of its current holdings of 700 stores in 21 countries (IBISWorld 2014f). However, lenders have reported the entry into the Australian SACC landscape of international players such as American Pawnshop, a major player in the US industry, UK-based Paid International, Norwegian-based Credit 24 and US/UK owned Loan Ranger.

Conclusion
Contrary to popular perceptions, this study has shown that the SACC industry is not only showing immense buoyancy in a post-regulatory environment but also responding with conspicuous innovation in loan product and business technology. Key factors underpinning this growth of consumer finance include the consolidation of major lenders, the rise of an online market and new borrower demographic, and greater institutional integration between the payday sector and finance capital. A key finding of this paper is that these changes warrant a new conceptualisation of the SACC loan industry as one which is increasingly moving into the mainstream. This should also help to inform both the prospective government review of the industry and public debate in this area. With the industry undergoing continuous and rapid change, further research is required to build on the initial findings presented in this paper.

References

Cagney, P and Cossar, D 2006, Fringe Lenders in New Zealand, 3433, Research New Zealand for Ministry of Consumer Affairs, Wellington, NZ.


Dun & Bradstreet Company 360 Report 2014a, Cash stop financial services company profile.

Dun & Bradstreet Company 360 Report 2014b, Money3 Corporation Limited.


IBISWorld, 2014b, Credit agencies Australia market research report, IBISWorld database.

IBISWorld, 2014c, Credit card issuance market research report, IBISWorld database.

IBISWorld, 2014d, Credit unions in Australia market research report, IBISWorld database.

IBISWorld, 2014e, Debt collection in Australia market research report, IBISWorld database.

IBISWorld, 2014f, Cash Converters company report, IBISWorld database.

IBISWorld, 2014g, National and regional commercial banks in Australia market research report, IBISWorld database.


Kitney, D, 2014a, ‘Nimble start-up challenges the big four banks’, The Australian, 26 June.


Populus 2013, Which? Press Office media release, Populis on behalf of which.co.uk, London.

TNS BRMB and Competition Commission 2014, Research into the payday lending market, Competition Commission, London.

While governments are traditionally the major provider of infrastructure investment, government balance sheets are currently constrained, along with their capacity to lift infrastructure investment, given the high levels of public debt in many countries. As a result, attention has turned to increasing the role of the private sector in infrastructure investment. In outlining Australia’s priorities as chair of the G20 in 2014, the Australian Prime Minister, Tony Abbott, said ‘it should be easier to get big new road, rail, pipe and dam infrastructure off the ground and we can do that through attracting more private capital’.

Infrastructure is not a new priority for the G20. At previous G20 summits, leaders have endorsed the importance of infrastructure investment to growth and jobs, and have committed to lift infrastructure investment. For example:

- At the Seoul Summit in 2010, as part of the Multi-Year Action Plan on Development, leaders said they were committed to overcoming obstacles to infrastructure investment, developing project pipelines, improving capacity and facilitating increased finance for infrastructure investment.
- Prior to the Cannes Summit in 2011, a high-level panel was established to identify measures to scale up and diversify sources of financing for infrastructure, make projects bankable and enhance knowledge by sharing skills with low-income countries.
- At the Los Cabos Summit in 2012, leaders emphasised that infrastructure is critical for sustained economic growth, poverty reduction and job creation. They noted that while public financing of infrastructure developments remained critical, it should be complemented by private sector investment.
- At the St Petersburg Summit in 2013, leaders re-emphasised the key role of long-term investment, particularly infrastructure, and committed to put in place the conditions that would promote financing for infrastructure investment, including mobilising private investment.

The challenge facing the G20 in 2014 is to move beyond rhetoric and identify specific steps that the international community can take to help bridge the infrastructure gap.
Attributes of and influences on infrastructure investment

Infrastructure projects are generally large, long-lived and require long-term financing. Cost-benefit calculations are often difficult given the long life of the project, different opinions on discount rates to be used and accuracy around demand estimates, such as the use of a highway. Moreover, judgments need to be made on whether the project should be based on today’s demand, or look well into the future and consider whether the project can be a catalyst for future development. It is also necessary to take into account costs and benefits that go beyond the direct financial returns associated with the project. For example, social, distributional and environmental costs and benefits have to be included when deciding whether to undertake a project. The scale of projects is often too big for a single investor and collective financing is required. Given the long life of the project, the stability of the investment environment is important, particularly the stability of the legal, regulatory and tax systems as well as the overall macroeconomic situation.

Large infrastructure projects can be politically contentious. Often there are substantial externalities associated with infrastructure projects, with benefits accruing to those who cannot easily be required to pay for the service. Even when it is practicable to charge the users of the infrastructure projects, which would not only provide for the funding for the investment but also contribute to its efficient use, there is often strong public resistance and the expectation that the service should be provided free. For example, there is often public opposition to the introduction of toll roads and congestion charges.

The scale of infrastructure projects can also be such that it is only practicable to have one provider of the service, resulting in monopoly situations. In such situations, pricing may have to be set by regulatory authorities, and there may be political pressure to keep prices low.

Taking into account all of these considerations, the first priority is selecting and prioritising the ‘right’ infrastructure projects, namely those where the benefits from the project exceed its costs, with all of the social and environmental costs and benefits being taken into account. Focusing on project financing options presumes that the decision has already been made that the investment is the best use of limited resources. Moreover, the source of financing, be it public or private, cannot fundamentally alter the economics of the project. However, the economics of the project will influence its attractiveness to private investors.

When looking at the range of factors that will influence which projects are the priority infrastructure investments for a country, it is evident that they lie in the hands of each government. Some of the issues are technical, but many are political, particularly when it comes to project selection. One of the factors that works against the selection of the right infrastructure projects is the tendency for governments to select projects because they are popular or for political reasons rather than because they generate the highest net social returns. In this context, with infrastructure investment largely a domestic issue, what role does international cooperation in general, and the G20 in particular, have to offer?

When looking at the range of factors that will influence which projects are the priority infrastructure investments for a country, it is evident that they lie in the hands of each government. Some of the issues are technical, but many are political, particularly when it comes to project selection.

The role of international cooperation

There are a number of channels through which international forums can assist countries in increasing infrastructure investment. There can be a collective commitment to address the fundamentals required to increase infrastructure investment, recognising that implementation will depend on each country’s actions but that the benefits of collective action will exceed those from individual responses. The international organisations can assist in identifying and monitoring the steps countries need to take to increase infrastructure investment, as well as
being a source for sharing knowledge and capacity building. This can be particularly beneficial for developing countries, along with the financial support that the international organisations can provide. It is also important to ensure that international standards, particularly those applying to the financial system, are not impeding the financing of infrastructure investment. These issues will be considered further in the context of the G20.

Infrastructure and G20 growth strategies
In February 2014, G20 finance ministers and central bank governors committed to developing new policy measures with the aim of raising the level of G20 output by at least 2 per cent above the then projected level in the next five years. This collective commitment is to be translated into specific actions — growth plans — by each country. A key part of achieving this aim of lifting growth is an increase in infrastructure investment. In this regard, at their February 2014 meeting, G20 finance ministers committed to creating a climate that facilitates higher investment, particularly in infrastructure and small and medium enterprises. This is critical for the global economy’s transition to stronger growth in the short and medium term. We will undertake reforms to remove constraints to private investment by establishing sound and predictable policy and regulatory frameworks and emphasising the role of market incentives and disciplines.

As noted, given that the steps necessary to increase infrastructure investment will depend on specific policy measures by each country, it is appropriate that the translation of the collective agreement by the G20 to increase infrastructure investment is contained in individual country growth strategies. The relative importance of the various factors impacting on the environment for infrastructure investment will vary across countries. Moreover, increasing infrastructure investment is not the same priority for every country. For example, while China may need to improve the quality of its infrastructure investment, its overall challenge is to increase consumption expenditure relative to investment spending. Japan is another country where raising infrastructure spending in aggregate is not a priority. In contrast, the IMF has indicated that in order to achieve the collective G20 growth ambition, public investment, particularly on infrastructure, has to be increased by 0.5 per cent of baseline GDP in the US, Germany, Brazil, India and Indonesia.

While the steps necessary to remove the obstacles and to facilitate infrastructure investment depend on individual country policy action, commitments made at international forums can help in advancing domestic agendas. Peer pressure can assist, as can the advice and monitoring of the international institutions. For example, there would be value in international organisations — such as the IMF, World Bank and OECD — focusing on and publicising the specific priorities that countries should address to improve their investment environment. These institutions have noted that the barriers to increased infrastructure investment in the G20 include: unfavourable regulatory conditions, financial regulations and a lack of markets for long-term financing, constrained public investment, and a lack of capacity to plan and deliver projects. But, as noted, the significance of these barriers will vary across countries. For example, the IMF identifies that key steps which India must take to increase infrastructure investment include simplifying and making contracts more enforceable, facilitating land acquisition and making it more predictable and equitable, and diversifying funding sources beyond the banks. In the case of Australia, the OECD recommends that there is a need to enhance capacity and regulation in infrastructure in a cost effective way, such as through expanding user and congestion charges.

In summary, the international organisations can play an important role in identifying the specific steps that countries need to take to increase infrastructure investment, publicise these recommendations, and monitor countries performance in addressing them.
Setting priorities
The recommendation from the B20 — business representatives from G20 countries — is that G20 leaders should reaffirm the critical importance of infrastructure and set infrastructure investment targets for 2015–19.13 As noted, G20 leaders have repeatedly emphasised the importance of infrastructure investment at previous summits. Hence a lack of affirmation regarding the importance of infrastructure investment does not appear to be evident. While it may be standard practice for private companies to set targets for investment spending, it may not readily translate as an efficient method to spur increased quality infrastructure investment.

The challenge facing governments is not only to improve the quantity of infrastructure investment but also to improve the quality of such investment and the efficiency with which infrastructure services are used. The danger associated with countries making commitments at an international forum to lift infrastructure investment by a certain proportion of GDP by a set date is that the focus will be on the quantum of spending rather than the quality of such spending. Often, there is also political pressure for large infrastructure projects at the expense of periodic maintenance and of small-scale options that could postpone or even avoid the need for more costly asset expansions.

As noted, selecting the right infrastructure projects is the highest priority facing countries. The B20 have recommended that all G20 countries should establish, publish and deliver credible national infrastructure pipelines that have been rigorously assessed and prioritised by independent national infrastructure authorities which take full advantage of private sector finance and expertise.14 Governments generally take the lead role in infrastructure development. This is often to ensure equitable access to infrastructure services, to counter market failures, or for historical and cultural reasons. While Australia has a degree of independent assessment over infrastructure investment through the operations of Infrastructure Australia, the concept of an authority that is independent of the government with the mandate to select and prioritise infrastructure projects may not be acceptable in all countries. In addition, what constitutes ‘independence’ may be a variable concept when applied internationally. In addition, the cost-benefit analysis associated with selecting infrastructure projects is different from the financial analysis of investment undertaken by firms. The cost-benefit assessment for infrastructure has to be broad and take into account social, distributional and environmental considerations. These are ultimately matters for which governments have to take responsibility.

The key requirement to improve infrastructure planning and project selection, along with management and operation, is transparency. In many respects, it does not matter who undertakes project assessments, provided that all of the factors which are taken into account in making a decision are fully disclosed and available for public scrutiny. The international community can make a positive contribution to advancing infrastructure investment if forums such as the G20 emphasise the importance of making the selection of infrastructure projects fully transparent, as this would help not only improve the quantity but also the quality of infrastructure investments.

Sharing best practice
While country circumstances may differ and policies need to be tailored to domestic conditions, many of the challenges which countries face in increasing infrastructure investment are similar and much can be gained from sharing experiences and seeking best practices. Towards this end, the B20 have advocated the establishment of a Global Infrastructure Hub that would have a mandate to collect and disseminate leading practice, collaborate with key stakeholders on project preparation and capacity building, and design and promote appropriate standards.15

The international community can make a positive contribution to advancing infrastructure investment if forums such as the G20 emphasise the importance of making the selection of infrastructure projects fully transparent, as this would help not only improve the quantity but also the quality of infrastructure investments.
The argument is that while there is a wealth of information and support on leading practices available globally, it is fragmented and seldom integrated into decision-making processes and practices. However, the B20 have not indicated who would finance such an infrastructure hub, beyond saying that it should be adequately resourced and draw on professionals with private sector experience.

An existing major source of infrastructure experience is the multilateral development banks (MDBs), such as the World Bank, and regional development banks, such as the Asian Development Bank. When originally established, the main function of these banks was the provision of infrastructure, although the MDBs pulled back from supporting infrastructure investment following criticism of the social and environmental impacts of some projects along with demands for increased expenditure on areas such as health and education. The MDBs are in the process of increasing their support for infrastructure investment and they can make a significant contribution by better coordinating the technical expertise that they have assembled over many decades.

The World Bank Group has announced that it is establishing a Global Infrastructure Facility with the aim of making better use of the World Bank’s resources to leverage additional financing for infrastructure, progress active partnerships with other development banks and be a focal point for integrated technical and advisory assistance to infrastructure development. While it is proposed that this new infrastructure facility be housed in the World Bank, its governance arrangements are yet to be finalised. It will be important to ensure that any proposed Global Infrastructure Hub does not attempt to duplicate the activities of the multilateral development banks in coordinating their infrastructure expertise. Also, given that the extent of the involvement of development banks in infrastructure investment and the depth of their expertise, it would be preferable for the G20 to support efforts at helping to coordinate the existing international institutions, including injecting more private sector expertise into their operations, rather than attempting to establish a new global infrastructure body.

Facilitating private infrastructure financing

The B20 have highlighted that there is no shortage of private capital that could potentially be deployed to finance global infrastructure. The challenge is getting the right policy settings in place to access the full potential of this pool of capital. As noted previously, a key component of facilitating a favourable investment environment is ensuring that there is policy certainty, particularly with respect to regulatory, legal and tax policy.

The B20 also note that risk sharing between the government and the private sector should be seen in the context of value for money (as part of a cost-benefit analysis). Public-Private Partnerships (PPPs) are often presented as the key to gaining greater private sector financing of infrastructure investment. However, whether a PPP makes sense almost exclusively depends on the economic characteristics of the infrastructure, not on the way it is financed or funded. The international community and the international institutions should advocate that a decision to use private financing through a PPP should depend on whether it would result in lower production costs, better maintenance, and a higher level of service than if the investment were financed totally by public funds.

An area where it is important to ensure that there are no unnecessary impediments to preventing the flow of private financing into infrastructure is through international regulatory standards. For example, the provision of project financing and long-term financing generally will be affected by the Basel III rules on capital and liquidity requirements. These rules are an important component of ensuring stability in financial markets but it is important that they do not unnecessarily inhibit the flow of finance to support needed investment. One area of concern that has been identified by the B20 is that the imposition of high capital charges for long-term assets held by insurers may unnecessarily reduce their incentive to investing in infrastructure debt. This is an issue that the G20 and Financial Stability Board need to keep under review.
The role of Multilateral Development Banks in supporting developing countries

Strengthening the MDBs to enable them to play a significant role in supporting infrastructure investment in developing countries should be a priority area for an international forum such as the G20.

As noted previously, promoting infrastructure investment has traditionally been a core role of the MDBs although, over the past two decades, the infrastructure mandate has lost relative weight in their operations. Given the broader set of priorities now confronting the MDBs, it is even more important that their engagement in fostering infrastructure investment is as efficient and effective as possible. ‘Additionality’ should be the key test to determine how and where the MDBs can meaningfully contribute to promoting infrastructure investment. This means that the MDBs should not be involved in supporting an infrastructure project if it would have gone ahead without their involvement.

The MDBs’ support for infrastructure investment can be through the direct provision of finance as well as facilitating access to other sources of finance by providing an official ‘stamp of approval’ that comes with their involvement. The MDBs can also provide an indirect role in fostering infrastructure investment by helping to improve the underlying investment conditions, for example, by providing technical assistance in areas such as capital markets development, governance and regulation. In addition, as already mentioned, the MDBs are an important source of technical expertise in areas such as project design and implementation, and accountability standards.

For MDBs to pass the test of ‘additionality’ in supporting the infrastructure needs of developing countries, their lending should be concentrated on low- and lower-middle-income countries that lack other funding options. The MDBs can further increase the productivity of their lending by reinforcing efforts to more strongly embrace financial innovation. Their role in providing technical assistance would benefit from a strong integration between the infrastructure agenda and efforts to combat climate change and promote inclusive development. Given the enormous challenges in terms of infrastructure investment, particularly in developing countries, an efficient and effective MDB system is of utmost importance. As such, a key focus of forums such as the G20 should be on strengthening the role of the MDBs and ensuring that they have the capacity to effectively promote productive and sustainable infrastructure investment in developing countries.

Conclusion

Increasing infrastructure investment is a major challenge facing many countries, both advanced and developing. The factors that will determine whether there is the required increase in investment are largely in the hands of each government. But international cooperation does have a role to play. In particular, to the extent that there is a collective increase in investment, there will be significant positive spillovers and the combined impact on global growth will be larger than if each country operated independently. Moreover, international forums and institutions can help identify and monitor the steps that each country must take to increase investment. The international organisations also play an important role as a source for sharing knowledge and assisting with capacity building. In addition, forums such as the G20 should ensure that the MDBs have the capacity to assist developing countries in meeting their infrastructure requirements.
Notes

1. Australia 2014 G20, Investment and Infrastructure, available at www.g20.org/g20_201_agenda/investment_and_infrastructure
5. G20, 2012, G20 Los Cabos Declaration, Los Cabos.
10. IMF, February 2014, Global Prospects and Policy Challenges, Washington DC, USA.
11. IMF, April 2012, 2012 Article IV Consultation Staff Report, Washington DC, USA.
CHALLENGES AND TOOLS FOR Determining Public Infrastructure Projects and Priorities

EMILY POOLE and CARL TOOHEY

Governments, in their enthusiasm to expand investment in infrastructure, are keen to promote new models for financing public infrastructure. This focus on how to finance an infrastructure project presumes that a decision has already been taken that the investment is the best use of limited resources. We argue that policy makers should in the first instance aim to identify public infrastructure service needs, an appropriate role for government in meeting them, and priorities for public investment. These decisions are far from straightforward. However, given the scale and long-term nature of public infrastructure and the multitude of ways it can affect economic and social activity, there are significant benefits to be realised (and costs to be avoided) from getting these threshold decisions right. The central economic question then becomes how a project can be delivered most efficiently, including which financing mechanisms ought to be used. This paper examines the appropriate role of government in identifying and prioritising infrastructure projects which best meet public infrastructure service needs.

What is ‘public infrastructure’?
‘Public infrastructure’ can be defined as infrastructure in which government has the primary role and responsibility for determining whether and how such infrastructure is provided and funded in the interests of the broader community. The economic rationale for government intervention is that socially beneficial infrastructure (that which delivers net social benefits) would otherwise be underprovided by the private sector. This may arise, for example, where services exhibit public good characteristics (i.e. are non-excludable and non-rival in consumption), network effects and/or positive externalities, or where a facility has natural monopoly characteristics. Governments may also become involved to address social or equity objectives (though from an economic efficiency perspective, such interventions should still pass a social net benefit test).

The case for government intervention based on market failure should be properly balanced against risks of government failure. A number of studies have explored the scope for government intervention to create inefficiencies, not least because of an absence of commercial disciplines, and distorted or absent market signals. Indeed, this has become a primary reason for increasing the involvement of the private sector in public infrastructure provision under a variety of different models (Krueger 1990; Winston 2006). All approaches involve efficiency trade-offs that need to be assessed on a case-by-case basis.

Challenges in identifying the ‘best’ projects
Estimates of infrastructure ‘gaps’ or ‘deficits’ are prevalent in the policy discourse on infrastructure (for example, OECD 2006; Dobbs et al. 2013), and might indicate a need for new and continued investments in infrastructure (either private or public). However, such estimates should not substitute for effective processes to ensure that public infrastructure service needs are properly identified, the appropriate role for government determined, and the highest value projects selected for public funding. Poorly chosen projects run the risk of diverting resources from more socially productive activities. Challenges in identifying the best projects include the prevailing institutional and governance arrangements, the lack of a market mechanism to signal demand, the sheer range of options available and the network nature of many infrastructure projects.
The link between infrastructure investment and broader macroeconomic indicators, such as growth and productivity, has been extensively considered and debated in the literature. However, there is widespread agreement that the institutional and governance arrangements applying to public infrastructure influence the quality of decisions about project selection (PC 2014; Woetzel and Pohl 2014). The importance of good process is demonstrated in a recent paper by Gupta et al. (2014). In the paper, project selection and implementation processes were identified as important factors affecting the marginal productivity of both public and private infrastructure.

An ongoing challenge for governments is meeting or striving for ‘best practice’ institutional and governance arrangements. This policy goal applies whether government is the investment:

- decision maker (allocating public funding to a publicly owned project)
- facilitator (setting the overarching policy and regulatory framework), or
- partner (establishing a public-private partnership).

Poor governance, combined with vested interests, rent seeking, principal-agent problems, and the political process, can result in poor, uncoordinated decisions about project design and selection (Robinson and Torvik 2005; Keefer and Knack 2007; PC 2014). Identifying the best projects is especially challenging for public infrastructure services where there is no market mechanism, such as a commercial price signal or profitability, to signal future needs, consumer willingness to pay, or the need for capacity adjustments (or there are constraints on an operator’s ability to vary prices to test these matters). For example, the lack of direct user charging for most roads or cost-reflective pricing for many public transport systems means governments must rely on other tools to judge the case for capacity expansion.

Even when the need for an infrastructure service or its expansion has been identified, there is potentially a wide range of options to address this need in the short or long term, creating challenges for governments in selecting between investment options of different nature, size and scale (Banks 2008). Options might include more efficient use of existing infrastructure or policy/regulatory changes to facilitate efficient private sector investment. For example, overcoming barriers to the adoption of new technologies, such as adjustable lane technologies for roads, has been identified as a way of improving efficiency and extending the life of existing infrastructure assets (Winston 2014). In Australia, the Productivity Commission has observed that pricing policies and regulation have created incentives for underinvestment in the urban water sector and overinvestment in electricity transmission infrastructure (PC 2011, 2013).

Further complicating matters, the network nature of many public infrastructure assets means that investment in one element of the system could have important system-wide impacts. Network externalities need to be considered in the planning process, as do other interdependencies, such as disruptions during construction phases and the competition for scarce construction resources. For larger projects in particular, the effective sequencing of investments might offer economies of scope or avoid higher per unit costs due to capacity constraints.

**Challenges in prioritising the ‘best’ projects**

Investments in public infrastructure are typically made in the presence of real resource and funding constraints. Therefore, it is relevant to consider not only the costs of planning, building and operating the infrastructure, but also the opportunity costs of raising taxes or diverting public funds or resources from other uses. This highlights the importance of prioritising the best projects once infrastructure needs have been identified. Challenges in prioritising the best projects include the appropriate use of cost-benefit analysis, avoiding inappropriately favouring large projects, and considering how the scope for user charges might affect prioritisation.
Robust social cost-benefit analysis is not straightforward

Cost-benefit analysis is used in many countries as an assessment tool to help guide and improve public sector appraisal and prioritisation of public infrastructure projects. However, putting together a rigorous social cost-benefit analysis of all relevant infrastructure investment options is rarely a straightforward exercise. Public infrastructure investments typically involve both positive and negative spillovers that can be difficult to identify or quantify. There is often debate about key inputs to the analysis, such as which costs and benefits should be included (including how wider economic and social benefits should be handled), treatment of risk and uncertainty, and the choice of discount rate. Decision makers are also often confronted with ‘optimism bias’ in estimates from project proponents (Flyvbjerg 2009).

The quality of, and weight given to, cost-benefit assessments can also vary widely (Ergas and Robson 2010; Mackie 2010; Pickford 2013). Some governments have attempted to address these challenges by establishing ‘best practice’ standardised frameworks and guidelines for the use of cost-benefit analysis. For example, in Australia, the Department of Finance provides a Handbook of Cost-Benefit Analysis (DOFA 2006). Many texts and studies also provide important insights for the application of social cost-benefit analysis assessments to public decision making in general, and the various pitfalls that have befallen assessments in the past (Layard and Glaister 1994; Mishan and Quah 2007; Boardman et al. 2010; PC 2014).

Selecting between large and small projects

There is a risk that in some circumstances decision makers may have incentives to prioritise, or proponents will advocate, larger ‘iconic’ public infrastructure projects at the expense of smaller projects or the more efficient use of existing infrastructure (Flyvbjerg et al. 2003; Ergas and Robson 2010; PC 2014). However, ensuring that the public gets the best value does not necessarily mean prioritising major public infrastructure projects. For example, Dobbs et al. (2013) cite estimates that the average benefit-cost ratio (BCR) for ‘traditional’ road capacity is 2.7, while that for the use of intelligent traffic management is 14 and that for optimised traffic signals is 17. Infrastructure Australia’s latest National Infrastructure Priority List also indicates that ‘smaller’ projects (by estimated capital value) often have higher forecast BCRs (Infrastructure Australia 2013).

Further, where investments involve considerable risk and uncertainties, it can be beneficial for governments to evaluate the ‘option value’ of delaying a large and substantially irreversible commitment of capital until more information becomes available and/or making smaller-scale investments in the short term to retain longer term flexibility (Dixit and Pindyck 1994). Where appropriate, these types of options can be evaluated using a ‘real options’ approach to ex ante investment appraisal, and as an augmentation to a robust cost-benefit analysis (PC 2014).

The funding task — gap between user charges and costs

In the presence of government funding constraints, another relevant issue in thinking about the application of cost-benefit analysis and prioritisation of projects is the size of the ‘gap’ between user charges and the total costs of a project. For public infrastructure, the larger this gap the greater is the funding task of governments (i.e. from tax revenue). There is an important distinction between the ‘funding’ and ‘financing’ of infrastructure. Funding is how the total investment costs, such as capital costs, are repaid over time — either through users, other beneficiaries or taxpayers (IFWG 2012; Maddock 2013). Funding also involves meeting the ongoing operating costs, including maintenance, where there can be a trade-off between investment at the construction phase and costs during operation. Financing is raising money upfront to pay for the capital costs, which usually involves the design, construction and early operational phases of a project, through debt or equity instruments of a public or private nature.

The size of the gap between user charges and total costs of a project might influence project selection and prioritisation. For example, where the government is concerned about debt and long-term budget pressures it could lead to decision makers favouring projects that are largely funded through user charges, that is, choosing low or no gap projects regardless of the overall costs and benefits. On the other hand, there might be limits and challenges to levying direct user charges in some public infrastructure sectors even where they can be justified on economic grounds (such as technical, institutional or policy barriers), or if user charging is in conflict with other government objectives.
Government tools available to promote high-quality decisions

Robust and transparent analysis
As discussed, the institutions and planning frameworks through which decisions about public infrastructure are made (including project selection and prioritisation) have an important bearing on the quality of decisions.

Entrenching rigorous and transparent use of cost-benefit analysis in the project appraisal process should improve the quality of, and impose discipline on, public infrastructure investment decisions (Ergas and Robson 2010). A well-constructed social cost-benefit analysis of all viable options for addressing a recognised need is an essential tool for identifying the best option. Transparency of the analysis is critical as this ensures that there is scope for independent audit or testing of the key assumptions underlying the analysis, improves stakeholder engagement, and ultimately should improve the quality of public investment decision making (Freebairn and Cordon 2013; PC 2014).

Transparency of the analysis is critical as this ensures that there is scope for independent audit or testing of the key assumptions underlying the analysis, improves stakeholder engagement, and ultimately should improve the quality of public investment decision making.

Expert scrutiny and independent advice
A notable development in some countries has been the establishment of specialist institutions to advise on public infrastructure decision making and project delivery. The specific role of these institutions, the extent to which they draw on private sector expertise, and their degree of independence from government varies in each case (Box A). Some (such as Infrastructure Australia) advise on matters relevant to the ‘project selection’ decision stage. Others focus more on project delivery issues once an investment decision has been made.

The capacity for specialist institutions to improve the quality of decision making has been recognised in some studies (as has their varied nature of success), particularly where they provide an added avenue to ensure independent scrutiny and greater transparency of project selection and prioritisation decisions (Armitt 2013; Freebairn and Cordon 2013).

**BOX A: Examples of specialist infrastructure advisory institutions**

Infrastructure Australia (IA) — A statutory body that advises the Australian Government on a range of infrastructure policy issues. As part of its role, IA evaluates nationally significant infrastructure proposals put forward for funding (including through reviewing the associated cost-benefit analysis (Infrastructure Australia 2014).

Infrastructure UK — A unit within the UK Treasury Department. Its main responsibilities are co-ordinating and simplifying the planning and prioritisation of investment in UK infrastructure, and improving UK infrastructure by achieving greater value for money on infrastructure projects and transitions. The unit is made up of civil servants and private sector commercial experts (HM Treasury 2014).

PPP Canada — Established as a federal Crown corporation, with an independent Board of Directors reporting through the Minister of Finance to Parliament. Among other responsibilities, it administers the P3 Canada Fund, which provides funding support to eligible P3 (PPP) public infrastructure projects (PPP Canada 2014).
Long-term planning and project ‘pipelines’
There is widespread agreement on the importance of governments developing and publishing national long-term infrastructure plans, with these plans often forming a core part of internationally accepted principles guiding public infrastructure financing (see OECD 2013 for a recent example). However, the case for whether these plans need to take the form of a list of specific projects with firm timelines (what is often referred to as a ‘project pipeline’) is less clear.

On the positive side, a national plan might assist in the forward planning of resources by identifying long-term priority areas and policy goals for infrastructure investment, and should assist in improving coordination between different levels of government and government agencies. They can also assist in addressing short-termism associated with the political cycle, and providing information to both the public and potential private investors. To achieve these aims, transparency is crucial, and there should be scope for the plan to be updated as infrastructure needs evolve.

On the negative side, focusing on publishing a pipeline of specific projects with defined timelines stretching out beyond the short-term might provide a false sense of certainty to private investors. More problematically, a pipeline might lock governments into projects that no longer provide the best value for money to taxpayers as new information becomes available. Ideally, private parties seeking to be involved in future public infrastructure projects should be able to combine the priorities in a national infrastructure plan with the results of the rigorous and transparent cost-benefit analyses of individual projects to ascertain what might be in ‘the pipeline’ (PC 2014). Such a pipeline would be both flexible and credible.

This high degree of transparency is the ideal. However, in practice, governments take a range of approaches in the level of detail provided on priority national infrastructure projects. This ranges from almost no information in the case of many low income countries, to the UK’s annually updated 100-plus page National Infrastructure Plan (which includes an assessment of infrastructure needs and strategic objectives, a ‘top 40’ list of priority investments and an estimate of the total infrastructure pipeline costs out to beyond 2021 (HM Treasury 2013)).

Consideration of cost-reflective pricing where appropriate
Where there are clear linkages between user benefits and costs, it is generally desirable from an efficiency perspective to link consumer’s willingness to pay with charges for use of the infrastructure. User charges provide signals for efficient use of infrastructure once deployed, can be used to test and signal the need for future capacity adjustments, and minimise (or even eliminate) the need for government funding (PC 2014). In addition, user charges, and the scope providers have to vary prices, can provide incentives for service innovation.

In considering the design and implementation of user charges, decision makers must consider other relevant trade-offs, such as the transaction costs of implementing and administering pricing systems, and other relevant policy, regulatory or legal impediments. Moreover, in some instances structuring user charges based on the full recovery of costs may conflict with other economic and social policy objectives of providing the infrastructure. For example, a rationale often put forward for subsidising public transport networks is as a second-best tool for reducing congestion on roads where user charges are infeasible (Parry and Small 2009; Button 2010).

Where the balance and design of user charges and other funding sources (taxes) affects the efficiency of the project (and measured benefits or costs) this is a relevant factor to feed back into the cost-benefit analysis process.

Conclusion
With a focus on the need for new infrastructure investment, infrastructure financing issues are high on the policy agenda in many countries. However, the merits of any investment should be properly considered before thinking about how to finance it. Further, the source of financing itself does not fundamentally alter the economics of a project. As such, a necessary threshold step is ensuring that public good infrastructure projects — that is, ones that generate the highest net benefits to the community of all available options — are identified and prioritised by governments.
Undoubtedly, governments face a range of challenges in ensuring that the ‘best’ infrastructure projects are selected and prioritised. However, there are some clear best practice tools available to governments to ensure that scarce public resources are channelled towards the right projects at the right time. One of those tools is establishing or moving towards best practice institutional and governance arrangements. Another tool is conducting high-quality cost-benefit analyses that are made available for public scrutiny. These benefit from relevant expertise and independent advice and allow for consistent comparison of project options and projects across different sectors. The use of prices through user charges, where practically possible and economically justified, can also provide valuable signals on future infrastructure needs as well as providing incentives for more efficient use of existing infrastructure.

There are some clear best practice tools available to governments to ensure that scarce public resources are channelled towards the right projects at the right time.

These tools do have their own financial and non-financial costs on government, but these should be viewed as an ‘investment in investment’, much like a private firm conducting due diligence before undertaking an investment on behalf of its owners.

Notes
1. This article draws heavily on Poole, Toohey and Harris (2014), a paper presented at a March 2014 conference on ‘Financial Flows and Infrastructure Financing’ jointly sponsored by the Lowy Institute for International Policy, Productivity Commission and Reserve Bank of Australia.

2. The authors of this paper are Emily Poole, International Department, Reserve Bank of Australia and Carl Toohey, Senior Research Economist, Productivity Commission. Views expressed in this article are those of the authors (Poole and Toohey 2014) and not necessarily those of the Reserve Bank of Australia or Productivity Commission. Use of any results from this article should clearly attribute the work to the authors and not to the Reserve Bank of Australia or Productivity Commission.

3. Literature reviews by Romp and de Haan (2005) and Straub (2008) indicate that although some studies find that infrastructure investment has a high positive impact on growth, others find negative or zero returns, and significant empirical challenges remain (not least the direction of causality). A recent working paper finds only a weak positive association between investment spending and growth, and lagged impacts are not significant (Warner 2014).

4. Brealey et al. (2014) describe options to modify projects — delay, make follow-on investments, abandon or vary output — as ‘real options’ and note that the opportunity to make such decisions adds value whenever project outcomes are uncertain. An extensive literature on the development and use of ‘real options’ analysis in a wide range of contexts has developed over the past 20 to 30 years.

References


Infrastrucure Australia 2013, ‘Infrastructure priority list update — December 2013’.


Pickford, M 2013, ‘State highway investment in New Zealand: The decline and fall of economic efficiency’, *Policy Quarterly*, vol. 9, no. 3, pp. 28–35.


LONG-TERM INVESTMENT IN INFRASTRUCTURE and the Demand for Benchmarks

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In this paper, we argue that long-term investment in thinly traded assets like infrastructure projects increases investors’ demand for investment performance monitoring, which also increases the need for new performance measurement tools. Long-term investment benchmarks are critical in order to match the supply and demand of long-term capital, improve asset allocation outcomes for investors and support the development of the economy. We highlight significant methodological challenges to the development of performance measures that are both useful to long-term investors and prudential regulators, and consistent with modern asset pricing theory, and we propose several directions for new research.¹

Matching the huge demand for capital in infrastructure projects around the world with the available supply of long-term funds by institutional investors, be they pension funds, insurers or sovereign wealth funds, has never been so high on the international policy agenda. This momentum, illustrated by the recent focus on long-term investment in infrastructure by the G20, coincides with the steadily growing investment appetite from the same investors for unlisted and illiquid assets. However, fully fledged investment solutions demonstrating the benefits of long-term infrastructure investment for institutional investors remain elusive and documenting the investment characteristics of these assets has become a pressing issue.

Increasing asset allocations to long-term investment in infrastructure requires that investors know what risk and performance to expect over time and in different economic environments, and that regulators understand what risks investors are taking. As a consequence, benchmarking the expected behaviour of long-term infrastructure investments is necessary to allow investors to fully integrate these assets into their asset-liability management strategies, and calibrate the risk-based regulatory frameworks that make these investments possible (or not) for large institutional investors. The information created with such benchmarks would be instrumental in helping to match the supply and demand of long-term capital.

Still, the need for benchmarks of long-term investment in infrastructure may seem incongruous at first. After all, infrastructure projects are lumpy and highly idiosyncratic endeavours. If every project is different, what can investors learn from a benchmark?

However, in modern finance, asset allocation is not about picking individual investments, but instead focuses on investing in groups of reasonably homogenous assets giving access to remunerated risk factors. The performance of each of these groups can be evidenced by a benchmark.

Indeed, long-term investment in infrastructure assets is related to a broader trend among institutional investors towards: improving portfolio diversification or seeking higher returns through alternative investments; investing increasingly outside of public capital markets, to find sufficiently long-dated instruments with a more attractive performance than government bonds; and investing in inflation-linked securities other than low-yielding Treasury Inflation Protected Securities (TIPS). One of the key features of these emerging investment choices is the decision to buy assets that are infrequently traded and to hold them until maturity.

One of the key features of these emerging investment choices is the decision to buy assets that are infrequently traded and to hold them until maturity.
In the absence of long-term investment benchmarks, the growing interest of investors for infrastructure investment has been motivated by what we call the ‘infrastructure investment narrative’ (Blanc-Brude 2013), i.e. the notion that infrastructure projects uniquely combine the following characteristics:

- low price-elasticity of demand for service, hence low correlation with the business cycle
- monopoly power, hence pricing power, hence an inflation hedge
- predictable and substantial free cash flow
- attractive risk-adjusted cash flows, available over long periods
- access to unlisted, illiquid financial assets.

That is, investing in infrastructure implies:

- improved diversification
- better liability-hedging, including inflation protection
- less volatility than capital market instruments.

Of course, this narrative is in fact a model, i.e. it describes the expected characteristics of the average infrastructure project. Individual projects in specific jurisdictions, relying on one or other form of contractual or regulatory arrangement, may only have some or none of the above characteristics.

Today, the infrastructure investment narrative is the only available ‘benchmark’, albeit one that does not rely on any empirical observations, for investors considering investing in infrastructure and who need to form return expectations and make allocation decisions.

A quantitative analysis of the above narrative has now become necessary to help answer investors’ most basic and pressing question: is the decision to invest in illiquid infrastructure debt or equity a relevant one from an asset allocation perspective?

In what follows, we discuss why long-term investment in thinly traded assets like infrastructure projects increases investors’ demand for investment performance monitoring and how recent developments in asset management practices — in particular the rise of the so-called Canadian model — suggest that this demand is not being met by investment service providers. We argue for the creation of dedicated benchmarks for long-term investment in infrastructure and discuss some of the methodological challenges to develop performance measures that are both useful to long-term investors and prudential regulators and consistent with modern asset pricing theory. We also highlight a way forward in the conclusion.

Long-term investing and the demand for monitoring

The intertemporal monitoring demand

Long-term investment can be defined in terms of investor horizon or instrument characteristics. Long-term investors intend to hold securities over multiple trading periods, possibly until maturity. Long-term instruments are characterised by the unavailability of a fair instantaneous payoff: trades are infrequent and investing requires patience. Unlisted infrastructure investment thus requires both long-term investors and instruments.

Long-term investment also leads to an increase in the demand for monitoring on the part of investors. Two motives explain this intertemporal monitoring demand: first, the opportunity to improve firm performance as an active shareholder with a long-term horizon; and second, the difficulty of measuring and benchmarking the performance of infrequently traded assets.

Recent research on the impact of longer investment horizons on monitoring demand with frequently traded assets allows us to isolate the two motives. In public markets, investors have a choice between monitoring and trading (Shleifer and Vishny 1986). Long-term ownership is expected to create incentives to engage in corporate monitoring and thus to specialise more in monitoring than in trading. Chidambaram and John (1998) argue that a long-term investment horizon creates incentives to improve shareholder value by imposing disciplinary mechanisms
on managers to align their interests with shareholders, and leads to ‘relationship investing’. Chen et al. (2007), Elyasiani and Jia (2008, 2010), Elyasiani et al. (2010) and Attig et al. (2012) among others, find that concentrated holdings by independent institutional investors with a long-term horizon leads to increased monitoring and is related to better public firm performance.

Thus, investors’ demand for firm monitoring is an increasing function of their investment horizon. But if long-term equity investors tend to be active shareholders, they are also passive investors whose asset allocation decisions require forming long-term expectations about risk and returns, i.e. investment benchmarks. In the case of frequently traded assets, market prices provide the basis for the formation of these expectations. In effect, private monitoring efforts by large block holders contribute to market efficiency, since they also benefit other stockholders. In turn, the market also provides monitoring benefits to long-term investors by processing information that is not available privately (see Holmström and Tirole 1993 for a discussion).

Likewise, investing in infrequently traded assets requires a longer investment horizon, hence it is a de facto asset allocation decision for investors. However, without the feedback of market prices, the formation of long-term expectations about risk and returns is less straightforward. It follows that long-term investment in unlisted assets must further increase investors’ monitoring demand. In effect, meeting investor’s demand for the continuous monitoring of the performance of unlisted firms determines the extent to which they are able to invest in such assets. First, because a better understanding of performance is necessary to achieve effective and efficient allocations, but also because inadequate performance measurement leads to a regulatory dead-end: when faced with unknown quantities, prudential regulation penalises long-term unlisted bets, further distorting allocation decisions.

Hence, for investors to make substantial investments in unlisted firms, such as infrastructure equity or debt, they have to be in a position to make a strategic asset allocation decision and this, in turn, requires ongoing performance monitoring of comparable assets because of the lack of market price feedback.

**Unlisted equity and the failure of delegated monitoring**

Selecting and monitoring unlisted, illiquid firms also requires specialist knowledge and should typically lead investors to delegate this process to investment managers.

Unfortunately for long-term investors in infrastructure, the current delegation model inherited from the private equity fund sector mostly fails to respond to their intertemporal monitoring demand. Existing research on PE performance overwhelmingly concludes that the self-reported net asset values (NAV), internal rates of return (IRR) and investment multiples reported by PE managers are both inaccurate and inadequate.

Inaccuracy springs from the tendency of PE managers to report their performance opportunistically (see Jenkinson et al. 2013 for a recent study). Meanwhile, PE performance metrics are inadequate. In their comprehensive critique of the performance monitoring of typical private equity funds, Phalippou and Gottschalg (2009) find that pooling individual investments and funds’ IRRs also creates misleading results because IRRs cannot be averaged. The authors also find a large negative correlation between duration and performance in private equity funds, which, combined with the incentive to time cash flows strategically, tends to create an upward bias in reported performance and creates incentives to exit investments quickly. Likewise, Jenkinson et al. (2013) find that current reported IRRs are poor predictors of the ultimate returns of PE funds.\

Self-reported IRRs and multiples are also grossly inadequate for the purpose of asset and risk management, in particular making any long-term asset allocation decision. As long as PE was a subplot of the alternative investment space, the absence of a clear benchmark did not stop investors from committing funds to such ‘absolute return’ strategies. However, the growing interest in unlisted assets like infrastructure among large institutional investors with long investment horizons now raises the important need to determine unlisted equity performance.
The end of delegation?

With unsatisfactory performance measurement and monitoring by PE managers as well as potentially misaligned reporting incentives, a number of large institutional investors no longer make long-term investments in unlisted firms and instead internalise the function of acquiring and managing infrequently traded assets such as real estate, industrial firms (which is still often called ‘private equity’) or infrastructure. Today, this tendency to invest directly in illiquid assets is most pronounced among Canadian pension funds, a few large European pension funds and sovereign wealth funds.

In effect, the largest investors have resorted to internalising the investment and monitoring functions necessary to access and benefit from unlisted equity. This is because long-term investment in unlisted firms leads to significantly increased demands for performance monitoring, and the PE industry has been mostly incapable of or unwilling to provide better monitoring to investors, particularly the kind of performance measure that would be meaningful from an asset allocation perspective.

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However, this is not necessarily an improvement. Task delegation to a specialist agent should be efficiency improving, and because information asymmetries between investors and managers can be so large that they can destroy all the benefits from delegation, many investors have decided to exit delegated PE altogether. Nevertheless, internalising creates other costs, in particular, as discussed by Blanc-Brude (2013), it can be difficult to create a well-diversified portfolio of large illiquid assets such as infrastructure project equity. Moreover, this approach is only available to very large investors, who can bear the cost of deal sourcing and the ongoing management of their portfolio companies.

Faced with a retreat from such large accounts as the Canadian pension industry, why are PE managers not offering to improve their monitoring and reporting so that investors can benefit from delegation while making well-informed asset allocation choices?

One explanation is that in a world where some PE managers are capable of making the costly effort to deliver high quality services and others are not, if information asymmetries between investors and managers are sufficiently large, both types of managers tend to ‘pool’ together, offer only the low effort service and charge the same high fees.4

Nevertheless, some managers are already evolving towards new private infrastructure equity fund models allowing investors to gain the kind of longer-term exposure they require. Moreover, the tendency for institutional investors to create large or very large unlisted equity allocations is a recent development and the need to monitor and benchmark performance has only recently become more pressing.

But the failure of the PE industry to provide satisfactory monitoring for large investors is also a collective action problem: most of the necessary information is privately disseminated, and data collection, when it exists, is very ad hoc, i.e. it is not designed to answer investors or regulators questions. While PE managers could be more transparent and aim to provide performance measures that are more relevant to long-term investors, taken individually, none of them has access to enough information to answer the long-term infrastructure asset allocation question.
Building long-term infrastructure investment benchmarks

Objectives

The objective of building long-term investment benchmarks is simply to create the performance measures that investors and regulators need. This includes measures of expected return that reflect the dynamic nature of infrastructure projects’ risk profile, adequate risk measures for portfolio management, including conditional value-at-risk, and measures of correlations between assets and between a basket of infrastructure investments and other asset classes.

Today, none of these measures is available to long-term investors in infrastructure. Indeed, creating relevant performance measures is not without difficulties. We discuss two of the most significant ones below.

Two challenges

Building a performance measurement framework of unlisted infrastructure project equity stakes must address two important challenges: the absence of large samples of empirical observations; and the absence of a unique pricing measure.

The absence of market prices

Two types of data can be used to value financial assets: transaction prices or cash flows. Transaction prices have an intuitive appeal since they are expected to embody the cumulative value of a stream of dividends discounted at the required cost of equity.

However, in the case of long-term equity investment in infrastructure projects, transaction price data is mostly unavailable: we can observe the initial investment decision of equity holders when new project companies are created, which may be interpreted as a price signal corresponding to a given expected dividend cash flow. However, unlike other types of unlisted investment such as venture capital, infrastructure project companies seldom lead to multiple financing rounds and even less frequently to IPOs.

Secondary market sales of infrastructure project equity do occur, but in a context where such assets are mostly held to maturity by long-term investors, they are relatively rare and observing secondary sales of infrastructure project equity stakes is unlikely to yield representative samples of asset prices.5

Indeed, if we were to estimate the determinants of private infrastructure equity prices empirically, we would like to control for different project-level risk factors explaining the average difference in price between projects (i.e. the cross-section of prices), as well as the change of risk profile that we expect to see in standalone projects, characterised by both deleveraging and the sequential resolution of uncertainty across their lifecycle (i.e. times series of prices). Observing representative samples of secondary market equity prices would require enough data at each point in the 20- or 30-year lifecycle of infrastructure projects in each annual investment period. Thus, any observable sample of secondary market infrastructure equity prices is likely to be affected by severe biases.

The absence of a unique pricing measure

The absence of a unique price for a given investment in unlisted infrastructure springs from the fact that there is no traded equivalent to the payoff of infrastructure project equity or debt. If a portfolio of traded assets, which are uniquely priced in (weakly) efficient markets, can be built so that it always replicates the payoff of unlisted infrastructure instruments over their multi-decade lifecycle, then unlisted infrastructure assets can be uniquely priced (assuming no arbitrage).

If, however, this is not the case, then all or part of the required return on equity for a given unlisted infrastructure project is a function of investor preferences for risk, duration, inflation hedging etc., and there is no unique pricing measure (the law of one price does not apply).
With incomplete markets, since some assets are not fully spanned by traded securities, individual investors can arrive at different valuations of the same asset. The proportion of returns that cannot be explained by traded factors may thus lie within a range of expected returns or discount rates, determined by individual investors preferences. From this perspective, the often-mentioned illiquidity premium expected by investors in unlisted assets need not be unique. While relatively illiquid but traded instruments can yield a unique illiquidity premium, unlisted assets may command a different illiquidity premium for different types of investors. Thus, large bid/ask spreads may persist for investments in private infrastructure projects.

**Solutions**
Addressing these issues requires new research involving both academia and the financial industry.

**The need for cash flow models**
Today, limited infrastructure project dividend data have been aggregated. They are scattered among numerous private investors, and little or no effort has been made to construct a database of these cash flows. Building this database is a necessary step towards properly documenting the expected value and volatility of dividend cash flows in infrastructure equity stakes.

Nevertheless, it must noted that even with such a database, empirical observations about infrastructure equity cash flows will remain truncated in time and limited in the cross-section.

First, observed dividend time series are incomplete: by definition, the immense majority of infrastructure projects currently investable are far from having reached the end of their lives. Hence, most of these cash flows remain in the future for which very little, if any, comparable investments currently exist. Indeed, in the cross section, the type of infrastructure projects that have been financed in the past has changed and is not necessarily representative of investment opportunities today.

Thus, even if year-23 dividends for projects that were financed 24 years ago can be observed today, they may not be good predictors of dividends in projects financed three years ago, 20 years from now. For example, projects financed in the early 1990s may have been in sectors where fewer projects exist today (e.g. telecoms) or rely on contractual structures or technologies that are not relevant to long-term investors in infrastructure today (e.g. coal-fired power).

Data paucity is an endemic dimension of our valuation problem, i.e. we must start from the premise that we cannot observe enough data to simply derive prices empirically. Instead, we have to acknowledge a position of relative ignorance and aim to build into our approach the possibility of improving or updating our knowledge as new observations become available.

Hence, implementing a valuation framework for long-term investors in infrastructure equity requires combining observable investment decisions with a model of expected cash flows and conditional volatility, i.e. a model, or series of models, capturing what we can know about the distribution of infrastructure project dividends today, and the best available approximation of what we do not know.
Bayesian inference for long-term investment

If data paucity is an endemic feature of long-term investment in illiquid, unlisted assets like infrastructure, then it ought to be integrated in the performance measurement framework. In particular, frequency-based estimation techniques are unlikely to produce robust results from truncated and severely biased datasets.

Instead, Bayesian inference provides a more powerful approach and can become an integral part of valuation and risk models when considering assets that can only be priced conditionally to available information today.

Investors and regulators should not have to wait for large samples of transaction prices or cash flows to materialise before considering what the characteristics of long-term investing in infrastructure might be. There may never be enough data.

Given the limited availability of project cash flow data, Bayesian inference can help optimise the use of available information about infrastructure projects, including how they are structured financially, which business models they correspond to etc., to build an ex ante view of the distribution of their dividends, i.e. our best guess before we can observe more data. Moreover, the option to update our knowledge, forces us to ask what data needs to be collected today and tomorrow, i.e. to standardise data collection.

Towards intersubjective pricing measures

Asset pricing is also an area in which new research is needed to better benchmark the performance of long-term investments.

Indeed, pricing measures may not be unique when markets are incomplete, but purely subjective approaches such as the expected utility or indifference pricing framework, while internally consistent, are limited because they does not take into account the possibility of ‘market review’ (Carr et al. 2001).

In other words, while the presence of incomplete markets warrants taking subjective valuations into account, the expected utility framework is strictly subjective, whereas the market dynamics of unlisted equity investments call for a more intersubjective understanding of price formation.

For example, if a new type of investor (e.g. less risk averse) enters long-term infrastructure equity market, the range of observable valuations may change. Likewise, if some investors want to increase their allocations to unlisted assets, given the limited available stock of investable infrastructure projects at a given point in time, their valuations will rise, but not that of others (who may sell). Finally, if infrastructure equity returns can gradually be better hedged using traded assets, then individual subjective valuations should converge towards a unique pricing measure.

Thus, while the price of a given unlisted infrastructure equity investment is unlikely to be unique and probably lies within a range that at least partly reflects investor’s subjective preferences, this range of values is not unlimited and must be bounded by the same investor preferences at one point in time.

The literature on pricing bounds and approximate arbitrage thus needs to be operationalised to allow capturing price ranges (for equivalent assets) at different points in time. Recent applications can be found in Blanc-Brude and Hasan (2014) and Blanc-Brude et al. (2014).
Conclusion: A roadmap

To conclude, much remains to be done to satisfy long-term investors’ and regulators’ increasing demands for benchmarking of infrastructure. In Blanc-Brude (2014), we highlight a roadmap of necessary steps towards the creation of such benchmarks.

At the underlying asset level, this roadmap first requires focusing on well-defined financial instruments used to invest in infrastructure projects (as opposed to ill-defined industrial sectors e.g. power, roads etc.). Next, adequate asset pricing models have to be designed that take into account data paucity and the absence of unique price measures upfront. Then, a parsimonious and realistic data collection standard can be determined and turned into a reporting tool for long-term investment infrastructure. Thanks to this standardisation effort, a central database of project cash flows can be created and maintained. Finally, at the portfolio level, different ‘building blocks’ representing individual exposures to infrastructure projects can be combined to design investment strategies in infrastructure and the performance benchmarks that correspond to them.

Notes

1. Financial support from NATIXIS, Meridiam Infrastructure and Campbell-Lutyens is acknowledged.
2. As opposed to a distressed sale.
3. Using fund IRRs also reveals a well-documented identification problem, i.e. the same cash flows may be returned to investors while individual assets have opposite betas and, if alpha is allowed to be positive, the identification problem only grows. In effect, direct IRRs comparisons requires making assumptions about the functional form of fund return distributions and on such assumptions being constant across time and between funds (Korteweg and Sorensen 2007).
4. This is a standard result of agency theory known as a ‘pooling equilibrium’ (see Laffont and Martimort 2002).
5. Secondary sales by private equity funds may also not be representative of ‘fair’ value when such sales occur between funds operated by the same managers.
6. For example, small cap stocks are less liquid than large caps and tend to command an illiquidity premium (see Amihud et al. 2013 for a recent international study).

References

Blanc-Brude, Frédéric, Hasan, Majid and Ismail, Omneia RH 2014, Unlisted Infrastructure Debt Performance Measurement, EDHEC-Risk Institute, Singapore.


