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Choosing Among Macroprudential Tools¹

“Macroprudential” policies may allow authorities to cushion the blow from dangerous financial crises by using an approach that fits between monetary policy for the economy as a whole and traditional regulation of individual financial institutions (now referred to as “microprudential” regulation to distinguish it from the new approach.) There are multiple definitions of “macroprudential,” but the core concept is to manage factors that could endanger the financial system as a whole, even if they would not be obvious as serious threats when viewed in the context of any single institution. Risks that are common to many financial institutions simultaneously, such as excessive exposure to housing credit, can combine with a high degree of interconnections between financial institutions to create systemic risks even when each individual institution appears sound, absent the potential for financial contagion.

Readers unfamiliar with macroprudential policy may wish to read the author’s comprehensive primer on the topic, written for non-specialists, (see www.brookings.edu/papers/2011/0311_capital_elliott.aspx.²) This paper will examine one of the key issues in more detail: how should macroprudential authorities decide which particular tools to use, and in what combination, once they determine action is necessary to deal with excessive financial exuberance or a credit crunch following such over-exuberance? Note that this question focuses on one half of macroprudential policy, actions focused on the problems of excessive cyclicity in the financial system. It does not address the separate issues related to macroprudential policies for minimizing overall, on-going systemic risk, such as by dealing with business models that encourage excessive counterparty risks, opaque financial transactions, or Too Big to Fail financial institutions.

One potential tool has dominated recent macroprudential policy discussions and is explicitly endorsed by leading global authorities: countercyclical bank capital requirements. This instrument builds on an important existing tool of microprudential regulation, the requirement that banks hold at least certain levels of “capital” to back the risks that they take³. In simplest form, capital represents the portion of a bank’s assets on which no one except the shareholders of the bank has a claim. Since there is normally no public policy reason to protect shareholders, this represents a cushion of protection against losses

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² Parts of this paper draw directly from that primer, although the bulk of this paper consists of new material.

³ See Appendix A for a detailed explanation of bank capital, its effects, and the rules to regulate it.

due to mistakes and misfortune that is available before the damage becomes so large that depositors or other parties that policymakers wish to protect have to lose money.

Required capital ratios are traditionally static, but macroprudential theory would call for them to increase at times when exuberance is leading to higher aggregate risk-taking during booms, and be allowed to decrease during credit busts. The build-up of capital as aggregate risk levels rise during the “good times” would increase the ability of the banks to withstand the eventual losses during the bust, which hopefully would mean that they would not be obliged to cut back as far on lending when the credit cycle swings to contraction. There is also the hope that forcing the addition of costly capital during a boom would somewhat diminish the desire of banks to lend excessively, thereby reducing the size of any bubble.

Countercyclical capital will clearly be an important macroprudential tool, perhaps the most important one used in advanced economies. However, the prominence given it has sometimes obscured the point that there are many potential tools and that it is highly likely that authorities will use combinations of tools. Unfortunately, there has been relatively little analysis of how authorities should choose between these instruments and how they can be combined for maximum effectiveness. This paper is intended to advance the discussion of these critical topics. It does so by examining a series of related questions:

- What macroprudential tools are available?
- Why is countercyclical capital the favored approach of many policymakers?
- How should the various tools be combined?
- Is the right choice of instruments different in a credit bust than in a boom?
- How have macroprudential policies worked historically?
- How might macroprudential tools have been used in the run-up to the recent crisis?
- What would be different going forward?

Background

The recent severe financial crisis which led to the “Great Recession” represented a serious failure of economic management and financial regulation. Post mortem analysis of the crisis has brought to the fore a set of ideas for the use of macroprudential tools to reduce systemic risks. Traditional monetary policy can be too blunt to optimally manage financial cycles on its own, since slowing down over-exuberant financial markets by raising interest rates can do major damage to the larger economy that may often outweigh the benefits of tackling a financial bubble. (This does not mean that monetary policy should never be used as one tool to rein in financial excesses. There is considerable debate among economists and policymakers about the role of monetary policy in dealing with potential financial crises. For example, a number of observers blame prolonged low interest rates, encouraged, or at least tolerated, by monetary authorities, for promoting a “search for yield” that led to quite excessive risk taking in the run-up to the recent crisis. However, this important debate is too complicated for this paper to summarize with any justice.)

On the other hand, traditional microprudential management of individual financial institutions clearly cannot fully manage cyclical risks either, as the recent crisis reminded us. It is too easy to lose the view of the forest for the trees, especially as there is a strong implicit tendency in microprudential regulation to assume that the other banks in the system will remain stable when evaluating the situation of a given bank.

The intent of macroprudential policy is to use tools adapted to managing the financial system to reduce the systemic risks to the larger economy of a financial crisis. There is a range of definitions of “macroprudential”. All of them are based on the idea that there is a need for a policy approach that falls between macroeconomic management and traditional prudential regulation of financial institutions. However, various definitions are broader or narrower or focus on different aspects of regulation and economic management.

Claudio Borio, one of the earliest and most persistent advocates of macroprudential approaches, has described it as follows⁴:

“As originally defined, macroprudential is an orientation or perspective of regulatory and supervisory arrangements. It means calibrating them from a system-wide or systemic perspective, rather than from that of the safety and soundness of individual institutions on a stand-alone basis. It means following a top-down approach, working out the desirable safety standards *for the system as a whole* and, from there, deriving that of the individual institutions within it. It means taking explicitly into account the fact that drivers of risk depend on the collective behavior of financial institutions (are “*endogenous*”), and are not something outside their influence (“*exogenous*”).”

The very length of this definition, plus the need to take up several further pages in his paper to distinguish this definition from others, is a clear indication that there are not solid dividing lines between macroprudential and other policy actions or tools.

Borio goes on to argue that macroprudential policy has both a “time dimension” related to cyclicity in the system and a “cross-sectional” dimension dealing with how risk is allocated within the financial system at a point in time. As he puts it⁵:

“To each source of financial distress corresponds a policy principle. To address procyclicality, the principle is to build up buffers in good times, as aggregate risk grows, so that they can be drawn down in bad times, as it materialises. Such countercyclical buffers can help to stabilise the system. To address common exposures and interlinkages, the principle is to calibrate prudential tools with respect to the contribution of each institution to systemic risk, once a given level of

⁴ See Borio (2010).

⁵ Ibid.

acceptable risk for the system as a whole is selected. This calibration can help ensure that each institution pays for the externality it imposes on the system.”

This paper focuses solely on the time dimension, using Borio’s terms, specifically the tools needed to reduce excessive cyclical in the financial system or minimize the systemic damage when such cyclical occurs.

A question that is still under debate is whether macroprudential policies should aim only at raising the capacity of the financial system to handle the boom/bust cycle so that it can continue to serve the real economy even under stress, or whether policy should go further and attempt to eliminate or substantially reduce the frequency and severity of asset price bubbles linked to excessive credit provision. To the extent there is a consensus, it is that the prime goal must be to stabilize the financial system, but that it ought to be possible to make some progress in fighting bubbles while remaining consistent with this core mission.

Few, if any, supporters of macroprudential policy believe that it can eliminate all asset price bubbles. For example, Bank of England (2009) supports macroprudential policy, but notes that there are “clear limitations to the extent to which prudential policy can moderate the credit cycle” and that the “limitations of macroprudential policy would be even more acute if the goal were instead to moderate asset price bubbles or financial imbalances more broadly. To the extent that fluctuations in credit supply contribute to – or indeed finance – bubbles and imbalances, macroprudential policies may help moderate them. Exuberance would, to a degree, be choked off at source. But sometimes bubbles and imbalances are not associated strongly with shifts in (bank) credit supply. Macroprudential tools are likely to be ineffective in these circumstances.” Others acknowledge limitations in the ability to attack asset price bubbles, but are somewhat more ambitious in their goals for macroprudential policy than the Bank of England.

What macroprudential tools are available?

The prime focus of countercyclical macroprudential policy is to attempt to avoid or minimize the effects of asset price bubbles supported by credit booms. Although the boom period generally increases economic growth and short-term prosperity, the inevitable bust that follows more than wipes out these benefits. As discussed in great detail in the primer, the most severe financial crises, as well as many more modest ones, result from excessive and rapidly rising asset prices supported by high levels of financial leverage. The use of credit to help fund the asset purchases means that the financial system is hurt badly by the bursting of such bubbles, with terrible knock-on effects for the wider economy, given the importance of finance to the smooth functioning of advanced economies. The most recent crisis is a perfect example, but many other financial crises have followed the same path. (By contrast, the bursting of the Tech Bubble in the early 2000’s, which was primarily funded by equity rather than credit, did significantly less harm to the rest of the economy.)

Macroprudential policy can assist in two ways. First, it can focus on better preparing the financial system during the boom times to be able to survive the busts, such as by requiring higher levels of capital as the

system enters the danger zone. Second, it can attempt to keep credit busts from becoming more severe than necessary, in order to minimize the damage to the real economy when credit and other financial services are withdrawn. This may well involve damping down the preceding credit boom in order to minimize the repercussions of its demise.

There are a number of tools available for macroprudential authorities, including:

Countercyclical capital requirements. This is the tool which has received the most attention and the widest acceptance by authorities. It has been endorsed by both the Basel Committee on Banking Supervision (Basel Committee), the committee of regulators that coordinates global banking rules, and the Financial Stability Board (FSB), a multi-lateral body empowered by the Group of Twenty (G-20) world leaders to advise on financial stability issues. The G-20 itself has endorsed countercyclical capital as part of its approval of the Basel Committee and FSB recommendations.

As described earlier, the idea is to force banks (and sometimes other regulated credit providers) to hold more capital during worrisome booms. The primary purpose is to build up protection against the hidden risks that lie below the surface of over-exuberant booms, so that banks will be in a better position to continue providing credit if the boom turns into a bust. A secondary purpose is to discourage excessive lending by making it more expensive, since capital is more expensive for banks than other funding sources⁶. This is particularly important because capital tends to be too cheap during booms, due to realized and unrealized gains feeding through balance sheets and the excessive eagerness of markets to supply new capital as a result of “bubble thinking.” (Appendix A explains many of the details of the nature of bank capital and how it is regulated.)

Countercyclical capital surcharges can either be set across-the-board for each financial institution or type of institution or can be specific to a given credit product or sector of lending. There are pros and cons to each approach, which are laid out in detail in Appendix B.

The next section below discusses why countercyclical capital is so strongly favored as a policy tool, after the remainder of this section lays out the main alternative tools.

Dynamic loan loss provisioning. This idea is somewhat similar to countercyclical capital requirements in that banks would be forced to reserve for a higher level of loan losses during a boom than they would otherwise. This can be implemented in one of two ways. First, the rules can attempt to counteract the procyclical aspects of conventional loan loss reserving; reserves tend to fall during booms even though it is the loans made during periods of over-optimism that are usually the most dangerous. Traditional loan loss provisioning methodologies generally require or encourage banks to estimate their losses based on

⁶ Various policy analysts have pointed out that the greater expense is principally due to various policy distortions, such as preferential tax treatment for debt, and therefore society as a whole might be better off with much higher capital levels. However, as long as these distortions exist, banks will find that their private costs of capital are higher than for other funding sources, regardless of what the overall societal costs are. Therefore, having to hold more capital creates a disincentive for banks to undertake lending.

relatively recent experience. During a boom, that recent experience will show unusually low loss levels, leading to diminished provisions. Dynamic loan loss provisioning applied in this manner essentially tries to keep loan loss provisions at a level sufficient for an average downturn. Second, the rules could go beyond that to try to build up quasi-capital reserves above the true best estimate of future loan losses during booms, either by focusing on losses under a stress case or by adding a margin of error in some other manner. The latter approach adds an element that is very similar to countercyclical capital requirements.

Spain employed dynamic loan loss provisioning for most of its banks, but not for its “cajas” or savings banks⁷. The consensus is that this approach probably cushioned the damage to its mainstream banks, even though Spain still ended up with a major financial crisis, partly due to the cajas and partly to crucial underlying aspects of its economic and financial systems.

Countercyclical liquidity requirements. Banks are increasingly being required by their regulators to hold at least minimum levels of safe, shorter-term or highly liquid assets to cover the possibility of their needing cash quickly to stop a bank run or to handle a freeze in credit markets that makes it difficult to raise funds. The revised capital and liquidity rules recently promulgated by the Basel Committee, known as “Basel III,” will impose some form of liquidity requirements over time, although the details are still being worked out. Some countries already have formal liquidity requirements in place and all regulators pay attention to liquidity issues on at least a judgmental basis. Increasing liquidity requirements in a boom would have an effect somewhat similar to increasing capital requirements, in that it would raise both the cost to the banking system of making loans and the safety of the individual institutions and of the system as a whole. (Costs go up because the whole reason banks are tempted to fund themselves excessively with short-term debt is that it is cheaper under normal circumstances.)

Regulators generally believe that capital requirements are a more effective way to handle cyclical pressures, but there could well be room for dynamic liquidity requirements as a complement. As with countercyclical capital requirements, and indeed most of the potential macroprudential instruments, regulators will need to keep in mind the trade-off between increased systemic safety and the cost burden of higher liquidity requirements and its effects on the financial system and the larger economy. Complicating matters further, strength in one area, such as capital, can sometimes make up for relative weakness elsewhere. For example, liquidity tends not to be a serious concern when a financial institution is perceived to have plenty of capital, because bank runs and their equivalents are generally spurred by concerns about solvency, fears which can be alleviated by strong levels of capital.

Administrative caps on aggregate lending. Regulators in some countries can put a limit on total lending by financial institutions as a class and/or on individual financial institutions. This approach is generally only used in less advanced economies where there is more state intervention in general and banks dominate the financial sector. The tool allows quite direct control of total credit volumes, but at the expense of substituting government decisions for market signals. In addition, the more complicated the

⁷ See Jimenez and Saurina for the theoretical underpinnings of the Spanish approach.

financial sector, and the instruments through which credit is provided, the harder it is to make the cap stick. For example, capital markets now provide much of the credit for US businesses, so aggregate lending caps on banks would largely be negated by an increased issuance of bonds. Trying to enforce caps in a more sophisticated environment is likely to end up involving increasingly interventionist policies that fail under the sheer weight of the required regulations. Appendix C presents a table from the Bank of England outlining the difficulties in a number of past interventions.

On the other hand, a number of less financially sophisticated economies have been able to exert substantial control over credit conditions using such administrative caps, since banks dominate the financial system and the government is in a position to directly cap bank lending.

Reserve requirements. Banks in many countries are required to hold a certain minimum percentage of their deposits as reserves at the central bank. In the past, the US and many other developed countries varied these reserve requirements to influence the propensity of banks to lend. This has ceased to be effective in the more advanced economies for reasons similar to those that limit the effectiveness of administrative caps on lending volumes. However, reserve requirements are still an important instrument in China and a number of the less financially developed economies.

Limitations on leverage in asset purchases. Authorities can place limits on the amount of leverage allowed on various types of *transactions* as opposed to controlling the total leverage at different types of *institutions*. This only works well if substantial amounts of borrowing are tied to transactions, such as asset purchases, rather than to general borrowing by households or businesses. Fortunately, transactions tied to real estate and securities comprise a large portion of the credit market in most countries. The next paragraphs review various types of transaction-based leverage limits. The relevance of these caps is that they could be varied over time to reduce the riskiness of loans being made during a period of over-exuberance or to relax limitations during a bust.

Loan-to-value (LTV) ratios for mortgages. Real estate is relatively well-suited to this type of limitation, since it tends to be a “large ticket” item and one where it is difficult to evade the restrictions by lending funds without tying in the real estate, since lenders place a high value on having the collateral protection that comes with the mortgage form of the transaction. In particular, households and small businesses generally cannot obtain very much credit without using their homes or business premises as collateral.

Financial regulators often have the ability to enforce a maximum LTV ratio for mortgages, at least those made by regulated financial institutions and sometimes more broadly. At one time in the US the common maximum LTV ratio was 80% for most private loans, (equivalent to a 20% down payment), although the government’s Federal Housing Administration would lend to qualified borrowers while requiring only a 3% down payment. In recent decades, the maximum LTV ratio offered by private financial institutions tended to be in the 95-97% range⁸, although many borrowers put down more in

⁸ There were a number of instances, however, of products where the LTV equaled or exceeded 100%.

order to obtain a better rate. Further, most US mortgages are securitized with the backing of Fannie Mae or Freddie Mac, which imposed their own LTV requirements, with the implicit penalty being a higher borrowing rate in the market if the loan could not have the benefit of their backing.

There are limits to the degree of effectiveness of LTV ratios. Not all mortgages are securitized, some that are securitized are done outside of Fannie and Freddie, and there is a large financial sector that provides second mortgages and home equity lines that effectively allow homeowners to increase their leverage after taking the original mortgage.

One of the moves being made by the US Congress and federal regulators in the wake of the housing and financial crises is to force higher LTV ratios through various mechanisms, such as placing additional regulatory burdens on mortgages that are not made with a sufficiently high down payment.

Loan-to-income (LTI) ratios. An alternative approach to limiting the risk of mortgages is to require that the borrower have a clear ability to service the loan from their earnings, so that lenders do not rely excessively on the value of the collateral. This can clearly serve to mitigate the over-exuberance of a real-estate bubble, unless there are easy ways around the actual limits. However, the ability to protect financial institutions from loss is lessened, although not eliminated, by several factors. First, some states in the US do not allow the mortgage lender any effective recourse to the income or other assets of the borrower if they default on their mortgage. If a borrower in one of those states chooses to default when the value of their home declines below the mortgage principal, then the lender has little more protection than the value of the collateral, regardless of the LTI ratio. Second, income levels can fluctuate and are correlated with overall financial and economic conditions. Borrowers with good LTI ratios at the time their mortgages are issued may still be caught in a recession and find themselves unable to pay. Regulators in Europe often have more confidence in LTI ratios than their US counterparts, probably because European mortgages are generally all on a recourse basis and income levels appear not to swing as much as they do in the US.

Minimum margins/haircuts⁹ on secured lending. In recent years, a large proportion of financial transactions among big institutions were undertaken through various forms of secured lending, such as repurchase agreements (repos). This has been particularly the case in the so-called “shadow banking” sector that has gained market share from banks in recent years but which has neither the same level of prudential regulation nor access to insured deposits or other stable sources of funds. The Bank of England (2009), the Committee on the Global Financial System (CGFS)¹⁰, and others, have suggested that the margins and haircuts that are used might be made subject to regulatory minimums that would vary over time.

⁹ “Haircut” is the industry term used for the difference between the value of an asset used to secure a loan and the amount of the secured loan that will be made. The haircut covers the lenders’ risk that a failure by the borrower will force them to sell the collateral, at a time when it may have fallen in price.

¹⁰ See Committee on the Global Financial System (2010), for example, for a quite detailed discussion of the issues.

The recent financial crisis was substantially worsened by large, swift increases in required margins and haircuts as providers of lending against securities responded to adverse developments such as the collapse of Lehman. These moves forced many securities holders to sell significant amounts of their holdings regardless of the price they could obtain, since they could no longer finance the securities at any reasonable cost under the panicked market conditions. These “fire sales,” pushed securities prices down further, often leading lenders to demand even higher margins and haircuts, initiating another round of fire sales.

If it were possible to avoid such strong cyclical moves, by ratcheting up the minimum levels more smoothly during boom times so as to avoid a sudden spike in requirements during periods of panic, then there would be less need for these fire sales. Kashyap et. al. (2011) provides an interesting theoretical model of the interplay of regulatory minimums of this type with more conventional capital and liquidity requirements.

In the US, the Fed retains the ability to use margin requirements to limit the amount of borrowing against common stock, which is a special case of secured lending that is often used by individual investors, and sometimes by institutions. Securities brokers in the US may lend only a certain specified percentage of the value of a stock and if the stock declines too far in value then they have to make a “margin call” asking for additional collateral. Apparently the Fed considered increasing the required margin during the Tech Bubble as a way of signaling its concern with the level of the stock market, but concluded that it would have been so easy for the borrowing to occur in other ways that the move would have been toothless and seen as such. For example, much higher effective levels of leverage can also be obtained through the purchase of options or futures on stock prices without the need for direct financial leverage, undermining the effectiveness of margin requirements focused on outright purchases.

Taxation. Targeted taxes represent another way of changing the incentives for financial institutions or market participants to take certain actions. For instance, there have been various proposals to use taxes to encourage sounder liquidity management. (The UK bank levy exempts assets funded by deposits and capital and has a reduced rate for debt with maturities above one year, for example, as a way to tilt the balance towards more stable funding sources, among other goals¹¹.)

Almost any instrument which uses a minimum or maximum ratio or absolute cap or floor could instead be arranged to tax violations of these levels, rather than absolutely forbidding them. This is discussed further below in regards to uncertainty and public policy choices. If taxation is used to influence the level of risk in the financial system, rather than being imposed simply to raise revenue, then changes in those tax policies could be considered to respond to booms and busts.

One key difference between taxation and the setting of safety margins such as through capital requirements, is that taxation does not directly improve system resilience and may lessen it by draining

¹¹ The Financial Crisis Responsibility fee proposed by the Obama Administration also discriminated among funding sources for similar reasons.

resources. Increased capital requirements, in contrast, provide incentive effects while also directly improving the ability of the system to withstand losses. On the flip side, taxation does produce revenues for the government that can be used for other purposes or set aside to support interventions to mitigate financial crises. The latter point, of course, also leads to questions of moral hazard if the existence of taxation leads to an assumption that government rescues would be available.

Constraints on currency mismatches. In many countries a considerable portion of credit activity takes place in currencies other than the country's own. This became a problem in parts of Central Europe and some other parts of the world during the recent crisis and, in general, these exposures represent a risk factor that becomes more important during boom times. Limits could be tightened during booms and released again during busts or in more normal times.

Capital controls. In some developing nations, capital inflows from outside the country are a major factor in credit cycles, with a strongly pro-cyclical effect. Foreign money flows in during good times and out again in bad, exaggerating the domestic credit cycle. Some countries have begun to use capital controls in a manner they view as macroprudential. There is a long history of economic debate on capital controls, which are too complicated to fully discuss here. There is certainly a theoretical argument for using them as a macroprudential tool, however opponents view the possibility with deep concern. First, the existing literature shows that capital controls can have a number of adverse consequences, although it may be that the financial stability benefits would outweigh these. Second, opponents fear that capital controls might be imposed for other, less benign, reasons but be protected by labeling them as "macroprudential" in nature.

Monetary policy. As noted earlier, there is reason to believe that overall monetary policy conditions play a significant role in helping to support or suppress financial cycles. In particular, prolonged low interest rates have been shown to encourage financial institutions and other market participants to take levels of risk that they would otherwise have shunned, levels that can become truly quite excessive in extreme cases¹². There is an ongoing debate about whether this fact should lead monetary authorities to hold rates higher than they otherwise would at times of over-exuberance in the financial markets. Opponents of this approach generally assert either that it is too hard to detect bubbles or that the damage to the wider economy from higher interest rates more than offsets the benefits of taming the financial cycle, or that both negatives are true. The debate is too complicated to be adequately covered in this paper. (See Bean et. al. 2010 for a review of the arguments.) However, it is worth noting that the more one believes in an active monetary response to financial crises, the less likely one would be to support macroprudential tools that work by affecting the financial system widely. That does not mean, though, that such a belief would be inconsistent with more focused uses of macroprudential policy, such as dealing with bubbles confined to a single sector, such as housing.

Many other potential tools exist, such as those listed in CGFS (2010) in Table 1 of that report. However, those listed above are likely to be the most relevant in the near term.

¹² See Altunbus et. al. (2008) for example.

Why is countercyclical capital the favored approach of many policymakers?

The macroprudential tool on which regulators in advanced economies are placing the most emphasis for damping the effect of credit cycles is countercyclical bank capital requirements. Minimum capital requirements set by regulators are strong factors in determining the economic attraction of credit provision by a bank. Currently they are set statically, with occasional adjustments that are usually based on revised risk analyses rather than macroeconomic conditions. Dynamically-adjusted bank capital requirements could provide a particularly powerful tool to influence banks' credit behavior, which in turn heavily affects the behavior of other credit providers. (Many non-bank financial institutions rely substantially on direct or indirect liquidity provision by banks.) It could be useful to give authorities the ability, underpinned by the necessary theoretical framework, to adjust capital ratios up to reduce the incentives to provide credit during booms that threaten to become bubbles and to adjust them down to counter excessive tightness in credit conditions.

As noted, the Basel Committee has endorsed countercyclical capital requirements. They put forth a method for creating countercyclical capital buffers in July 2010, (see Basel Committee (2010).) This leaves the decisions in the hands of national regulators, but suggests common approaches to encourage consistency across countries. The committee notes that buffers may be needed as infrequently as once every 10 or 20 years, depending on developments in the credit cycle in each country.

The Basel Committee states the objectives of its proposal as:

“The primary aim of the proposal is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking system from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk. Protecting the banking sector in this context is not simply ensuring that individual banks remain solvent through a period of stress, as the minimum capital requirement and capital conservation buffer are together designed to fulfill this objective. Rather, the aim is to ensure that the banking sector in aggregate has the capital on hand to help maintain the flow of credit in the economy without its solvency being questioned, when the broader financial system experiences stress after a period of excess credit growth. This should help reduce the risk of the supply of credit being constrained by regulatory capital requirements that could undermine the performance of the real economy and result in additional credit losses in the banking system.

In addressing the aim of protecting the banking sector from the credit cycle the proposal may also help to lean against the build-up phase of the cycle in the first place. This would occur through the capital buffer acting to raise the cost of credit, and therefore dampen its demand, when there is evidence that the stock of credit has grown to excessive levels relative to the benchmarks of past experience. This potential moderating effect on the build-up phase of the credit cycle should be viewed as a positive side benefit, rather than the primary aim of the proposal.”

In addition to the Basel Committee, the FSB and many national regulators, prominently including the Bank of England, have also shown considerable enthusiasm for adding this tool to its toolbox.

Why is countercyclical capital favored over other potential tools? Answering this requires a certain amount of conjecture, since little has been written comparing the desirability of the different macroprudential tools. The major comparative advantages of countercyclical capital appear to be:

- **Power of the tool.** Capital is a critical direct defense against losses and increases in its level clearly can improve the resilience of the system. Regulators also know that capital requirements are a significant factor in bank lending decisions and therefore changes in the requirements can encourage or discourage credit activity to a substantial degree. Thus, it both directly affects the resilience of banks and directly and indirectly provides incentives to change lending behavior.
- **Compatibility with market forces.** Some potential macroprudential tools transfer significant control from markets to national regulators, such as by setting a limit on the total credit issued by the banks. Capital, like taxes, is less intrusive. It provides incentives and disincentives, but allows the market to choose how it responds. This avoids the problems caused by regulators making absolute choices for the banks, which runs into many of the same difficulties that central planning regimes have run into for management of entire economies. Raising capital requirements, like raising taxes, discourages certain activities but will not stop them if they in fact make strong economic sense. This flexibility also somewhat reduces the incentive for banks to “game” the rules.
- **Existing theoretical and empirical analyses of capital requirements and their effects.** Capital requirements have been in existence for many years in the major financial centers and there is considerable theoretical and historical evidence concerning their effectiveness. (Miles (2011), for example, calculates the likely change in loan pricing and activity for a given movement in capital ratios and compares that to the economic benefits of greater bank safety. It also discusses some of the prior analyses of the same issues.) Admittedly, there is a great deal that remains unknown, but this is even more the case for many of the other potential tools.
- **Ability to use either broadly or narrowly.** Capital requirements are a fairly flexible tool, in that they can be increased or decreased for all regulated financial institutions or a subset and for all credit products or a subset. (See Appendix B for a detailed discussion of this point.)
- **Ease of implementation.** Banks are already subject to complex capital requirements. Adding a buffer on top of the other requirements would be very easy.

How should the various tools be combined?

This is a particularly difficult question. The state of understanding of macroprudential tools is still somewhat primitive even when examining such tools one at a time. There has been little work analyzing how they might be combined most effectively, especially in combination with countercyclical capital, the

favorite tool of many authorities. In addition, the right choice may vary considerably depending on the precise circumstances of the country, its financial and economic system, its macroprudential governance structure, and the particulars of the systemic threat.

At this point, the most useful decision-making structure may be to walk through a series of questions before choosing the set of tools to use. (The following assumes that the macroprudential authority has identified a problem. The difficulties in correctly identifying such a need for action are discussed in considerable detail in the overview paper.) These questions should include:

- What is the nature of the uncertainty about the systemic threat and potential responses?
- What tools are legally available and politically feasible?
- Is the systemic threat concentrated in a single sector or closely-related sectors?
- Can the activity be contained within the closely-regulated financial sector?
- If so, do the authorities have sufficient control to ensure appropriate actions without spillovers?
- If so, are the authorities in a better position than the private sector to make the decisions?
- Are there international ramifications of the systemic threat or potential responses?
- How strong are capital and liquidity levels in the relevant financial sectors?
- How risky is the systemic threat?
- What is the larger macroeconomic policy position?

What is the nature of the uncertainty about the systemic threat and potential responses?

Unfortunately, policy actions must be taken despite uncertainties about their effects. This may particularly be an issue with macroprudential policy, since it is quite early days for the systematic application of such an approach. One area that has been studied more than others in regard to policy uncertainty is the trade-off between a price-like mechanism (for example, a tax or a minimum capital or liquidity ratio that adds costs to credit provision) and a quantity limitation, such as a limit on total lending by an institution or sector. Weitzman (1974) wrote a seminal work establishing a set of principles that apply in many areas of regulation, such as pollution control, where there is a choice between price and quantity mechanisms. One of his conclusions was that the choice of instrument depends to a significant extent on the relative degree of uncertainty about the social costs of allowing too much pollution or other “bad” versus the uncertainty about the cost to the private sector of obeying the rules. As with pollution control, regulation of systemic financial risk imposes costs on the private sector that must be weighed against the harm to the economy from letting risk become excessive. If the costs of regulation are relatively clear, but we are uncertain about whether letting systemic risk rise above a certain level would produce catastrophic results for the economy, then Weitzman shows that we should prefer quantitative limits to maximize our ability to avoid the potential catastrophe. If, on the other hand, the greater uncertainty is about the cost of imposing restrictions, then we should prefer taxes or capital requirements or other actions that give the private sector flexibility to respond with the lowest-cost solution to the need to limit systemic risk. (It is difficult to put Weitzman’s reasoning and conclusions into intuitive terms, so these illustrations should not be taken too literally.)

More recently, Perotti and Suarez (2009) and Jeanne and Korinek (2010) have built on these insights with specific applications for taxes versus capital/liquidity ratios. Perotti and Suarez, for example, argue that taxation might be superior to liquidity ratios for inducing the socially appropriate behavior in regard to systemic liquidity. In general, it appears that the insights first brought to light by Weitzman argue for price-like policy tools, such as countercyclical capital, as opposed to aggregate lending caps or maximum loan-to-value ratios.

Finally, each macroprudential authority will have to make its own determination of the degree of confidence it feels in using each tool. That is, how sure is the authority of the effects, including side-effects, of using the tool and how sure is it of the degree of response it will obtain from a given movement of the instrument. One of the arguments advanced for countercyclical capital requirements is the long history regulators have with using capital requirements in general. Many of the other tools do not come with this base of experience.

What tools are legally available and politically feasible? Perhaps it goes without saying, but not every macroprudential authority will have the legal right to use every instrument. Even for those that do, there may be political constraints or costs that must be weighed in choosing which tool or tools are right for the job at hand. For example, in the US and UK, a rise in the capital required for a bank to hold mortgage assets would likely encounter considerably less political resistance than a decrease in the maximum LTV ratio on mortgages. This is not to say there would be no resistance to a capital change, but it would not have strong resonance with politicians or their voters, since it seems so technical. Down payment requirements, however, are easily understood by voters and they can translate them into their own situations and those of people they know. A further constraint may be potential conflicts with the microprudential regulators, since most of the tools discussed here can be used for either micro- or macro-prudential purposes.

The political costs and constraints may matter most in the early days of macroprudential policy, since it will not have had a chance to demonstrate its value yet. Although, on the other hand, actions may become tougher as memory of the recent terrible crisis fades, unless other, probably smaller, crises follow before the recollection fades too much.

Is the systemic threat concentrated in a single sector or closely-related sectors? If there is a clear focus of the risk, such as a housing bubble, it would be logical to first consider applying tools aimed specifically at that sector. This has the advantages of responding directly to the specific problem and also maximizes the signaling benefit by focusing on the problematic area. However, this could be inappropriate or inadequate for several reasons.

- **There may not be a good tool available** for that particular sector. It could be that there just is not a logical tool, or perhaps that tool, such as the US margin requirements on equities, is too easy to work around.

- **The tool may be insufficient.** For example, lowering the maximum allowable LTV for mortgages may reduce both the volume of risky loans and the risk inherent in each loan, but still not completely eliminate a housing bubble. Lenders might even push to increase the volume of their loans, reassured by the reduced riskiness of each individual loan.
- **The true problem might be wider,** but happened to have manifested itself first, or most strongly, in one particular sector. In that case, sector-specific action could be like pushing a finger into an inflated balloon -- the air just moves to another part of the balloon.

Appendix B contains a more detailed discussion, taken from the primer, of the question of wide versus narrow application in the context of countercyclical capital requirements.

Even if the sector-specific tool would not be enough for the full scope of the problem, it may still make sense to apply that tool as part of a package, especially if it is a solid instrument without too many negative side-effects. There could also be merit in combining it with tools of wider application if there is uncertainty about the effectiveness of the sector-specific tool. (Sometimes a tool is promising, but still uncertain.)

Can the activity be contained within the closely-regulated financial sector? If the source of the systemic threat is controlled by the closely-regulated financial sector and there is little potential for the activity to move outside that circle, then direct administrative controls, such as caps on lending, become feasible. Thus, an economy where credit provision is dominated by a small set of domestic banks is a better candidate for such administrative controls, as long as there is little danger that those controls would simply create or substantially enlarge other credit providers that are less regulated. On the other hand, the more sophisticated financial systems in the advanced economies are very difficult to control in this manner, since it is much too easy for credit activity to migrate to capital markets rather than financial intermediaries or to less regulated intermediaries. For those countries, these policy options can pretty much be rejected out of hand.

If so, do the authorities have sufficient control to ensure appropriate actions without spillovers? Even if a less sophisticated economy is dominated by closely-regulated financial institutions, there is still a question as to whether the government has the ability to enforce its administrative controls without doing undue harm. For example, a relatively weak macroprudential or financial regulatory authority might be in a position to declare lending caps, but not to enforce them effectively. Banks may be able to exert political influence to invalidate the limits in advance or to receive forgiveness after the fact for violating them. An issue that makes a high degree of control harder is that the authority must effectively divide the total cap into a series of individual institution caps, which can be easier to appeal to political allies than trying to overturn the entire policy. Yet the net effect of multiple political interventions could in fact negate the policy move. Further, in some economies, the accounting and auditing systems may simply not be good enough to enforce the caps. In the extreme, even the bank itself may not have sufficient controls to ensure that the accumulation of all the lending decisions within the bank do not add to more than it intended.

In addition, of course, there is the risk that cosmetic solutions will be found to continue the excessive lending without violating the letter of the administrative controls, such as by providing guarantees, perhaps even implicit ones, instead of directly making loans.

If so, are the authorities in a better position than the private sector to make the decisions? Even if administrative controls appear feasible and enforceable, there is a core question as to whether the central authority is in a better position than the financial institutions to make the decision about lending caps or similar controls. A major risk with administrative controls is that it substitutes the judgment of a government entity for the implicit judgments of the financial system. At one level, this is inherent in any macroprudential policy dealing with excessive cyclicality, since it assumes, correctly I believe, that financial markets can move to excess or make other collective mistakes. However, there is a great deal of difference between relatively nuanced regulatory actions, such as the use of countercyclical capital requirements, and direct administrative controls, which sharply limit the room for judgment by market participants.

There are some economies where it is likely at this point in time that the level of sophistication of central financial authorities and the nature of the incentives that they face, make them more capable of arriving at the right choices than the collective decisions of those they regulate. It is critical that this be true if the macroprudential authorities are going to initiate an intrusive set of policies such as administrative controls on lending, which can lead to fairly specific intervention in financial institution activities. One danger, of course, is that there is a strong tendency for humans and institutions to judge their capabilities as stronger than they are and those of the people they deal with as weaker.

Finally, Moreno (2011) discusses a number of potential short-run benefits for emerging market economies of using many of the alternative tools besides countercyclical capital requirements. However, he adds some interesting caveats:

“Over the medium term, the use of supplementary and macroprudential tools raises issues of financial development and efficiency. On the one hand, many supplementary tools discussed here have been abandoned in advanced economies because of the heavy costs imposed on the financial system and distortions in resource allocation. On the other hand, recent experience showed clearly that market discipline is not enough to guarantee financial stability. The crisis has prompted a reassessment of how these two competing considerations should be balanced.

Another concern is that the focus on supplementary tools, including capital controls, could draw attention away from the need for sound macroeconomic policies. A number of central banks take the view that there is no substitute for conservative fiscal, monetary and regulatory policies in order to prevent fluctuations in global capital flows from causing severe disruptions in [e]merging market economies.”

Are there international ramifications of the systemic threat or potential responses? Macroprudential authorities have a freer hand if they are dealing with purely domestic issues. For instance, the administrative controls discussed above could be harder, or even impossible, to effectively implement if the financial system is open to international financing transactions. Lending caps to hold down excessive real estate speculation, for example, could be rendered less effective because foreign lenders step in to take on the risk. This would have the advantage of transferring some of the eventual pain overseas, as the US found, (due to other causes than lending caps), after it sold large amounts of mortgage-backed securities to foreigners. However, as that example also shows, the ramifications of the resulting bust can still be quite severe for the domestic institutions. In the other direction, domestic institutions may move portions of their risky lending overseas, if the over-exuberance extends across borders. This could have the advantage of slowing the local portion of the bubble, but exposes the domestic financial institutions to large losses on their foreign risks. This effect can be magnified by the relative ignorance of domestic institutions about their foreign lending. They have a better chance of recognizing when their lending has gone too far in the market they are familiar with.

The international aspect does not show up only when lending caps or other administrative controls are instituted. All of the macroprudential tools that focus at the institutional level are subject to those same international ramifications, including countercyclical capital requirements. In the case of the latter tool, there is a global consensus that if a local macroprudential authority adds countercyclical capital requirements for certain types of domestic borrowing, the authorities in other countries will mimic that action in regard to such loans made into that country. It will remain to be seen in practice how effectively this global agreement is followed.

Macroprudential tools that focus on individual transactions, rather than institutions, are somewhat less affected by international issues. For instance, imposing lower maximum loan to value ratios on UK mortgages would have an effect on any mortgage made in that country, regardless of the location of the lender. Thus, all such lending would be made less risky, both from domestic and foreign lenders, and there would probably be some local benefit as well from dampening a housing bubble. However, the dampening effect would be reduced by the willingness of foreigners to add their lending supply, as compared to a purely domestic market. Sadly, market delusions such as housing bubbles very frequently prove attractive to foreign money and not just domestic funding sources.

In sum, the international aspects of macroprudential policy are likely to reduce the effectiveness of administrative controls, giving a relative advantage to tools such as countercyclical capital where there is an ability and a willingness to apply them in a globally coordinated manner, and also providing a relative advantage to transaction-level restrictions such as loan-to-value ratios. The balance of these factors will depend significantly on the particular circumstances of a country.

How strong are capital and liquidity levels in the relevant financial sectors? The benefits of altering the minimum required levels of capital and liquidity for financial institutions will depend to some extent on their starting points. If the industry's capital levels are already high, perhaps well above the regulatory minimums, including the preferred cushions banks hold, there might be little benefit to increasing the

minimums to counter over-exuberance in the markets. On the other hand, it is possible in that situation that liquidity levels are near their minimums. In fact, the higher capital levels could easily lead banks to feel comfortable taking more liquidity risk and to accepting it at their counterparties. Under those conditions, choosing to increase the minimum liquidity levels may do more for safety than an equivalent change in capital ratios and would also be a greater deterrent to excessive lending, since it would have more effect on the lenders' costs than an increase in a minimum capital ratio that was not currently binding.

The starting points also matter because the increase in systemic safety resulting from a given increment of additional capital or liquidity decreases the higher the initial level¹³. That is, going from an 8% capital ratio to a 9% ratio provides significantly more systemic risk reduction than raising it from 18% to 19% and certainly than raising it from 89% to 90%. However, the marginal cost to the financial institution, and the economy, of the capital increase is fairly linear. Since the benefits decrease at higher levels while the marginal cost remains relatively constant, it makes most sense, all else equal, to bolster the weaker element first.

How risky is the systemic threat? The greater the perceived risk, the wider the set of tools that is likely to be optimal. First, there are limits to the effectiveness of each tool and, as noted, many of them produce less marginal benefit the more strongly they are pursued. Dealing with a big problem may, therefore, require a number of tools. Second, the bigger the problem, the more important it becomes that macroprudential policy works. A classic analysis by Brainard (1967) concludes that optimal policy in the presence of uncertainty about the effects of that policy generally argues for using all relevant tools, even if there is only one discrete target variable. This argument would push for using multiple policy tools generally, even with smaller risks, but the author believes that the offsetting disadvantages in this case suggest simpler policy choices if the systemic threat is not large. We will only learn what works in the area of macroprudential policy by making choices and seeing the effects, which will be harder the more tools are combined. Similarly, the signaling effects on markets may be diminished if too many actions are taken at the same time. For that matter, communicating macroprudential actions to all interested parties would be easier with single policy moves.

What is the larger macroeconomic policy position? Macroprudential policy takes place in a larger macroeconomic context, necessarily influenced by policy choices in that area. These affect both the level and nature of risk in the financial system and may make some macroprudential choices more or less attractive than they would otherwise be. For example, changes in monetary policy normally impact the difference in cost between shorter- and longer-term funding. If, as an extreme, short-term funds are actually more expensive than long-term funds for an extended period of time, then altering the minimum liquidity requirements may have less effect than usual, since banks will already have economic incentives to hold medium- to long-term funding¹⁴.

¹³ See, for example, Miles et. al. 2011.

¹⁴ There may still be incentive effects, of course, since the inverted yield curve would point towards lower short-term rates in the future. A bank which believed the yield curve accurately predicted future short-term rates might

Are the right choices different in a credit bust than in a boom?

Conceptually, all of the macroprudential actions used during periods of over-exuberance are simply reversed in periods of under-exuberance or “busts.” Lower capital requirements make it easier and cheaper to lend and higher maximum LTV ratios make it easier to issue mortgages. However, credit busts can present a problem analogous to the “zero lower bound” problem in monetary policy, which simply reflects the fact that you cannot force people in free markets to lend for less than zero percent, effectively paying their borrowers to take the money. The analogy is a somewhat loose one, but still of considerable force.

In a credit bust, there is a limit to how low the authorities can push the safety margins, such as minimum capital requirements. First, there would be great reluctance to go below the “base” minimum capital ratios agreed upon under Basel III or the equivalent liquidity ratios that are yet to be agreed. These figures were chosen because it was felt that the system would not be safe enough at lower levels. Second, a credit bust, which always harms the larger economy and markets, is a particularly risky time to drop below the base levels for safety margins, since these are the times when those margins may actually be needed. (One only needs an umbrella when it is actually raining.) Third, even if the authorities were willing to reduce the safety margins further, the private sector might not allow it. Permitting a bank to lend more on a given base of capital does not mean it will do so if it is scared to lend. The fear could be because of the risk of the available loans, or because it wants to maintain higher capital ratios to be sure of avoiding insolvency if more loans default, or to reassure its investors and depositors of its strength.

The difficulty in adjusting safety margins downwards is generally present across all of the macroprudential instruments. The degree to which it is a binding constraint may vary across the instruments in particular circumstances, and therefore affect the choice among them, but it is not entirely clear that one type of instrument will be relatively better in downturns than in booms. Even administrative controls can lose some effectiveness in downturns. It is easier to decree that lending cannot exceed a certain level than to force a bank to make a given volume of loans, unless the government or central bank very closely controls the banks.

Although it is difficult to be sure, it may be that maximum leverage ratios on transactions lose more effectiveness than do many of the other tools in a downturn. For instance, LTV ratios for residential mortgages may be the binding constraint determining how many marginal borrowers can still get loans during a boom, when lenders might be inclined to pay too little attention to risk. However, lenders may have no interest at all in pursuing such marginal borrowers during a credit bust, when creditors are very focused on risk and prefer not to take chances. Raising the regulatory maximum LTV in such circumstances might have only a small impact on whether additional loans are made.

not feel economic pressure to hold medium- and long-term funding. That said, firms that care about their stock prices, as most financial firms do, show some tendency to prefer actions that maximize near-term earnings.

How have macroprudential instruments worked historically?

There is little direct evidence about the effectiveness of the authorities' favorite potential macroprudential tool, countercyclical capital requirements. It has been relatively rare for regulators to move capital requirements specifically to affect credit conditions in the short- or medium-term rather than for other reasons. There *is* a considerable body of research on capital requirements, including their effects on lending, which can provide useful guidance. However, only a small fraction of this has focused specifically on *countercyclical* capital requirements.

Prior to the last couple of decades, governments and regulators frequently intervened directly to affect credit volumes. This was made considerably easier than it would be today by the greater simplicity of national financial systems and the lesser degree of linkages across borders. Even so, these efforts often failed to achieve their overall goals, as Appendix C outlines.

The Committee on the Global Financial System, an international coordinating body for central banks to discuss broad issues concerning the financial system, issued a report in May of 2010 addressing macroprudential issues. It reports on a survey the CGFS conducted on experience with macroprudential tools, to which 33 central banks responded. The report indicated:

“In most economies, macroprudential policy frameworks are at an early stage of development. They have been implemented using existing microprudential monetary policy and liquidity management mandates and institutions. And, macroprudential interventions have taken the form of adjustments or add-ons to instruments already used for microprudential or liquidity management purposes.

To date, most experience with macroprudential policy has focused on judgmental, rather than rules-based, use of instruments. The aims have mostly been to enhance financial system resilience rather than to moderate aggregate financial cycles, though there are examples where instruments have been used with a flavour of both.

The evidence for effectiveness is tentative. The independent effect of macroprudential instruments is hard to isolate, given that they have come into use only recently in most cases, and often in conjunction with other stabilisation measures such as monetary policy responses. Authorities that have used them generally report that they helped to protect the financial system from downturns, but made a lesser contribution to moderating the financial cycle.

To date, macroprudential instruments have been used mainly to limit the amount of credit supplied to specific sectors seen as prone to excessive credit growth, especially property investment and development. In addition, some emerging market economies have used reserve requirements to prevent the build-up of domestic imbalances arising from volatile cross-border capital flows. Measures targeting the size and structure of financial institution balance sheets for macroprudential purposes have been less common, with the exception of Spain's dynamic provisioning system, which has now been in place for a number of years.”

The report is of particular value because, so far as the author is aware, it is the only wide survey of macroprudential activity around the world¹⁵. However, the high degree of subjectivity in the responses and the difficulty of independently analyzing the actions and their effects renders the results unavoidably quite tentative. The report itself acknowledges that “most respondents had a broad concept of what constitutes a macroprudential instrument” and that “responses indicated that conceptions of macroprudential policy aims and objectives are fuzzy.”

How might macroprudential tools have been used in the run-up to the recent crisis?

It may be helpful to explore what instruments were available and how they might have been combined in the mid-2000's in the US in order to better position financial institutions and markets to deal with what became the worst financial crisis since the Great Depression. This is too easy a case to examine in some ways, because there was so much wrong with the financial system and its regulation that almost all of the tools discussed here would have helped and could usefully have been used in combination. Nonetheless, it is still helpful to consider the situation a strong macroprudential authority would have faced and the thought processes involved in deciding what to do.

For the sake of discussion, assume that a strong macroprudential authority existed in the US and correctly perceived the systemic risks in the mid-2000's, but was unable for some reason to push through the type of necessary systemic reforms that are being pursued now to eliminate core weaknesses of the financial system. That is, the government support that helped create the massive housing bubble was intact, opaque securitization and derivatives vehicles remained popular, base capital levels were too low, financial institutions still took excessive liquidity risks, counterparty credit exposures were opaque and excessive, ratings for securitizations were fatally flawed, etc. In sum, the authority had the ability and foresight to use countercyclical measures, but was not in a position to eliminate the underlying risk factors.

The authorities would not have been in a position to use administrative controls, such as aggregate lending caps, even if this were otherwise desirable. Borrowers could easily have side-stepped such regulation by issuing bonds or obtaining funds from lightly-regulated credit providers, such as mutual funds specializing in bank loans or from parts of the so-called “shadow banking” sector. Larger corporations would also have been able to tap foreign lending sources directly and smaller borrowers could perhaps have done so indirectly.

Countercyclical capital and liquidity requirements would both have been feasible, putting aside political constraints, and would clearly have been helpful. We know in hindsight that *base* capital and liquidity levels should have been substantially higher, so it is very likely that the banking system would have been meaningfully safer without much counteracting harm to the economy if these margins of safety were

¹⁵ As noted earlier, Moreno (2011) recently reviewed macroprudential policy in emerging markets. This provides a deeper analysis of the situation in the emerging markets, as well as some examples of central bank and regulatory actions and their consequences.

increased. Dynamic loan loss provisioning would have had similar benefits, since it is another way of increasing the level of protection during boom times.

On the other hand, many of the problems might have been shifted into the capital markets and the shadow banking markets, rather than being eliminated altogether. Higher capital and liquidity requirements would have made banks more expensive and less willing credit providers, increasing the competitiveness of finance companies, investment banks (if they were not subject to the higher requirements), insurers, and the capital markets in general. Banks would also have shifted more of their lending off their balance sheets and onto Structured Investment Vehicles (SIVs) that were financially interconnected with the banks and therefore represented an illusory transfer of risk, but a real reduction in regulatory requirements.

Nonetheless, there are frictions and institutional constraints which do partially separate the bank lending market from other parts of the financial system¹⁶. As a result, aggregate credit levels would likely not have risen quite as high and this might have provided a bit less fuel to the asset price bubbles in housing, commercial real estate, and other markets. Perhaps more importantly, the banking system would have been somewhat safer, since it would have held at least modestly more capital and liquidity and would have taken somewhat less risk.

There is also some benefit in shifting risk away from the core of the financial system, all else equal, since individuals and firms in the real economy do most of their transactions with these entities. The confidence shock suffered by the economy would likely have been smaller if the crisis had hit the banks less and other parts of the financial system more. In addition, probably even more of the pain would have been exported internationally, since securitization activity would almost certainly have been higher and would likely have been priced at least marginally more attractively, thereby pulling in somewhat more foreign funds. It is impossible to predict the knock-on effects of exporting the financial problems, but the direct effects on the US would have been positive relative to retaining the exposure.

Lower loan-to-value or loan-to-income caps on residential mortgages would also clearly have been helpful. In retrospect, it is difficult to dispute that many mortgages were made without adequate equity to borrowers who had insufficient, and often unproven, income levels. Somewhat tougher, and binding, caps would have reduced the volume of mortgages and raised the average creditworthiness of those mortgages that were made. This in turn would almost certainly have cut down on the size of the housing bubble, since mortgage availability and pricing is a key factor in whether someone purchases a home and in determining what they are willing to pay for it. Again, this example may be too easy a test, since we know that *base* requirements became far too easy and their enforcement too sloppy. Given this, it would be very difficult for tougher standards not to have been helpful unless they were jacked up to unreasonable levels, which is never likely to occur given the political constraints on toughening these requirements even to reasonable levels.

¹⁶ Please see Elliott (2010b) for a discussion of the competitive situation of banks versus other lenders in the US.

That all said, there would have been some room for individuals to obtain supplementary credit to support house purchases. Second mortgages/equity credit lines were readily available and generally fell outside of the standard mechanisms for regulating LTV and LTI ratios. (Put another way, the housing and finance system allowed lending subordinate to the first mortgage to occur with much looser restrictions.) Non-mortgage personal loans might also have been available for individuals, and lenders might have implicitly or explicitly included home equity in determinations of creditworthiness.

Further, the housing bubble, and ensuing bust, could still have been quite severe even with lower LTV ratios. Government loans were available within fairly wide limits from the Federal Housing Administration (FHA) at a 97% LTV ratio. Documentation requirements for these loans remained sane even during the bubble, so many of the riskiest borrowers would have been excluded, but there still was plenty of room for people to borrow and over-pay for housing. Similarly, many initially creditworthy borrowers paid the inflated prices demanded at that time by the housing market. Some of them lost their jobs in the recession and had to default on their mortgages, while others chose to exercise “strategic defaults”, walking away once the value of their home fell too far below the mortgage principal.

The commercial real estate bubble, which was fueled less by excessive LTV ratios on mortgages, demonstrates that lending practices did not need to be as poor as they became in the residential mortgage market in order to create severe credit problems when a bubble bursts. It appears that the US commercial real estate market became at least as inflated in percentage terms as the residential housing market and probably more so. LTV caps alone would almost certainly not have eliminated this problem, although they might have reduced it.

In theory, another form of cap on transactional leverage would also have assisted. Effective minimum margin/haircut requirements on repurchase agreements (repos) and similar secured lending against securities would have helped in several ways. First, it would have raised the costs of short-term liabilities and possibly encouraged less extreme asset-liability mismatches at the investment banks. (This was less of a problem at commercial banks.) Second, it would have ameliorated the effects of a vicious circle that kicked in when market prices of the types of securities underlying these borrowings started to fall. The decline in the value of the securities reduced the amount that could be borrowed against them. Since many investors in some of these securities obtained most of their funds in this manner, they had to sell off a portion of their securities. This put further pressure on the prices and therefore on the collateral value, leading to further sales of the securities, etc. If the haircuts had been higher in the first place, at least the initial phase of this spiral would have been avoided or reduced.

The main difficulties in this area would have been technical ones, since there were many alternative ways to obtain the credit, allowing considerable shifting between types of transactions. (This would have been the most severe with margin requirements on equity purchases by individuals, as the Fed had concluded during the Tech Bubble.) Nonetheless, it is quite likely that some good could have been done in this area. However, there is a limit to how much difference this would have made in the overall crisis, since it was not as important as aspects such as the housing bubble or the existence of the SIVs.

The US did not have a particular need to deal with currency mismatches in the run-up to the crisis. Foreign money did play a major role in feeding the imbalances, but the lending almost always took place in dollars. Thus, there were not problems analogous to Hungary's, where individuals were taking out Euro-denominated loans rather than using the local currency.

In sum, considerable good could have been done with countercyclical safety margins for financial institutions, tougher LTV and LTI requirements on mortgages, and higher margin and haircut requirements on secured borrowings against securities. However, it is evident that underlying imbalances and serious problems in the financial system's functioning would still have led to a fairly major financial crisis and ensuing recession. Nonetheless, the author believes that the benefits of these policies would have been quite noticeable. They would not have kept the system out of crisis, but they would have mitigated the damage substantially. In addition to their direct effects, the loss of confidence in the financial system, indeed panic, might have been considerably reduced if there had been greater safety margins in the first place, lowering the concern about contagion.

What would be different going forward?

The legislative and regulatory changes being put in place in response to the recent crisis will significantly change the effectiveness of the different macroprudential instruments, as can be illustrated by examining a future version of a US financial crisis centered on the bursting of a housing bubble, but with the same broader over-exuberance across many markets.

The systemic risks should be substantially lower after the various reforms are in place. There will continue to be serious financial crises, but they should be less frequent, less severe, and easier to recover from. When they occur, however, they are likely to take the classic pattern of excessive growth in the price of various assets, generally including housing, supported, in part, by excessive credit growth.

The lessened severity of the systemic risk may encourage macroprudential authorities to choose among their tools, rather than using many of them at the same time. As noted earlier, a high level of risk presumably warrants bringing out all the guns while a smaller threat might be dealt with through fewer instruments.

There will be counteracting forces changing the effectiveness of the tools. On the one hand, systemic reforms should reduce various kinds of leakages in the system that lessen the impact of macroprudential actions. For example, higher capital requirements will be less likely to be offset by a move of credit provision to less regulated sectors, such as some of the off-balance sheet vehicles that no longer exist. On the other hand, increasing safety margins should have less of a marginal benefit than if they started from excessively low levels. Moving from "unsafe" to "fairly safe" is a more important change than going from "safe" to "very safe". These points should be true for the safety margins for individual transactions, both mortgages and loans collateralized by securities, as well as for the safety margins at financial institutions as a whole, such as capital and liquidity ratios.

The overall shape of the choices available to macroprudential authorities is not likely to change, however. In the US case, administrative controls will remain infeasible, but movements in the required safety margins for financial institution soundness, and for individual transactions like mortgages, will remain reasonable options. Nor is there a “big picture” reason why the trade-offs between them should be radically different, such as choosing between increases in countercyclical capital as opposed to countercyclical liquidity. The details of the reforms may make significant differences here, but the general direction of the changes should not do so.

Appendix A: A Review of Bank Capital

What is capital?

In its simplest form, capital represents the portion of a bank's assets which have no associated contractual commitment for repayment. It is, therefore, available as a cushion in case the value of the bank's assets declines or its liabilities rise. For example, if a bank has \$100 of loans outstanding, funded by \$92 of deposits and \$8 of common stock invested by the bank's owners, then this capital of \$8 is available to protect the depositors against losses. If \$7 worth of the loans were not repaid, there would still be more than enough money to pay back the depositors. The shareholders would suffer a nearly complete loss, but this is considered a private matter, whereas there are strong public policy reasons to protect depositors.

If bank balance sheets were always accurate and banks always made profits, there would be no need for capital. Unfortunately, that is not the case in the real world, so a cushion of capital is necessary. Banks attempt to hold the minimum level of capital that supplies adequate protection, since capital is expensive, but all parties recognize the need for such a cushion even when they debate the right amount or form.

The issues surrounding bank capital can be very complex and extend well outside the scope of this paper, (see "Bank Capital: A Primer"¹⁷ for more detailed explanations of bank capital, how it works, and the regulations covering it.)

What are the requirements for bank capital?

Banks, and other financial institutions, generally hold capital equal to at least the minimum required by each of the main parties that they care about. Regulators directly impose minimum requirements, but most banks also target some minimum rating from the credit rating agencies, all of whom have their own idea of the right minimum capital levels¹⁸. In addition, the more sophisticated banks that tend to dominate the financial system each have their own economic models that attempt to determine the minimum capital necessary to avoid, with some high level of probability, a future insolvency. Looking ahead, it appears that the newly toughened regulatory capital requirements will be the most binding measure for most banks, therefore the bulk of the discussion will focus on those. Naturally, banks will not generally run themselves right at those minimums, but rather will wish to keep an additional cushion to avoid running into regulatory constraints should their plans miss by a modest amount.

¹⁷ Available at http://www.brookings.edu/~media/Files/rc/papers/2010/0129_capital_elliott/0129_capital_primer_elliott.pdf

¹⁸ At times, debt or equity investors may push for still higher capital levels, but this generally only occurs in the heart of a crisis. The rest of the time, the rating agencies generally act as the proxy for market requirements.

The key countries in the world financial system model their capital requirements after the global agreements that have been reached at the Basel Committee. The original capital agreement, now known as “Basel I” was reached in 1988. It was amended quite considerably in 2004 to a version that became known as “Basel II.” This accord is in force in most countries, with the important exception of the US. However, the recent financial crisis revealed a number of glaring flaws which the Basel Committee has just agreed to attempt to fix through a series of additional modifications to the Basel Accord. The amended version is known, not surprisingly, as “Basel III” and takes effect on a phased-in basis starting 2013.

All of the Basel accords are based on the concept of “tiers” of capital. Tier 1 is intended to represent the strongest form of capital, which is then supplemented by Tier 2 capital which includes instruments that are less pure forms of capital. The purest form of capital is common stock, since it has the key attributes of capital:

- It does not have to be repaid.
- There is no legal requirement for periodic dividend or interest payments.
- It has the very lowest priority of repayment in a bankruptcy or insolvency proceeding.

Other forms of capital do not have all of these attributes to the same extent as common stock, but share enough of them to provide real protection to depositors, counterparties, bank customers, and others whom the banking regulators wish to protect. For example, a perpetual, non-cumulative preferred security comes close to providing the full level of protection that common stock does. It never has to be repaid (hence the term “perpetual”), the planned dividends can be skipped without giving the security holders the ability to take action against the bank, and it has the lowest bankruptcy priority except for common stock, thereby providing a cushion for all other bankruptcy claimants.

At the other end of the capital spectrum, the Basel Committee has decided that subordinated debt securities should no longer be counted as capital for most purposes. They *do* have to be repaid at maturity, they *are* entitled to periodic interest payments, and holders *may* put a bank into insolvency if the payments are not made. The one element of capital that they do have is that their claim in insolvency is below almost all other claimants, although ahead of common and preferred stock. The recent financial crisis showed that this was less useful to regulators than was originally hoped, since it became critical in practice to keep the major financial institutions out of insolvency proceedings, negating the key capital benefit of subordinated debt. In addition, subordinated debt prices largely failed to provide early warning signals of distress, which had been a second perceived benefit of allowing their issuance as capital instruments.

The Basel calculations include a number of deductions from the stated balance sheet figures for capital. First, and probably most importantly, the Basel agreements require the deduction of goodwill,

effectively treating it as worthless for these purposes¹⁹. Second, Basel III will limit the portion of deferred tax assets that may be counted in capital, because the value of those assets would be realized only if a bank makes future taxable profits, which might not occur if it ran into the kind of trouble that makes capital important. Several other items are similarly limited or eliminated from the calculation because they are viewed as not being sufficiently reliable loss-absorbers in a crisis.

The principal measurement of capital adequacy under Basel rules is the ratio of Tier 1 capital to “risk-weighted assets,” (RWA.) RWA is the risk-weighted total amount of assets held by the bank. That is, the total value of each asset is multiplied by a percentage reflecting its risk level, and this adjusted amount is added across all assets to produce a total risk-weighted asset figure. The percentage weighting for each category ranges from 0%, for extremely safe investments such as cash and US government securities, to 100% for riskier classes of assets. In a few cases, the levels exceed 100% for certain very risky assets, such as loans in default or imminent danger of default and the riskiest tranches of securitizations. Commitments to lend that are not carried on the balance sheet are converted to an asset amount using weightings that depend on the type of commitment, with those that are certain to be drawn down receiving 100% weightings. These asset-equivalent amounts are then treated as if they were already on the balance sheet, with their effect on total RWA depending on the riskiness of their type of credit.

Under Basel III, once it has taken full effect, Tier 1 capital must be equal to at least 7% of RWA, of which 4.5% must be in the form of Tier 1 common equity. On top of this, there is a capital conservation buffer of 2.5% of RWA that is required to be in the form of additional Tier 1 common. Failure to maintain the full buffer will lead to limitations on the ability to pay dividends, repurchase stock, pay the desired levels of compensation, or take certain other actions. The idea is that banks should be strongly encouraged not to eat into their buffer, but that if they do, the consequences should not be drastic, and that they be given time to rebuild the buffer. In contrast, falling below the minimum Tier 1 level would have quite drastic consequences, including the possible seizure of the bank by regulators. Arguably, the ability to eat into this buffer without drastic consequences gives the policy some of the characteristics of a countercyclical capital buffer.

Banks can also be required to maintain an additional “countercyclical buffer” of up to 2.5% of RWA in periods of credit booms. This buffer, and how it would operate, is still being defined, as is discussed in greater length below.

¹⁹ Goodwill is the accounting term for an intangible asset that represents the difference between what was paid for an acquisition (usually of a company) and the accounting value of the acquisitions assets minus liabilities at the time of the acquisition. The presumption is that the arms-length transaction price is an accurate measure of the value of the purchase and that therefore there must be additional value beyond what is shown on the books of the acquired firm. (It may be easier to envision this with a different type of intangible asset, such as the value of Coca Cola’s brand name.) The problem in a banking context is that it can be extremely hard to turn “goodwill” into cash in a crisis, even if it does represent true longer-term value.

In addition to Tier 1 capital, banks will also be required to keep an additional 2% of RWA in the form of Tier 2 capital and excess Tier 1 capital. Serious consideration is being given to adding yet another form of capital, so-called contingent capital, on top of this. Contingent capital would be a debt instrument containing contract terms that would cause it to convert into an instrument qualifying as Tier 1 capital if the bank becomes stressed in a defined manner. This remains a quite ill-defined concept that is subject to intense debate. Regulators and many others, including the author, find it an attractive concept. However, it is quite hard to design it to have a cost not too far above normal debt instruments while still having the locked-in ability to become Tier 1 capital when regulators need it to do so. Put another way, if the cost is close to that of raising equity capital, then firms may simply opt to issue additional equity, making the requirement for contingent capital, or a stronger form of capital, equivalent to simply requiring a higher equity capital ratio.

In general, the Basel rules discussed above all fall under the so-called “Pillar 1” mechanisms, which are those that the signatories agreed would be applied essentially uniformly by all countries, with some modest adjustments for national differences in legal and financial systems. The Basel accords also contain “Pillar 2” agreements, laying out principles to guide national regulators in making decisions that apply solely to their own jurisdictions. For example, regulators are allowed to set capital or other requirements higher than the Pillar 1 minimums, if they feel these are necessary in their jurisdictions. This would, in fact, be one mechanism by which countercyclical capital requirements, or certain other macroprudential tools, might be implemented. There is also a set of “Pillar 3” guidelines to encourage or require appropriate reporting transparency by the financial institutions themselves in order to aid market discipline, which is recognized as an essential complement to regulatory actions.

How are capital requirements set?

Governments and regulators in each country set their own capital requirements as part of their national bank regulation. The great bulk of the global financial system is in countries that have voluntarily agreed to coordinate their capital requirements through the Basel Committee. However, there is no global enforcement mechanism and few countries have implemented Basel II in exactly the form that most outsiders would agree is precisely consistent with the Basel rules. In the case of the US, Basel II was never implemented for its commercial banks, although it was eventually put into place for its investment banks. All of the countries represented on the Basel Committee are likely to implement Basel III, including the US, but there may be considerable differences in implementation globally.

How do capital requirements affect the supply of credit?

Financial institutions determine the volume and price of their credit activities in large measure based on the cost of capital, which in turn depends on the amount of capital that they must hold. For example, loan pricing is significantly influenced by a calculation along the following lines:

The price of a loan must be at least equal to: the sum of the cost of the allocated capital, plus the cost of other funds used to make the loan, plus any administrative costs, plus expected credit losses, minus the profits from any ancillary business for the bank made possible by agreeing to make the loan.

This formula is not an absolute determinant, because other factors must be taken into account, such as the longer-term bank relationship with the client or market share considerations, either of which might encourage a bank to accept under-pricing in order to “stay in the game” for future business. There may also be either a glut or a deficit of capital from non-lending activities which may cause the bank to relax or tighten its credit terms in order to employ or free up the additional capital. In theory, the bank would simply adjust its capital size, but practical considerations often cause management to be reluctant to raise or release a large amount of capital in one period.

An increase in the regulatory capital requirement would generally both raise the price of credit and reduce the volume. At first glance, the increase in price might seem simply to fall out of the formula, since it would mean an increase in the cost of capital which, in the first instance, would simply feed through to price. However, as I have analyzed at length in previous papers²⁰, the other variables in the equation are not fixed and can be moved either by the bank or the markets. For example, the banking industry is likely to cut expenses, including compensation expenses, in reaction to pressure placed on it by significantly higher capital requirements. Looking at another dimension, higher capital requirements translate into reduced volatility and greater safety, which should cause equity investors over time to lower their required returns at least modestly, thereby reducing the required loan price²¹. Directionally, it is clear that loan pricing would rise, but it could be by a significantly smaller amount than would be implied by leaving all the non-capital parts of the equation fixed.

Loan volumes should decline with higher capital requirements, for multiple, related reasons. First, higher prices resulting from increased capital costs would likely reduce the demand for loans. Second, banks may tighten their credit underwriting requirements to reduce expected loan losses, which may eliminate some loans from consideration. Third, some banks may be unwilling to increase their capital quickly to the substantially higher levels that might be necessary to undertake the full volume of lending that would otherwise be indicated. There are disadvantages in going to the capital markets to raise more equity, particularly the fact that new issuance tends to depress stock prices for a period of time. (This is a larger factor when individual firms raise capital at a time when others in their industry are not, since it may create a “signaling effect” suggesting that management considers its stock over-priced or at least not under-priced. Capital raisings resulting from broad trends in an industry do not carry the same stigma.) In general, managements prefer a “glide path” that allows them to raise any needed capital internally through earnings, rather than by accessing external markets.

Of course, banks are not the only providers of credit. Competitive sources may constrain banks from taking some of the actions they would otherwise take, such as raising loan prices to the full extent necessary to recoup increased capital costs. This also means that macroprudential tools, such as

²⁰ See Elliott (2009) and Elliott (2010b).

²¹ See Miles (2011) for an extensive analysis of the changes in required equity returns demanded by the financial markets as a result of changes in bank capital levels. This is an area of some controversy. Virtually every analyst agrees on the direction of changes, but there are major arguments about the degree of change.

countercyclical capital requirements, are less effective if they affect only banks. This is discussed further below in the section on coordination issues.

How precise an instrument is this?

Macroprudential tools, including countercyclical capital, are unavoidably blunt tools, although less blunt for these purposes than ordinary monetary policy. They attempt to impose simple aggregate limits of one kind or another in order to influence overall credit conditions. A more precise intervention would require considerably more detailed constraints and a substantial amount of regulatory judgment. However, that degree of regulatory intervention could quickly subvert the market mechanisms that work so well in general for generating prosperity for our societies. The economic costs of an excessive level of interference in the economy could be very high.

There are a number of ways in which an increase in capital requirements could fail to produce the desired decrease in credit volumes across the economy, including:

Failure to change the actual capital ratios. Minimum regulatory capital requirements are only one determinant of actual capital ratios. Banks could choose to eat into the buffer of capital they maintain above the minimum, which would be particularly likely if they set their capital levels based on rating agency requirements or their own economic models and these factors have been more binding.

Banks might raise more capital. The apparent attractions of lending during a credit boom might cause more capital to be deployed in order to continue the desired volume of lending, such as by issuing more common stock. This is one way in which macroprudential regulation differs from traditional prudential regulation. The increase in capital would meet traditional regulatory objectives by lowering the risk per dollar of capital in the financial system, however it would fail to meet the macroprudential goal of slowing the credit boom.

Less-regulated financial institutions or markets might pick up the lending volumes. If capital requirements are increased only for part of the financial system, such as banks, other parts may expand to replace the foregone lending. This is a constant problem with financial regulation, sometimes referred to as the issue of the “perimeter of regulation.” It is discussed further below.

Banks might find a way to work around the regulatory constraints. The minimum capital requirements might prove to be ineffective. For example, the Basel II rules proved less effective than intended in part because banks found ways to move assets off of their own balance sheets while still retaining most of the profit and, as it turns out, much of the risk. If the requirements are not fully binding in practice, then toughened capital requirements will not decrease lending to the extent expected.

Foreign banks might fill the gap in lending. They might increase their activities within the country’s borders or by lending to that nation’s corporations or citizens outside of the country. Methods of coordinating across borders are discussed below.

Aggregate lending might decline, but not in the worrisome sectors. The response to higher capital requirements may include decreased lending, but the sectors producing a bubble may continue to receive the same volume of lending due to their apparent attractiveness. It may be the safer, but seemingly less profitable, business that is cut back.

All of this is not to say that macroprudential tools will not work, but to indicate (1) that they will necessarily be blunt instruments and (2) that additional measures will have to be taken to ensure their full effectiveness, given that the most straightforward methods face these various difficulties.

Appendix B

Should capital surcharges be imposed across the board or by product/sector?

A key question is whether the national buffer levels should be constant throughout the regulated financial system or based on particular products or credit sectors. There are pros and cons of both approaches.

Arguments for focused changes in capital requirements

Direct impact on the area of greatest concern. If the problem is a bubble in housing, then reducing the volume of housing loans is likely to have a more appropriate impact than simply reducing lending across the board. More expensive or harder to obtain mortgage loans may help deflate an asset price bubble that could otherwise grow more dangerous over time, while also reducing the banking system's direct exposure to the bursting of that bubble. One way to achieve this could be selectively and temporarily increasing Basel III risk weightings for the specific categories of assets of concern.

Signaling effect. As with monetary policy, the first step towards damping a bubble could have a multiplicative effect. It could cause market participants to reassess both the underlying rationale for their actions and the possibility that further capital requirement increases may follow, reducing the economic viability of their investments. (It might also have knock-on signaling effects related to monetary policy if it is assumed that overall monetary policy may be tightened if the macroprudential approach fails to damp the excessive growth.)

Reduction of the potential negative impact on the wider economy. One potential problem with raising capital requirements across the board is that safer and more socially useful lending may be curtailed to allow the capital to be redeployed to the booming sector. Higher capital requirements in that sector would likely reduce lending in that area from what it would otherwise be, although the effect might be muted by the high demand from borrowers and the desire of lenders to participate in the sector.

Arguments for across the board capital changes

Avoidance of specific credit allocation. The use of macroprudential tools is already a significant new intervention in credit markets; many regulators may be reluctant to risk the further step of "allocating" credit by using dynamic capital requirements to increase or decrease the attractiveness of different types of loans. Of course they already do this on a static basis under the Basel rules, but this is based on an analysis of the relative risk of the loans and does not change over time. Countering this, it could be argued that the reason to intervene in a housing bubble, for example, is that mortgage lending has become more dangerous as the result of cyclical factors, and that an increase in capital requirements therefore would be appropriate for both macroprudential and traditional safety and soundness reasons.

Harder for the industry to work around. Focused changes in capital requirements may be subject to technical enforcement difficulties. For example, the housing risk might be taken in another manner, perhaps through lending to a different corporate form, such as a mutual fund or real estate investment trust, or through undertaking some form of derivative transaction. Or the funds might shift to a closely related area, perhaps commercial real estate loans for apartment buildings instead of residential mortgages.

Better at catching wide problems. It may be that a housing bubble is just one manifestation of a wider set of financial and economic circumstances that are encouraging excessive risk-taking, as was true to some extent in the recent bubble. In that case, focusing specifically on housing may move the risk-taking without particularly diminishing it. A wider capital increase could be more effective in this case.

Appendix C The following chart is taken from Bank of England (November 2009), Box 7.

Box 7

Leakages in past regulations

The problem of disintermediation is endemic to financial regulation.⁽¹⁾ Recent financial history provides a number of instructive examples of the powerful incentives that exist to circumvent regulation. In the United Kingdom, these include direct credit ceilings in the 1960s and the supplementary special deposit scheme, also known as the 'Corset', in the 1970s. International examples include federal margin and deposit interest rate regulation after the Great Depression in the United States and the introduction of Basel I. Most of the examples were not primarily directed at prudential regulation — many were seen as monetary policy instruments. But without exception, they all resulted in financial activity leaking to the unregulated sector. This box draws lessons from past episodes of financial disintermediation.

Direct credit ceilings (1961–71)

In the United Kingdom, direct ceilings on the growth in lending to the private sector were enforced on clearing banks in the 1960s through to the introduction of Competition and Credit Control in 1971. Although these appeared to be effective in limiting credit creation by the firms they covered, financial activity migrated to the less regulated secondary banks. These fringe institutions developed large exposures to the commercial property sector, financed through the wholesale market, including from the clearing banks. The emergence of this highly vulnerable 'shadow' banking system culminated in the Secondary Banking Crisis in the mid-1970s, forcing the Bank of England to intervene for fear of a loss of depositor confidence in the core banking sector.⁽²⁾

Supplementary special deposit scheme — 'the Corset' (1973–80)

The implementation of the 'Corset' at different phases between 1973 and 1980 aimed to limit the rapid growth in credit that had occurred following the introduction of Competition and Credit Control in 1971.⁽³⁾ Banks were required to hold a share of their assets as non-interest bearing reserves if growth in certain sterling interest-bearing (retail and wholesale) deposits grew beyond a specified limit.

These rules were quickly circumvented. Instead of borrowing directly from banks, large companies financed themselves by issuing bills that were guaranteed (accepted) by banks. The growing 'bill mountain' had to be factored into monetary policy decisions at the time. Non-bank financial institutions were willing to buy these bills in the knowledge that they were guaranteed by the major banks. Financial activity also diverted to building societies which were not covered by the scheme. During the Corset period, building societies' share of personal sector deposits grew substantially and was used to finance

rapid growth in mortgage lending. Following the abolition of the Corset, there was large-scale re-intermediation and a marked increase in conventional measures of broad money and bank lending growth.

Margin and Deposit Interest Rate Regulation (1933–34)

US Federal regulations governing minimum initial margin requirements have been in place since 1934, but there has been no change in their level since the early 1970s because of doubts about their effectiveness given the development of derivatives and other financial innovation. Regulation Q — which imposed ceilings on the interest rates that financial institutions in the United States could pay on deposits — spurred the development of the Eurodollar market in London, especially after it was tightened in 1963.⁽⁴⁾

The Basel Capital Accord (1992–2007)

At an international level, the incentive structure underlying the original 1988 Basel Capital Accord contributed to the rapid growth in securitisation over the past two decades. Banks responded to the imposition of risk-weighted capital requirements by engaging in regulatory arbitrage. Exposures with high regulatory capital relative to economic capital were shifted off balance sheet. The problem, as witnessed during the current crisis, is that many of the vehicles used to securitise these assets remained reliant on banks, actually or implicitly through reputational effects. So when liquidity risks materialised they were borne, to a significant extent, by the regulated institutions.

This historical experience with international leakages from regulatory frameworks underscores the importance of international co-ordination in implementing a robust macroprudential regime.

(1) As Goodhart (2008) states, 'effective regulation, one that actually bites, is likely to penalise those within the regulated sector, relative to those just outside, causing substitution flows towards the unregulated'.

(2) Bank of England (1978).

(3) Bank of England (1982).

(4) Milton (1971).

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