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‘Automatic’ cycle-stabilising capital requirements: what can be achieved?

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DP2008/04**‘Automatic’ cycle-stabilising capital requirements: what can be achieved?+****Tim Ng*****Abstract**

This paper discusses the potential for lenders’ capital requirements to be used as ‘automatic stabilisers’ of the business cycle in New Zealand. The procyclicality of lending, and its importance for cyclical developments, motivates the consideration of regulation of lending for cycle-stabilisation purposes. This application of lenders’ capital requirements is distinct from, but complements, the prudential reasons for capital adequacy requirements. I set out a putative capital requirement on housing lending intended to have cycle-stabilising properties. I explore the likely degree of cycle stabilisation that could be expected from feasible calibrations of such a requirement. I conclude that the putative cycle-stabilising capital requirement might have some impact on the cycle at the margin, and that this impact is most likely on the downside of cycles. However, the highly-developed and open nature of New Zealand’s housing lending markets is likely to limit the degree of cycle stabilisation that can be achieved with this approach.

JEL Classification: E58, E59

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1. Introduction

Economists have long been interested in the interaction between financial intermediaries, financial markets and the business cycle. The evidence is well accepted that swings in financial activity and asset prices are positively associated with swings in aggregate demand, and the literature on the reasons for this association and its implications is vast.

Central bankers are interested in the topic for both monetary policy (meaning, in this context, cycle stabilisation) and financial stability reasons. In addition, those central banks that are prudential supervisors also have an interest in whether the financial institutions under their charge tend to respond prudently to business cycle fluctuations. In New Zealand and other small open economies, the key role of the exchange rate in both financial market dynamics and in the business cycle makes understanding the links between financial and real quantities and prices even more important.

From a basic credit-demand point of view, the evidence on lending and spending is unremarkable. Spending needs to be financed somehow, and households generally want to smooth consumption relative to income across time, leading credit markets to arise. Spending therefore drives lending both because of the short-term credit needed to settle transactions, and the longer-term credit borrowers demand in response to expectations of an improving financial situation.

For the purposes of this paper, the more interesting propositions are about the supply side of credit markets. I start with the notion that lenders do more than simply responding passively to meet the demand side's funding needs as they move with the business cycle, and that they are an active and destabilising contributor to the cycle. This financial 'procyclicality' motivates the analysis of possible mitigating policy interventions in the financial system, to dampen its procyclical tendencies.

In this paper, I follow the bulk of the literature and focus on the regulation of intermediated credit, as distinct from securities issuance and trading. I also focus on lending secured on residential property (housing lending)², reflecting the important role of housing market dynamics in New Zealand's business cycle, and of housing lending exposures on New Zealand lenders' balance sheets. Almost all of the stock of credit secured on housing in New Zealand, and probably in most of the developed world, is still accounted for by intermediated, rather than securitised, credit. Also, the literature and regulatory policy experience is much better established in the case of intermediated credit.

Within the regulatory tradition, I focus on regulation of banks' capital. This discipline is well-developed for prudential purposes and is currently a high priority in prudential policy development across the world. Prudential capital adequacy policy provides an analytical 'infrastructure' that seeks to put some constraints on lending and lenders' leverage, and is thus a natural place to start exploring the possible role of capital regulation in cycle stabilisation. Building on an existing regulatory infrastructure has the advantage of reducing any additional compliance cost to regulated lenders associated with capital requirements imposed for cycle-stabilising reasons.

Finally, I distinguish cycle-stabilisation objectives from the financial stability objective of protecting the ability of the financial system to continue to perform in the face of distress, and

² The term 'housing lending' should not be taken to connote only lending for the purposes of purchasing housing, though in most cases that will be the actual purpose

from the prudential objective of preventing the failure of individual financial institutions. This is mainly for sharpness of focus. There are, of course, substantial overlaps and complementarities among these policy objectives, and any distinction is bound to be somewhat artificial and open to contest.

This paper pulls up short of looking at cases of business cycles involving actual financial instability. Most of the time, the monetary policy job of cycle stabilisation is conducted against the background of sound financial institutions, deep and liquid securities markets, and a financial system overall performing its function of creating, pricing and allocating credit. If financial institution failures and other sorts of financial system dysfunction emerge, sharp discontinuities in the business cycle process are likely to occur, and the central bank's 'crisis' intervention tools, such as the lender of last resort function, will come into play.

Though financial instability of this sort is obviously one type of downward influence on the business cycle, the discontinuities and deployment of crisis tools in any particular case will tend to be rather idiosyncratic. For that reason I restrict attention for present purposes to business-as-usual cycle management. Even under business-as-usual, though, the evidence seems compelling that credit supply may be materially curtailed by lenders' acting to protect their capital bases out of fear of imminent financial distress, as well as in response to any distress itself. It thus remains interesting to consider how capital regulation could mitigate these adverse credit supply effects, even if actual distress does not eventually arise.

This paper is not a call for implementation of the putative cycle-stabilising capital requirement discussed here. That would require much more empirical and theoretical testing. Nor is it a challenge to the very broad consensus that the official interest rate should be the primary instrument for cycle stabilisation purposes. In this respect, this paper is in keeping with the approaches of Blackmore *et al.* (2006) and RBNZ (2007b). The intention is to see how capital regulation might assist in cycle stabilisation, by acting as an automatic stabiliser akin to the automatic stabilisers inherent in fiscal policy frameworks.

The rest of this paper proceeds as follows. In Section 2, I discuss the literature on how intermediated lending interacts with the business cycle. The notion that financial activity is procyclical is set out to motivate the regulation of lending aimed at stabilising the cycle. Section 3 discusses prudential capital adequacy regulation as a natural platform on which to build capital requirements for cycle-stabilisation purposes. Section 4 looks at how a capital requirement on housing lenders might be implemented for cycle-stabilisation purposes. Section 5 discusses how effective such regulation might be at stabilising the cycle. Section 6 concludes.

2. Lending, the business cycle and financial regulation

The bare-bones, traditional view of credit supply responding passively to spending is the view implied by perfect capital markets. More formally, the bare-bones view could be expressed as an infinitely elastic, cycle-invariant credit supply curve. This is the view implicit in most large macro models in active use for practical policymaking.

The recognition is fairly widespread that the omission of a formal role for 'financial frictions' in such models is not particularly satisfactory (e.g. Mishkin, 2007), and the literature on incorporating such effects is growing rapidly (Bernanke *et al.*, 1999, is typically cited as seminal). Financial frictions are beginning to appear in the 'next generation' DSGE models.

Outside the formal model context, the idea is already commonplace among policymakers that financial frictions cause the credit supply curve to be sensitive to the state of the economy, in a materially procyclical manner. That is, credit supply behaviour tends to propagate and amplify ‘real’ side shocks. Various departures from perfect capital markets are generally used to produce a credit supply curve that shifts downwards as the business cycle turns upwards. At least seven strains of thought are relevant:

- *The financial accelerator.* Due to Bernanke and Gertler (1989), and founded on asymmetric information between lenders and borrowers, the financial accelerator works through lenders making credit cheaper relative to a borrower’s internal funding sources, when the lender observes improvements in the borrower’s financial condition or infers them from improvements in general economic conditions. Bernanke (2007) cites some evidence in support of the financial accelerator.
- *Collateral-valuation effects.* Kiyotaki and Moore’s (1997) approach focuses on the value of the borrower’s collateral moving positively with the cycle, and thus being able to support a greater quantity of collateralised borrowing. Almeida *et al.* (2002) and Craig *et al.* (2006) provide supporting evidence in the case of housing lending. Committee on the Global Financial System (2006) looks in detail at the recent international experience in housing finance markets and the policy issues raised. Almeida (2000) suggests that financial liberalisation has increased the likely importance of the collateral-valuation effect, through increasing the sensitivity of house prices to macroeconomic fluctuations.
- *Lenders’ hubris.* Prudential supervisors have long documented that lenders’ perceptions of economic prospects, borrowers’ creditworthiness, collateral valuations, etc. tend to be biased in a procyclical manner. Imprudent lending tends to occur more often at high points in the economic cycle, when a long run of benign conditions lead to underestimates of risk. In addition to risk perceptions being unrealistically rosy at high points in the cycle, lenders’ risk tolerance may also increase with upswings in the cycle. The incentive structures within lending managers’ contracts, including short horizons for performance assessment, generally encourage this behaviour. Theory and evidence suggests that lenders are better at (or are incentivised to focus on) estimating relative risk across different exposures at a given time, rather than relative risk across time (Craig *et al.*, 2006; Borio *et al.*, 2007).
- *Competitive-strategic effects.* In monopolistic lending markets, lenders may move lending margins or the availability of credit as a competitive instrument in the course of games over market share. Lenders’ emphasis on growing market share in monopolistic markets (or at least cutting margins to defend market share against encroachment by new entrants, such as foreign banks) appears to move with the cycle (Mandelman, 2006). If these games are important (which would probably be more likely in a concentrated market), then system lending growth will be sensitive to an individual lender’s decision to compete via margins or new credit products, and geared to the cycle.
- *Credit product innovation.* In a similar manner, lenders might tend to put more energy into introducing new credit products during periods of strong economic growth, when the payoffs are likely to be larger. Credit product innovations will increase lending to the extent that they provide credit to borrowers that would be otherwise unable to participate in traditional credit markets. An example of this effect would be the emergence of ‘low doc’ loans in Australia and adjustable-rate mortgages in the US this

decade. (One could also argue that these phenomena are simply expressions of the hubris and competitive-strategy effects noted above, or may be related to new lending products “filling the gap” as regulatory constraints are eased – see e.g. Ellis, 2006).

- *Regulatory constraints and the ‘credit’ and ‘capital’ channels of monetary policy.* Regulatory constraints themselves may contribute to financial procyclicality. Later in this paper, I briefly discuss risk-sensitive prudential capital adequacy requirements in this context. Lowe (2002) and Kashyap and Stein (2004) offer detailed treatment. Also, the presence of regulatory restrictions on lenders’ balance sheets has long been argued to amplify the impact on demand of interest rate movements – the so-called “credit channel” of monetary policy (e.g. Bernanke, 2007, and references therein). Traditionally, this literature has focused on the role of reserve requirements, but more recently it has branched into the proposition that in equilibrium, capital adequacy requirements can interact with interest rate movements in a reinforcing manner (e.g. van den Heuvel, 2002; Gambacorta and Mistrulli, 2004, look at some evidence from Italian banks). The general idea is that the degree to which a regulatory balance sheet restriction inhibits lending is reduced (increased) if interest rates fall (rise).
- *Financial distress.* Finally, as touched on earlier, if the downturn phase of the cycle is especially severe, financial system distress, or the fear of imminent financial distress, will lead to curtailment of lending due to incapacity, which may be especially sharp if financial institution failures are involved. Goodhart (2005a) provides a wide-ranging discussion.

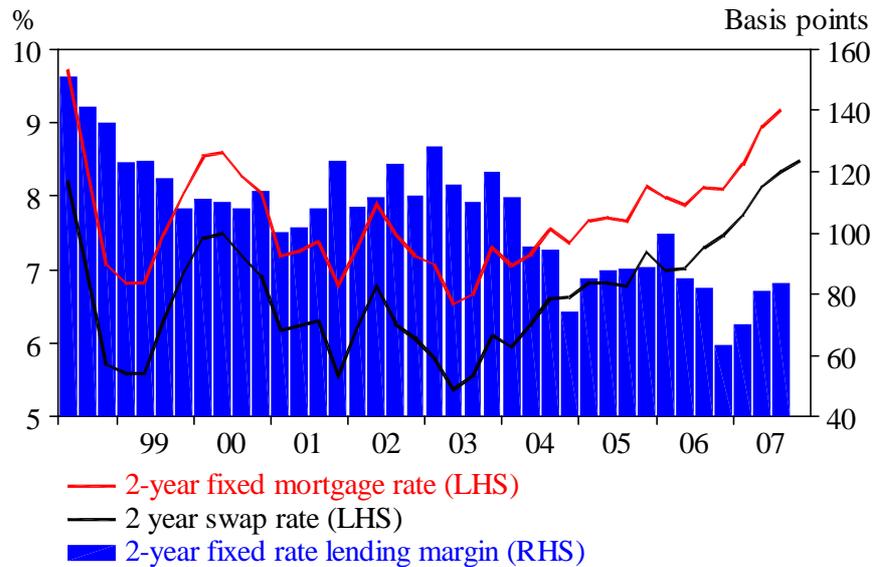
If any of these contributors to financial procyclicality exists, and if borrowers are responsive either to the availability of credit or to its price (probably a fairly innocuous assumption), then a downward shift in the credit supply curve in response to a cyclical upturn will drive further spending and growth, which will in turn further boost credit supply.

The New Zealand case

There has been little empirical study of financial procyclicality in New Zealand.³ The experience in the most recent period of strength in the business cycle, however, is suggestive of some degree of financial procyclicality. Figure 1 shows that the margin of the two-year fixed-rate mortgage rate over the two-year swap rate (the predominant funding rate for two-year lending), dropped noticeably in 2004-05, by around 20-30 basis points. This was at a time when the economy and housing market had reached substantial levels of stretch and reports of a “mortgage war” were widespread (e.g. Bennett, 2006).

³ Craig *et al.*’s (2006) study includes New Zealand in a sample of eleven countries.

Figure 1
Mortgage lending margin

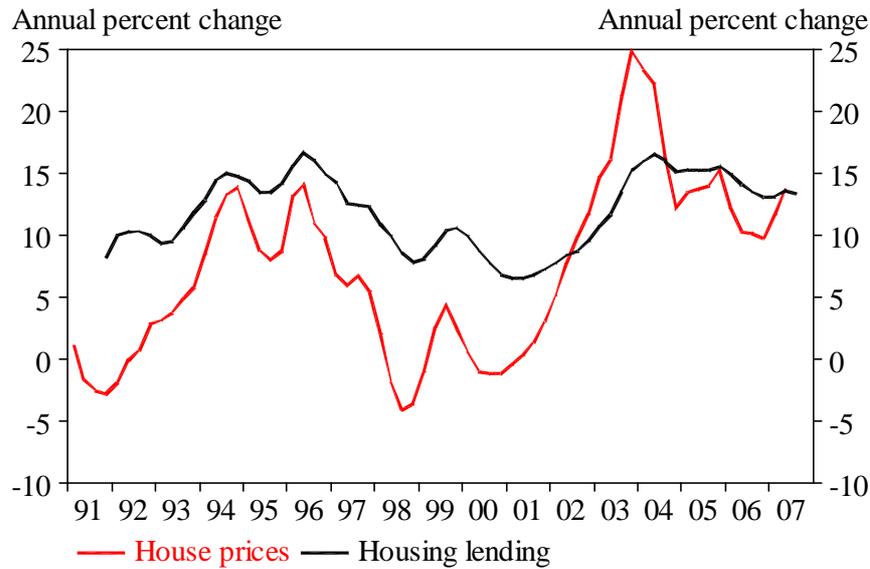


Source: RBNZ.

In contrast to the dearth of formal empirical investigation of financial procyclicality in New Zealand, a related idea, that house price inflation is correlated with or causes household spending and plays a large role in the New Zealand business cycle, has been well-explored (see Hodgetts *et al.*, 2006, and Reserve Bank of New Zealand, 2007a, and references therein). The connection to financial procyclicality is via housing assets' role as collateral and the Kiyotaki/Moore-style channel through which lending may influence spending.

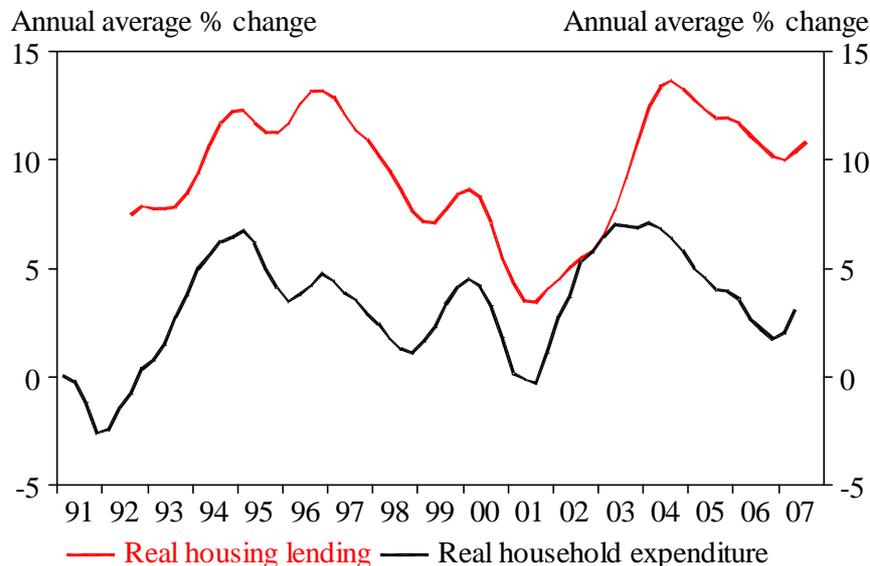
A key question, obviously, is the empirical significance of housing lending in these relationships. Figures 2 and 3 illustrate some basic correlations suggesting that housing lending tends to lag slightly both house prices and household expenditure. This suggests at least that shocks to house prices or to household expenditure are larger or more frequent than those to housing lending.

Figure 2
Housing lending growth and house price inflation



Sources: Statistics NZ, RBNZ.

Figure 3
Housing lending and household expenditure growth



Sources: Quotable Value NZ, Statistics NZ.

The lack of a lead from lending to spending does not mean that there is no role for procyclical credit supply effects. No lead is still consistent with a role for lending in propagating or amplifying shocks to house prices or to household expenditure that arise from other sources. Coleman and Landon-Lane (2007), for example, document that movements in net migration flows appear to have a surprisingly large and long-lasting impact on house prices, controlling for the supply response of the construction industry.

Lending regulation and the business cycle

If there is a procyclical credit supply effect of some magnitude, and credit supply can effectively be constrained, then managing credit supply could be a way to manage the business cycle. Developing such an approach to stabilising the cycle requires confrontation of at least the following issues:

- the nature and behaviour of the supply and demand curves for credit over the cycle;
- the degree to which lending is necessary for spending;
- the impact regulation would have on the credit supply schedule facing borrowers; and
- whether the impact would stick over time.

From a theoretical point of view, the aim is at least to make credit supply less procyclical – that is, lessening the tendency of the credit supply curve to shift downwards with the cycle and reinforce it. Making the credit supply curve shift upwards with the cycle (or perhaps shift upwards more than one-for-one with the OCR, so as to amplify the credit channel of monetary policy) would be even better from the narrow point of view of cycle stabilisation – growing credit demand would feed back negatively onto the cycle via a rise in the price of credit – but would raise a number of adverse efficiency issues.

As noted in Fisher and Gai’s (2005) survey, there appears to be little policy-focused research on the potential for the regulation of lending to assist in stabilising the cycle. Goodhart *et al.* (2004) take a look at the idea, fleshed out with some attempt at broad calibration in this paper, of adjusting lenders’ capital adequacy ratios for cycle-stabilisation purposes. Jiménez and Saurina (2005) discuss a supervisory requirement on loan-loss provisioning that explicitly recognises the tendency for credit standards to be relaxed as the cycle enters an upturn phase, and this kind of instrument has been used by the Spanish prudential authorities. Carmichael and Esho (2001) compare a range of prudential instruments, including capital adequacy requirements, portfolio composition restrictions and provisioning approaches in their suitability for managing asset price bubbles and prefer provisioning approaches.

The previous New Zealand Treasury and Reserve Bank of New Zealand work on “supplementary stabilisation instruments” (Blackmore *et al.*, 2006 and RBNZ, 2007a) considered prudential measures that might have ancillary cycle-stabilisation benefits. This work was premised on the assumption, supported by the authors, that the OCR would remain the main instrument of monetary policy, and that other possible instruments, including regulations on lending, should be viewed as supplementary to the OCR.

The regulatory tools discussed were focused on the housing market, but most could be generalised to focus on macroeconomic cycles driven by events in any asset market. The work generally focused on instruments that would be varied at the discretion of the Reserve Bank – for example, imposed when the cycle was approaching extreme peaks and removed when the cycle returned to a more normal state – but with the same aim of shifting the credit supply curve upwards when the instruments were imposed. The work paid less attention to possible ‘automatic stabilisers’.

The prudential measures considered were grouped into ‘hard’ caps or prohibitions on certain types of lending (e.g. housing loans over a certain loan-to-value ratio), ‘soft’ measures linking lending to capital requirements (largely within prudential capital adequacy frameworks), and ‘moral suasion’ or supervisory pressure. The work concluded that because hard restrictions

by definition imply closure of otherwise operative credit markets, they would have fairly severe drawbacks from efficiency, targeting and administrative points of view (including the necessity of fairly strong anti-avoidance measures). Soft measures were viewed as less distortionary because they would be more continuous in nature, and thus closer to a pricing mechanism. The work concluded that there was merit in further exploring better alignment of prudential capital requirements with risk, and discretionary changes to capital requirements in exceptional circumstances.

3. Prudential capital adequacy policy

Prudential regulation of lenders and other types of financial intermediary is, of course, already mainstream. Prudential policy is well-versed in the implications of the business cycle for risks facing lenders, and in how financial supervisors should ensure that financial institutions account appropriately for those risks. Prudential policy frameworks are thus a natural place to start to consider how cycle-stabilising lending regulation might be designed, in a way coherent with prudentially motivated lending regulation. This section briefly summarises prudential capital regulation principles, as a platform on which cycle-stabilising capital regulation could be built.

Prudential policy broadly refers to regulation and supervision to “ensure that banks operate in a safe and sound manner and that they hold capital and reserves sufficient to support the risks that arise in their business” (Basel Committee on Banking Supervision, 1997, p8). In New Zealand, under current law, prudential policy is implemented largely through the supervision of registered banks by the Reserve Bank.

The purposes for which the Reserve Bank’s banking registration and supervision powers must be exercised are set out in section 68 of the Reserve Bank of New Zealand Act, which states that the powers shall be used for promoting the maintenance of a sound and efficient financial system, or avoiding significant damage to the financial system that could result from the failure of a registered bank. Prudential policy covers many areas of banking conduct. Core prudential rules in New Zealand and other countries typically aim to ensure that financial institutions and the financial system are prepared to deal with difficult times, including those that might arise from cyclical downturns.

Although the section 68 objectives and the monetary policy objective of maintaining price stability are not identical, there is a clear natural alignment between them. At the least, a sound and efficient financial system, and one that is resilient in the face of individual registered bank failures, makes monetary policy more effective. Likewise, macroeconomic stability reduces the stresses to which the financial system might otherwise be exposed.

A ‘cornerstone’ of prudential policy is capital adequacy policy. Regulated financial institutions must generally hold capital against the risks they face. Risks are categorised for prudential purposes into different types – e.g. credit (the largest risk for a typical commercial bank), market risk, operational risk, etc. A key broad principle of capital adequacy policy is that of ‘risk sensitivity’. A larger risk exposure should attract a higher minimum capital requirement, for the institution facing the exposure.

The supervisory world is in the process of replacing the current international framework for prudential capital adequacy policy, “Basel I” (Basel Committee on Banking Supervision, 1988), with ‘Basel II’ (Basel Committee on Banking Supervision, 2004). Among other

things, Basel II is intended to increase the risk-sensitivity of bank capital requirements. This move responds to increased complexity and innovation in banking, and regulatory arbitrage across the (much simpler) Basel I risk categories. Under Basel II, a bank, subject to its supervisor's approval, may calculate its capital adequacy requirement using its own risk models.

A much-discussed 'side effect' of Basel II is the possibility that increased risk-sensitivity in prudential rules might exacerbate financial procyclicality (e.g. Goodhart, 2005b). Probably the most analysed source of potential procyclicality from Basel II is the behaviour of banks' estimates of the key risk parameters in the Basel II internal models approaches. These are the probability of default of the borrower (PD), the loss given default (LGD), the lender's exposure at default and the maturity of the exposure. In particular, the literature has focused on PD. As noted earlier, evidence suggests that perceived default risk tends to fall during an upswing and rise during a downswing (the 'hubris' effect noted earlier). Because capital requirements are related positively to risk, then capital requirements will also tend to fall during the upswing, "releasing" capital to support further lending.

Procyclical lending may also be promoted by loss-given-default (LGD) measures varying negatively with the cycle. This is perhaps easiest to see in respect of secured lending, given that collateral values tend to vary positively with the cycle. In the case of housing loans, for example, rising house prices reduce measured loan-to-value ratios, which may lead banks to reduce estimated LGDs.

Procyclical lending behaviour is of concern not only for cycle-management reasons, but also prudential reasons, because, among other things, it implies individual bank behaviour contributing to macroeconomic conditions that increase risks to individual banks and to the financial system more generally.

Basel II is clear that a bank's regulatory capital at any given time must account for the business cycle position at that time, and not be set in a manner that contributes to financial procyclicality. Avoiding procyclical effects arising as a side-effect of risk-sensitivity is, however, quite technically challenging. Generally speaking, avoiding procyclicality in regulatory capital implies adjusting capital formulae for any cyclical component in the risk measures. For example, a cyclically-adjusted estimate of LGD using the loan-to-value ratio (LVR) on a housing loan as a risk indicator should take account of the strong cyclicity in LVRs.

"Macro-prudential" risks

To use Borio's (2003) taxonomy, Basel II's risk approach is "micro-prudential", focused on risks at the individual exposure level and on limiting the distress of individual institutions. The business cycle is largely treated as an external, 'exogenous' risk driver for banks. Taking account of the externality created by banks' procyclical lending leads to a "macro-prudential" view of risk. The externality exists when individual decisions to expand lending do not take account of the extra systemic risk created when all other banks do the same. Adrian and Shin (2007) show that aggregate banking system leverage, and hence the aggregate system's exposure to credit risk, in the US increase materially as the cycle swings upwards.

Borio (2003) and Borio and Lowe (2004) advocate the addition of macro-prudential risks to the prudential capital-setting process, to account for this behaviour. Although their idea is

motivated by financial stability considerations, they are also a clear move in the direction of integrating financial stability policy with cycle-stabilisation policy.

4. Damping the cycle with capital rules

As noted in the previous section, an important step in addressing financial procyclicality is to ensure that prudential settings do not exacerbate financial procyclicality. A next step, discussed in this section, is to consider how the prudential capital adequacy rules might be used as a platform to support capital requirements aimed at stabilising the cycle.

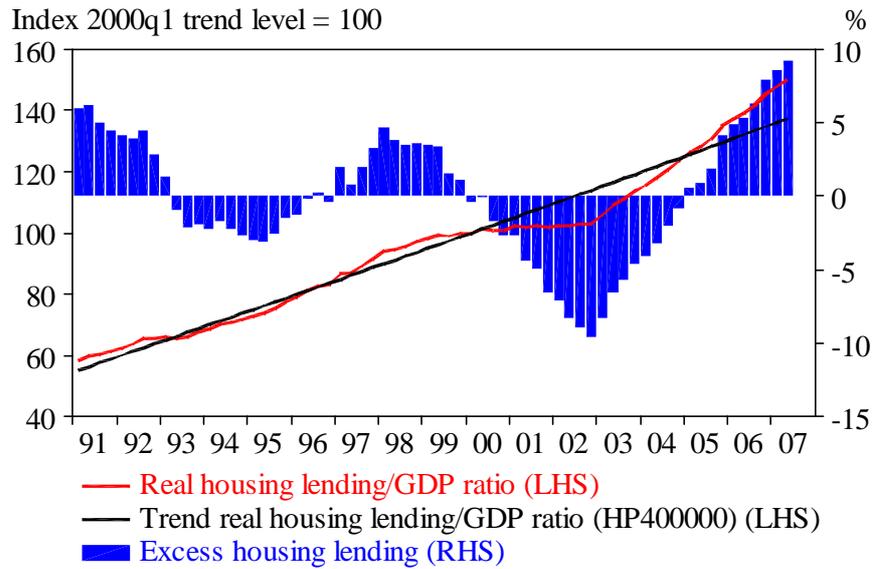
A putative cycle-stabilising capital rule

A very simple way of addressing non-prudential financial procyclicality, while preserving the risk-sensitivity principle at the heart of prudential capital adequacy policy, would be to scale, continuously over the cycle, prudential capital requirements as a function of the state of the business cycle or of particular asset markets.

Indicators of those states would be needed in such an approach. As it happens, as part of their macro-prudential approach to capital requirements, Borio and Lowe (2004) econometrically identify indicators that are a useful place to start. Their indicators, for macro-prudential use, are based on the idea that macroeconomic and financial overheating – “excess” credit growth and “excess” asset price departures from equilibrium – signal an impending banking crisis. These overheating conditions are also likely to exist if financial procyclicality is making a large contribution to a cyclical upturn, so they might successfully predict future inflation and activity outcomes in such a state.

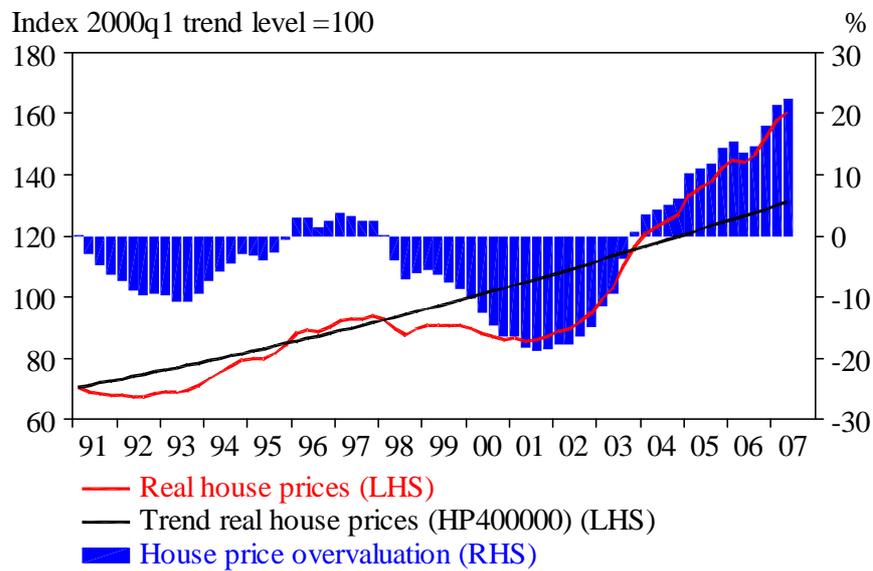
As an example, Figures 4 and 5 show Borio/Lowe-style indicators for housing market conditions, based on housing lending and house prices. I use Borio and Lowe’s approach of detrending with a Hodrick-Prescott filter with smoothing parameter of 400000, on the ratio of real housing lending to GDP, and on real house prices. As noted above, Borio and Lowe’s econometric investigations are predicated on predictive ability for banking crises, rather than for output and inflation, so further exploration of these indicators in the latter context is necessary. For example, the housing market indicators shown in Figures 4 and 5 do not appear to signal that the mid-90’s period was one of business cycle strength associated with, in the Reserve Bank’s judgement at the time (e.g. Reserve Bank of New Zealand, 1996), a strong housing market (Figure 6).

Figure 4
Excess housing lending



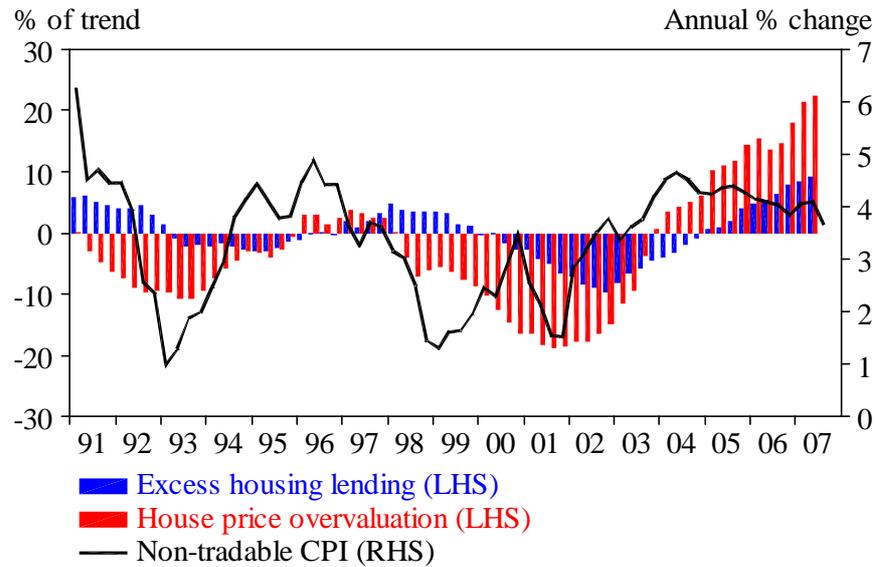
Sources: Statistics New Zealand, RBNZ.

Figure 5
House price overvaluation



Sources: Quotable Value New Zealand, Statistics New Zealand.

Figure 6
Housing market strain indicators and non-tradable CPI inflation



Sources: Quotable Value New Zealand, Statistics New Zealand, RBNZ.

In this regard, it is worth noting that Borio and Lowe's smoothing parameter is very large compared to the 1600 typically used for business cycle analysis on quarterly data. An obvious item of further work would be to investigate the sensitivity of endpoint estimates of these indicators to different choices of smoothing parameter and to additions of data to the end of the sample, and how the revisions thus caused could affect the use of the indicators in practice.

Borio and Lowe's analysis suggests that extreme levels on *both* the excessive credit and excessive asset price overvaluation indicators are econometrically necessary to reliably predict a banking crisis. Borio and Lowe argue for the large smoothing parameter on the grounds that banking crises are rare events compared to business cycles, so indicators of banking crises should only rarely enter the 'extreme' territory consistent with a high likelihood of impending crisis. The evidence that *both* indicators need to be extreme at the same time to produce a positive signal further reduces the frequency of positive signals.

It may well be the case that output and inflation pressure fluctuations associated with financial procyclicality occur at a somewhat higher frequency, suggesting a lower smoothing parameter and perhaps more independent signal value in each indicator.

More complexity to the cycle-stabilising capital adequacy requirement could be added by making the scalar a function of variables in addition to the 'overheating' indicators, where those variables have predictive power for output and inflation. For example, accepting the evidence that leverage increases with the cycle, the scalar could be made a positive function of leverage, which would serve to discourage the extension of highly levered loans in the boom part of the cycle.

Implementation of the scalar

Putting aside the analytical questions of the appropriate design and choice of indicator variables with which to condition the capital requirement scalar, implementation of the scalar would be fairly easy for banks. The infrastructure to calculate prudential capital adequacy requirements by type of exposure, at the level of granularity needed for particular asset markets to be picked out, already exists within banks.

It is perhaps worth noting that the implementation style considered here – a ‘mechanical’ rule intended to operate in the background – contrasts with the discretionary adjustments to capital requirements envisaged in Blackmore *et al.* (2006). I have chosen a mechanical-rule approach to give the instrument a flavour akin to the automatic stabiliser inherent in tax and government expenditure schedules.

A mechanical rule would preserve the clarity, transparency and accountability benefits already established with the official interest rate as the primary instrument of monetary policy. It might also avoid some of the problems associated with achieving timely and effective discretionary interventions discussed in Blackmore *et al.* (2006), given the probable need under a discretion approach for the Reserve Bank to reach, and exhaustively document, assessments in real time about the state of the housing market. One-sided contention around assessments of the cyclical position would be likely and there would be a process lag needed before implementation of the adjusted rules.

These risks, and the likelihood that delay would be more adverse than haste (because of momentum effects in asset markets), would seem to argue for a rule, rather than discretion. The presence of a rule does not exclude, of course, that in exceptional circumstances a regulator might take discretionary steps on capital adequacy in response to heightened financial system risk. Such steps would be standard prudential supervisory practice.

5. The feasibility and effectiveness of capital rules for cycle stabilisation

By how much would the scalar have to move over the cycle to offset materially the procyclical movement in the credit supply curve? Taking the upswing period shown in Figure 1 as indicative, let us assume that the housing credit supply curve drops at high points in the cycle by around 25 basis points, and that this movement should be offset by the effect of the scalar on the lender’s loan pricing.

An obvious approach would be to use the capital requirement in an attempt to induce the lender to shift from debt funding to equity funding (as opposed to subordinated debt funding), as this is where the largest difference in the cost of funds is. *If the lender prices as a markup over the cost of funds, and the ‘cost of funds’ for this purpose is simply the weighted average of the cost of debt and the cost of equity capital*, then a shift of around 2% of each housing loan from debt funding to equity funding would be needed, assuming that debt costs 8% p.a. and equity 20% p.a. ($2\% \times (20\% - 8\%) = 24$ basis points). Currently, banks are required to hold 2% of a normal housing loan as equity capital, *so if a movement in the regulatory capital requirement translates one-for-one into a movement in the actual equity capital charge against the loan*, the scalar would have to move in the order of 100 percent through the upturn (i.e. regulatory capital on housing loans would have to double).

The italicised “if”s in the previous paragraph are large. The relationship between regulatory capital requirements and the credit supply curve is complicated and indirect. For one thing, the large lenders in New Zealand (like those elsewhere) target capital holdings well in excess of regulatory minima, typically to attain a desired credit rating for the purposes of marketing and access to deep wholesale funding markets.

For example, the large retail banks in New Zealand hold Tier 1 capital of around 8 per cent of (Basel I) total risk-weighted assets, against the current regulatory requirement of 4 per cent. This margin is much more than enough to absorb even a doubling of the regulatory capital charge on housing lending (which accounts for about a third of regulatory capital). (There might be a small positive impact from regulatory capital on a bank’s target capital level, to the extent that rating agencies take the regulatory capital level as a signal of the bank’s default risk).

The large retail lenders are also able to source equity capital cheaply from their parent banks. Finally, lenders’ pricing of loans typically depends on a range of factors other than simply the average cost of debt and equity capital, including market structure and competitive circumstances, the lender’s tax circumstances, the underlying risk of particular types of lending, the lender’s risk appetite, and the value of any implicit or explicit too-big-to-fail supervisory policy.

So, all of the “if”s in the above calculation are, in practice, probably questionable – or at least deserving of thorough empirical validation. The margin of capital above regulatory minima suggests that even fairly substantial changes to those minima are unlikely to have more than an indirect and diffuse effect on pricing at the individual loan level, particularly in the upswing when capital is relatively cheap and plentiful.⁴

All of the above considerations suggest that the 100% movement of the scalar calculated above should be interpreted as a lower bound on the movement needed in practice to offset a 25 basis point drop in lending margins.

Even if capital regulation could have a material effect on the credit supply schedule, there would remain the question of the effectiveness with which the regulation itself could be imposed in practice on both actual and potential lenders. Relevant considerations include practicability, administrative cost, distortions, and avoidance risk. The long-term effectiveness of the regulation would depend on the incentives for, and legal ability to prevent, avoidance and disintermediation.

A limitation on any regulation that seeks to constrain the ability to transact in a particular good or service is that the regulation will, by definition, generate incentives for avoidance. The scope for loan pricing to be moved forcibly by regulation will be limited by the difference between the external finance premium charged by the regulated intermediary and the next smallest premium available from an unregulated intermediary. This difference is likely to be quite small in the New Zealand market, which already features an array of close substitutes for regulated intermediated credit (both provided by non-regulated intermediaries, and potentially through direct securities issuance or securitisation).

⁴ A larger impact on prices might arise if capital requirements are used by lenders as a coordinating device for concerted movement in lending rates – but any such impact would probably be short-lived in a competitive market with strong incentives to defect from any cartel.

The lenders accounting for the vast bulk of housing lending in New Zealand all happen to be New Zealand-incorporated registered banks, and thus subject to local capital requirements, but of course that need not always be the case. Borrowers using housing collateral are likely to be able quite easily to find, or be offered, alternative sources of funding.

It is likely, for example, that regulatory capital movements large enough to be a real constraint on the price or volume of credit extended by the large lenders in New Zealand would be quickly undermined by movement of the credit to the balance sheets of offshore parent banks, which would be subject, in general, to lower (i.e. standard prudential) capital requirements. Even regulatory capital movements of the order of those needed to offset the 25 basis point compression in mortgage margins in Figure 1 – which is sizeable compared to the spread of mortgage rates in the market – are probably large enough to cause some distortion due shifting credit provision towards offshore or unregulated lenders.

Finally, regulatory measures to constrain one particular class of lending for cycle-stabilisation reasons would tend to shift the distribution of lending towards the other classes of assets. Because this would be distorting and inefficient, it is a reason why risk sensitivity in regulatory capital settings should not be disturbed too much. Likewise, the efficiency costs of financial procyclicality support regulatory measures to correct that procyclicality, but raising the cost of lending above its efficient level in an upswing for cycle-stabilisation reasons would present trade-offs with efficiency considerations.

6. Conclusions

An overall message from this paper is that capital regulation should not be relied upon for a substantial dampening of the business cycle, in upswings at least. Fairly large regulatory capital movements would be needed to recover the order of magnitude of credit supply shift typically seen in upswings, probably to levels where disintermediation would be encouraged. In New Zealand, branches of offshore parent banks could quite easily take over the New Zealand lending business while offering a more or less identical customer experience, but escaping local capital requirements altogether. Such a development would completely remove any ability for local capital requirements to be used to cushion the New Zealand economy and the financial system from downswings, and thus represent a shot in the foot.

Although capital requirements that increase as the cycle turns upwards are unlikely to have much effect on credit supply because of the cheapness and abundance of capital during upturns, capital requirements might nevertheless at the margin be successful in preventing financial distress, or the fear of impending financial distress, from exacerbating downturns through credit supply contractions. In effect, the build-up of a large capital buffer through the upturn would mitigate the adverse effects on credit supply of any sharp rise in the cost and availability of capital, and of lenders' desire to protect their existing capital, when the downturn arrives. In this sense, capital may be likely to be better as an airbag than as a brake.

Future directions

Macro effects of regulatory measures cannot be simply inferred from micro effects. The law of unintended consequences counsels caution. Further theoretical and empirical work that would be needed on the cycle-stabilising capital requirement before implementation includes:

- better understanding the nature of credit supply and demand curves and their behaviour over the cycle, and embedding that understanding within models in regular use for analysis of the business cycle and monetary policy making;
- estimating the degree of intervention on the credit supply curve of regulated lenders that is likely to be tolerated before disintermediation becomes a concern; and
- development and analysis of indicators of cyclical or asset-market imbalances caused or materially exacerbated by financial activity, and analysis of the cyclical properties of those indicators – with a view to establishing the transparency and credibility of the indicators before they are used in rule making.

Although this paper has deliberately sought, for clarity, to distinguish to some degree financial stability and cycle stabilisation activities, there is a clear literature emerging that is confronting the implications of blending the two together (for a survey, see Fisher and Gai, 2005). What were once distant or unlikely financial-instability-related shocks to the cycle and threats to inflation control are arguably now becoming more present, frequent and material as a result of financial liberalisation and the achievement of credibility in monetary policy conduct (Borio and White, 2004).

Bearing that in mind, even if the marginal effects of any cycle-stabilising capital requirement on lending procyclicality would be fairly small in themselves, this does not mean that they couldn't form part of a financial regulation and supervision approach that included moderation of the business cycle as a key objective, with other supporting measures.

This paper has not explored other tools that might be useful in such an approach. They include 'moral suasion' in supervisory engagements with banks, central bank communications activities on the impact of financial conditions on cyclical developments, and requirements on banks to disclose data relevant to the measurement of financial procyclicality (such as housing loan book LVRs). Publication of asset market "strain" indicators may also assist in dampening the responsiveness of the credit demand schedule to the cycle.

Other approaches to regulation of lenders and their leverage spring to mind where the existing infrastructure of prudential regulation could be used to carry cycle-stabilising objectives. Capital requirements against lending are a case of a general class of instruments seeking to increase the cost of, or reduce the expected returns to, leveraged risky lending. Other mechanisms include linking debt funding to something costly to the bank, such as liquid assets.

Requirements on banks to hold liquid assets above certain minimum levels are, like capital requirements, part of mainstream prudential policy practice deserving of attention in terms of their cyclical properties and implications. Aspachs *et al.* (2005) provide evidence that UK resident banks' liquid assets holdings are procyclical (liquidity held is lower in upturns), suggesting that a liquid-assets policy on banks might have countercyclical, as well as prudential, benefits.

For the New Zealand financial system, issuance of debt obligations to offshore investors is a substantial source of exposure, because these sources of funding are potentially volatile and procyclical. A starting point for the analysis of cycle-stabilising liquid assets policy could be to seek to constrain the degree of leverage that could be funded by offshore debt issuance, by requiring liquid assets (rather than relatively illiquid mortgages) to be held against such

funding. (Liquidity risk is identified as a relevant risk for Basel II purposes, and it could thus be readily incorporated into the capital adequacy regime as well.)

A requirement for banks to fund via stable debt above certain minimum levels would be motivated by the desire to buffer the financial system against liquidity risk, analogously to the way capital buffers the system against credit risk. The cyclical risk in this case arises from the possibility that in a downturn in the foreign exchange market (rapid currency depreciation associated with loss of foreign investor appetite for NZD exposure), foreign funders will become unwilling to bear NZD exposure, while domestic intermediaries will not have the capacity to bear FX exposure on foreign issuance, and thus be forced to contract credit sharply (Grenville, 2006).

Requirements focusing on liquid assets or stable funding, for cycle-stabilisation purposes, are more greenfields in nature than capital requirements. More work would be needed to understand the way in which the funding and liquid-asset parts of lenders' balance sheets affect the credit supply schedule over the cycle. A general observation would remain that the scope of cycle stabilisation that could be expected would similarly be limited by the risk of disintermediation, if particularly distorting measures were imposed.

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