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7 An assessment of the social desirability of high-frequency trading
STEPHEN E SATCHELL
While much has been written on the vast topic of high-frequency trading (HFT), a great deal of the evidence has been contaminated by group self-interest. Furthermore, what constitutes a ‘good’ or a ‘bad’ is not clearly discussed. This paper presents an assessment of the costs and benefits of HFT and considers the more philosophical question as to what good or bad might mean here.

12 Is Australia HFT-friendly?
CAROLE COMERTON-FORDE
Stephen Satchell’s paper ‘An assessment of the social desirability of high-frequency trading’, in this issue of JASSA, examines the costs and benefits, and highlights some empirical evidence on the impact of HFT on market quality and welfare. Building on Satchell’s paper, this paper provides a perspective on HFT in the Australian market and identifies the factors influencing its attractiveness to HFT players. It also compares the US and Australian markets in terms of these factors to indicate the growth prospects for HFT activity in Australia.

15 Momentum returns to S&P/ASX 100 constituents
BRUCE VANSTONE, TOBIAS HAHN and GAVIN FINNIE
With mixed evidence to date on the performance of momentum strategies in Australia, this paper examines returns to momentum strategies for constituent companies within the S&P/ASX 100, focusing on practical, realisable investment strategies. We find that momentum is both present and obtainable, and has been a persistent feature of the S&P/ASX 100 since its inception, including throughout the global financial crisis.

19 Papers from the Melbourne Money and Finance Conference 2012
Finsia acknowledges the contribution of the papers from the 17th Melbourne Money and Finance Conference to this issue of JASSA. The conference — Recent Developments in Financial Regulation: An Assessment — was held in July 2012 by the Australian Centre for Financial Studies.

20 Financial regulation in Australia since the GFC
IAN BECKETT
Post GFC standard-setting work has focused on financial stability and prudential supervision. In many respects, the impact of post-financial crisis global regulatory developments on Australia’s framework of financial regulation has been evolutionary rather than revolutionary. Generally, we have not seen calls for the type of major changes that are being implemented in some other jurisdictions. While our existing framework is likely to undergo further refinement over time, we already have many of the key attributes identified by the Financial Stability Board.
Financial regulation and A$ liquid assets
ALEXANDRA HEATH, MARK MANNING and GREG MORAN
This paper examines the existing and prospective demand for Australian dollar-denominated high-quality liquid assets and considers the supply of assets that are available to meet these various needs. It also canvasses the options available to private market participants and policy makers, respectively, to alleviate any possible adverse implications for the smooth operation of financial markets.

Liquidity buffers of Australian-owned ADIs
JOEL GRANT
Liquidity risk has many characteristics prompting the need to manage the exposure via a liquidity buffer. The objective of this paper is to build on the scarce empirical evidence surrounding the determinants of authorised deposit-taking institutions (ADIs) liquidity buffers. Of particular interest is the question of how macro-economic and ADI-specific factors influence Australian-owned ADIs’ holdings of liquid assets.

Liquidity regulation: lessons from New Zealand
DAVID TRIPE SF Fin and JINYUE SHI
This paper examines the effects of the new liquidity ratios implemented in New Zealand with effect from 1 April 2010. It finds that the introduction of new rules designed to force banks to reduce their exposure to funding risk has been associated with greater use of retail funding and a lengthening in the maturity of funding. Both of these results are consistent with expectations.

Disclosure of superannuation fund holdings: what would be best?
ALEX ERSKINE and CLARE MARLIN
The Stronger Super and other reforms present an opportunity to improve the disclosure of fund holdings, which is becoming more pressing as savings for retirement accumulated in defined contribution superannuation funds grow and the number of members approaching retirement age increases. In an increasingly global industry, Australian practice should also reflect the practices of its international peers. This paper explores the potential benefits and challenges of disclosing portfolio holdings to superannuation investors.

The Future of Financial Advice and MySuper
HAZEL BATEMAN and GEOFFREY KINGSTON
This paper summarises and appraises federal legislation passed in 2012 under the headings of The Future of Financial Advice (FoFA) and MySuper. FoFA reforms, which follow a review of the industry by a Joint Parliamentary Committee, aim to improve financial advice and seek to ban conflicted advice. MySuper reforms, based on recommendations made by the Cooper Review, aim to address a lack of engagement with superannuation by 60 per cent of workers and to ensure that default superannuation accounts are simple, comparable and affordable.

The usefulness of risk profile questionnaires in financial advising
TOM VALENTINE
With extensive research indicating that investors do not have consistent and rational attitudes to risk, this paper seeks to determine whether risk profile questionnaires lead to more rational investment decisions being made by clients. Analysis of the results of a risk profile questionnaire used by a financial planning practice suggests that investors are unwilling to bear short-term risk and, therefore, a more prescriptive approach may be necessary.
This issue of JASSA contains articles which provide insights into three areas of topical interest: stock market trading strategies — particularly high-frequency trading (HFT); bank liquidity management and regulation; and the provision of information and advice in superannuation and financial planning. It also contains an overview of developments in the global financial regulation agenda and implications for Australia.

Apart from the first three articles, which focus on HFT and momentum trading strategies, the journal contains papers presented at the 17th Melbourne Money and Finance Conference — Recent Developments in Financial Regulation: An Assessment — held in July 2012 by the Australian Centre for Financial Studies. While not subject to the usual double-blind review process, each of these papers has been reviewed by the Managing Editor and a member of the Editorial Board prior to inclusion.

What are the costs and benefits of HFT? Stephen Satchell examines claims and empirical evidence regarding the effects of HFT on price discovery (efficiency) and on liquidity and trading costs. While there has been extensive public debate about, and regulatory interest in, the desirability of HFT, the evidence available to guide policy is somewhat sparse. It does suggest that HFT is of benefit to the traders involved, the exchanges and the providers of products whose use is intrinsic to the HFT process. But whether there are benefits to fund managers and retail/private investors is not clear-cut. It undoubtedly makes the task of regulators more complex. Satchell concludes that, in attempting to assess the overall welfare effects of new trading strategies such as HFT it may be appropriate to rely on simulations or experiments using artificial markets.

The second article, by Carole Comerton-Forde, is in response to an invitation from the Managing Editor for a paper to accompany the Satchell paper, providing an Australian perspective on HFT. Comerton-Forde notes that there is currently limited reliable data available to assess the role of HFT in Australia, although it appears to have grown considerably in recent years and may now account for around 20 per cent of trading. We hope to have several contributions on this topic in the next issue of JASSA, as better data becomes available. Comerton-Forde focuses on whether the characteristics of the Australian equity market are as favourable to the growth of HFT as those in major overseas markets. She considers the role of factors such as: fragmentation of markets; availability of low-latency trading systems; size of explicit trading fees; market liquidity; tick size limits; and ‘trade-through’ protection of limit orders. While generally favourable to the development of HFT, the Australian market has some characteristics (fee arrangements and lack of trade-through protection) which may make HFT less pervasive than in the United States.

Next, the paper by Bruce Vanstone, Tobias Hahn and Gavin Finnie examines returns to momentum strategies (buying past winners and selling past losers) in the context of the S&P/ASX 100. The authors note that previous Australian studies of momentum (for which they provide a concise overview) have generated mixed results. Vanstone et al. find support for the use of momentum-based investment strategies within the S&P/ASX 100, with long positions in large stocks underpinning the results. They indicate that their results are in contrast with some prior US work, which finds that the momentum effect is primarily driven by the smaller, illiquid stocks in a portfolio. These results are also in contrast with some prior Australian work, which finds that the momentum effect is largely due to short selling of smaller stocks.

In the first of the papers from the 17th Melbourne Money and Finance Conference, Ian Beckett examines the plethora of financial regulation since the GFC. He examines the development, and implications for Australia, of the international regulatory agenda which aims for improvement in four key areas: national supervision/oversight arrangements; crisis management/resolution arrangements; resilience of core prudentially regulated institutions; transparency/resilience of wholesale markets and the ‘shadow banking’ sector. He notes that the involvement of Australian officials in the work of international standard setters has increased markedly since the GFC, and that within the G20 context they have sought to emphasise the importance of active supervisory oversight (rather than an excessive focus on detailed rules).

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He suggests that the area where new global standards may have the greatest impact on Australia’s regulatory regime in the longer term is in wholesale financial markets and shadow banking.

The next three papers address various aspects of ‘liquidity’, which has returned to centre stage following the experiences of the GFC. The paper by Alexandra Heath, Mark Manning and Greg Moran highlights the extent to which regulatory changes (including the need to prepare for Basel III) and market discipline in the aftermath of the GFC are producing increased demand for high-quality liquid assets (HQLA). The authors indicate that despite some increase in the stock of government securities over recent years, this will not be sufficient to cover additional demands from the introduction of new liquidity standards that will come into force in 2015 and the demand for collateral to support derivatives market activity. They note that, in response, the RBA has committed to provide liquidity to ADIs against a very broad range of collateral in return for a fee, and has revised its policy around access to central bank facilities. The authors also point to concerns that HQLA may become very expensive. As an editorial aside, it is worth noting one possible implication of this — that regulatory induced demand may mean that government bond yields reflect a ‘liquidity premium’, such that they underestimate the underlying risk-free rate of time preference.

Joel Grant seeks to build on the empirical evidence surrounding the determinants of Australian deposit-taking institutions (ADIs) liquidity buffers, focusing on the question of how macro-economic and ADI-specific factors influence Australian-owned ADIs’ holdings of liquid assets. His results provide strong evidence that for ADIs’ subject to liquidity regulation based on scenario analysis (SA) liquidity buffers are higher in high economic growth periods and when short-term interest rates are lower. He finds that SA ADIs build up their liquidity buffers during economic downturns and draw them down during economic upturns, which may give rise to pro-cyclical effects. However, no such relationship is evident among (generally smaller) ADIs which are subject to liquidity regulation based on minimum liquidity ratios.

Grant’s results are based on the period 2002 to 2012, and use a definition of liquid assets (as was common over that period) which includes some private sector securities. As the Basel III liquidity regulation changes (discussed by Heath et al.) take effect for the SA ADIs, based on a different, more limited liquidity definition, it will be interesting to examine how liquidity buffer behaviour changes.

The Basel III liquidity requirements are of two types — the liquidity coverage ratio (LCR) which relates to the liquidity buffers studied by Grant, and the net stable funding ratio (NSFR) requirement which relates the maturity composition of funding to asset portfolio maturity characteristics. The paper by David Tripe SF Fin and Jinyue Shi, which examines the effects of the new liquidity ratios implemented in New Zealand in April 2010 (prior to, but similar in nature to, the Basel requirements), focuses primarily on the likely effects of that latter requirement. It finds that, generally, the new liquidity rules have put pressure on banks to change the structure of their funding, resulting in increased use of retail funding and funding for longer maturities. While the authors identify an increase in banks’ cost of funds relative to benchmarks, they note that this may be partly explained by the very significant reductions in benchmark interest rates since the onset of the GFC.

Shifting the focus towards superannuation reform, Alex Erskine and Clare Marlin explore the potential benefits and challenges of superannuation funds disclosing the composition of portfolio holdings to members. They note that portfolio disclosure by Australian managed funds (not just superannuation) is low (reflecting an absence of mandatory requirements) relative to international peers. Improved disclosure is arguably becoming more pressing as savings for retirement accumulated in defined contribution superannuation funds grow and the number of members approaching retirement age increases. They suggest that greater information can be made available for member-investors without necessarily overburdening members with information (such as by placing it on a website). Other arguments against requiring transparency (such as revealing private information about strategies etc.) are also reviewed, but none are seen as compelling. Given the increasing importance of defined contribution superannuation, the issue of mandatory disclosure by these, and other, managed funds is one which warrants further analysis and study.

Disclosure is of value if investors can understand it, take notice of it, and act upon it. Many would argue that the involvement of investors with their superannuation, and general financial literacy, is low, such that disclosure may add little value. In that regard, two pieces of federal legislation passed in 2012 under the headings of The Future of Financial Advice (FoFA) and MySuper are particularly relevant and are summarised and appraised in the paper by Hazel Bateman and Geoffrey Kingston. They suggest that the default super fund model of MySuper can be interpreted as de facto mass financial advice for the large part of the population which does not engage with financial planners. For such a scheme, they argue that portfolio allocation should change systematically with investor age and they suggest an explicit glidepath on percentage exposure to growth assets that would see growth assets drop from 60 per cent.
to 40 per cent of default accounts once a MySuper account holder reaches 55 years of age.

Financial advice is particularly relevant for the rapidly growing self-managed super fund sector, and Bateman and Kingston examine, inter alia, the consequences of FoFA for typical fee structures of financial planners. They argue that a significant number of traditional fee arrangements could be ‘conflicted’. They also note the potential conflict between an optimal portfolio near retirement being of lower risk, and the financial incentives for financial planners to advise a more ‘growth-oriented’ portfolio on which fees for assets under management are typically higher.

Finally, with extensive research indicating that investors do not have consistent and rational attitudes to risk, the paper by Tom Valentine seeks to determine whether risk profile questionnaires used by financial planners lead to more rational investment decisions being made by clients. One immediate result is that in assessing investor risk tolerance, a small number of questions appear to provide most of the valuable information — suggesting that the merits of long questionnaires can be questioned.

But more importantly, Valentine also observes that individuals save for different motives with different time frames, such that attempting to identify a specific, unchanging, level of risk aversion may be inappropriate, and that advisers should take these different motives into account. In particular, even though investors may appear from questionnaire results to be quite risk averse regarding possible short-term returns, Valentine argues that advisers should help educate their clients regarding the appropriate nature of growth assets for long-term savings such as superannuation.

I would like to thank both the sponsors of the Melbourne Money and Finance Conference — Finsia, Australian Prudential Regulation Authority (APRA) and the Reserve Bank of Australia (RBA) — and the authors for their contribution to the important insights provided in this issue of JASSA.

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Keywords: high-frequency trading, liquidity, price discovery, multilateral trading facilities.

AN ASSESSMENT OF THE SOCIAL DESIRABILITY of high-frequency trading

STEPHEN E SATCHELL, Fellow, Trinity College, Cambridge University and Visiting Professor, Discipline of Finance, University of Sydney

While much has been written on the vast topic of high-frequency trading (HFT), a great deal of the evidence has been contaminated by group self-interest. Furthermore, what constitutes a ‘good’ or a ‘bad’ is not clearly discussed. This paper presents an assessment of the costs and benefits of HFT and considers the more philosophical question as to what good or bad might mean here. The paper formed the basis of a presentation given at JP Morgan, Sydney on 22 March 2012.

After defining HFT, my analysis focuses on an examination of HFT across three main categories, each of which follows naturally from the existing literature. The first broad category is what HFT has done to prices. Here we can consider price efficiency, price discovery and price volatility. The next broad category is the impact of HFT on price liquidity/volume/costs. A third category is HFT profitability. Where appropriate, the discussion on each of these three issues distinguishes between different agents operating in the markets, including retail investors, asset managers, hedge funds, high-frequency traders, the public and regulators. Finally, a brief review on current academic research in this area is provided along with a discussion of the welfare issues associated with HFT.

What is HFT?

Like many things, HFT is easy to see and hard to define. We instantly get into problems as it is often confused with algorithmic trading (ALGO), which is the use of algorithms to make trading decisions. It is worth noting that in United States (US) markets, there are approximately 100,000 orders per second. As such, some form of ALGO seems necessary if we believe that traders should endeavour to analyse available information.

In defining HFT, we follow the SEC (2010) concept release on equity market structure. The SEC definition is based on five characteristics:

1. the use of extraordinarily high-speed and sophisticated computer programs for generating, routing and executing orders;
2. the use of co-location and data-feed services offered by exchanges to maximise speed;
3. very short times for establishing and liquidating positions;
4. many orders and high cancellation rates; and
5. very few overnight unhedged positions.

Some common practises associated with HFT include high-speed market making, taking advantage of stale prices, cross-exchange arbitrage, order anticipation and momentum ignition (i.e. artificial trades designed to induce correlated price behaviour in other market participants). There may be many others as well. Many of these activities could be described by the phrase du jour — ‘latency arbitrage’. This refers to the ability to act more quickly than other agents in the market. As such, it can be compared to an antique dealer getting to a street market at 5 am where it is known that all the bargains will be gone by 5.10 am. Controversy enters if the market mechanism allows for unfair informational advantage. Consider a closed auction where bids are made, not knowing what other bids are extant (an example would be a double-blind Dutch auction, see Mendelsohn 1982). If the bids/asks are entered, then the book is closed, and then sorted, latency might allow you to change your bid upon
HFT on this basis is probably misguided.

form has a built-in option and legislation to remove

market making in any
during periods of market turmoil, such as during the

makers (are claimed) not to answer their phones
during periods of market turmoil, such as during the

climates. However, the fact that traditional market

this is not equivalent to traditional market marking

which was there to provide two-way prices in all

markets during the crash of 1987, suggests that market making in any

any form has a built-in option and legislation to remove

HFT on this basis is probably misguided.

HFT costs and benefits: price efficiency

Our first area of interest is the impact of HFT on price

efficiency. This can be interpreted in many ways, but

a simple mechanistic version is that prices are random

walks, and that corresponding returns are white noise.

Such an approach has been used by Castura et al.

(2010) and Linton and O’Hara (2011). By comparing

results of variance ratio tests, which indicate the

presence of positive/negative correlation in returns,

they present strong evidence that price efficiency is a

consequence of the introduction of, and increase in,

HFT. Other attempts to assess the impact of HFT are

based on the use of volume-weighted average price

(VWAP). The idea is that you want VWAP to be high

if you are selling and low if you are buying. Here the

argument takes a number of twists. The essential idea

is that the presence of HFT traders selling in a market

with a lower VWAP than other traders is creating a

trading opportunity. An opposite argument will apply
to VWAP buyers. The difficulty with this measure is

that there is very little theory to guide us as to what

VWAP is actually capturing. It could be movements

along a demand or a supply curve, for example, in

which case, it is simply reflecting order size rather than

trading skill. Another version of VWAP is that high

VWAP for sales by HFT traders is a ‘good’ because it

suggests that they are performing well relative to

others. This latter version may reflect the benefits of

HFT to HFT traders but does not give much indication

of benefits elsewhere.

Yet another claim in favour of HFT is improved ‘price
discovery’. The term price discovery is very widely

used in modern microstructure but again, it is less

clearly defined. In this respect, it is worth examining

a paper by Huddart et al. (2001). They use the term
to mean specifically that the uncertain future price

will have a smaller variance. This is in the context

of normal returns and has no time dimension. More

generally, we might think of it as meaning that

improved price discovery means less fat-tailed

distributions. A time-based notion of price discovery

uses the idea that if news arrives, then the system will

take a certain time until the price reflects that new

information, so enhanced temporal price discovery

means that this process will be quicker. HFT is likely
to deliver this version of price discovery. Since the

impact of HFT on price distributions will be discussed

later in the section on academic research, we will say

no more on price discovery.

HFT costs and benefits: price liquidity,

volume and costs

We now consider liquidity. Again, it is often argued

that HFT traders bring liquidity to the market. Indeed,
it is a source of income for them as exchanges

provide compensation for liquidity providers.

Liquidity is somewhat difficult to define, but it can

be viewed as something like the number of resting

orders that allow for trades near the current price.

Some traders state that this definition falls short in

terms of what one can really trade. This definition is

synonymous with depth and could be thought of as

timeless. A very similar concept is resilience, which

indicates the price sensitivity due to an increase

in supply or demand and thus is closely related to

inverse price elasticity.

A number of papers make the claim that HFT

increases depth and this seems to hold most of the

time, especially in normal times. The point that is

contested is what happens when the market is

shocked. The HFT risk systems are usually faster

than their counterparties and can therefore cease

trading when market risk is high. Thus, in abnormal

times, HFT may lead to a reduction in liquidity. This

argument is examined in BIS (2011).

We digress slightly to talk about HFT risk management

systems. These seem to be shrouded in mystery and

I am not aware of a theoretical approach analogous
to conventional risk management models. Such an

approach would presumably define risk in terms of

the particular features of HFT, in addition to the

conventional metrics of tracking error and value-at-
risk (VAR). This seems an excellent topic for research.

Another claim in favour of HFT is the reduction in

transaction costs that result from it. Again, research

suggests that bid–ask spreads are unambiguously

reduced. This is seen by many market practitioners

The HFT risk systems are usually faster than

their counterparties and can therefore cease

trading when market risk is high. Thus, in

abnormal times, HFT may lead to a reduction

in liquidity.
as being an unambiguous ‘good’. However, it was not always so. Keynes (1936), in chapter 12 of his general theory, states fairly clearly that the British stock market was better than the American stock market because the transaction costs there were higher. This resulted in more investment for income (long-term) rather than investment for capital gains/speculation (short-term).

It is always dangerous to presume what a long-dead economist might have liked, but it seems reasonable to think that he might not have liked HFT. It is also worth noting in this context that the alleged ‘deterioration’ of financial markets from places of investment to places of speculation has been noted by others, e.g. Haldane (2010). He noted that the mean holding period for investors in US stocks has fallen from 10 years in the 1940s, to seven months by 2007, with broadly similar numbers in the United Kingdom (UK). Recent research with HFT data present has produced mean holding periods of about 22 seconds. However, it may well be that bid–ask spreads would have fallen anyway as the whole trading structure has become more competitive.

**Profitability of HFT**

The third area I will consider is the profitability of the HFT industry. It is hard to get any accurate measure of this, but some published figures for HFT activity on US liquidity rebates suggest an annual income of $3 billion. Estimates of the profitability of US equity HFT seem to be of the order of $12 billion per annum, although Brogaard (2010) claims the amount to be about $3 billion per annum. Tabb Consulting Group publishes commercial reports (which I have not been able to obtain) that advance annual net profit figures on US HFT of circa $10 billion per annum. It is very hard to compare these figures as they involve a great deal of guesstimation as to whom or what is HFT.

Scaling the former number up to gross profits might give us $24 billion. If we believe that US equity HFT represents one-tenth of the global HFT industry, we may end up with an annual gross profit of perhaps $300 billion worldwide.

**Academic research on HFT**

Academic research on HFT tends to take two paths. The first is empirical work based on the exhaustive analysis of tick data such as orders or trades. A frequently quoted author on this issue is Brogaard (2010, 2012) who has examined the US market. To briefly summarise, Brogaard finds that:

- HFT follows a price reversal strategy based on order imbalance;
- HFT makes up 74 per cent of trades;
- HFT does not seem to systematically front-run non-HFTs;
- HFT adds a lot to price discovery;
- HFT trading levels don’t change much with market volatility;
- HFT produces best bid-asks but not much depth; and
- HFT may actually reduce volatility.

There is very limited theoretical work on HFT. The most notable, in my view, is the paper by Cvitanic and Kirilenko (2010). They show that price distributions have thinner tails after the introduction of machines. This would indicate that HFT reduces extreme tail risk in the market. The theoretical tools used are Poisson distributions of order arrival, very much in the spirit of Mendelson (1982). While the Cvitanic and Kirilenko (2010) paper is outstanding, the conclusions follow from the assumptions. In particular, they assume that the HFT trader in the model picks off all the high and low orders and this has the intuitive implication that it truncates the distributions of prices; thus it is not surprising that tail risk is reduced. It may well be possible to reverse the result by assuming different rules for HFT trading.

The view that tails would be thinner after the introduction of HFT is consistent with improved price discovery. Taken together with the improvements in price efficiency, we seem to have a conclusion that HFT will lead to a well-behaved market with innovations in prices being Gaussian or something very similar. This does not seem to be the view held by Sonnette and Von der Becke (2011). They unequivocally assert that HFT leads to higher turbulence in prices. This is a reference essentially to unstable dynamics. The authors’ backgrounds are much more econo-physical (one at least is an eminent vulcanologist). They claim that the processes involved don’t differ dramatically from our understanding of financial bubbles. Rather, they are the same but they happen more quickly. They also argue that we need to look at agent-based models to assess the welfare gains or losses. They conjecture that the gains, if any, are likely to be minimal.

**Welfare issues and HFT**

The question of welfare is a very important one and seems to be unstudied in any of the existing research. I shall repeat a few well-known facts on welfare analysis, familiar to economics 101 students. The notion of a Pareto optimum is one where any improvement in the welfare of one person will lead to a loss of welfare (utility) for another one. Furthermore, even if the introduction of HFT leads to a Pareto improvement, in that everyone benefits from lower transaction costs, it may be the case that 99 per cent of the gains accrue to the traders, while 1 per cent accrues to the investors whose positions are being constantly front-run, thereby offsetting the gains from lower costs.
Echoing the remarks of Sornette and Van der Becke (2011), it seems that one way you could address welfare issues is by computing an agent-based model with and without HFT. Such an approach has been used by Leland (1992) to assess the equilibrium benefits of insider trading. There is no incentive for the private sector to carry out such a calculation; this needs to be done by central banks/regulators/academics.

A number of recent unpublished papers look at social welfare issues, see Hoffmann (2011) and Cartea and Penalva (2012). However, they are concerned with deriving analytics and use highly stylised models. While these papers make useful contributions, their goals are of a more theoretical nature and do not include sufficient detail or complexity to guide policy.

It is almost mandatory in a paper of this kind to talk about the Flash Crash (6 May 2010). Since this has been well analysed elsewhere. I shall desist except to note that it seems that HFT did not start it but may well have exacerbated it. This conclusion is worthy of a comment as it may well be what we will see in the future. Large portfolio movements resulting from problems in Europe, or whatever, may initiate periods of turbulence which may well be more turbulent or longer-lived as a result of HFT. However, we don’t really know this as there is not an accumulation of evidence as yet, nor are there clear counterfactuals to compare with.

In many cases, the policy responses to HFT are rather predictable. Those academics from certain business schools, whose belief in the efficiency and primacy of markets can reach extreme levels, tend to believe that regulators should take no actions at all. If the regulators were to act, they claim, then all HFT would go overseas to the huge loss (in terms of foregone taxes) to the regulating country. This policy recommendation raises a number of questions, not the least being what tax base is at risk, which leads to the profitability of the HFT industry, a topic I shall deal with later.

It is claimed that the Europeans, especially the French, want to introduce a transactions tax on HFT. This is again problematic as it would require a very precise definition of HFT to avoid keeping corporate lawyers busy for many years. Again, one would have to be sure that there is a clear differentiation between HFT and ALGO trading. However, the notion that a transactions tax on limit orders that cancel in less than some fraction of a second does seem at least worth serious discussion.

Regulators, especially those in Europe, have launched a number of initiatives about treating customers fairly. These, in the main, are concerned with how managers treat their clients, but presumably should apply to exchanges as well. If this is so, the notion of co-location does seem to suggest a preferred client status and certainly goes against the idea of a market being a fair place for all to buy and sell. At the level of political economy, notions of exchanges being places where wage earners can diversify their income risk through share ownership, which was very much a feature of Thatcherian political economy, seems vulnerable to preferred client structures.

Multilateral trading facilities (MTFs) have evolved in Europe as a way of trading that allowed exchanges, in effect, to propagate. They were a consequence of legislation (MiFID) and it is not clear whether their growth is in reaction to HFT or is encouraging the spread of HFT. They exist both within investment banks (Nomura) and outside, such as Chi-X Europe. But HFT firms are also key clients or stakeholders of these organisations and the market fragmentation MTF’s have caused has led to more exploitable HFT opportunities through multiple listing and timing issues. It may well be that in some circumstances they provide better trading environments for institutional block trades relative to the traditional exchanges whose revenue dependence on HFT has been growing over the decade. They currently account for about half of total volume traded.

Conclusion

The available evidence suggests that HFT is of benefit to the traders themselves, the exchanges who support it and the providers of products whose use is intrinsic to the HFT process. It may be of benefit to fund managers although this is not clear-cut. Likewise, the same can be said for retail/private investors. It is clearly not beneficial to regulators as it complicates regulatory control, and the notion of market activity being a combined ‘tape’ of all market activity on all assets ordered by time may become unmanageable as a regulatory tool. HFT is, however, part of an evolving process which cannot be ignored and will not go away.

I will finish by noting that the costs and benefits of HFT discussed in the previous paragraphs involve so many loose assumptions that it is very difficult to say very much for or against HFT that is evidence based. However, the original idea of Sornette and Van der Becke (2011) seems to be the best one. We need to build artificial markets to get some sense of what the introduction of new trading methods is likely to do to the welfare of all agents. I’m fully aware that practitioners will be very dismissive of what we might learn from simulation/experimental analysis since they seem to be obsessed with back-testing. I believe that that position is incorrect. Notwithstanding the limitations of having to be definite about the true generation of prices, I would remind them that simulation/experimental analysis provides them with an infinity of parallel and/or alternative histories while back-testing involves only one.
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Notes

1. Acknowledgements: I would like to thank Lee Bray, Michael D. McKenzie, John Wiley and an anonymous referee for helpful and insightful comments.


3. For example, see www.fsa.gov.uk/pages/doing/regulated/tcf/
IS AUSTRALIA HFT-friendly?

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Stephen Satchell’s paper ‘An assessment of the social desirability of high-frequency trading’, in this issue of JASSA examines the costs and benefits, and highlights some empirical evidence on the impact of HFT on market quality and welfare. Building on Satchell’s paper, this paper provides a perspective on HFT in the Australian market and identifies the factors influencing its attractiveness to HFT players. It also compares the US and Australian markets in terms of these factors to indicate the growth prospects for HFT activity in Australia.

How prevalent is HFT?

HFT has become a dominant form of trading in many equity markets around the world. The US Securities and Exchange Commission described high-frequency trading (HFT) as ‘one of the most significant market structure developments in recent years’. Despite its dominance, data restrictions prevent direct measurement of the volume of trading attributable to HFT. However, market estimates suggest that HFT represents a substantial portion of trading. In March 2012, the Financial Times reported that HFT accounted for 55 per cent of trading in the United States (US), 38 per cent in Europe, 28 per cent in Japan, 18 per cent in Canada, and 5 per cent in Asia (excluding Japan).

Consistent with other markets, it is not possible to directly identify HFT in the Australian market. There are some firms known globally as HFT players that have recently become ASX and Chi-X participants. Trades executed by these firms can be easily identified in the trading data. However, there are other HFT firms that are not direct participants of either ASX or Chi-X. These firms trade through other brokers. It is not possible to separate the trades of these firms from other non-HFT clients using publicly available data. Therefore, it is not possible to determine the overall level of HFT activity in Australia with any certainty. However, conversations with brokers in Australia suggest that the current level of HFT in Australia is around 15 to 25 per cent of trading. This is substantially higher than the 3 to 4 per cent estimate reported by the Australian Securities Exchange (ASX) in February 2010.

Is Australia an attractive market for HFT?

There are several factors that make a market attractive to high-frequency traders. These include: fragmented markets; the use of low-latency trading systems; low explicit trading fees; high liquidity; small tick sizes; and trade-through protection.

These factors help to explain the variation in the level of HFT in different markets and provide some insights into the extent to which HFT might grow in Australia in the future. The US equity market exhibits the highest level of HFT in the world and is considered to be an extremely HFT-friendly market. The US is therefore used as a reference point for examining how Australia measures-up on these factors.

Fragmented markets

When multiple venues trade a single security, liquidity becomes fragmented across these venues. This fragmentation offers high-frequency traders the opportunity to exploit pricing inefficiencies across these venues. HFT acts to reconsolidate liquidity across the different trading venues. Competition between venues also puts downward pressure on exchange trading fees, which is also important for HFT strategies.

The level of fragmentation in the US markets is extreme. There are more than 10 exchanges and over 50 Alternative Trading Systems. This provides a very attractive environment for HFT firms.

In Australia, there are now three exchange venues: ASX TradeMatch, Chi-X (launched October 2011) and ASX PureMatch (launched November 2011). Trading on...
Chi-X and PureMatch is limited to the S&P/ASX 200 stocks and some exchange-traded funds (ETFs). Chi-X accounts for approximately 5 per cent of the dollar volume traded in ASX-listed equities while PureMatch has failed to gain traction with participants. This segmentation provides trading opportunities for HFT but to a more limited extent than the fragmentation in the US markets.

**Low-latency trading systems**

HFT strategies depend on being able to trade in and out of positions very quickly and therefore require trading venues offering low-latency trading systems. The large number of orders and trades associated with HFT strategies also requires large capacity systems. Some market participants suggest that if latency is above 10 milliseconds HFT strategies are more difficult to implement.

All of the major equities markets in the US offer low-latency trading systems. They continually compete with one another to offer faster and better trading technology.

The ASX upgraded its trading technology in November 2010. This technology offers latency down to as little as 300 microseconds and increased the trading capacity to exceed 5 million trades and 500 million order book changes per day. In addition, ASX launched a high-speed distribution network (ASX Net) and enhanced co-location facilities (ASX Liquidity Centre). These changes have made the Australian market more attractive to HFT players.

Like ASX, Chi-X offers a very low-latency platform. The combination of competing exchanges and lower-latency trading systems has made the Australian market a much more attractive venue for HFT.

**Low explicit trading fees**

Because HFT strategies generate low margins, it is important that low costs are achieved while executing these strategies. In the US markets competition on trading fees has been intense. The growth in HFT has also been aided by maker-taker pricing where differential fees are charged to parties providing and demanding liquidity. Typically, liquidity providers are offered a rebate rather than charged a fee for providing liquidity to the market. In some cases, the situation is reversed and liquidity demanders are offered a rebate. The rebates paid by exchanges are particularly important for electronic market-making strategies as they supplement the spreads earned by the liquidity suppliers. In the US, trading fees and rebates are charged on a cents per share basis. This means that in low-priced stocks, the rebates offered can be extremely high relative to the tick size and price of the stock. Rebates have fuelled growth in HFT activity in the US.

In Australia, competition for trading services has also brought with it lower trading fees. ASX reduced its headline trading fee from 0.28 bps to 0.15 bps in June 2010. Chi-X offers cheaper pricing with differential fees for providing (0.06 bps) and demanding liquidity (0.12 bps). Neither exchange currently offers rebates. The absence of rebates is likely to ensure that the level of HFT in Australia remains well below the level in the US.

It is also worth noting that the ASIC supervision cost recovery charges may also put some downward pressure on the level of HFT activity in Australia. The cost of supervision is recovered from market operators and participants, with part of these costs being allocated proportionally based on the number of trades and messages generated by them. This therefore provides an economic incentive for participants to reduce the number of messages sent to the market.

**High liquidity**

Low margins mean that HFT strategies require high levels of turnover in order to be profitable. As a result, these strategies are employed most frequently in liquid markets and in liquid stocks. Trading in less liquid stocks incurs much greater risk as it may be more difficult and costly to manage inventory and adverse selection risk in these stocks. This, combined with the fact that Chi-X currently only trades S&P/ASX 200 stocks and ETFs, means that we would only expect to see substantial HFT activity in these stocks.

**Small tick sizes**

Tick size is a very important factor for implementing HFT strategies. Small tick sizes provide high-frequency traders with more price steps at which to place orders and to find arbitrage opportunities. Having small tick sizes also helps to manage risk at tighter pricing increments.

In the US, minimum tick sizes are set at one cent for all stocks. The average stock price in the US is approximately $30 resulting in a very small average relative tick size of 0.03 per cent. This small increment facilitates HFT.

In Australia, ASIC has mandated a consistent tick size across all exchanges. The tick sizes vary with stock price, with a minimum tick size of one cent for all stocks priced above $2. The average stock price in Australia is substantially lower than the US at around $3, which means that the relative tick size for the average stock is approximately 10 times higher than the equivalent statistic for the average US stock. HFT activity is likely to be more prevalent in high-priced stocks than in low-priced stocks in Australia.
Trade-through protection
Trade-through protection means that orders displayed at the best price cannot be traded-through. Market orders must be routed to the market displaying the best price. This rule is helpful for HFT firms using electronic market-making strategies as it ensures that the limit orders they post in displayed markets are protected when they are at the best prices. Regulation NMS in the US markets provides trade-through protection. This rule contributes to the high level of HFT activity in the US.

The Australian market does not offer trade-through protection. The best execution requirements set out in the Market Integrity Rules allow institutional investors to make trading decisions based on factors other than price. This will reduce the level of HFT relative to the US.

Conclusions
The Australian equity market exhibits a number of high-frequency friendly characteristics. The relatively recent upgrade of the ASX trading system and co-location facilities, the launch of Chi-X and reduction in trading fees has attracted and will continue to attract new HFT players and new HFT strategies. However, the lack of rebates and trade-through protection is likely to mean the level of HFT activity in Australia will not grow to the levels that have been observed in the US market.

While it is not possible to identify HFT players in the Australian data, with the market becoming more HFT-friendly, it would be feasible to analyse the changes in the characteristics of trading activity in the Australian market. This type of analysis would assist in obtaining a better understanding of the impact these changes have had on the market and help to inform debate and regulatory policy. This analysis should be the subject of future research.

Notes
1. The Financial Times arrived at these estimates based on surveys and estimations from TABB Group, Celent and Credit Suisse Advanced Execution Services. Details are available at: http://im.media.ft.com/content/images/354ca2f6-6722-11e1-9d4e-00144feabdc0.img?width=854&height=693&title=&desc=High-frequency trading graphic
2. For example, Getco and Virtu Financial became ASX participants on 30 May 2011 and 1 August 2011, respectively. Collectively these participants account for less than 1.5 per cent of the value traded on the ASX in the S&P/ASX 200 companies.
4. See the Fidessa Fragmentation Index at www.fidessa.com for current market share details.
5. A millisecond is equal to one thousandth of a second. A microsecond is one millionth of a second.
8. The minimum tick size is the minimum price variation for a stock. For example, if the minimum tick size is one cent, then orders must be placed at increments of one cent.
MOMENTUM RETURNS TO S&P/ASX 100 constituents

BRUCE VANSTONE, Assistant Professor in the Faculty of Business at Bond University, TOBIAS HAHN, student in the Faculty of Business at Bond University and GAVIN FINNIE, Professor in the Faculty of Business at Bond University

With mixed evidence to date on the performance of momentum strategies in Australia, this paper examines returns to momentum strategies for constituent companies within the S&P/ASX 100, focusing on practical, realisable investment strategies. We find that momentum is both present and obtainable, and has been a persistent feature of the S&P/ASX 100 since its inception, including throughout the global financial crisis.

Momentum has been a puzzling phenomenon of financial markets since its discovery by Jegadeesh and Titman in 1993. Momentum refers to the anomaly of abnormal returns due to buying stocks that have been past ‘winners’ and selling stocks that have been past ‘losers’. Momentum has been comprehensively studied in many markets around the world, and is often cited as ‘the premier anomaly’, a termed coined by Eugene Fama, the father of the efficient markets hypothesis (Fama and French 2007). There is overwhelming international evidence that momentum is a persistent, pervasive feature of stock prices and that it is not explained by traditional risk models.

In Australia, the evidence about the performance of momentum strategies is quite confusing. Table 1 documents 10 previous academic studies on momentum in the Australian market, and indicates the general findings of each of these studies.

TABLE 1: Previous Australian momentum studies

<table>
<thead>
<tr>
<th>Paper</th>
<th>General findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Short-term autocorrelation in Australian equities’, Gaunt and Gray (2003)</td>
<td>Although not specifically testing for momentum, this paper tested autocorrelations among Australian stocks, which is a necessary precondition for momentum to occur. This paper supports the existence of momentum for stocks outside the top 200, but does not support momentum for the top 200 stocks.</td>
</tr>
<tr>
<td>‘Momentum in Australian stock returns’, Hurn and Pavlov (2005)</td>
<td>This paper tests for momentum within the top 200 stocks, as well as the top 50 stocks, and the remaining 150 stocks. It documents a strong momentum effect and notes that the effect appears strongest in the largest stocks.</td>
</tr>
<tr>
<td>‘Global momentum strategies: a portfolio perspective’, Griffin, Ji and Martin (2004)</td>
<td>This paper tests for momentum in the Australian market as part of a larger global study on momentum. It concludes that the momentum effect is not significant in Australia.</td>
</tr>
<tr>
<td>‘Momentum returns in Australian equities: the influences of size, risk liquidity and return computation’, Demir, Muthuswamy and Walter (2004)</td>
<td>Momentum is found to be a prevalent feature of the Australian market and this paper concludes that the returns to momentum in Australia are of a greater magnitude than previously found in overseas markets.</td>
</tr>
<tr>
<td>‘Do momentum strategies work? — Australian evidence’, Drew, Vererahavan and Ye (2004)</td>
<td>This paper supports the finding that the momentum effect is stronger in Australia than in the United States.</td>
</tr>
<tr>
<td>‘Momentum in Australia — a note’, Durand, Limkriangkrai and Smith (2006)</td>
<td>Using Australian data from a much longer period than previous research, this paper finds no support for the momentum effect in Australia.</td>
</tr>
<tr>
<td>‘Disentangling size from momentum in Australian stock returns’, Brailsford and O’Brien (2008)</td>
<td>This paper attempts to explain the varying results of previous Australian studies by reference to differences in design empirics, sample periods and cross-sectional stock selection.</td>
</tr>
<tr>
<td>‘Momentum profits in the Australian equity market: a matched firm approach’, Bettman, Maher and Sault (2009)</td>
<td>Using a matched firm approach, this paper demonstrates that momentum returns are robust to short selling restrictions and transaction costs, and the paper confirms the existence of the momentum effect in Australia.</td>
</tr>
<tr>
<td>‘What should we know about momentum investing? The case of the Australian Security Exchange’, Galariotis (2010)</td>
<td>This paper confirms that the momentum effect in Australia is greater than in the majority of developed markets. It also documents that the most of the returns come from the ‘long’ side of the portfolios.</td>
</tr>
<tr>
<td>‘Interaction of size, book-to-market and momentum effects in Australia’, O’Brien, Brailsford and Gaunt (2010)</td>
<td>This paper suggests that previous studies which report loser portfolios outperforming winner portfolios may be picking up on the small-size effect rather than the momentum effect. It confirms the existence of momentum for large portfolios.</td>
</tr>
</tbody>
</table>
Methodology

In conducting our analysis, we chose to focus on the extent to which momentum returns were obtained by constituents of the S&P/ASX 100. There are a number of benefits to focusing on the constituents of an S&P index, such as their level of liquidity and market capitalisation. Further, the mandates for many fund managers cause them to invest almost exclusively among the constituents of S&P indices to ensure liquidity and to provide a ready investment benchmark. In addition to this, the stocks within the higher level ASX S&P indices have contracts for difference (CFD) equivalents, meaning there are no short selling constraints.

To conduct our analysis, we sourced data from the Securities Industry Research Centre of Asia Pacific (SIRCA). We obtained historical membership data for the S&P/ASX 100, daily prices for all constituents including de-listed stocks, daily dilution adjustment factors and relevant symbology changes. The price data adjustment factors allow for adjustments related to bonus issues, consolidations, splits, capital returns and dividends. This allowed us to reconstruct the daily prices of all members of the S&P/ASX 100 since its inception in early 2000, until the end of 2011.

To test momentum strategies, researchers usually use the J/S/K methodology. In the J/S/K approach, stocks are ranked on the basis of their previous J months’ price change, and their performance is measured for the next K months. The S parameter is usually 0 or 1, and indicates whether a month is skipped between the end of the J-month ranking period and the beginning of the K-month holding period. For example, a 6/1/6 strategy means that in any month, all stocks are ranked on the basis of their last six months’ price change. The top group of stocks are bought into a portfolio after waiting for one month. This portfolio is then held for the next six months, and the average portfolio return is calculated. It is traditional to create decile portfolios, that is, to divide stocks up into 10 portfolios dependent on the strength of the J-month prior returns. It is also traditional to create monthly rolling, overlapping portfolios, and the results in this paper reflect those traditions. This allows for a direct comparison of our results with other prior research on momentum.

To understand how momentum develops, we have created traditional J/S/K momentum portfolios for the cases where J/S/K range over {J=3, 6, 9, 12, 18, 24} / {S=0.1, 0.5} / {K=3, 6, 9, 12, 18, 24}. This results in 72 different momentum strategies. Within each strategy, we divide the stocks into deciles on a rolling monthly basis.

To implement a momentum strategy, the investor goes long (short) the highest (lowest) ranked decile each month.

We calculate the total returns (known in momentum terminology as the ‘WML portfolio’ — winner minus loser portfolio), and then compare the result with the returns to holding the S&P/ASX 100. In doing so, we can assess the potential for the winners to outperform the losers, and for the entire WML implementation to outperform the index.

Discussion of results

Table 2 shows the returns to the 6/1/6 strategy. It is traditional to present calculations for the 6/1/6 strategy and present summary figures for other strategy implementations, and we have followed that convention here. Table 2 presents the monthly mean returns to the winner and loser deciles, the WML returns and the index returns. The WML returns are tested for difference to zero, and significant values are marked with an asterisk to indicate significance at the 5 per cent level. The relevant p-value for the t-statistic is shown in parentheses.

Table 2: Monthly mean returns to the 6/1/6 strategy

<table>
<thead>
<tr>
<th>Decile</th>
<th>Mean</th>
<th>t-stat (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loser</td>
<td>0.0023</td>
<td></td>
</tr>
<tr>
<td>Winner</td>
<td>0.0123</td>
<td></td>
</tr>
<tr>
<td>WML</td>
<td>0.0100</td>
<td>2.3835 (0.0186) *</td>
</tr>
<tr>
<td>Index (XTOA)</td>
<td>0.0078</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 documents the 6/1/6 mean monthly returns for the S&P/ASX 100 constituents since inception. The S&P/ASX 100 is designed to represent the large and mid-cap universe for Australia, and covers approximately 74 per cent of Australian equity market capitalisation (Standard and Poor’s 2011). Companies in this index are specifically chosen for their size and liquidity, with the aim being to minimising turnover and thereby ensure tradability. The comparison index used is XTOA, which is the accumulation index for the S&P/ASX 100.

The WML portfolio for the 6/1/6 strategy is statistically significant at the 5 per cent level.

The ‘loser’ portfolio is the portfolio that an investor would need to short to implement a zero-cost momentum strategy. The ‘winner’ portfolio is the portfolio that an investor would need to take long positions in to implement a momentum strategy. Interestingly, it is the long portfolio which contributes the largest overall return. One of the past criticisms of momentum has been that it can be difficult to implement a momentum strategy due to the restrictions of short selling.
TABLE 3: Monthly mean returns to the J/1/K strategies for all investors.

<table>
<thead>
<tr>
<th>J</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>18</th>
<th>24</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.013 (t= 3.076; p= 0.003)</td>
<td>0.008 (t= 2.24; p= 0.027)</td>
<td>0.009 (t= 2.975; p= 0.004)</td>
<td>0.006 (t= 2.305; p= 0.023)</td>
<td>0.001 (t= 0.644; p= 0.521)</td>
<td>0.000 (t= 0.113; p= 0.910)</td>
</tr>
<tr>
<td>6</td>
<td>0.015 (t= 2.686; p= 0.005)</td>
<td>0.010 (t= 2.383; p= 0.019)</td>
<td>0.008 (t= 2.397; p= 0.018)</td>
<td>0.004 (t= 1.552; p= 0.125)</td>
<td>-0.001 (t= 0.493; p= 0.623)</td>
<td>-0.001 (t= 0.595; p= 0.553)</td>
</tr>
<tr>
<td>9</td>
<td>0.014 (t= 2.835; p= 0.005)</td>
<td>0.007 (t= 1.808; p= 0.073)</td>
<td>0.005 (t= 1.516; p= 0.132)</td>
<td>0.001 (t= 0.593; p= 0.555)</td>
<td>-0.003 (t= 1.023; p= 0.309)</td>
<td>-0.002 (t= 1.338; p= 0.184)</td>
</tr>
<tr>
<td>12</td>
<td>0.011 (t= 2.222; p= 0.028)</td>
<td>0.003 (t= 0.903; p= 0.368)</td>
<td>0.001 (t= 0.195; p= 0.846)</td>
<td>-0.003 (t= 1.468; p= 0.145)</td>
<td>-0.005 (t= 2.084; p= 0.039)</td>
<td>-0.005 (t= 3.258; p= 0.001)</td>
</tr>
<tr>
<td>18</td>
<td>0.003 (t= 0.750; p= 0.455)</td>
<td>-0.003 (t= 0.878; p= 0.381)</td>
<td>-0.004 (t= 1.726; p= 0.087)</td>
<td>-0.006 (t= 3.342; p= 0.001)</td>
<td>-0.010 (t= 4.222; p= 0.000)</td>
<td>-0.009 (t= 5.888; p= 0.000)</td>
</tr>
<tr>
<td>24</td>
<td>0.001 (t= 0.26; p= 0.794)</td>
<td>-0.004 (t= 1.884; p= 0.239)</td>
<td>-0.005 (t= 2.360; p= 0.020)</td>
<td>-0.007 (t= 4.300; p= 0.000)</td>
<td>-0.009 (t= 4.090; p= 0.000)</td>
<td>-0.009 (t= 5.644; p= 0.000)</td>
</tr>
</tbody>
</table>

Table 3 demonstrates a number of well-understood, stylised facts concerning stock market data. The data in the upper left-hand side of the table show significant momentum returns. Further, the data clearly show a trend of returns to momentum falling for each J as the holding period K increases, confirming that momentum is a medium-term effect. It is a stylised fact that momentum returns tend to dissipate with increases in holding periods.

The bottom right-hand side of the table shows the well-documented mean-reversion effect, that is, the tendency for outperforming stocks to revert to their means over extended periods of time. Indeed, for lengthy J and K periods, following an ‘opposite’ approach to momentum would have led to statistically significant returns. This is the well-known ‘mean reversion effect’.

**Conclusion**

This research has focused on documenting the returns to momentum strategies in the S&P/ASX 100. Momentum was found to be present in the shorter timeframe J and K combinations tested. The long side of portfolios performed at a statistically significant level in every combination tested.

This is in contrast with some prior US work (Lesmond, Schill and Zhou 2004), which finds that momentum effect is primarily driven by the smaller, illiquid stocks in a portfolio. It is also in contrast with some prior Australian work (Brailsford and O’Brien 2009), which finds that the momentum effect is largely due to short selling smaller stocks.

However, these results closely align with the prior findings of Galariotis (2010), who finds that the momentum effect in large stocks in Australia is predominantly driven by the long side of the portfolio.

Overall, we find support for the use of momentum-based investment strategies within the S&P/ASX 100.

**Future work**

This research has documented the returns to momentum portfolios over a wide range of J/S/K combinations. To fully understand the benefits and potential of momentum investment strategies, our future work will aim to benchmark momentum returns among the constituents of the S&P/ASX 50 and S&P/ASX 200 indices.

Along with the S&P/ASX 100, these indices represent the larger Australian S&P indices, and their constituents are specifically chosen for their size, liquidity and tradability. For these reasons, momentum investment among the constituents of the ASX/S&P indices represents potential opportunities for all investors.

**Overall,** we find support for the use of momentum-based investment strategies within the S&P/ASX 100.
Note
1. Acknowledgement: The data used in this research was supplied by the Securities Industry Research Centre of Asia-Pacific (SIRCA) on behalf of Reuters and the ASX. The authors also gratefully acknowledge the financial assistance provided by Bond University through the Vice Chancellors Research Grant.

References
Papers from the Melbourne Money & Finance Conference 2012

Finsia acknowledges the contribution of the papers from the 17th Melbourne Money and Finance Conference to this issue of JASSA. The conference — Recent Developments in Financial Regulation: An Assessment — was held in July 2012 by the Australian Centre for Financial Studies.

The sponsors of the conference were:
Post GFC standard-setting work has focused on financial stability and prudential supervision. In many respects, the impact of post-financial crisis global regulatory developments on Australia’s framework of financial regulation has been evolutionary rather than revolutionary. Generally, we have not seen calls for the type of major changes that are being implemented in some other jurisdictions. While our existing framework is likely to undergo further refinement over time, we already have many of the key attributes identified by the Financial Stability Board. An earlier version of this paper was presented to the 2012 Australian Centre for Financial Studies’ Melbourne Money and Finance Conference.

Keywords: financial regulation, financial stability, prudential supervision, regulatory framework.

FINANCIAL REGULATION IN AUSTRALIA since the GFC

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In the period since the global financial crisis (GFC) a massive wave of global standard setting has occurred in relation to financial sector oversight and regulation. We have seen the emergence of Basel II.5 and Basel III as well as a range of new standards in areas like financial sector compensation and resolution regimes. This standard-setting work has some way to go, with substantial work still underway on the regulation of wholesale financial markets and shadow banking sectors as well as on the issue of whether domestic systemically important banks (D SIBs) should be subject to higher loss absorbency requirements along the lines that have already been agreed in relation to global systemically important banks (G SIBs).3

In addition, some of the jurisdictions that were at the epicentre of the financial crisis have been implementing their own regulatory changes. Examples include the United Kingdom (UK) Government’s response to the recommendations of its Independent Commission on Banking and the United States’ (US) Dodd-Frank legislation, the detailed rules for which are gradually being written by relevant regulatory agencies. Some of these changes depart from or go beyond internationally agreed standards. While this is not unusual, it can cause some issues for cross-border markets (such as in relation to over-the-counter (OTC) derivatives).

A new Financial Stability Board (FSB) has been established to coordinate the process of developing new regulatory standards. In some areas, the FSB has become a standard setter in its own right (e.g. compensation and resolution). It is playing a key role in monitoring national implementation of G20 commitments through its Coordination Framework for Implementation Monitoring (CFIM), a peer review council for G-SIB regulation and through its ongoing program of rolling thematic and country peer reviews. Some other standard setters are also playing a more active role in monitoring implementation (including the Basel Committee on Banking Supervision (BCBS) in relation to Basel III). Finally, G20 members are subject to more intensive peer review through the International Monetary Fund (IMF) and World Bank Financial Sector Assessment Program (FSAP) process as well as annual Article IV surveillance by the IMF.

Key themes

Standard-setting work since the financial crisis has been focused on four key objectives: enhancing oversight and supervision by national regulators; improving crisis management and resolution arrangements; strengthening the resilience of core prudentially regulated institutions; and increasing the transparency and resilience of major wholesale markets and the ‘shadow banking’ sector.

Enhancing oversight and supervision by national regulators

The aim of enhancing oversight and supervision reflects the view that absent or ineffective supervision was a key cause of the financial crisis. The FSB has produced recommendations to enhance supervisory intensity and effectiveness.4 There is also a view that supervisors in major financial centres should have played a more active role in identifying and mitigating the build-up of systemic risk, both within the core banking system and also within wholesale markets and the shadow banking sector. The FSB has also played a role in promoting stronger cross-
An important issue in this context has been the appropriateness of existing burden-sharing arrangements in the event of a major bank failure. In some jurisdictions, taxpayers have been required to provide substantial support to financial institutions. It has been difficult to recover these funds. This has substantially eroded the fiscal position of some governments. By contrast, shareholders, investors and depositors have received relatively favourable treatment.

Improving crisis management and resolution arrangements

The focus on improving crisis management and resolution arrangements reflects the problems experienced by many national authorities in managing bank failures. In some cases, the lack of relevant powers made it difficult to resolve failing institutions and may have increased the cost of taxpayer support. Failures of large globally active banks also raised significant cross-border issues. In response to these developments, the BCBS produced recommendations on cross-border crisis resolution while the FSB has produced its Key attributes of effective resolution regimes. G20 members have been asked to indicate their plans for implementing the key attributes, and national frameworks will be subject to a thematic peer review in the second half of 2012 (following on from the review undertaken by the BCBS in 2011). An important issue in this context has been the appropriateness of existing burden-sharing arrangements in the event of a major bank failure. In some jurisdictions, taxpayers have been required to provide substantial support to financial institutions. It has been difficult to recover these funds. This has substantially eroded the fiscal position of some governments. By contrast, shareholders, investors and depositors have received relatively favourable treatment. This has prompted considerable interest in how it might be possible to shift the burden of crisis management and resolution from taxpayers to the private sector. The issue was examined by the IMF in 2010. It has also been considered by the BCBS and the FSB.

Different approaches are being adopted in this area, although there is not yet any consensus on how to proceed. To some extent this reflects the novelty of some of the proposals as well as the current environment of financial market volatility. One response has been the introduction of ex ante levies and crisis resolution funds. Some of these levies are also intended to discourage growth or encourage particular funding models. Another response has been to experiment with techniques to force private investors to participate in rescuing failed institutions (through bail-in rather than bail-out). Options that are being explored include requiring banks to issue a certain amount of ‘bail-inable’ debt in advance or giving regulators a general power to impose haircuts on liability holders in a crisis situation.

Strengthening the resilience of core prudentially regulated institutions

The aim of strengthening the resilience of core financial institutions represents a response to concerns that some of them had inadequate capital and liquidity buffers in the lead-up to the crisis. There was also a more fundamental concern that the prudential framework exacerbated pro-cyclicality by allowing the build-up of excess leverage during booms then forcing excess deleveraging during subsequent downturns. Basel II.5 and Basel III will establish higher minimum capital and liquidity requirements for banks. In addition, G SIBs will be subject to higher loss absorption requirements in the form of capital surcharges. Higher regulatory capital requirements are being introduced alongside requirements for ‘bail-inable’ debt in some jurisdictions (e.g. Switzerland and the UK).

Some jurisdictions have gone further in seeking to boost the resilience of major financial institutions by limiting their activities. The US is pursuing this objective through the Volcker Rule while the UK has announced it will require certain retail functions of major banks to be ‘ring fenced’ from other operations.

Increasing the transparency and resilience of major wholesale markets and the ‘shadow banking’ sector

Increasing the transparency and resilience of wholesale markets and the shadow banking sector emerged more slowly as a key theme of international work than the other objectives. The initial focus of this work was on securitisation, credit rating agencies and credit default swap markets. However, it has expanded to cover all OTC derivatives, securities lending and repo markets, money market funds and hedge funds (including issues such as margining and re-hypothecation). This reflects concerns on the part of some regulators that these markets are a potential source of wider financial vulnerabilities, including for
core prudentially regulated institutions, as well as a concern that more intensive regulation of core prudentially regulated institutions may cause activity and risk to shift into the shadow banking sector. To date, the key output in this area has been the agreement to implement reporting and boost the use of central counterparty (CCP) clearing and trading platforms in relation to OTC derivatives. There has also been agreement to collect more data on the operation of the shadow banking sector to better understand the risks involved. By the end of 2012 there is expected to be a decision on whether, and if so how, these areas should be subject to more intensive oversight.

Post GFC standard-setting work has focused very much on financial stability and prudential. Post GFC standard-setting work has focused very much on financial stability and prudential supervision. Relatively little attention has been devoted globally to consumer protection issues, although the Organization for Economic Co-operation and Development (OECD) did produce some high-level principles on financial consumer protection. However, this has been an issue in particular jurisdictions, such as the UK, which witnessed major problems with product miss-selling. In response to these developments, the UK has been considering how to make product issuers take more explicit responsibility for the design of retail products, rather than simply being required to disclose their key features. It has also shown an interest in the regulator having more powers to restrict the availability of products to retail consumers.

Australia’s role in the process

As a member of the G20, Australia has been an active participant in the process of developing new global standards on financial regulation. The involvement of Australian officials in the work of international standard setters has increased markedly since the financial crisis, both in relation to standards development and reviews of implementation. Australia now has two seats in the restructured FSB (we only had one position in the former Financial Stability Forum). We have also become a full member of the BCBS for the first time, where we are represented by the Australian Prudential Regulation Authority (APRA) and the Reserve Bank of Australia (RBA).

The members of these bodies have approached standard-setting work from different perspectives. Regulators from Europe and the US have often been proponents of major change (although not always in the same direction). On the other hand, some emerging market economies have seen the financial crisis as a European and US problem that requires European and US solutions (especially as many of their own financial sectors were relatively unaffected by the financial crisis and did not require extraordinary public support).

The Australian Government took steps to secure the domestic financial system during the GFC through the introduction of the Financial Claims Scheme (FCS), the wholesale bank guarantees and Australian Office of Financial Management investment in the residential mortgage-backed securities (RMBS) market. However, taxpayers will earn a return for these measures. Our regulatory framework did not fail; although strains were exposed in a few areas (e.g. reliance on short-term funding). In these circumstances, the challenge for Australia has been to determine what lessons we should draw from the experience of Europe and the US, and the extent to which we should incorporate new approaches into the design and operation of our regulatory framework, especially where our financial system is materially different, or where potential recommendations may be at odds with existing domestic regulatory practice.

Implications for Australia’s regulatory framework

In many respects, the impact of post-financial crisis global regulatory developments on Australia’s framework of financial regulation has been evolutionary rather than revolutionary. Generally, we have not seen calls for the type of major changes that are being implemented in some other jurisdictions. The financial crisis did not expose fundamental flaws in the basic supervisory architecture we introduced following the 1997 Financial System Inquiry or the way in which supervisors approach their responsibilities. Indeed, it reinforced the value of APRA’s active supervisory oversight and close cooperation between members of the Council of Financial Regulators (CoFR). One of the key points we have sought to emphasise in the G20 context has been the importance of active supervisory oversight (rather than an excessive focus on detailed rules).
One of the key points we have sought to emphasise in the G20 context has been the importance of active supervisory oversight (rather than an excessive focus on detailed rules). While some jurisdictions have adopted more elaborate and formalised approaches to macro-prudential regulation, there appears to be increasing recognition on the part of IMF staff that this can be carried out in different ways and that it is not necessary for all jurisdictions to adopt the approach that has recently been implemented in the UK or the US.

While some jurisdictions have adopted more elaborate and formalised approaches to macro-prudential regulation, there appears to be increasing recognition on the part of IMF staff that this can be carried out in different ways and that it is not necessary for all jurisdictions to adopt the approach that has recently been implemented in the UK or the US. In relation to cross-border cooperation, Australian regulators already have close relations with their New Zealand counterparts, including through the Trans-Tasman Council on Banking Supervision.

In recent years, Australian authorities have devoted considerable attention to crisis management and resolution. This is an area where Australia benefited from the harsh lessons learned from the collapse of HIH Insurance. In the years since the HIH collapse, we progressively upgraded the powers of relevant regulators and coordination arrangements between regulatory agencies. This work has continued in the wake of the GFC, for example, through APRA’s recent engagement with a selection of major banks on the development of resolution plans. The main development in this area involves extending crisis management arrangements to providers of systemically important financial market infrastructure.

While our existing framework is likely to undergo further refinement over time, we already have many of the key attributes identified by the FSB. In relation to burden sharing, the government has not introduced new levies on the banking sector. As part of Basel III, APRA proposes that subordinated debt will be required to be ‘bail-inable’ at the point of non-viability. However, Australia has not followed other jurisdictions like Switzerland and the UK in requiring banks to issue additional tranches of ‘bail-inable’ debt that could be used to replenish dwindling capital buffers. Given uncertainty about the effectiveness of these instruments in a crisis situation in light of their potential to trigger wider contagion, our approach to date has been to see how they perform overseas before making any recommendation to the government about their possible introduction.

As a member of the G20, Australia has agreed to implement Basel III to boost the resilience of our banking sector. APRA is currently consulting on how the new standards will apply in Australia. In contrast with some other jurisdictions, implementation of new capital standards will have relatively small impact on our banks because of the extent to which they have boosted capital since 2008 to meet the demands of investors and rating agencies (as well as APRA’s conservative approach to implementation of Basel II).

A key issue for Australia in the G20 context has been the need for additional capital surcharges over and above Basel III. Because we do not have any G SIBs, we have not been required to impose capital surcharges. However, the FSB and BCBS are considering whether and how to extend these requirements to D SIBs. This would be a significant departure from current practice if it was required to be introduced in Australia.

Australia’s banks are expected to be subject to new liquidity standards from 2015. Again, the immediate impact of these has been reduced by the efforts made since 2008 to strengthen bank funding positions, boost access to deposits and reduce their reliance on short-term funding. The immediate impact will also be limited by the ability of banks to meet a significant part of the new liquidity requirements through committed liquidity facilities (CLF) with the RBA (which are necessary because of our shortage of high-quality liquid assets). In the longer term, the impact of the Basel III liquidity rules will depend on decisions by APRA on the extent to which banks can access the CLF.

In common with most other G20 members, Australia has not elected to take additional structural steps to reduce the riskiness of banks, for example by banning certain activities or requiring ‘ring fencing’ of retail banking. In contrast with the UK and US, our major banks remain focused on traditional lending activities and do not have major investment banking arms. Moreover, experience overseas suggests ‘traditional’ banking is also a major source of risk (especially in relation to property lending).

The area where new global standards may have the greatest impact on Australia’s regulatory regime in the longer term relates to wholesale financial markets and shadow banking. Up until now, these parts of our financial system have not generally been subject to direct regulation (although they have been indirectly affected to the extent that participants are prudentially regulated or are part of groups containing prudentially regulated entities). This reflects the position that there can be parts
of the financial sector that are not regulated for on prudential or investor protection grounds.

In April 2012, the government set out how it will implement the G20 commitment on reforming OTC derivative markets.17 This includes proposals for legislation that could be used to mandate trade reporting, use of central counterparty clearing and use of trading platforms. The FSB and other standard-setting bodies are currently examining the need for more intensive oversight and regulation of the shadow banking sector, including money markets and securities lending and repo markets. The outcome of these reviews is not expected until the end of 2012. However, they could potentially recommend a significant expansion of regulation. The issue for Australian authorities will be to determine whether this is justified given the relatively small size of Australia’s shadow banking sector.18

Other issues
A key issue from the perspective of the Australian Government has been the impact of the financial crisis on competition in domestic banking (especially in lending markets). We have seen an increase in the market shares of the major banks as other lenders have struggled to access funding.

In response to these developments, the Government has sought to strengthen access to various types of funding (covered bonds, RMBS and deposits) as well as reduce obstacles to competition. This has included a new account switching package, new fact sheets and the banning of exit fees on new mortgages. The Government has also been examining options for promoting Australia’s corporate bond market, both as a means to enhance bank access to domestic debt funding and as an alternative source of funding for larger corporations. These issues will become even more salient in the future if demand for credit rises.

Notes
1. The views presented in this paper are solely those of the author. They do not necessarily reflect the views of the Australian Government or the Department of the Treasury.
2. For details see Financial Stability Board progress reports to the G20 published on the FSB website (www.financialstabilityboard.org).
3. See FSB’s interim report on Securities lending and repos: market overview and financial stability issues (27 April 2012); FSB’s third progress report on implementation of OTC derivative market reforms (15 June 2012) and Basel Committee consultation document on A framework for dealing with domestic systemically important banks (1 August 2012).
4. See Basel Committee’s Good practice principles on supervisory colleges (12 October 2010), the FSB report on the Intensity and effectiveness of SIFI supervision (2 November 2010) and FSB progress report on implementing the recommendations for enhanced supervision (27 October 2011).
5. See FSF Principles for cross-border cooperation on crisis management, 2 April 2009.
9. See FSB’s Overview of progress in the implementation of the G20 recommendations for strengthening financial stability, report of the Financial Stability Board to G20 Leaders, 19 June 2012.
11. See G20 High-level principles on financial consumer protection. The FSB has also completed a Thematic peer review of mortgage underwriting and origination practices, 17 March 2011.
12. See for example, IMF Staff note on institutional models for macroprudential policy, 1 November 2011.
16. See APRA’s Consultation package on implementation of Basel III liquidity reforms (16 November 2011).
Keywords: high-quality liquid assets, credit risk management, OTC derivatives, committed liquidity facility, liquidity coverage ratio.

FINANCIAL REGULATION
and A$ liquid assets

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This paper examines the existing and prospective demand for Australian dollar-denominated high-quality liquid assets and considers the supply of assets that is available to meet these various needs. It also canvasses the options available to private market participants and policy makers, respectively, to alleviate any possible adverse implications for the smooth operation of financial markets. An earlier version of this paper was presented to the 2012 Australian Centre for Financial Studies' Melbourne Money and Finance Conference.

Liquid assets play an important role in the financial system. They are generally defined as assets, such as cash and government securities, that can be readily liquidated even in stressed financial markets. These assets are central to liquidity and credit risk management in financial markets, commonly being used as collateral to obtain short-term funding and to manage counterparty credit risks in derivatives transactions. Liquid assets are also an important asset class for many institutional investors, such as official reserve managers, because of their low credit and market risk.

A number of regulatory reforms designed to increase the stability of the financial sector in the wake of the financial crisis are set to increase demand for liquid assets, both locally and globally. In particular, the Basel Committee on Banking Supervision (BCBS) is introducing the liquidity coverage ratio (LCR), which will require banks to have sufficient high-quality liquid assets (HQLA) to meet the outflows associated with a 30-day stress scenario. This is a much more demanding metric than is currently being applied in most jurisdictions. Regulatory changes designed to improve counterparty credit risk management in the over-the-counter (OTC) derivatives market are also likely to add to the demand for liquid assets.

In Australia, the supply of HQLA, such as Commonwealth Government securities (CGS), is structurally low compared to the size of the financial sector, reflecting consistent budget surpluses over a number of years prior to the global financial crisis (GFC). Although the supply of government bonds has increased since 2007, it remains very low both by international comparison and relative to the needs of the financial system.

The demand for A$ liquid assets

Banks and other financial institutions require liquid assets to support their activities. Banks, in particular, need to hold assets that can be exchanged for cash at short notice to manage their day-to-day needs. Banks also demand liquid assets that can help them to manage the liquidity risk inherent in using short-term liabilities to fund longer-term lending activities. In addition, financial institutions active in derivatives markets typically need to hold an inventory of liquid assets for use as collateral to fund their trading and hedging activities. To fulfil these roles, there needs to be reasonable certainty about the value of these assets.

At the beginning of 2007, before the GFC, liquid assets accounted for around 6 per cent of banks’ total domestic assets (Table 1). A large share was in the form of unsecured securities issued by other banks: holdings of short-term paper, such as bank bills and certificates of deposit (CDs), accounted for almost 56 per cent of liquid assets, and a further 10 per cent was held in long-term bank paper. In normal market conditions, prime bank bills and CDs can be sold readily with very little impact on the prevailing price and have similar market liquidity to government bonds. The importance of unsecured bank paper as a source of liquidity was highlighted as the GFC emerged in the second half of 2007. Issuance of these securities increased significantly, with most being taken up by other banks to increase their capacity to access liquidity from the Reserve Bank of Australia (RBA, Boge and Wilson 2011). In contrast, only around 6 per cent of liquid assets were either CGS or semi-government debt. Some of these securities would have been held under a repurchase agreement (repo).
TABLE 1: Australian banks’ assets
Domestic books, excludes interbank deposits

<table>
<thead>
<tr>
<th></th>
<th>March 2007</th>
<th>March 2009</th>
<th>March 2012</th>
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<tr>
<td></td>
<td>$ billion</td>
<td>Share(%)</td>
<td>$ billion</td>
</tr>
<tr>
<td>Liquid assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGS &amp; semis</td>
<td>98</td>
<td>6</td>
<td>199</td>
</tr>
<tr>
<td>Short-term bank paper</td>
<td>54</td>
<td>56</td>
<td>94</td>
</tr>
<tr>
<td>Long-term bank paper</td>
<td>9</td>
<td>10</td>
<td>42</td>
</tr>
<tr>
<td>Other(b)</td>
<td>28</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>Total bank assets</td>
<td>1640</td>
<td></td>
<td>2411</td>
</tr>
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(1) Share of total A$ assets (per cent), subcomponents are the share of liquid assets.
(2) Includes notes and coins, A$ debt issued by non-residents and securitised assets (excluding self-securitised assets).
Sources: ABS; APRA; RBA.

Institutional investors, such as official reserve managers, sovereign stabilisation funds and pension funds demand liquid assets to fulfil mandates that emphasise capital preservation and steady income flows. Official reserve managers, for instance, tend to hold a significant share of their reserves in safe, liquid assets in foreign currencies. Insurance companies and pension funds have long-term liabilities and, therefore, demand long-term liquid assets, such as long-dated government bonds. The IMF estimates that almost half of the government bonds on issue globally are held by institutional investors (IMF 2012). Demand for Australian dollar-denominated liquid assets from non-resident investors, such as official reserve managers, has increased five-fold since the beginning of 2000. This partly due to an increase in these investors’ funds under management, and partly due to increasing diversification of their portfolios across a range of AAA-rated sovereign securities (IMF 2012). As a result, the share of these assets held in accounts of non-residents doubled to around 60 per cent from 2000 to the present (see Figure 1).

FIGURE 1: Foreign ownership of Australian Government debt

Basel III liquidity standards

During the GFC, many assets that had been liquid in normal market conditions performed very poorly. In particular, many highly rated assets experienced sharp price falls and/or became illiquid (IMF 2012). This has led the BCBS to reappraise its regulatory rules around the management of liquidity risk (BCBS 2010a) and the capitalisation of trading book assets (BCBS 2012).

Most notably, the BCBS has established new minimum standards for the size and composition of banks’ liquid asset holdings. In particular, from 2015 the Liquidity Coverage Ratio (LCR) will require banks to have a sufficient quantum of the highest-quality liquid assets, a subset of the liquid assets considered in Table 1, to meet the outflows associated with a 30-day stress scenario. This is a significantly more stringent test than the five-day stress scenario that has been in place Australia for the largest banks. Under the LCR, HQLA are defined as assets that are unencumbered, easily and immediately convertible into cash with little or no loss of value under stressed market conditions and, ideally, are eligible for repurchase transactions with the central bank. In Australia, the Australian Prudential Regulation Authority (APRA) has defined HQLA as cash, central bank reserves, CGS and semi-government securities.

Changes to Australian banks’ balance sheet management practices, partly driven by market discipline and partly by the need to prepare for Basel III, are apparent in the profile of their liquid asset holdings (Table 1). The share of liquid assets has increased steadily since 2007 and was 10 per cent at the end of 2012. The share of government securities in liquid assets increased to 30 per cent while the share of short-term bank paper more than halved. At the same time, holdings of other banks’ long-term bonds increased to almost 30 per cent.
Despite this, APRA estimates that banks would have needed around $300 billion more HQLA at the end of 2011 to cover the outflows estimated for the 30-day stress scenario under the LCR framework as articulated by BCBS (2010a). The BCBS has estimated that the global shortfall of HQLA for banks is at least $2 trillion (BCBS 2010b, IMF 2012). Banks can reduce these shortfalls to some extent between now and 2015 by adjusting their business models to decrease the net outflows that need to be covered in the stress scenario (the denominator of the LCR). Furthermore, the LCR is subject to an observation period and therefore the specific parameters used to set requirements could potentially be refined. Nevertheless, the magnitude of the estimated shortfall suggests that there will be a significant further increase in demand for HQLA.

**Regulation of OTC derivatives**

The GFC revealed that some OTC derivatives markets, such as the credit default swap market, were a source of uncertainty and risk. In many cases, the size of exposures was not transparent to counterparties or regulators, and prevailing risk management arrangements were not adequate to control the build-up of counterparty credit exposures or to prevent the transmission of distress between financial institutions. These observations have led to a number of regulatory initiatives.

Most notably, the G20 has committed to centrally clearing all standardised OTC derivatives by the end of 2012, and to higher capital requirements for non-centrally cleared derivatives (Council of Financial Regulators 2012). Since not all OTC derivatives are well suited to central clearing, the G20 has also endorsed the development of international standards for bilateral margin requirements on non-centrally cleared derivatives, to improve counterparty risk management in those markets and to ensure that there are no disincentives to central clearing (BCBS-IOSCO 2012).

While variation margin is already typically exchanged in cash under existing bilateral arrangements between financial institutions, the expansion of both central clearing and initial margining of non-centrally cleared transactions will increase the demand for assets that are accepted as initial margin. The collateral eligibility criteria for many central and bilateral counterparties are broader than HQLA. However, assets with low credit and liquidity risk are often preferred so that, in the event of a default, the holder of collateral can manage any cash flows arising until its exposure can be extinguished. Indeed, in practice, in many markets initial margin payments are predominantly settled in cash. As a result, demand for HQLA may be expected to increase further.

To illustrate the broad magnitude of the increase in demand for collateral in Australia from this source, we consider margin requirements on the two largest classes of OTC derivatives currently held on Australian banks’ books. These are single-currency interest rate swaps and foreign exchange swaps and forwards (including cross-currency swaps), of which Australian banks were holding notional amounts outstanding of $8.5 trillion and $4.3 trillion, respectively, in March 2012.

It is likely that, as a result of either regulatory requirements or commercial incentives, single-currency interest rate swaps will largely move to central clearing. However, the increase in demand for collateral to meet margin obligations arising from these transactions is likely to be relatively limited for two reasons. First, margins are based on the central counterparty’s (CCP’s) multilateral net exposures to individual participants. Second, the prices of these assets are relatively stable. Hence, initial margin posted against single-currency interest rate swaps may be in the order of just 0.02 per cent of notional amounts outstanding (LCH.Clearnet 2011).

In contrast, the increase in demand for collateral to meet initial margin requirements associated with Australian banks’ positions in foreign exchange derivatives is likely to be substantial. These positions will, at least in the short term, remain bilaterally cleared, since no CCP yet offers a central clearing service for most classes of these derivatives. Estimates of the potential increase in demand for Australian dollar-denominated HQLA from paying initial margin on foreign exchange derivatives are sensitive to assumptions on the margin rate, the share of Australian banks’ notional exposures involving the Australian dollar, and the degree to which gross notional outstanding positions can be reduced through bilateral netting. Margin rates could be as high as 6 per cent, but approved internal models, which will be widely used in practice, are likely to produce estimates closer to 3 per cent (BCBS-IOSCO 2012). Assuming that around 50 per cent of gross outstanding foreign exchange derivatives involve the Australian dollar and that net exposures are around 50 per cent of gross outstanding exposures (which is plausible given the data available), the potential collateral needed to meet initial margin requirements could be around $35 billion.

**The supply of A$ high-quality liquid assets**

The discussion above highlights the variety of sources of demand for HQLA in the Australian financial system and observes that there will be a significant increase in such demand. At present, there is almost $240 billion outstanding in CGS, representing around 17 per cent of GDP and around 9 per cent of bank assets (Figure 2). The semi-government bond market is similar in size.
times a given security is re-used or re-hypothecated, has been falling, partly due to regulation as well as increased demand from clients for collateral assets to be protected (Singh 2011). This will exacerbate any pressures in the market for collateral. There have been a number of responses, both internationally and domestically, and in both the public and private sectors, to alleviate these pressures.

### The private sector response

Internationally, the prospect of increasing and competing demands on a limited pool of HQLA has raised concerns in the private sector around the costs of meeting liquidity and collateral requirements. In practice, the private sector has at least four ways of responding to these developments:

- Third-party collateral management services that allow market participants to increase the efficiency of collateral usage are well established, but are likely to become more heavily utilised. In the Australian context, commercial bank providers of such services are already active and the ASX Group is working with Clearstream Banking Luxembourg to develop a centralised collateral management service linked to the financial market infrastructure.

- Internationally, there has been an increase in demand for so-called ‘collateral transformation’, or ‘collateral upgrade’ services, whereby low-quality or illiquid assets are exchanged for high-quality assets that meet either a central or bilateral counterparty’s collateral eligibility criteria.

- Central and bilateral counterparties are, where appropriate, increasingly likely to accept a broader set of collateral assets than HQLA to satisfy initial
margin obligations. Some CCPs already accept a relatively wide range of collateral assets. The CPSS–IOSCO Principles of financial market infrastructures (CPSS–IOSCO 2012) suggest that while CCPs should prefer collateral ‘with low credit, liquidity and market risks’, other assets may be ‘acceptable collateral for credit purposes if an appropriate haircut is applied’. BCBS–IOSCO (2012) makes similar recommendations in relation to non-centrally cleared transactions.

> With demand for HQLA increasing more rapidly than supply, the inevitable adjustment in yields will trigger some portfolio reallocation towards higher-yielding assets where investors have discretion to do so.

The central bank response

Heightened demand for HQLA is also likely to affect central banks’ operations and policy objectives in a number of ways. First, for many central banks, including the RBA, repurchase agreements play a central role in open market operations. The availability of eligible collateral can therefore influence the effectiveness of monetary policy operations. It can also have implications for the smooth functioning of high-value payment systems, which generally rely on the provision of intraday liquidity against eligible collateral to facilitate real-time gross settlement.

Second, to the extent that increasing demand for eligible collateral assets drives up the price of those assets, banks’ costs of funding and the costs of trading would be expected to rise. This could, in turn, lead to a decline in financial activities, such as foreign exchange and interest rate hedging, which support many transactions in the broader economy.

Finally, financial stability risks could also arise if financial institutions were unable to manage their liquidity effectively, such that facing a shortfall they were forced to sell illiquid assets at fire-sale prices.

In contrast to private sector financial institutions, a central bank can increase the supply of cash to its desired level by using its balance sheet. Given this unique capability, a central bank can provide a vehicle to transform a broader range of financial system collateral into cash. One way this can be done is by expanding the set of securities that are eligible for central bank repo operations. The RBA has done this on a number of occasions over the past decade, both in response to the structural decline in the availability of CGS before the GFC and in response to the increase in demand for central bank liquidity as market conditions became distressed during the crisis.2 During this period, the RBA took a number of steps, including expanding the list of eligible securities to include residential mortgage-backed securities (RMBS) issued by the collateral provider (so-called ‘self-securitised’ securities). This episode highlights the importance of the central bank as a source of liquidity in times of stressed financial markets.

The RBA has taken a similar stance in responding to the structural shortage of HQLA to meet ADIs’ requirements under the LCR. In particular, ADIs may be able to establish a committed liquidity facility (CLF) from the RBA to help meet these requirements (APRA 2011), which in many ways is merely a formal extension of the RBA’s existing arrangements. Under the CLF, participating ADIs will be permitted (at a price) to access a pre-specified amount of liquidity (determined by APRA) by entering into repurchase agreements outside the RBA’s normal market operations. All the securities that are eligible for the RBA’s normal market operations will also be eligible for the CLF. In addition, the RBA will allow ADIs to present certain related-party assets, including self-securitised RMBS and asset-backed securities.

In establishing the CLF, the RBA has effectively committed to perform collateral transformation, at a penalty rate, on assets that do not have the defining features of HQLA. The RBA will receive a fee of 15 basis points in return for this commitment (RBA 2011). This level has been set to capture the liquidity premium component of the yield differential between the assets eligible under the CLF and government securities (Debelle 2011).3 APRA’s effective prudential supervision, including an explicit requirement that ADIs take all reasonable steps to reduce their need for the CLF, further ensures that ADIs face strong incentives to manage their liquidity risk appropriately.

The way in which the structural shortage of HQLA and the need to meet the Basel III prudential standards have been resolved in Australia highlights the importance of balancing regulatory goals against other policy objectives. In this case, the regulatory objectives of self-reliance and improving liquidity management in the banking sector need to be balanced against the objective of having liquid, and therefore more stable, financial markets for securities that are integral to the efficiency of the financial system.

The impending increase in demand for collateral-eligible assets arising from regulatory reforms in the OTC derivatives market may require a similarly flexible response from central banks, to the extent that it cannot be satisfied by the private sector. Consistent with this, the RBA recently revised its access policy to require that systemically important central counterparties maintain Exchange Settlement accounts at the RBA (RBA 2012b).

While there has been some increase in the stock of government securities over recent years, this will not be sufficient to cover additional demands from two sources. The first is the introduction of new liquidity standards that will come into force in 2015. The
In many ways, this is a formal extension of existing its policy around access to central bank facilities. The Finsia Journal of Applied Finance Issue 3 2012

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At the international level, there is concern that the increase in demand for HQLA, driven both by regulatory changes and market discipline in the aftermath of the GFC, could lead to a substantial rise in the price of these assets. This could, in turn, increase the cost of key financial risk management activities in both the financial sector and the wider economy, with potential implications for both efficiency and stability in financial markets. The Finsia Journal of Applied Finance Issue 3 2012

Australia confronted increasing demands on a limited pool of Australian dollar-denominated HQLA for many years before the GFC. Relatively low levels of government debt were not sufficient to meet financial institutions’ day-to-day needs for liquid assets, and the growing demand for these assets from offshore institutional investors. In response, the RBA broadened the range of eligible collateral that could be used in the RBA’s daily open market operations. The Finsia Journal of Applied Finance Issue 3 2012

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Conclusion
At the international level, there is concern that the increase in demand for HQLA, driven both by regulatory changes and market discipline in the aftermath of the GFC, could lead to a substantial rise in the price of these assets. This could, in turn, increase the cost of key financial risk management activities in both the financial sector and the wider economy, with potential implications for both efficiency and stability in financial markets. The Finsia Journal of Applied Finance Issue 3 2012

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Notes
1. We would like to thank Matthew Boge, Guy Debelle, David Jacobs and many other colleagues for comments on this paper. We would also like to thank Sara Ma and Paul Ryan for assistance with the data. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Reserve Bank of Australia. The authors are solely responsible for any remaining errors.

2. This calculation is on a consolidated banking group basis, whereas Table 1 presents data for banks’ domestic books only.

3. See for example, Cameron (2012) and The Economist (2012).


5. The rationale for pricing the facility to capture the liquidity premium on eligible assets relative to government securities is that the RBA is seeking to replicate the economics of how the LCR would be met in the absence of a structural shortage of HQLA.

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BCBS 2010b, Results of the comprehensive quantitative impact study, Bank for International Settlements, Basel, December.


Keywords: liquidity risk, liquidity buffers, liquidity regulation, authorised deposit-taking institutions, global liquidity standards.

LIQUIDITY BUFFERS of Australian-owned ADIs

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Liquidity risk has many characteristics prompting the need to manage the exposure via a liquidity buffer. The objective of this paper is to build on the scarce empirical evidence surrounding the determinants of authorised deposit-taking institutions’ (ADIs) liquidity buffers. Of particular interest is the question of how macro-economic and ADI-specific factors influence Australian-owned ADIs’ holdings of liquid assets. An earlier version of this paper was presented to the 2012 Australian Centre for Financial Studies’ Melbourne Money and Finance Conference.

Funding liquidity is the ability to meet cash claims as they arise. For banks this is extraordinarily important because of the uncertainty surrounding the nature of their future cash flows. Liquidity buffers serve to insulate banks against this uncertainty by providing access to cash when needed. They are therefore considered a fundamental element of liquidity risk management.

In a broader context, banks that are more self-reliant help to mitigate liquidity contagion, defined herein as the spreading of liquidity problems from one troubled bank to other financial system participants. Liquidity contagion has the potential to quickly exacerbate a bank-specific liquidity problem into a systemic liquidity event. This may loom as a threat to financial stability and, in extreme cases, the viability of the financial system as evidenced by the financial crisis that began in 2007.

Despite the importance of liquidity buffers in mitigating liquidity risk at both the bank- and system-level, little is known about how they relate to the macro economy and to bank-specific factors. Extant regulatory guidance material focuses almost entirely on the size, marketability and composition of ADIs’ liquidity buffers, and on the survival periods that form part of scenario modelling. Among the academic literature, much of the work relating to banks’ liquidity buffers examines the effect of the lender of last resort. This paper seeks to fill that gap.

Australia provides an ideal setting for such a study for two main reasons. First, the Australian Prudential Regulation Authority (APRA) classifies ADIs as either simple minimum liquidity holdings (MLH) financial institutions (generally credit unions and building societies) or more complex scenario analysis (SA) ADIs for the purpose of liquidity regulation and supervision. This classification provides a non-arbitrary distinction between small and large ADIs which is ideal for testing for differences in their liquidity buffers. Second, Australian ADIs are not subject to a reserve requirement, meaning that changes in an ADI’s liquidity buffer will be more sensitive to management’s strategic decisions.

Using a balanced panel of 112 Australian-owned ADIs, a generalised method of moments (GMM) model is employed to examine the levels of ADIs’ liquidity buffers with respect to various macroeconomic and ADI-specific factors. Strong evidence suggests that SA ADIs build up their liquidity buffers during economic downturns and draw them down in economic upturns. This behaviour may give rise to pro-cyclical effects. There is no evidence that economic growth affects the liquidity buffers of MLH ADIs. In addition, there is strong evidence that both SA and MLH ADIs carry more (less) liquidity when interest rates are low (high), which may have consequences for the transmission of monetary policy. The effect is more pronounced among SA ADIs. Overall, large ADIs are found to carry less liquidity, relative to total assets, than small ADIs.
Background

**Liquidity regulation and supervision in Australia**

APRA sets out qualitative and quantitative liquidity requirements for ADIs under *Prudential Standard APS 210 Liquidity* (APS 210). ADIs are required to have in place a liquidity risk management framework that includes at a minimum: the liquidity risk tolerance of the ADI; a board-approved liquidity management strategy; policies, procedures and controls for liquidity risk identification, measurement and monitoring; a funding strategy for the group; as well as a contingency funding plan.

The minimum quantitative requirements depend on APRA’s classification of ADIs as either MLH or SA. MLH ADIs are required to maintain a minimum holding of 9 per cent of their liabilities in specified liquid assets or, in many cases, more than 9 per cent, as APRA exercises its supervisory discretion. SA ADIs, on the other hand, must consider various scenarios to ensure they can continue to meet their obligations under a range of adverse operating environments.

**Policy-oriented work**

The Basel Committee on Banking Supervision (BCBS) has traditionally promoted liquidity buffers as a fundamental element of ‘better’ liquidity risk management and supervision practice. This is highlighted by Principle 1 and Principle 12 of the BCBS’ *Principles for Sound Liquidity Risk Management and Supervision* (September 2008). The guidance focuses largely on factors affecting the size of banks’ liquidity buffers and the composition of liquidity buffers. Regulators in many jurisdictions have incorporated these principles into their liquidity regulation and supervision practices.

Prompted by the severity of banks’ funding and liquidity problems that were brought to light by the global financial crisis, the BCBS have introduced two global liquidity standards: i) the liquidity coverage ratio (LCR); and ii) the net stable funding ratio (NSFR). Of most relevance to this paper, the LCR helps to ensure ADIs can meet their funding demands during a stressed environment lasting one calendar month. It requires ADIs to hold more liquid assets and better quality liquid assets than prior to the crisis. This is the first time most ADIs in most jurisdictions are subject to scenario modelling and stress testing requirements for liquidity, many of the models relied on historical data and narrow confidence intervals, and underestimated the extent and prolonged duration of a market disruption.

**Academic literature**

Aspachs, Nier and Tiesset (2005) examine empirically the determinants of ADIs’ liquidity buffers. They use a panel of 59 UK-resident ADIs for which data was collected from the period Q1 1985 to Q4 2003. Their research produced two main findings. First, ADIs’ liquidity buffers are inversely related to GDP, increasing in downturns and decreasing in upturns. Second, ADIs are financially constrained with strong evidence suggesting they hoard money as a source of liquidity when current profits are high and future lending opportunities are good. The second finding is consistent with the results of Almeida, Campello, and Weisbach (2004) who report evidence of financing constraints among a panel of US non-financial corporate institutions.

**Data**

This study uses a balanced panel of 112 Australian-owned ADIs, which consists of nine SA ADIs and 103 MLH ADIs. ADI-specific data is extracted from a number of regulatory reporting forms submitted to APRA on a quarterly basis from June 2002 to March 2012. Economic data is sourced from statistical tables published by the Reserve Bank of Australia (RBA) over the same time period.

A list of the variables used to examine levels of liquidity buffers is presented in Table 1.
**TABLE 1: Variables used in regression analysis**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Measure of:</th>
<th>Calculated as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity ratio</td>
<td>Buffer of liquid assets</td>
<td>Liquid assets divided by total assets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Measure of:</th>
<th>Calculated as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan growth</td>
<td>Current lending opportunities</td>
<td>Quarter-on-quarter growth in loans to the non-financial sector</td>
</tr>
<tr>
<td>Net interest margin</td>
<td>Opportunity cost of holding liquid assets</td>
<td>Net interest income divided by total assets for the reported quarter</td>
</tr>
<tr>
<td>Profit/total assets</td>
<td>Profitability as a source of liquidity</td>
<td>Quarterly net profit after tax divided by total assets</td>
</tr>
<tr>
<td>Size</td>
<td>Controlling for size</td>
<td>Log total dollar assets</td>
</tr>
<tr>
<td>Wholesale funding ratio</td>
<td>Reliance on wholesale funding</td>
<td>The proportion of wholesale funding to total funding liabilities</td>
</tr>
<tr>
<td>GDP</td>
<td>Business cycle effect</td>
<td>Quarter-on-quarter growth in output</td>
</tr>
<tr>
<td>BBSW</td>
<td>Monetary policy</td>
<td>Three-month bank bill swap rate (BBSW)</td>
</tr>
</tbody>
</table>

**TABLE 2: Summary statistics**

<table>
<thead>
<tr>
<th>Panel A: Scenario Analysis ADIs (n=9)</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th># Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity Ratio</td>
<td>4.62</td>
<td>48.64</td>
<td>16.04</td>
<td>14.35</td>
<td>7.62</td>
<td>360</td>
</tr>
<tr>
<td>Loan Growth</td>
<td>-21.46</td>
<td>35.47</td>
<td>3.08</td>
<td>2.91</td>
<td>5.00</td>
<td>360</td>
</tr>
<tr>
<td>Net Interest Margin</td>
<td>-2.00</td>
<td>3.15</td>
<td>1.75</td>
<td>1.86</td>
<td>0.65</td>
<td>360</td>
</tr>
<tr>
<td>Profit/Total Assets</td>
<td>-1.02</td>
<td>3.01</td>
<td>0.26</td>
<td>0.22</td>
<td>0.36</td>
<td>360</td>
</tr>
<tr>
<td>Size (Log Total Assets)</td>
<td>21.53</td>
<td>27.09</td>
<td>24.87</td>
<td>24.81</td>
<td>1.56</td>
<td>360</td>
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<tr>
<td>W/Sale Funding Ratio</td>
<td>45.28</td>
<td>99.62</td>
<td>76.34</td>
<td>79.90</td>
<td>14.05</td>
<td>360</td>
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</table>

<table>
<thead>
<tr>
<th>Panel B: Minimum Liquid Holding ADIs (n=103)</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th># Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity Ratio</td>
<td>8.27</td>
<td>63.47</td>
<td>21.65</td>
<td>19.81</td>
<td>8.04</td>
<td>4120</td>
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<tr>
<td>Loan Growth</td>
<td>-30.92</td>
<td>37.48</td>
<td>1.88</td>
<td>1.75</td>
<td>3.62</td>
<td>4120</td>
</tr>
<tr>
<td>Net Interest Margin</td>
<td>-4.56</td>
<td>14.45</td>
<td>3.81</td>
<td>0.84</td>
<td>1.12</td>
<td>4120</td>
</tr>
<tr>
<td>Profit/Total Assets</td>
<td>-1.63</td>
<td>7.39</td>
<td>0.17</td>
<td>0.15</td>
<td>0.19</td>
<td>4120</td>
</tr>
<tr>
<td>Size (Log Total Assets)</td>
<td>14.41</td>
<td>22.95</td>
<td>18.92</td>
<td>18.88</td>
<td>1.55</td>
<td>4120</td>
</tr>
<tr>
<td>W/Sale Funding Ratio</td>
<td>4.52</td>
<td>89.54</td>
<td>21.29</td>
<td>19.42</td>
<td>10.73</td>
<td>4120</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel C: Macro Economic Variables</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th># Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBSW 3M</td>
<td>3.19</td>
<td>7.64</td>
<td>5.33</td>
<td>5.39</td>
<td>1.09</td>
<td>40</td>
</tr>
<tr>
<td>GDP (quarterly change)</td>
<td>-0.68</td>
<td>1.73</td>
<td>0.74</td>
<td>0.74</td>
<td>0.53</td>
<td>40</td>
</tr>
</tbody>
</table>

Note: All values reported are in percentages and are based on quarterly observations. The exception is size, which is reported as the log of total dollar assets. Growth variables represent quarter-on-quarter change. Net Interest Margin is annualised in the same manner as APRA’s quarterly banking statistics.
From 2002 until late 2007 the liquidity buffers of SA ADIs trended slightly downwards from 16 per cent toward 12.5 per cent. On the contrary, MLH ADIs maintained liquidity buffers in the vicinity of 21 per cent. In mid 2007 the liquidity buffers of SA ADIs jumped around 4 per cent (12.5 per cent to 17.5 per cent), with a subsequent increase of approximately 3 per cent (16.5 per cent to 19.5 per cent) in mid 2008. Since then they have continued to increase to around 20 per cent. Over the same period, the liquidity ratios of MLH ADIs have also increased, but to a lesser extent.

Method and results

A one-stage generalised method of moments (GMM) model is employed to examine empirically the determinants of liquidity buffers. The approach is similar to that of Blundell and Bond (1998) in which explanatory variables are first-differenced and used as instruments and parameters are estimated using level moment equations.

The baseline model examines the effect of GDP and short-term interest rates on levels of ADIs’ liquidity buffers while controlling for size. It has the form:

\[
\text{Liq}_t = a + \text{I(SA)}a + \beta_{\text{SA}} \text{I(SA)} \Delta \text{GDP}_t + \beta_{\text{MLH}} \text{I(MLH)} \Delta \text{GDP}_t + \beta_{\text{SA}} \text{I(SA)} \text{BBSW}_t + \beta_{\text{MLH}} \text{I(MLH)} \text{BBSW}_t + \beta_{\text{size}} \text{Size}_t + \gamma + \epsilon_t
\]

where:

- \( \text{Liq}_t \) is the liquidity buffer of ADI \( i \) at time \( t \)
- \( a \) is the intercept term
- \( \text{I(SA)} \) is an indicator variable that is equal to 1 for SA ADIs and 0 otherwise
- \( \Delta \text{GDP} \) is the change in GDP from the previous quarter
- \( \text{I(MLH)} \) is an indicator variable that is equal to 1 for MLH ADIs and 0 otherwise
- \( \text{BBSW} \) represents the three-month bank bill swap rate
- \( \text{Size} \) is measured as the log total assets per ADI-quarter
- \( \gamma \) are cross-sectional fixed effects
- \( \epsilon_t \) is the error term

Comparing the means of SA ADIs (Panel A) and MLH ADIs (Panel B) the main observations are as follows.

- On average, SA ADIs have lower levels of liquidity (16 per cent) than MLH ADIs (22 per cent).
- SA ADIs are much larger than MLH ADIs with average assets approximately AUD$63 billion versus AUD$165 million.
- SA ADIs rely much more heavily on wholesale funding (76 per cent) than MLH ADIs (21 per cent).
- SA ADIs exhibit higher quarterly lending growth to the non-financial sector (3.1 per cent) than their MLH counterparts (1.9 per cent) and generate a higher return on assets (0.26 per cent v 0.17 per cent). There is, however, greater variability in SA ADIs’ quarterly profits.
- The net interest margin for SA ADIs (1.8 per cent) is considerably lower than that for MLH ADIs (3.8 per cent). Higher average funding costs for SA ADIs accounts for much of this difference.

Figure 1 plots the levels of ADIs’ liquidity buffers over the sample period.
First, net interest margin is inversely related to the liquidity buffers of both groups of ADIs, but only significant for MLH ADIs. The negative coefficient implies that ADIs carry less liquidity, relative to total assets, when their net interest margin is high. This is consistent with the predictions of inventory models of optimal liquidity holdings. Second, wholesale funding reliance affects the liquidity buffers of SA ADIs, but not MLH ADIs. The positive coefficient implies that SA ADIs that rely more on wholesale funding carry more liquidity, relative to total assets. This appears prudent from a liquidity risk management perspective. Third, loan growth affects the liquidity buffers of ADIs. The negative coefficient implies that ADIs experiencing higher lending growth will carry less liquidity, relative to total assets. Fourth, profit affects the liquidity buffers of ADIs with the negative coefficient suggesting that higher profits result in less liquidity, relative to total assets. Finally, the negative coefficient on size implies that large ADIs carry less liquidity than small ADIs.

Summary

SA ADIs are found to build up their liquidity buffers during economic downturns and draw them down during economic upturns. This behaviour may give rise to pro-cyclical effects, whereby a reduction in liquidity to fund loans amplifies the upturn and the hoarding of liquidity by not funding loans deepens and lengthens the downturn. No such relationship was evident among MLH ADIs.

Another important finding is that both SA and MLH ADIs carry more (less) liquidity when interest rates are low (high). This implies that when the central ADI seeks to stimulate the economy by reducing interest rates, and increasing money supply, both groups of ADIs respond by carrying more liquid assets.

The use of indicator variables in the regression allows for SA ADIs to be compared to MLH ADIs, with different intercept terms and different slope parameters for GDP and interest rates. The use of first-differenced explanatory variables as instruments controls for any ADI-specific fixed effects.

The regression results are presented in column 1 of Table 3.

The results provide strong evidence that SA ADIs’ liquidity buffers are affected by both economic growth and the short-term interest rate. First, the negative coefficient on GDP implies that ADIs carry more (less) liquidity, relative to total assets, when economic growth is weak (strong). Second, the negative coefficient on the short-term interest rate implies that SA ADIs carry more (less) liquidity, relative to total assets, when rates are low (high).

For MLH ADIs, the results provide no evidence that their liquidity buffers are affected by economic growth. While there is a significant inverse relationship with the short-term interest rate, the effect is significantly less pronounced than for SA ADIs.

As a check for robustness, the model is expanded to include other factors that may affect the level of ADIs’ liquidity buffers. In particular, net interest margin as a measure of the opportunity cost of foregone return, wholesale funding reliance, loan growth to the non-financial sector and net profit after tax are included. The results are presented in column 2 of Table 3.

The effect of economic growth and the short-term interest rate on the liquidity buffers of SA and MLH ADIs remains unchanged. As for the additional control factors there are a number of interesting findings.
This result may have been driven by the central bank’s actions to reduce interest rates to historic low levels during the early part of the crisis. Further analysis into the supply and demand effects of loan growth is needed to determine if this behaviour mitigates the effect of monetary policy.

In terms of the ADI-specific factors that were examined, net interest margin affects the liquidity buffers of MLH ADIs but not SA ADIs. The negative coefficient implies that MLH ADIs carry less liquidity when opportunities to earn higher returns on loans and other investments are available. Intuitively, this makes sense. Loan growth and profit are both significant and inversely related to ADIs’ liquidity buffers. These findings imply that ADIs experiencing higher loan growth and larger profits will carry less liquidity relative to total assets. The positioning of liquidity to account for lending opportunities suggests that ADIs cannot fully rely on external sources of funds to lend optimally over time.

Overall, these findings may prove useful for the future development of liquidity policy at both the ADI- and system-level. Further analysis into the effect of the crisis on ADI liquidity and loan growth is planned. ■

Notes
1. Disclaimer: This paper reflects the author’s views and not necessarily the views of APRA. APRA does not accept any responsibility for the accuracy, completeness or currency of the material included in this publication, and will not be liable for any loss or damage arising out of any use of, or reliance on, this publication.
2. Acknowledgement: The author is grateful for the helpful comments received from John Laker, Charles Littrell, Bruce Arnold, other APRA colleagues and staff from the RBA’s Research Department.

References
Keywords: liquidity ratios, funding risk, cost of funding, retail funding, wholesale funding, maturity of funding.

LIQUIDITY REGULATION: lessons from New Zealand

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This paper examines the effects of the new liquidity ratios implemented in New Zealand with effect from 1 April 2010. It finds that the introduction of new rules designed to force banks to reduce their exposure to funding risk has been associated with greater use of retail funding and a lengthening in the maturity of funding. Both of these results are consistent with expectations.1 An earlier version of this paper was presented to the 2012 Australian Centre for Financial Studies’ Melbourne Money and Finance Conference.

The adoption of an internationally standardised set of rules on bank liquidity is one of the innovations in the package of international regulatory rules known as Basel III.2 The Reserve Bank of New Zealand (RBNZ), the New Zealand regulator, was on record as having been concerned about New Zealand banks’ exposure to liquidity and funding risks sometime prior to the global financial crisis (GFC),3 and a program of work was already in place before the period during September and October of 2008 when funding pressures in international markets became particularly severe. This resulted in a set of ratios being designed during 2008 and 2009, to which the New Zealand banks have had to adhere since 1 April 2010.

The RBNZ’s concerns were that New Zealand banks were unable to cover their loan portfolios from deposits, and that they were particularly dependent on relatively short-term wholesale funding, especially relatively short-term non-resident funding. This meant that the banks were particularly exposed to disruption in wholesale markets internationally, an issue which has been recognised by the rating agencies in their reviews of both New Zealand and Australian banks.

The ratios adopted by the RBNZ are a mismatch ratio, which broadly resembles the liquidity coverage ratio specified under Basel III, and a core funding ratio, which broadly resembles the net stable funding ratio.4 The mismatch ratio focuses on liquid asset holdings in the short run, and is focused essentially on liquidity risk, whereas the core funding ratio has a longer time horizon, and is targeted at funding risk, defined as whether or not a bank can sustainably fund itself at stable interest costs which will preserve profitability.5 The required figure under the core funding ratio was initially set at 65 per cent, but this was increased to 70 per cent as at 1 July 2011, and is set to increase to 75 per cent from 1 January 2013. No data have yet been published on what ratios individual banks are achieving, although the RBNZ has stated that banks have been achieving these ratios comfortably.6

Against this background, this paper reports on a number of questions as to what the practical outcomes might be from the RBNZ’s new rules. Our key focus is on the core funding ratio and banks’ funding risk. We investigate whether New Zealand banks have changed the structure of their funding in response to the new ratios (in terms of lengthening maturities and emphasising retail rather than wholesale funding), and we look at potential implications in terms of the cost of funding. We also consider whether there might have been any impact from the new rules in terms of banks’ willingness to lend, an issue which has been raised internationally as a criticism of Basel III (although the limited extent of economic cyclicality in New Zealand since the rules came into effect limits the conclusions we can draw on this question).

Data and method

The primary data source used for this analysis is the RBNZ’s data table SSR (Aggregate Standard Statistical Return (SSR) — registered banks) Part B1, which reports funding in a total of 10 maturity categories according to a number of classifications: funding in New Zealand dollars relative to funding in foreign currencies; funding from residents relative to funding from non-residents; and for New Zealand dollar funding only, a distinction between retail and wholesale funding. To simplify the analysis, we aggregate the data into three maturity categories: up to 90 days; 90 days to one year; and more than one
The switch from wholesale to retail funding is sizeable and to be expected in terms of the incentives under the new rules. This is because retail deposits will generally conform with what is defined as non-market funding, and are therefore allowed to be mostly counted as retained for the purposes of calculating both the mismatch ratio and the core funding ratio.

The switch from wholesale to retail funding is sizeable and to be expected in terms of the incentives under the new rules. This is because retail deposits will generally conform with what is defined as non-market funding, and are therefore allowed to be mostly counted as retained for the purposes of calculating both the mismatch ratio and the core funding ratio.

The lengthening of maturities in retail funding is also consistent with the incentives given to banks in terms of the mismatch ratio — the lengthening of maturities will reduce the amount of scaling back that has to be applied to these deposits as non-market funding. Yet another possible reason for the increase in retail funding might be the disappearance of some of the other vehicles into which such deposits might have flowed following the failure of many New Zealand finance companies since 2006.

The increase in wholesale funding for more than one year is consistent with the requirements under the core funding ratio, particularly as this has largely been matched by a reduction in funding for 90 days to one year. The lack of any significant change in shorter-term wholesale funding indicates that this may be driven by supply — banks have not been able to change counterparty behaviour with this category of funding.

Our next focus is on non-resident funding, which is predominantly wholesale, mostly looking at whether deposits are for more or less than one year. Whether deposits are for more or less than one year is of particular importance because the time horizon for the core funding ratio is one year.

The current RBNZ data series commences at December 2004, and this is the starting point for our analysis. We look at the average (mean) figures for two periods, from December 2004 through to July 2007, as the period prior to the GFC, and then at the post-GFC period, which we define as being from January 2010 through to April 2012 (the latest date for which data were available when this paper was being written). We specify July 2007 as the last month prior to the GFC, as effects on bank liquidity and funding began to be observed during August 2007. We then treat the period from August 2007 through to December 2009 as a period during which the banks were adjusting their portfolios in response to both the shocks experienced during the GFC and the imposition of the RBNZ’s new rules. Even though the new rules did not come into effect until April 2010, the banks had had time to prepare themselves for their introduction and had positioned themselves accordingly in advance.

Data are analysed as a percentage of the total funding in the relative classification, so that effects of changes in overall funding do not confound the effects we are looking for. Due to their small size, samples are unlikely to conform to a normal distribution, meaning that the t-test is not an appropriate method to compare them. We therefore use the Mann-Whitney test, which should be more robust to outliers than the t-test, to explore the statistical significance of apparent differences.

Results

We look first at the mix of funding between wholesale and retail, with this data available for New Zealand dollar funding only. These results are reported in Table 1 and changes in the maturities of funding are reported in Table 2.

### TABLE 1: The retail/wholesale mix

<table>
<thead>
<tr>
<th></th>
<th>12/04 – 07/07</th>
<th>01/10 – 04/12</th>
<th>Significance of difference (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td>57.57%</td>
<td>66.74%</td>
<td>0.000</td>
</tr>
<tr>
<td>Wholesale</td>
<td>42.43%</td>
<td>33.26%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

### TABLE 2: Maturities of retail and wholesale NZD funding

<table>
<thead>
<tr>
<th></th>
<th>12/04 – 07/07</th>
<th>01/10 – 04/12</th>
<th>Significance of difference (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 90 days</td>
<td>79.21%</td>
<td>67.58%</td>
<td>0.000</td>
</tr>
<tr>
<td>90 days to 1 year</td>
<td>18.63%</td>
<td>27.72%</td>
<td>0.000</td>
</tr>
<tr>
<td>More than 1 year</td>
<td>2.17%</td>
<td>4.70%</td>
<td>0.000</td>
</tr>
<tr>
<td>Wholesale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 90 days</td>
<td>75.31%</td>
<td>76.59%</td>
<td>0.157</td>
</tr>
<tr>
<td>90 days to 1 year</td>
<td>16.26%</td>
<td>8.89%</td>
<td>0.000</td>
</tr>
<tr>
<td>More than 1 year</td>
<td>8.44%</td>
<td>14.53%</td>
<td>0.000</td>
</tr>
</tbody>
</table>
We have not examined funding in foreign exchange by New Zealand residents. This funding is very limited, accounting for only approximately 2 per cent of total funding as at April 2012, and its composition by maturity has not changed, with it almost all being for 90 days or less.

A further area that we can examine from the SSR Part B data is the maturity mix of banks’ funding as a whole. Results are reported in Table 4, which shows a reduction in shorter-term funding and an increase in longer-term funding. Again, this is consistent with our expectations.

Further analysis
There are a number of further issues that arise from our analysis. Although we have seen New Zealand banks extend the maturity of their funding, we don’t know how well they are achieving compliance with the new ratios. To what extent could the switch to longer-term funding reflect a switch in the shape of the yield curve, which has made longer term deposits more attractive for less sophisticated retail investors? To what extent could banks’ improved funding profile be a reflection of their reaction to the funding pressures they experienced in 2008, rather than a response to the rules now being applied to them? It would be good to be able to examine comparable data for the Australian banking sector, where changes would be only in response to funding and rating agency pressures, with no current need to respond to regulation.

The only information seen so far on banks’ adherence to the ratios is through the comments made in the

this has changed as a proportion of total funding, and then at its composition. Comparing our two periods, we find that the proportion of non-resident funding increased slightly, although the effect is not statistically significant. A review of the trend suggests that the proportion of non-resident funding to total funding has fallen since June 2010, but not yet by enough or for long enough to show a statistically significant effect.

Results for the composition of non-resident funding are reported in Table 3. Non-resident funding in foreign currencies is now significantly more important than previously, but it is not clear why this might be a consequence of the new liquidity rules. It is more likely to be attributable to the diminished importance of the Eurokiwi and Kauri bond markets, with New Zealand interest rates no longer offering such outstanding opportunities to investors. It is interesting in this regard to note that the maturities of non-resident New Zealand dollar funding appear to have shortened, which is the opposite of what we would expect (although this may reflect the diminished importance of this funding channel).

By contrast, we can see a significant lengthening in the maturities of non-resident funding in foreign currencies. We expect this to be comprised almost wholly of wholesale (market) funding, for which banks seek longer maturities (more than one year) so that it can be included for calculation of the core funding ratio. This trend is also consistent with banks both looking to comply with the new rules and reducing their own risk exposure, with this funding class having been identified as particularly at risk during the problem period in late 2008, following the failure of Lehman Brothers.

We have not examined funding in foreign exchange by New Zealand residents. This funding is very limited, accounting for only approximately 2 per cent of total funding as at April 2012, and its composition by maturity has not changed, with it almost all being for 90 days or less.

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The only information seen so far on banks’ adherence to the ratios is through the comments made in the

### Table 3: Breakdown of non-resident funding

<table>
<thead>
<tr>
<th></th>
<th>12/04 – 07/07</th>
<th>01/10 – 04/12</th>
<th>Significance of difference (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-resident funding by currency</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand dollars</td>
<td>39.86%</td>
<td>30.20%</td>
<td>0.000</td>
</tr>
<tr>
<td>Foreign currency</td>
<td>60.14%</td>
<td>69.80%</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>New Zealand dollar funding, by maturity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 90 days</td>
<td>68.86%</td>
<td>75.52%</td>
<td>0.000</td>
</tr>
<tr>
<td>90 days to 1 year</td>
<td>19.93%</td>
<td>18.37%</td>
<td>0.012</td>
</tr>
<tr>
<td>More than 1 year</td>
<td>11.21%</td>
<td>6.11%</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Foreign currency funding, by maturity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 90 days</td>
<td>69.49%</td>
<td>44.55%</td>
<td>0.000</td>
</tr>
<tr>
<td>90 days to 1 year</td>
<td>17.98%</td>
<td>18.08%</td>
<td>0.689</td>
</tr>
<tr>
<td>More than 1 year</td>
<td>12.53%</td>
<td>37.37%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

### Table 4: Trend in maturity of total funding

<table>
<thead>
<tr>
<th></th>
<th>12/04 – 07/07</th>
<th>01/10 – 04/12</th>
<th>Significance of difference (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 90 days</td>
<td>76.56%</td>
<td>64.23%</td>
<td>0.000</td>
</tr>
<tr>
<td>90 days to 1 year</td>
<td>17.26%</td>
<td>20.15%</td>
<td>0.000</td>
</tr>
<tr>
<td>More than 1 year</td>
<td>6.39%</td>
<td>15.62%</td>
<td>0.000</td>
</tr>
</tbody>
</table>
RBNZ’s six-monthly Financial Stability Report. Data reported in these reports show that banks have been increasing their core funding ratios, above the required minima, as can be seen in Figure 1. The problems with this, however, are that reporting is infrequent and we don’t know how each individual bank sits relative to the required ratios, with the RBNZ not yet having required banks to report these in their quarterly disclosure statements.

Another way to explore the effects of the change would be to look at loan-to-deposit ratios, as a number of comments in the immediate aftermath of the worst of the GFC suggested that banks with loan-to-deposit ratios in excess of one were at greater risk. One of the problems in discussing such ratios is in terms of what is to be included in deposits, as practices between banks are not necessarily all the same. Moreover, the RBNZ does not report a single, clear figure for loans by New Zealand banks, and therefore we have examined the trend in the ratio of total non-M3 claims in New Zealand dollars to total retail deposits. The results are shown in Table 5.

The ratio has clearly improved, but it remains much higher than is regarded as optimal. We should note, however, that our measure is unlikely to generate the same numbers as might be reported as loan-to-deposit ratios for banks individually.9

Another issue is the complaint raised internationally that the new liquidity rules may put pressure on banks to reduce their lending. Examination of the data shows that New Zealand banks have reduced lending growth very significantly since the end of 2008, but it is not immediately obvious as to whether this is attributable to the GFC or to pressures on bank liquidity.

A cursory examination of the data suggests that the slowdown in lending may be a demand effect, with banks apparently showing a willingness to compete for new lending, to the extent that their lending margin relative to cost of funds appears to be shrinking.10

Comparisons between the New Zealand and Australian experience could help us to better decompose the relative effects.

Another issue identified is that the switch towards more retail and longer-term funding started in early 2009, which was about the same time as the yield curve moved from being negatively to positively sloping. This may account for some of the switch from short-term to longer-term deposits by retail investors, who were previously deterred from investing in longer-term deposits by lower headline interest rates and who may look only at headline interest rates without appreciating the economic meaning of the yield curve. Wholesale depositors should not be impacted in the same way, however, and the increase

<table>
<thead>
<tr>
<th>TABLE 5: Trend in ratio of NZD claims to retail deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/04 – 07/07 (Mean)</td>
</tr>
<tr>
<td>208.47%</td>
</tr>
</tbody>
</table>
in wholesale deposits at longer maturities is likely to be a reflection of banks specifically targeting longer-term funding as they sought to reduce risk and prepare themselves for the new rules.

Summary and conclusion
The conclusion we have drawn from this analysis is that, generally, the new liquidity rules have put pressure on banks to change the structure of their funding, resulting in increased use of retail funding and funding for longer maturities. Our analysis has had to be limited to aggregate data provided by the RBNZ. It is likely that, at some future date, when the RBNZ starts to report the relevant detail, it might be possible to look at how individual banks have responded. We also still need to justify our conclusion that the changed funding structure is a consequence of the new liquidity rules, rather than being a reaction to the risky position banks found themselves in during the GFC. This may be best tested by comparing New Zealand banks with those in Australia, to look at the extent to which they have changed their funding structure (noting that Australian banks are not required to comply with liquidity rules until 2015).

The relationship between New Zealand banks and their Australian parents also matters, in that funding raised by parent banks may be passed through to New Zealand, although the New Zealand subsidiaries are often seeking funding in their own names. Once both countries have liquidity rules to comply with, particular attention may be applied to the maturity of intra-group funding.

There are other questions that we have not been able to answer satisfactorily. We have seen an increase in banks’ cost of funds relative to benchmarks, which is commonly attributed to the more aggressive pursuit of retail funding, but we cannot be wholly sure of this explanation. If this is a correct explanation, we can expect to see interest rates increase more sharply when we get an economic upturn that pushes up lending volumes. However, our ability to explore this is limited by the New Zealand economy having been consistently weak since the onset of the GFC. We need to see a more varied set of economic conditions before we can properly understand the effects of the new rules. In the meantime we note a discussion of some of the relevant issues by Wong (2012).

An alternative partial explanation for some of the increase in average funding costs relative to the benchmarks might lie in the very significant reductions in benchmark interest rates since the onset of the GFC. Banks which were previously raising some portion of their funding at rates significantly lower than benchmark would no longer be able to do so, because of the zero lower bound on funding costs.

It would also be good to look at New Zealand and Australian banks alongside each other. Australian banks have been aggressive in their pursuit of retail deposits in response to funding pressures and rating agency criticisms, but they have not had the additional pressure of regulation to drive them to change the structure of their funding. A further research agenda beckons.

Notes
1. Acknowledgement: this paper builds on work by Jinyue Shi, reflected in turn in a paper by Jinyue Shi and David Tripe, presented at the 2012 New Zealand Finance Colloquium in Auckland and the IFABS conference in Valencia. This paper has been assisted by feedback received at those conferences. Helpful feedback on this version of the paper was received from Rod Maddock and participants at the 17th Melbourne Money and Finance Conference, 2012.
2. See Basel Committee on Banking Supervision (2010).
3. Concern was recorded, for example, in the November 2006 issue of their Financial Stability Review (p. 9).
4. For more detail on these ratios and how they are calculated, see Hoskin, Nield and Richardson (2009) and Richardson (2010).
5. This is a slightly broader definition of funding risk than that adopted by the CBA in its annual report. See Commonwealth Bank of Australia (2011), p. 43.
6. See the May 2012 Financial Stability Review. Detail is reported in Figure 1.
7. See, for example, the discussion by Brunnermeier (2009), while Nield (2008) reports signs of stress in New Zealand from around this time as well.
8. A majority of it comes from associates and financial institutions.
9. The author’s analyses for individual banks suggests that significantly lower numbers prevail. As at 31 March 2012, the ratio of net loans to retail deposits for six major banks with retail business (collectively) stood at 141.3 per cent.
10. This is based on data from the RBNZ’s data Table HC10.

References
Commonwealth Bank of Australia (CBA) 2011, Annual report, Sydney, CBA.
Reserve Bank of New Zealand (RBNZ) various issues, Financial Stability Report, Wellington, RBNZ.
DISCLOSURE OF SUPERANNUATION FUND HOLDINGS: what would be best?¹

ALEX ERSKINE, Chief Economist, Australian Securities and Investments Commission (ASIC) and CLARE MARLIN, Senior Researcher, Australian Securities and Investments Commission (ASIC)

The Stronger Super and other reforms present an opportunity to improve the disclosure of fund holdings, which is becoming more pressing as savings for retirement accumulated in defined contribution superannuation funds grow and the number of members approaching retirement age increases. In an increasingly global industry, Australian practice should also reflect the practices of its international peers. This paper explores the potential benefits and challenges of disclosing portfolio holdings to superannuation investors. An earlier version of this paper was presented to the 2012 Australian Centre for Financial Studies’ Melbourne Money and Finance Conference.

For most Australians, superannuation represents their biggest investment outside the home.

In recent years, concerns have been raised about the limited disclosure of the underlying investments of superannuation funds. Superannuation funds, like other investors, have to disclose significant shareholdings in companies (i.e. 5 per cent or more of a company’s shares on issue). Most comparable international jurisdictions require full and complete disclosure of portfolio holdings at least once a year. While Australia is currently an exception, the government’s Stronger Super reforms propose that this gap be closed. The superannuation and managed funds industry, particularly the Association of Superannuation Funds of Australia (ASFA) and the Financial Services Council (FSC) are developing their own industry guidance on this issue. ASIC has strongly encouraged positive engagement by industry on this issue.

Currently there is no legal requirement for superannuation funds and unlisted managed investment schemes to fully disclose portfolio holdings to investors, although this information can be made available on request. While funds may disclose the nature of their investments by asset class or by a strategic or tactical asset allocation range, investors may be unable to access details of the specific investments in the range of investment options offered.

In the view of the authors, enhanced disclosure of portfolio holdings carries both opportunities and challenges. Some of these, together with the rationale for full disclosure, are explored in this paper.

Superannuation’s place in Australian households

All members of superannuation funds are members of households. Households hold more of their financial assets in the form of equity in superannuation funds than in any other form. Around 80 per cent of the equity in superannuation is in defined contribution funds, with the remainder in defined benefit funds.

While households have been increasing their holdings of currency and deposits over the past two decades, their assets in superannuation funds have risen by more. Meanwhile, since 2007, households have been running down their holdings of shares and other equity — market-linked financial assets held outside superannuation.

The persistent differential growth rates for superannuation assets and currency and deposits have occurred despite a number of years of volatile returns from superannuation fund investment and increased identification of deposits (or debt reduction) as the wisest place for savings (see Figure 1). The continuing rapid growth of household holdings of equity in superannuation funds results from member contributions, most of which are mandated, as well
as from earnings and changes in asset prices. With superannuation guarantee contributions set to rise progressively from the current level of 9 per cent of wages to 12 per cent, the share of household financial assets in superannuation funds seems likely to rise further over time.

It is an unfortunate conjunction that even as households increasingly seek certainty and express strong risk aversion they are becoming more exposed to, and ultimately more dependent for their retirement standard of living on, a form of holding savings that currently can involve minimal disclosure and can embody substantial market and other risks.

FIGURE 1: ‘Wisest place for savings’, Westpac-Melbourne Institute Survey of Consumer Sentiment

![Graph showing consumer sentiment from 1998 to 2012.]

Sources: Melbourne Institute of Applied Economic and Social Research, Westpac-Melbourne Institute Survey of Consumer Sentiment; various to June 2012.

FIGURE 2: Superannuation sentiment (2008 to 2011)

![Graph showing superannuation sentiment from 2008 to 2011.]

Sources: Mercer 2011, Mercer Superannuation Sentiment Index: Wave 7.
Superannuation member sentiment and engagement

Although superannuation sentiment plummeted following the global financial crisis (GFC), in late 2011 Mercer reported a modest rise in its measure of superannuation sentiment (see Figure 2).2

Interestingly, this rise in sentiment was accompanied by:

> a fall in the level of worry about share market volatility, even though the survey was carried out during a period of market volatility (56 per cent were ‘worried’ in September 2011 compared with 61 per cent in June 2010); and

> somewhat more subdued expectations about future balances (in September 2011, 48 per cent anticipated that their next superannuation balance would grow compared with 72 per cent in June 2008).

These findings may be a product of fatigue, complacency, market developments, communication from superannuation funds, or a combination of factors.

What is clear is that many working Australians have only a superficial level of engagement with their superannuation and some are completely disengaged. For example, recent surveys of Australians with superannuation have reported that:

> 45 per cent answered ‘don’t know’ when asked to select the most accurate description of a superannuation ‘balanced’ option from a multiple choice list;3

> 41 per cent were unaware that superannuation is taxed at a lower rate than other investments (i.e. 11 per cent thought it was taxed at the same rate; 3 per cent thought the rate was higher; and 27 per cent were unsure);4

> 29 per cent were unaware that members had the ability to change investment choice within superannuation;5

> 20 per cent of those who said they received superannuation statements indicated they do not read them (a further 11 per cent did not recall receiving them);6

> 19 per cent answered ‘don’t know’ when asked to select the best indication of a superannuation fund’s performance from a list of choices;7 and

> 16 per cent were unable to list any factors that someone would need to take into account if they were trying to calculate whether their current arrangements were enough for retirement.8

However, most people are aware of the most basic rules of superannuation and a significant minority are actively engaged with their superannuation.

For example:

> 98 per cent understood that employers are required by law to make superannuation payments on behalf of employees;9

> 92 per cent understood employees can make superannuation payments additional to any payments made by their employer;10

> 35 per cent said they had made additional contributions/payments into superannuation (either directly or via salary sacrifice);11 and

> 22 per cent said that, when they received their last superannuation statement, they opened it and read it thoroughly.12

Those with self-managed superannuation funds (SMSFs) appear to be more engaged than other superannuation members. Indeed, Roy Morgan Research (2012) data suggests that those with SMSFs tend to be more engaged with financial matters compared with those without SMSFs. In 2012, people with SMSFs were:

> less likely to be unable to estimate their current superannuation balance;

> more likely to be making voluntary contributions to superannuation;

> more likely to have recently switched funds in the previous 12 months;

> more likely to have met with an adviser or used one to obtain their superannuation;

> more likely to have been asked about finance and investments by family or friends;

> more likely to have visited business and finance websites;

> more likely to have bought or sold shares over the internet in the last 12 months; and

> more likely to ‘always read the business section of the newspaper’.13

There is mounting research describing barriers to engaging people in their retirement savings and investment decisions (ASIC 2011). These barriers include behavioural biases, cost, time pressures, complexity, life-stage factors, market conditions and, in Australia, the compulsory nature of the superannuation system. Nevertheless, industry and government are working together to promote the benefits of superannuation, and better communicate with superannuation members. While a significant number of Australians with superannuation feel there is nothing that could encourage them to be more interested in their superannuation, many believe they will become more engaged as they get closer to retirement and/or receive improved services (see Table 1). A small number of these would like to see more information or advice on investment performance and/or risks specifically.
Recent research commissioned by the Australian Taxation Office (ATO) (2012), confirms that interest and engagement grows as people age: 57 per cent of individuals indicated they were interested in their super, with the proportion of individuals reporting to be ‘very interested’ in their super increasing within each age group (e.g. 18−24 year olds: 16 per cent and 55−64 year olds: 47 per cent). Similarly, younger age groups were significantly more likely to report that their super ‘does not concern them’ (e.g. 18−24 year olds: 38 per cent and 40−54 year olds: 27 per cent).

Disclosure of fund holdings: how Australia compares internationally

Australia ranks very poorly compared with many other countries in terms of its disclosure of the holdings of mutual funds. Morningstar is a leading provider of financial information about managed funds. Periodically, it publishes a survey of investor experiences of mutual funds in 22 OECD countries (most recently in 2009 and 2011). The purpose of this survey is to obtain a cross-country comparison of the investment climate for mutual funds.

In the disclosure section of the 2011 Morningstar assessment, Australia was given a ‘D’ grading and ranked equal lowest out of the 22 countries compared (see Figure 3). The disclosure section examined whether investors were given sufficient information in the prospectus, shareholder reports and in other readily available sources of fund data.

Decomposing Australia’s poor disclosure grade highlights the Morningstar report’s implicit recommendations for improvement to the regulatory regime from an investor perspective. One area in which Australia scored poorly was in the mandated transparency of portfolio holdings. Transparency ought to assist investors to understand what their fund invests in and where any investment risks may lie. The vast majority of the countries in the Morningstar study required full and complete disclosure of portfolio holdings, either on a quarterly or semi-annual basis. A minority of funds even published monthly performance. Of the 22 countries, only Australia and New Zealand did not require any disclosure of portfolio holdings by funds.

Australia also scored poorly in terms of its disclosure of the name, tenure and compensation of portfolio managers. Furthermore most countries surveyed mandate that a discussion of the financial performance be included within fund reports. Australia does not, for instance, require any discussion of fund performance against its objectives. The Morningstar survey also found that discussions by Australian portfolio managers in the financial reports were generic and failed to connect fund performance with portfolio actions.

Australia ranked well in some other aspects. For instance, Australia along with Canada, Italy, Sweden, the United Kingdom and the United States scored well in terms of disclosure of the amount of fees and expenses paid by an investor; primarily because some disclosure documents had a numerical illustration of the total expenses an investor could expect to pay on an investment.

TABLE 1: What would encourage you to be more interested and involved in your superannuation?

<table>
<thead>
<tr>
<th>Answer</th>
<th>Per cent who gave this answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing</td>
<td>20%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>13%</td>
</tr>
<tr>
<td>A better understanding/user friendly/options/control available/layman’s terms/simplified paper/statements</td>
<td>11%</td>
</tr>
<tr>
<td>I’m already interested/involved/as much as I want/need to be/happy with how things are</td>
<td>8%</td>
</tr>
<tr>
<td>More benefit/improved returns/performance of superfund investments/able to see it grow</td>
<td>8%</td>
</tr>
<tr>
<td>My age/when I’m older/approaching retirement</td>
<td>6%</td>
</tr>
<tr>
<td>Larger balance in my superannuation/paid more super/earnings/working more</td>
<td>5%</td>
</tr>
<tr>
<td>More information/advice/investment performance news/comparisons/risks involved</td>
<td>4%</td>
</tr>
<tr>
<td>Easier access variaty of channels/easy to contact/access information/online</td>
<td>3%</td>
</tr>
<tr>
<td>More time</td>
<td>3%</td>
</tr>
<tr>
<td>Being employed/change of employment/full time work</td>
<td>3%</td>
</tr>
<tr>
<td>Able to make/afford extra contributions/salary sacrificing</td>
<td>3%</td>
</tr>
<tr>
<td>Changing legislation/more incentive/tax benefits/government contributions/remove caps</td>
<td>3%</td>
</tr>
<tr>
<td>Improved/regular communication/newsletter/monthly email/fund manager</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: AIST and Russell Investments 2011, Tuning into super (a superannuation engagement index).
Disclosure of fund holdings: opportunities and challenges

The Stronger Super and other reforms present an opportunity to improve the disclosure of fund holdings, which is becoming more pressing as savings for retirement accumulated in defined contribution superannuation funds grow and the number of members approaching retirement age increases.

Benefits/opportunities

Greater fund transparency

Enhanced disclosure regarding portfolio holdings may play an important role in an engaged investor’s decision to invest, remain invested or exit the product. It also gives consumers the information required, and the encouragement based on that information, to take more responsibility for ensuring that investments in defined contribution retirement incomes schemes are invested and managed appropriately.

Potentially, there may be some change in investment management practices in the longer term if full disclosure of portfolio holdings leads to improved attribution analysis by research houses. At the margin, enhanced disclosure may prompt an increased desire to report portfolio holdings that increase the probability of positive and negative returns. In the shorter-term, disclosure and a requirement to discuss performance against investment objectives may result in some fund managers restating more achievable long-run investment objectives (e.g. ‘CPI + real economic growth’, rather than ‘CPI + 5 per cent’).

Greater access to information for the investor

In order for investors to be confident and informed, they require access to salient information about their investment, including underlying portfolio holding information. Specifically:

- such information is a potentially important resource for investors in balancing the likely risks and rewards of various investment options;
- information relating to major investments may also facilitate an assessment of the level of liquidity of the investments;
- information may also facilitate an assessment of the level of diversification of the investor’s super and non-super investments;
- investors would be better able to identify the key components of the assets contributing to the fund’s return and it could enable identification if there are any assets that appear inappropriate or problematic; and
- due to the compulsory nature of super, and with more personal dollars at stake, consumers may become more engaged and proactive in relation to their investments.

The benefit may be the promotion of diversification and a great sense of confidence in superannuation among the engaged members.

Adopting global best practice

Although there is no uniform global approach to disclosure of portfolio holdings, most countries require full and complete disclosure. In an increasingly global industry, Australian practice should reflect the practices of its international peers.

Superannuation as a key retirement income pillar

It is not solely for the members themselves that transparency is important. As a key pillar of the country’s retirement income system, superannuation has specific tax advantages over other forms of investment and, of course, it is compulsory. The actions of superannuation funds are important issues for all taxpayers. As such, there are obligations to the community for the funds to be accountable for their investments.

Disadvantages/challenges

Inevitably, depending on how disclosures are made, some funds see disadvantages to this. Opponents of increased disclosure have cited costs and potential abuses of the information disclosed as reasons not to proceed.
Increased costs
Enhanced disclosure is likely to increase the operational costs of issuers (and will ultimately be passed on to investors via an increase in the management expense ratio (MER)). However, it is likely that issuers already have access to information on daily portfolio holdings of funds and so the increased costs should be reasonably small. It should primarily be a question of making this information available in the prescribed manner.

There are pragmatic approaches to providing the disclosures that can ensure they are not overly burdensome. For example, it should not be necessary to give members a copy of the disclosures. Rather, disclosures can be made available on a website or via other mechanisms that a member can access.

Potential abuse of proprietary information
Some argue that increased disclosure may lead to abuse of the information in order to profit from the disclosed trading strategies of large or well-performing funds. That said, it is generally accepted that the disclosure of portfolio holdings needs to be controlled to mitigate the likelihood of copycat fund structures (of high-performing portfolios) and the risk of being traded against or ‘front running’. For example:

> disclosure must be sufficiently infrequent (e.g. six-monthly);
> with a substantial lag (e.g. a 90-day delay); and
> information must be made available publicly on a specific date without prior dissemination to private recipients.

International experience suggests that these safeguards enable the provision of information without the potential negative impact on a fund’s intellectual property.

Increased turnover
Arguably, enhanced disclosure could encourage switching between funds, some of which would be disadvantageous if it resulted in investors crystallising capital losses/gains and triggering other transaction costs such as the buy/sell spread. However, it seems likely that only a minority of investors may be motivated to transact more frequently because of the enhanced disclosure, in part because of the significant lag (e.g. 60 days) from trading day to the date of disclosure and also because of the resistance to information overload and the bias towards procrastination.

Potential for misleading disclosure
When it is published, information will necessarily be out of date, and therefore potentially misleading, because the actual portfolio holdings on the date of disclosure will be different from holdings as disclosed. Adequate (and more frequent) explanation will need to be provided to avoid misleading investors, for example, after sharp market moves.

Unengaged members
For the unengaged superannuation saver, creation of a supply of additional information that is ‘pushed’ to recipients would be intrusive and counterproductive. This concern needs to be balanced against the benefits for members who are engaged with their superannuation, together with the potential benefits of engaging some of these unengaged members. Arguably, by merely making the information available to members this concern can be avoided.

Looking forward
A recent ASFA and Ernst & Young study of industry preparedness for Stronger Super identified a comparatively low level of preparedness in the area of members and employers. Clearly, there is considerable work in train and ahead.

ASIC’s priorities are to focus on three key outcomes: confident and informed investors and financial consumers; fair and efficient financial markets; and efficient registration and licensing. The rising importance of superannuation savings within Australia and within household balance sheets is a key driver of our priorities and outcomes.

Contributions to, and growth of assets in, superannuation funds and their increasing importance to members as they save for their retirements will continue to ensure interest in the adequacy of fund disclosures. Notwithstanding increasing complexity, both industry and the regulators need to be proactive in anticipating and responding to members’ needs, both the engaged and the unengaged. Some members already seek full disclosure and are disappointed. These members and some others would benefit from full disclosure, and only a small minority will be disadvantaged if full disclosure is implemented at a reasonable cost and avoids overburdening the currently unengaged members of superannuation funds.
Notes
1. The paper presents the personal view of the authors. While they have benefited from contributions from colleagues, the views are not necessarily shared by the Australian Securities and Investments Commission.
2. The September 2011 index was based on a national survey of 1,001 full-time working Australians aged 25 to 65 conducted by Indeana in September and October 2011.
3. Australian Institute of Superannuation Trustees (AIST) and Essential Research (2012). The survey was conducted by Your Source online in March 2012 and had 1,038 adult Australian respondents. Only those with superannuation were asked this question (i.e. 782 respondents).
4. ANZ and The Social Research Centre (2011). The 2011 survey involved 3,502 phone interviews with adult Australians conducted during July and August 2011. Where appropriate, only those with superannuation were asked certain questions.
5. AIST and Russell Investments (2011). Based on a national survey of 1,320 Australians who had at least one superannuation fund and were not retired. The survey was conducted by newfocus both online (n=1,020) and by phone (n=300).
7. Ibid.
8. Ibid.
9. Ibid.
10. Ibid.
11. Ibid.
12. Australian Institute of Superannuation Trustees (AIST) and Essential Research (2012).
13. Based on interviews and surveys conducted with more than 50,000 Australians aged 14 and over between April 2011 and March 2012.
14. Based on an online survey of 1,513 individuals between 26 October and 1 November 2011.
15. Generally referred to as ‘managed funds’ in Australia.
16. Morningstar’s global analysts provided examples of typical fund literature for funds domiciled in each country. The report’s authors then compared the information and format using translated documents to evaluate the effectiveness of the simplified prospectus. The prospectuses were reviewed for clarity of language, length, presentation of costs, information on trading costs, holdings information, manager information, performance data and general presentation.
17. In the 2009 study, this section was titled, ‘Transparency in prospectus and shareholder reports’.
18. ASFA and Ernst & Young (2012).

References
ABS — see Australian Bureau of Statistics.
AIST — see Australian Institute of Superannuation Trustees.
ANZ — see Australia and New Zealand Banking Group Limited.
ASFA — see Association of Superannuation Funds of Australia.
ASIC — see Australian Securities and Investments Commission.
ATO — see Australian Taxation Office.
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In 1992 compulsory superannuation was added to Australia’s pre-existing voluntary arrangements, resulting in the world’s first compulsory and pre-funded scheme in which ordinary workers bear sizeable investment risk. At the same time, the regulatory approach for financial markets has increasingly emphasised market efficiency, with regulation limited to market conduct and information disclosure requirements. The underlying assumption was that ordinary people would be both engaged in financial matters and be able to make optimal decisions using the information provided under financial product disclosure requirements. This framework has been found wanting. Many people have insufficient financial skills and have failed to engage in retirement saving decisions (Bateman et al. 2012). For many, participation in superannuation has been limited to legislated and scheme-specific defaults. At the same time, while greater system and product complexity has increased the need for financial advice, questions have been raised about conflicts of interest and the quality of advice.

A review of the financial planning industry by a Joint Parliamentary Committee (the Ripoll inquiry) was triggered by several episodes of poor outcomes for clients of some planners (JPCCFS 2009). The 2009 report of the committee led to changes to the Corporations Act under the heading of the Future of Financial Advice (FoFA). FoFA aims to improve financial advice by banning conflicted advice, restricting trail commissions, and introducing standards for the conduct of advisers and other measures. Equally valuable in bringing financial planners up to the mark will be the continued strength of the self-managed superannuation fund (SMSF) sector, which holds about a third of superannuation assets and acts as a socially beneficial ‘competitive fringe’ to an increasingly concentrated financial planning industry.

Up to four out of five adults never see a financial planner and many of these rely on default options within the superannuation system. Indeed, over 95 per cent of workers fail to exercise choice of fund and opt for the default superannuation fund offered by their employer and around 60 per cent of workers in defined contribution schemes fail to elect an investment option (Super System Review 2010). This behaviour was interpreted as a lack engagement by the Super System (Cooper) Review. MySuper is designed to provide simple, comparable and low-cost default accounts (Parliament of Australia 2011c, Ellis 2012). As a default, MySuper could be seen as de facto advice and should be designed with mass-market application in mind. We suggest that MySuper could be improved with an explicit cap of one per cent on management expense ratios and an explicit glidepath on percentage exposure to growth assets that would see growth assets drop from 60 per cent to 40 per cent of default accounts once a MySuper account holder reaches 55 years of age.

The Future of Financial Advice

FoFA contains three key reforms: first, a prospective ban on conflicted remuneration, including commissions, volume payments, soft-dollar amounts over $300 and asset fees on geared products; second, the introduction of...
of an adviser charging regime, which will require annual fee disclosure and client ‘opt-in’ every two years; and third, the introduction of a statutory fiduciary duty for financial advisers, requiring them to act in the best interests of their clients. The reforms are voluntary from 1 July 2012 and mandatory from 1 July 2013.

The ban on conflicted remuneration structures
FoFA seeks to restrict all ‘ongoing’ or ‘trail fees’ from clients to advisers and from product providers to financial planners or their licensees. This tightening applies even if advice is not ‘conflicted’ although the new law is especially concerned with banning conflicted advice. An objective is to ensure greater transparency and specificity in fees charged by financial planners, over and above the question of conflicted advice, though not stipulating that advice fees have to be paid fully upfront.

The reforms also impose a ‘ban on payments relating to volume or sales targets, including platform shelf space fees based on volume’. Here again the idea is to motivate planners to act in the best interests of their clients rather than the interests of licensees or providers. Sales of basic banking products and pure risk insurance enjoy a ‘limited carve-out’.

Asset-based fees can only be charged on ungeared products or investment amounts. Initial or upfront asset fees that are a mixture of advice fees and fees to the product provider are to be banned as well. These are welcome steps towards dampening pre-existing incentives for advisers to recommend risky investment strategies.

As part of FoFA’s endeavours to bring in ‘product-neutral’ advice, soft-dollar benefits of $300 or more will be banned, although ‘consideration will be given to appropriate transitional arrangements’. A soft-dollar benefit is ‘any benefit received by a financial planning firm, its representatives or associates, other than basic monetary commissions or direct client advice fees’ (Parliament of the Commonwealth of Australia 2011a, Shorten 2012a). This reform makes sense.

Introduction of an adviser charging regime with opt-in
The old law requires initial disclosure of an ongoing fee, but not ongoing disclosure. Now an adviser must fulfill a disclosure obligation: every 12 months she must send the client a statement of fees and of services rendered. There is also a renewal notice obligation: every 24 months a planner must accompany her fee disclosure statement with a renewal notice. Absent active renewal by the client, the contract automatically lapses. This requirement is described as opt-in and only applies to new clients. A March 2012 amendment enables the Australian Securities and Investments Commission (ASIC) ‘to provide relief from the opt-in obligations provided fee recipients are bound by an ASIC-approved code of conduct’ (Parliament of the Commonwealth of Australia 2011b, Shorten 2012b).

The ‘set and forget’ feature permitted by the old law may have rendered customers of financial plans vulnerable to ‘inertia selling’ whereby a potential customer has to take active steps to avoid buying a product. Couples may have been particularly vulnerable. If, for example, one member of a couple becomes unable for health reasons to keep looking after the family’s paperwork, years could elapse before the other member of the couple is in a position to take stock of whether the family is continuing to get value for money from an adviser. In the future, the value of the adviser’s services is more likely to receive regular scrutiny by the client’s family and this is commendable. However, the release from opt-in if fee recipients are bound by an ASIC-approved code of conduct has overtones of an unenforceable honour code and privileging industry association members over non-members. Advisers will be required to disclose the charging structure to clients in a clear manner, including total adviser charges payable, expressed in dollar terms and there must be separate fees for product and advice. These reforms are overdue.

Introduction of ‘best interests’ duty
A statutory fiduciary duty on Australian Financial Services Licensees and their authorised representatives will require them to act in the best interests of their clients. This reformulation is described as clarifying that in no circumstances can advisers place their own interests ahead of their clients’ interests. The duty will include a ‘reasonable steps’ qualification. However, in relation to questions such as how many funds an adviser investigates on behalf of clients, like a number of other FoFA initiatives, the ‘best-interests’ rule is far from finalised. Clearly, it is realistic that ‘advisers and authorised representatives are not expected to base their recommendations on an assessment of every single product available in the market’ (Bowen 2010.)

Other reforms
Other FoFA reforms address scaled advice, ASIC’s power to licence and ban advisers and the accountant’s exemption. ASIC intends to release regulatory guidance on these and other issues once the legislative process is completed.

The existing package which provides for simple advice within a superannuation fund (known as intra-fund advice) will be extended to new topics to facilitate simple, single issue, personal advice in a compliant matter. However, specifically excluded will be advice relating to: consolidation of superannuation accounts; a switch away from the member’s current superannuation fund into another superannuation fund; recommendations in relation to financial products that the member holds outside
of superannuation; and investment choice outside of the trustee-prescribed investment options (Shorten 2011). These provisions should increase access to financial advice.

On 23 June 2012 the government announced a new, limited form of Australian Financial Services Licence (AFSL) that will enable accountants and other financial advisers to give strategic advice short of specific product recommendations. The government also announced a requirement that SMSF auditors be registered. The conditions for registration include a tertiary accounting qualification, qualification in audit, a ‘fit and proper’ test, professional indemnity insurance, 300 hours of SMSF audit experience in the three years prior to registration, undertaking continuing professional development (CPD) training every three years, and passing a competency examination set by ASIC, which issues AFSLs. At the time of writing, however, comparable requirements for financial planners were still under review.

FoFA enhances the powers of ASIC to license and ban individuals. Specifically, FoFA empowers ASIC to ban individuals from holding a licence on the grounds that they are not ‘fit and proper’. This looks reasonable.

**Evaluation of FoFA**

How will FoFA affect a traditional holistic financial plan? In 2008 the Financial Planning Association included on its website an example statement of advice (SoA) (FPA 2008). As discussed in Kingston (2009), the example SoA sets out five different fees. Based on our interpretation of FoFA, three of these fees would be conflicted (see Figure 1).

In more detail, ‘initial’ advice is charged out at $8,277, after tax and on a fee-for-service basis. This initial fee appears to be primarily in exchange for receiving the tax benefits of salary sacrifice and a Transition To Retirement (TTR) pension. There may be scope to unbundle the initial fee from ongoing fees in the event that the couple decides to remain with their pre-existing superannuation fund while adopting the planner’s recommendations concerning salary sacrifice and a TTR pension (so ‘scaled’ advice predates FoFA). This particular fee appears to satisfy FoFA’s rules about conflicted advice and itemisation of services rendered.

If the couple does switch its superannuation balances into the fund recommended by the FPA’s model plan, the investor pays 1.89 per cent p.a. of assets under management to the product provider. This type of fee would appear to remain legitimate under FoFA. On the other hand, the provider pays 0.6 per cent p.a. of assets under management to the licensee, ‘from their management fees’, and ‘to pay the cost of ongoing advice’. This fee appears to be conflicted. Similarly conflicted is the fee whereby the provider may pay 0.2 per cent to the licensee for recommending its products. Finally, whereas the provider may pay soft-dollar benefits of between $10,000 and $20,000 per planner per year, FoFA caps soft-dollar benefits at $300.

**MySuper**

The 2010 Super System Review was concerned with the fact that only about 40 per cent of super fund members actively choose an investment option. In 2011, the government responded with a tranche of legislation under the heading of MySuper. The general idea is that default superannuation should go to funds which are simple, comparable and affordable. Specifically, licensees of Registrable Superannuation Entities (RSEs) will be required to establish and pay the contributions of a member into a MySuper product unless the member has elected in writing that the contribution is to be paid elsewhere.
Viceira’s estimates for a risk aversion coefficient equal to 2 makes more sense for a worker who is engaged with her superannuation, if only because this case entails gearing in the early years of working life. On the other hand, his estimates for a risk aversion coefficient equal to 3 suggest a simple two-step mandated glidepath for MySuper: a 60 per cent weight to growth assets for workers under 55 years of age, and a 40 per cent weight to growth assets for workers over 55 years of age.5

Concluding comments
After FoFA, planners will probably continue to derive most of their income from asset-based fees (hopefully not conflicted ones). Asset-based fee income typically hits a maximum at the point of a client’s retirement. Average fees on the growth assets in the FPA’s model plan exceed average fees on cash and ‘income’ assets by 33 basis points. These two considerations tempt planners to overweight high-fee growth assets at the retirement point of a client’s life cycle. By contrast, theory suggests that the case for a high weight on growth assets applies at ages well before retirement, as having many years left in the workforce is comparable to having a big position in bond-like securities.6 Perhaps FoFA’s plans to promote scaled advice will improve matters.

Defined benefit funds are exempt. Each regulated accumulation fund can generally offer only one MySuper product. RSEs must apply to the Australian Prudential Regulation Authority for authorisation to offer a MySuper product. The provisions will come into effect in 2013.

Each MySuper product will consist of a single diversified or life-cycle investment strategy, to be provided to all members. The MySuper product is only for the pre-retirement phase. The explanatory memorandum of MySuper points to age as a suitable basis for a life-cycle strategy but does not go into specifics. Only permitted fees can be deducted from member accounts, with investment fees and member services to be the same for all members. Features which can be varied across members include administration fees and insurance.

Switching, exit or ‘activity’4 fees may be charged but must be limited to cost recovery. An exit fee cannot be charged to a member transferring to the pension product in the fund but a switching fee could be charged in this case.

MySuper is reminiscent of the stakeholder accounts introduced in the United Kingdom — which were not particularly successful as they were not supported by compulsion, that being the key feature of Australia’s superannuation guarantee. Emulating stakeholder accounts, MySuper accounts could have an explicit cap of 1 per cent p.a. on their management expense ratios. This would rule out highly active management of MySuper accounts, a service best reserved for actively engaged contributors.

Target dating for the pre-retirement phase makes good sense. We propose a mandated glidepath for ‘life-cycle’ asset allocation in MySuper. Viceira (2001) came up with pioneering and well-regarded estimates of a worker’s optimal percentage exposure to shares through her working life. Table 1 reproduces a subset of his results.

### Table 1: Optimal percentage weight on growth assets

<table>
<thead>
<tr>
<th>Risk aversion coefficient</th>
<th>Expected years to retirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35</td>
</tr>
<tr>
<td>2</td>
<td>130</td>
</tr>
<tr>
<td>3</td>
<td>63</td>
</tr>
</tbody>
</table>

Notes: The assumed risk premium is four percentage points and the assumed volatility of stocks is 18% p.a. The assumed correlation between stock returns and growth in real wages is 25%. The estimates assume that the worker can neither be forced to retire early nor choose to postpone retirement. The two estimates in excess of 100% correspond to geared positions in stocks.

Source: Viceira (2001, Table 1).
Notes
1. We would like to thank the Australian Research Council who kindly assisted us via DP120102239.
2. FoFA estimates that 85 per cent of financial planners are sponsored. The theory of ‘contestable’ markets (due to William Baumol) holds that markets with few sellers may in fact act like competitive ones if there is a ‘competitive fringe’ of suppliers capable of entering and exiting the market at low cost.
3. A licensee is an entity which holds a Financial Services Licence issued by ASIC.
4. Examples of an activity fee include a family law fee, whereby a member is required to have their account split as a result of a family law settlement, or a death benefit nomination.
5. Basu and Drew (2010) offer a detailed and sophisticated treatment of the question of investment strategy for default investment options. They recommend ‘strategies heavily tilted towards stocks’. We have reservations about their approach. It does not consider how steep the glidepath needs to be. It assumes wages are uncorrelated with stock returns. In frameworks like Viceira’s, by contrast, with an explicit utility function, wages uncorrelated with stock returns can generate very aggressive allocations early in the life cycle of a worker-investor, including hefty gearing. In our view, the decision to opt for an aggressive allocation (including a geared one) is best reserved for engaged investors, although there is room for more research on the positive and normative economics of asset allocation for unengaged investors.
6. And, possibly late in retirement as well, depending on how the client’s investments have performed, the retiree’s minimum acceptable income stream, and the importance of bequests (discretionary spending in most cases) in a retiree’s overall budget.

References
Joint Parliamentary Committee on Corporations and Financial Services (JPCCFS) 2009, Inquiry into financial products and services in Australia, Commonwealth of Australia, November.
Keywords: financial advice, risk-return profile, risk profile questionnaires, risk tolerance.

THE USEFULNESS OF RISK PROFILE QUESTIONNAIRES in financial advising

TOM VALENTINE, Visiting Professor, MGSM and UBSS Research Foundation

With research indicating that investors do not have consistent and rational attitudes to risk, this paper seeks to determine whether risk profile questionnaires lead to more rational investment decisions being made by clients. Analysis of the results of a risk profile questionnaire used by a financial planning practice suggests that investors are unwilling to bear short-term risk and, therefore, a more prescriptive approach may be necessary. An earlier version of this paper was presented to the 2012 Australian Centre for Financial Studies’ Melbourne Money and Finance Conference.

It is generally accepted by the financial advising industry and its regulators that advisers should attempt to measure their clients’ attitudes to risk bearing so that they can devise an investment plan which conforms to these attitudes. That is, a client should be comfortable with the amount of risk involved in the investment portfolio recommended. Some legal advice (for example, Bobbin (undated)) has suggested that advisers who do not attempt to measure clients’ attitudes to risk may leave themselves open to legal action.

Valentine (2003) argues against this viewpoint. For example, it questions whether such a thing as a stable risk profile exists. It also cites extensive evidence that investors do not have consistent and rational attitudes to risk.

The purpose of this paper is to carry this discussion further by examining the results of an actual risk profile questionnaire used by an independently owned financial planning practice.

The analysis has two steps. First, the consistency of the risk category allocated to the responding client by the adviser and the answers to the questions is examined. Second, the study considers the question: do the answers to the questions in the risk profile questionnaire have an underlying common factor (a latent variable) which can be identified as the clients’ attitude to risk?

The final section of the paper examines the questionnaire and the results from the general viewpoint of whether these questionnaires actually lead to more rational investment decisions being made by clients.

The data
The questionnaire used is shown in Table 1. The data used is a sample of 40 completed questionnaires obtained from one financial planner. Each question was coded as -1 for the answer indicating an unwillingness to take risk, +1 for an answer indicating a willingness to take risk and 0 for a neutral answer. The financial planner in question classified the latter group as ‘balanced investors’. That is, a balanced (diversified) portfolio was recommended for them. A separate argument would be necessary to justify this identification of the appropriate portfolio for a neutral investor.

An examination of the correlation matrix for the answers to the 10 questions shows only one negative value — the correlation between the answers to questions 5 and 9. This negative value arises because a large number of respondents (many of whom had otherwise indicated an unwillingness to take risk) chose the alternative of taking a job with less job security and a big pay rise. This result suggests that clients’ attitude to risk in investment differs from their attitude to risk in the job market. This difference could arise from the generally low rate of unemployment prevailing in Australia.

The rating of the client’s attitude made by the adviser (SCORE) was coded as follows:

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>conservative investor</td>
</tr>
<tr>
<td>0</td>
<td>neutral (balanced) investor</td>
</tr>
<tr>
<td>+1</td>
<td>growth investor</td>
</tr>
</tbody>
</table>
TABLE 1: Risk profile questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How do you rate your willingness to take financial risks?</td>
<td>Average</td>
</tr>
<tr>
<td>2. When you think of 'risk' in a financial context, which comes to mind first?</td>
<td>Possible gains</td>
</tr>
<tr>
<td>3. How easily do you adapt when things go wrong financially?</td>
<td>With ease</td>
</tr>
<tr>
<td>4. How much confidence do you have in your ability to make good financial decisions?</td>
<td>I am not very confident about financial decisions</td>
</tr>
<tr>
<td>5. If you had to choose between more job security with a small pay rise, or less job security and a big pay rise, which would you pick?</td>
<td>I am not sure</td>
</tr>
<tr>
<td>6. When faced with a major financial decision, do you concentrate more on possible gains or possible losses?</td>
<td>Usually, if not always, the gains</td>
</tr>
<tr>
<td>7. Would you borrow money to make an investment?</td>
<td>Possibly</td>
</tr>
<tr>
<td>8. How much of your investment portfolio would you be willing to place in an investment that you thought had the potential for high returns but also had the potential for large losses?</td>
<td>Less than 10%</td>
</tr>
<tr>
<td>9. How big a loss across all your investments would have to occur before you began to feel uncomfortable?</td>
<td>I would be uncomfortable by the time my losses reached 10%</td>
</tr>
<tr>
<td>10. The chart below shows the highest one-year gain and the highest one-year loss on three different hypothetical investments of $10,000. Which one would you see as your preferred investment?</td>
<td>I would pick Investment A</td>
</tr>
</tbody>
</table>

Potential gains or losses

<table>
<thead>
<tr>
<th>Investment</th>
<th>Possible gains</th>
<th>Possible losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$593</td>
<td>-$164</td>
</tr>
<tr>
<td>B</td>
<td>$1,921</td>
<td>-$1,020</td>
</tr>
<tr>
<td>C</td>
<td>$4,229</td>
<td>-$3,839</td>
</tr>
</tbody>
</table>

Analysis of the results

If we regress SCORE on the answers to the 10 questions, we obtain:

\[
\text{SCORE} = 0.095 + 0.132Q1 + 0.160Q2 + 0.028Q3 + 0.187Q4 + 0.063Q7 + 0.295Q8 + 0.687Q9 + 0.490Q10 - 0.122 + 0.281Q1 + 0.140Q2 + 0.170Q6 + 0.060Q7 + 0.076Q8 + 0.255Q9 + 0.486Q10
\]

where \(Q_i\) is the answer to question \(i\). \(R^2\) is the coefficient of determination and the figures under the coefficients are \(t\)-values. Asterisks indicate the degree of significance. One asterisk indicates significance at the 5 per cent level and two asterisks indicate significance at the 1 per cent level. All equations reported in this paper were estimated using the Eviews package.

The overall relationship is highly significant, but there are clearly some redundant variables. It would be useful to eliminate these questions because it is desirable to present clients with the shortest possible questionnaire. A long questionnaire might not induce cooperation or may not receive adequate attention from the respondent.

Q5 has a negative coefficient for the reasons discussed above. It can be omitted from the analysis. Also, some of the very insignificant answers can be omitted without significantly reducing the explanatory power of the equation.

This process produces:

\[
\text{SCORE} = 0.121 + 0.140Q1 + 0.170Q6 + 0.060Q7 + 0.076Q8 + 0.255Q9 + 0.486Q10
\]

The equation is highly significant and all of the coefficients are positive. The most significant individual questions are questions 2, 9 and 10. Indeed, if we include only these questions in the regression:

\[
\text{SCORE} = 0.122 + 0.281Q2 + 0.295Q9 + 0.687Q10 - 0.122 + 0.281Q2 + 0.295Q9 + 0.687Q10
\]

That is, the adviser would have obtained very similar results if he/she had used a questionnaire including only three questions. It should be noted that these regressions test the consistency of the advisers’ rating of the client’s risk attitude with the answers to the questionnaire. It is clear that such a consistency exists.
In general the answers to the questions display an unwillingness of respondents to bear risk. Very few respondents could be classified as ‘growth investors’ i.e. as willing to take risk. Also, the answer to question 9 had very high numbers rated as -1. This outcome suggests that these respondents are subject to ‘loss aversion’ which means that they are reluctant to incur any loss. It is important for an adviser to identify the presence of such a characteristic, because such clients are likely to become very discontented in downturns even if the recommended portfolio has a good long-term performance.

The possibility of loss aversion raises doubts about the existence of a risk profile for investors. If it is present, investors will prefer investments with assured positive returns to those with even a small probability of negative returns even if the latter have much higher average returns. This would mean that there is a discontinuity in the risk-return profile.

**Common factors in the data**

A second question which can be asked about the questionnaire is: What are the questions measuring? Is there a common characteristic which affects the answers to the questions? One way of answering this question is to calculate the principal components of the answers. Principal components analysis (see Tabachnick and Fidell 2007, ch. 13) is based on the idea that there are latent variables underlying a set of variables and accounting for movements in the whole set.

Table 2 shows the weights in the first principal component (the one which explains the highest proportion of the total variance of the series for the sets of variables used in the regressions reported in the previous section).

<table>
<thead>
<tr>
<th>Variable</th>
<th>PC1</th>
<th>PC2</th>
<th>PC3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>0.406</td>
<td>0.422</td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>0.316</td>
<td>0.335</td>
<td>0.453</td>
</tr>
<tr>
<td>Q3</td>
<td>0.286</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>0.324</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>0.167</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>0.312</td>
<td>0.388</td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>0.296</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>0.355</td>
<td>0.377</td>
<td></td>
</tr>
<tr>
<td>Q9</td>
<td>0.282</td>
<td>0.346</td>
<td>0.619</td>
</tr>
<tr>
<td>Q10</td>
<td>0.360</td>
<td>0.439</td>
<td>0.642</td>
</tr>
<tr>
<td>Proportion of variance</td>
<td>0.364</td>
<td>0.440</td>
<td>0.539</td>
</tr>
</tbody>
</table>

These results indicate that there is a latent variable implicit in the data, i.e. it is measuring something, but the question is: what? One possible answer is that it is related to the variable SCORE, the risk rating given to each respondent. In order to test this possibility, SCORE was regressed on each principal component.

\[ \text{SCORE} = 0.45 + 0.422PC1 \quad R^2 = 0.671 \]
\[ (0.75) \quad (8.81^{**}) \]

\[ \text{SCORE} = 0.110 + 0.490PC2 \quad R^2 = 0.766 \]
\[ (2.09^*) \quad (11.17^{**}) \]

\[ \text{SCORE} = 0.189 + 0.700PC3 \quad R^2 = 0.747 \]
\[ (3.21^{**}) \quad (10.59^{**}) \]

These results indicate that the adviser’s classification of respondents is consistent with the major latent variable underlying the data. They also suggest that slightly better results are obtained from the questionnaire with seven questions. However, they also suggest that a smaller version of the questionnaire would have produced similar results to the original questionnaire.

An examination of the residuals from the equations reported in this subsection indicate that respondents 18 and 19 produced large errors. This result can be illustrated by including dummy variables for these observations in the equations. For example, if we do this for PC2:

\[ \text{SCORE} = 0.052 + 0.425PC2 - 1.102D_{18} + 0.904D_{19} \]
\[ (1.09) \quad (11.53^*) \quad (4.11^{**}) \quad (3.38^{**}) \]

\[ R^2 = 0.819 \]

where \(D_{18}(D_{19}) = 1\) for the 18th (19th) observation and zero otherwise. Clearly respondent 18 has been classified as too conservative and respondent 19 has been classified as too willing to bear risk.

An alternative view of the classification of investors according to SCORE is obtained by using, for example, PC3 to classify investors as conservative, neutral and growth investors. The (arbitrary) categories adopted are:

- \( \text{PC3} \leq -0.5 \) Conservative
- \(-0.5 < \text{PC3} < 0.5 \) Neutral
- \( \text{PC3} > 0.5 \) Growth

Using this classification as a benchmark, we find 23 conservative investors as against 11 for SCORE. The latter puts 12 respondents out of 40 in the wrong category. All of them are conservative investors who are classified as too conservative and respondent 19 has been classified as too willing to bear risk.

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However, it could also indicate that the adviser is following the process described in the following section. Indeed, some of these respondents were apparently investors in their superannuation funds.

**Limitations of the questionnaire**

Valentine (2003) cites a number of criticisms of risk profile questionnaires. One is that, usually, the questions do not present the respondent with a trade-off. In general the answers to the questions display an unwillingness of respondents to bear risk. Very few respondents could be classified as ‘growth investors’ i.e. as willing to take risk. Also, the answer to question 9 had very high numbers rated as -1. This outcome suggests that these respondents are subject to ‘loss aversion’ which means that they are reluctant to incur any loss. It is important for an adviser to identify the presence of such a characteristic, because such clients are likely to become very discontented in downturns even if the recommended portfolio has a good long-term performance.

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A second question which can be asked about the questionnaire is: What are the questions measuring? Is there a common characteristic which affects the answers to the questions? One way of answering this question is to calculate the principal components of the answers. Principal components analysis (see Tabachnick and Fidell 2007, ch. 13) is based on the idea that there are latent variables underlying a set of variables and accounting for movements in the whole set.

Table 2 shows the weights in the first principal component (the one which explains the highest proportion of the total variance of the series for the sets of variables used in the regressions reported in the previous section).
These considerations raise doubts about the need for investment advisers to attempt to measure clients’ attitudes towards risk and to make recommendations which are consistent with these measurements. Instead, advisers should be required to establish the investor’s objective position — age, employment, income, balance sheet, marital situation, age of children, investment objectives etc. — and to make investment recommendations based on these facts.

This will require advisers to provide some education and, in particular, to convince investors that their time horizon should play an important role in the evaluation of potential risks. In particular, they should be brought to understand that short-term variability of returns is not relevant to judging the risk of an investment which is made with a long time horizon.

Of course, this is easier said than done. However, this does not represent an argument for the use of risk questionnaires based on the short-term risks of alternative investments. These instruments can actually lead investors into making investment decisions contrary to their best interests.

Investments in superannuation funds are an easier case. They are clearly long-term investments and should, therefore, be invested in growth assets. Valentine (2011) suggests that self-managed super funds (SMSFs) should be required to select from a set of portfolios based on such assets.

**Conclusion**

This paper discussed a sample of responses to a questionnaire designed to evaluate respondent’s attitudes to short-term risk. It was concluded that:

- the answers to the questions convey some overall information about respondents’ attitudes as measured by the first principal component of the data; and
- the adviser’s ratings are consistent with this information.

However, this says little about the attitude of investors to risk on longer-term investments. It appears that investors are unwilling to bear short-term risk and, therefore, a more prescriptive approach may be necessary. Such an approach would encourage investors to make investment decisions in line with their long-term interests.
References
Clare, R. 2005, ‘Uniformity and diversity in superannuation fund investment portfolios’, paper presented to the 13th Annual Colloquium of Superannuation Researchers, Centre for Pensions and Superannuation, University of New South Wales, July.