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Asset Prices, Macroprudential Regulation, and Monetary Policy

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Confidence in combining inflation-targeting-cum-flexible-exchange-rate regimes with isolated microprudential regulation as a means to guarantee both macroeconomic and financial stability has been shattered by the scale and synchronization of the asset price booms and busts that preceded the global financial crisis. It has now become clear that if monetary policy makers and prudential regulators are to succeed in achieving stability, there can be no complacency regarding asset price cycles. This note explores some of the ways in which monetary policy can address asset price booms and busts through its integration with macroprudential regulation.

Until the onset of the global financial crisis, economists were close to a consensus on a set of blueprints for monetary and exchange rate regimes. An increasing number of central banks, both in advanced and emerging markets, had adopted a combination of inflation-targeting regimes and exchange rate flexibility. Alternatively, small, integrated economies had the option of virtually abdicating the exercise of monetary policy by fixing their exchange rates. There was rising confidence in the effectiveness of this approach to deliver macroeconomic stability, and implicitly, to achieve smooth international monetary cooperation, provided that there was no major fiscal imbalance in national economies (Canuto and Cavallari 2013).

The close relationship between inflation targeting and macroeconomic stability led to the belief that financial stability should be pursued solely by microprudential regulatory and supervisory measures. Monetary policy would take care of inflation by acting upon short-term interest rates and expectations of future interest rates and, thus, the yield curve that affects aggregate demand. Flexible exchange rates would

ensure smoother balance-of-payment adjustments. Microprudential regulation of bank capital and banking supervision would, in turn, prevent excessive risk taking.

However, confidence in the combination of an inflation-targeting-cum-flexible-exchange-rate regime and independent financial regulation and supervision has been shattered by the scale and synchronization of the asset price booms and busts that led to the 2008 global financial crisis. It is now increasingly accepted that, to some extent, the interdependence of macroeconomic and financial stability calls for coordination between monetary policy and macroprudential regulation (Canuto 2011a). Additionally, the magnitude of cross-border spillovers of asset price booms and busts, as well as corresponding country policy responses in the cases of large countries, has undermined the belief in the sufficiency of flexible exchange rates as a shock absorber.

Drawing on Canuto and Cavallari (2013), this note approaches some of the ways in which monetary policy can tackle the asset price booms and busts through its integration with macroprudential regulation. After addressing the impli-

cations of asset price booms and busts, as well as of corresponding cross-border spillovers, on monetary policy, this note outlines the challenges of integrating asset prices into monetary policy reaction functions, as well as those of integrating macroprudential regulation and monetary policy while maintaining a balance between discretion and rules.

Asset Prices and Monetary Policy

The blueprint of basic principles for an inflation-targeting-cum-flexible-exchange-rate regime did not give due attention to how financial markets and their channels of interconnectivity are relevant for macroeconomic stability (Canuto and Cavallari 2013). It had been commonly accepted that asymmetric information and market failures played a significant role in financial systems and in business cycles. Nonetheless, mainstream views maintained that markets and private institutions could self-adjust in an efficient way, and manage their own market and liquidity risks properly. Microregulation and supervision of individual entities would sufficiently discipline the behavior of private agents.

Even when the frequent appearance of bubbles could not be overlooked, economists still believed that attempts to detect and prick them at an early stage would be impossible to accomplish and be potentially harmful. Conventional wisdom was that, if necessary, resorting to interest rate cuts to safeguard the economy after bubble bursts would be the optimum procedure, conditional to subsequent impacts on inflation and output gap (Bernanke and Gertler 2000).

In fact, the issue was the object of an intensive debate for some time before the crisis—the so-called “lean versus clean debate” (Mishkin 2009). While many argued in favor of monetary policy “leaning against the wind” from financial developments, the prevalent opinion was that difficulties in detecting bubbles would outweigh the advantages of doing so. Furthermore, monetary policy tools would be too blunt to curb the rise of bubbles, and correspondingly sharp interest rate hikes would have harmful unintended consequences on output growth and volatility. The best approach would then be to have monetary policy reacting only if and when necessary to “clean up” the financial mess resulting from the bubble bursts.

However, it has now become clear that if monetary policy makers and prudential regulators are to succeed in achieving stability, there can be no complacency regarding asset price cycles. As Borio and Shim (2007, 7) have stated:

The establishment of credible anti-inflation regimes and the globalization of the real-side of the economy may have been to make it more likely that, occasionally, financial imbalances build up against the background of low and stable inflation. These imbalances can have potentially serious implications for the macroeconomy

and financial stability to the extent that they unwind in a disruptive way. By financial imbalances we mean overextensions in private sector balance sheets, characterized by joint credit and asset price booms that ‘go too far,’ sowing the seeds of the subsequent bust. In other words, changes in the economic environment may have increased the ‘elasticity’ of the economy or, put differently, its potential *procyclicality*.

The pervasiveness and magnitude of asset price booms and busts led to acknowledgement of a distinction between *microfinancial risks*, which arise due to specific problems in individual financial institutions, and *macrofinancial risks*, which affect the financial system as a whole because of the interconnectedness of the institutions within the system. The conceptual innovation from the last few years is that microprudential tools—concerned with ensuring the soundness of individual institutions and the protection of depositors—are not sufficient for financial stability and the avoidance of financial crises. Sound risk management of individual financial institutions is not enough to guarantee sound management of systemwide risk (see several examples in Canuto and Cavallari [2013, 9–11]).

With the benefit of hindsight, it has become clear that “inflation and output do not typically display unusual behavior ahead of asset price busts” (IMF 2009, 93). In other words, well-behaved inflation and output performance provide few, if any, assurances that asset prices will not acquire a life of their own, with potentially high costs in terms of output foregone during the moments of bust. Besides noting the typical economic costs associated with asset price busts, IMF (2009) detects and points out some leading indicators of busts, namely, rapidly expanding credit, deteriorating current account balances, and large shifts into residential investment.

Therefore, the framework of a flexible inflation-targeting regime and microprudential regulation is not sufficient to avoid asset price booms and busts because of *macrofinancial risks* that may develop beyond the scope of the framework. Given the high costs associated with asset price busts—including the possibility of protracted negative feedback loops between unsound private balance sheets, public sector imbalances and/or foregone employments, and gross domestic product (GDP)—the negligence must be addressed.

Cross-Border Spillovers

In the case of capital-receiving countries—like most emerging markets—the neglect of asset price booms and busts by the accepted wisdom regarding inflation targeting and microprudential regulation can be particularly severe. Even if these countries succeed in avoiding domestic generation of *macrofinancial risks*, they may experience asset price booms and busts caused by net capital flows from asset price cycles abroad. As

capital-receiving countries are integrated into the network of interlinked balance sheets of international financial institutions, they are vulnerable to spillovers and externalities, including contagion in terms of confidence, as risks pro-cyclically taken in large countries end up affecting the entire global system. Similarly, policy responses in countries with asset price booms and busts affect capital-receiving countries as well.

The framework of flexible inflation targeting and microprudential regulation does not address cross-border spillovers of asset price booms and busts and policy responses, although these are often of first-order relevance. The neglect of asset price booms and busts, in particular, has a counterpart in the neglect of cross-border capital flows and macroeconomic policy spillovers. Both types of overflows and spillovers bring implications in terms of higher volatility of activity on the real side, more complicated monetary policy management, and augmented financial sector risks (CIEPR 2011). Positive or negative feedback loops between domestic balance sheets and liquidity in other countries may by far outweigh the mitigating effects coming from exchange rate fluctuations in such situations. Furthermore, flexible exchange rates lose their ability to smooth balance-of-payment adjustments under prolonged situations of extraordinary liquidity inflows or outflows, because their persistent disequilibrium may have long-lasting effects on the domestic allocation of resources.

The following sections sketch some of the frontiers along which the flexible inflation-targeting regime will need to evolve to integrate the neglected macrofinancial risks.

Integration of Asset Prices into Monetary Policy Reaction Functions

Asset price booms and busts are now considered too important to be left only in financial supervisors' hands. And as mentioned, the pendulum of opinions has moved in favor of those arguing for some monetary policy "leaning against the wind" to prevent asset price bubbles, rather than the mop-up-afterward approach. While most financial upturns do not lead to crashes, large-scale financial booms are a meaningful predictor of crises. Also, because synchronization of economic activity, credit growth and asset prices are material (and real economic losses are usually higher), it is even more important that these aspects are monitored by monetary policy makers.

One question comes to the fore: Should central banks incorporate indicators of financial stability into their reaction function in a kind of "augmented Taylor rule"? Should they react automatically to variations in asset prices—or some associated variable, such as credit expansion—as they do under inflation-targeting regimes in the case of variations in output gaps and inflation?

An intermediary position in the lean versus clean spectrum has been offered by Blinder (2010), who argues that "a

distinction should be drawn between credit-fueled bubbles (such as the house price bubble) and equity-type bubbles in which credit plays only a minor role (such as the tech stock bubble)." In this view, the mop-up-afterward approach would still be appropriate for equity bubbles not fueled by borrowing, but the central bank should try to limit credit-based bubbles—probably through combining regulatory instruments and interest rates. This view may eventually become the new consensus on how to deal with asset price bubbles—for example, Bernanke (2010) came close to endorsing it.

Yet it remains advisable not to treat asset prices on the same footing as the common components of "Taylor rules." After all:

Even the best leading indicators of asset price busts are imperfect—in the process of trying to reduce the probability of a dangerous bust, central banks may raise costly false alarms. Also, rigid reactions to indicators and inflexible use of policy tools will likely lead to policy mistakes. *Discretion is required* [authors' emphasis] (IMF 2009, 116).

Such a cautious approach does not mean complacency. On the contrary, signs of rising macrofinancial risks may demand a response from monetary policy makers. But first it is necessary to properly identify the reasons behind the evolution of rising asset prices and credit—a task that is far from simple, as one can conclude after examining the challenges to integrate financial frictions into forecast models and to identify financial instability risks.¹

Integration with Macroprudential Regulation

One take away from the previous discussion is the relevance of macroprudential regulation commensurate with acknowledged macrofinancial risks, to both macroeconomic and financial stability. As a complement to microprudential regulation, macroprudential regulation should be concerned with the stability of the financial system as a whole and the mitigation of risks to the real economy, that is, strengthening financial stability in relation to endogenous propagation and exogenous shocks. Macroprudential regulation should aim to make the overall incentive structure for individual firms coherent and consistent so that externalities are internalized. The idea is to design a set of principles and rules that can reduce each institution's contribution to systemic risk and thus smooth the financial cycle, that is, reducing the systemic risk that inherently builds up in booms and has damaging consequences in slumps, since leverage, risk taking, credit, and asset prices are pro-cyclical and crises typically follow booms.

The objective of macroprudential regulation is not to eliminate the financial cycle, but to reduce its amplitude and associated systemic risk. Pro-cyclicality is linked to all business cycles and goes hand in hand with most fundamentals

and behaviors—for example, investments and “animal spirits.” What macroprudential rules can do is reduce pro-cyclicality and control the externalities that amplify fluctuations. By doing this, they can ensure that the financial system operates with less systemic risk and can enhance the resilience of the system in downturns.

Potential gains from macroprudential policy were being discussed long before the recent financial crisis. However, despite an overall convergence on a definition, there is still no consensus about which macroprudential policy targets and instruments should be prioritized. Specific targets for macroprudential policies may include countervailing measured risks during business cycles; stabilizing the provision of financial intermediation services; or avoiding bubble creation processes. Other potential targets could be limiting macroeconomic costs of system distress; addressing links and exposure of financial institutions and the pro-cyclicality of the system; discouraging individual institutions from generating systemic risk and negative externalities; controlling social costs of a generalized drop in asset prices caused by credit crunches and/or fire-sales; or enhancing financial system resilience. There are many ways to approach the objective, and policy makers have a range of macroprudential tools to cope with each one.

One of the main ideas that emerged from the 2008 crisis was to improve capital and liquidity regulations, since inadequacies in these areas were partially the root of the quasi-meltdown of the global financial system after the Lehman collapse. A more robust banking system—in terms of capital and liquidity—would be less vulnerable to crises, or at least would not require the magnitude of taxpayer transfers required to address the recent financial crisis. Tighter regulatory standards might also contribute to smaller output fluctuations and to higher welfare gains even apart from banking crises. There are a number of studies (for example, BCBS [2010]) that point out that better capitalization and higher liquidity of banks reduce the likelihood and the severity of crises and that regulatory reforms can reduce the amplitude of business cycles, especially using countercyclical capital buffers.

The Bank of International Settlements (BIS) and the Basel Committee on Banking Supervision (BCBS) have been advocating the adoption of countercyclical capital standards. Buffers need not be part of the prudential minimum capital requirement and would be capital in excess of that minimum, so that they are available to absorb losses in bad times. Countercyclical capital buffers would limit both the risk of large-scale accidents in the banking system and the amplification of macroeconomic fluctuations during crises.² The macroprudential rationale is the time-inconsistency argument that risks tend to build up in good times, but their negative consequences materialize only with a lag. The lag feature reveals the limitations of current risk measurement

practices as well as distortions in the microprudential incentives for individual firms.

There is a concern that risk-sensitive minimum capital requirements embedded in Basel II could lead to excessive pro-cyclicality.³ Other economists have argued that by raising capital requirements in a countercyclical way, regulators could help choke off asset price bubbles—such as the one that developed in the U.S. housing market—before a crisis develops. The “Turner Review” (Financial Services Authority 2009), for instance, favored countercyclical capital requirements, as did Brunnermeier and Sannikov (2009), who propose to adjust capital adequacy requirements over the cycle by two multiples—the first related to above-average growth of credit expansion and leverage, and the second related to the mismatch in the maturity of assets and liabilities.

At the international level, there has been significant progress in establishing new standards in this area: the BCBS developed a countercyclical framework that involves adjusting bank capital in response to excess growth in credit to the private sector, which it views as a good indicator of systemic risk. In a proposal released in September 2010, the BCBS suggested the implementation of a countercyclical capital buffer ranging from 0 to 2.5 percent of risk-weighted assets. Overall, total capital requirements would rise from a minimum of 8 percent of risk-weighted assets today, under Basel II, up to 13 percent, when accounting for the maximum value of the countercyclical capital buffer (BCBS 2011).

Macroprudential instruments can be discussed in a time series dimension or in a cross-section (Borio 2010), mirroring two different types of macrofinancial risks. When systemic behavior over time is considered, the key issue is how risks can be amplified by interactions within the financial system and between the financial system and the real economy. Such feedback loops are a crucial component of endogenously generated business cycles. In turn, the cross-section dimension relates to the common exposure of institutions at each point in time. Correlated assets, or even counterparty interrelations, create such a link among financial institutions.

Can financial instability be reduced without using monetary policy, relying only on prudential and regulatory rules incorporating macrofinancial risks? Would this method guarantee both financial and macroeconomic stability? Most practitioners believe that a combined (articulate) use of both monetary and macroprudential policies and rules is superior to a stand-alone implementation of either (Canuto 2011a). Instead of “a corner solution, where one instrument is devoted entirely to one objective, the macrostabilization exercise must be viewed as a joint optimization problem, where monetary and regulatory policies are used in concert in pursuit of both objectives” (CIEPR 2011, 7). Prudential rules and monetary policy are parameters to each other, because their stand-alone stances affect the evolution of asset prices. Therefore, a

joint optimization pursuit is likely to be superior to isolated corner solutions.

In the time series dimension of macroprudential issues, monetary policy and macroprudential tools can clearly be complementary in reducing pro-cyclicality. For example, during simultaneous asset price and macroeconomic booms, one could combine higher contingent capital requirements and additional liquidity surcharges with interest rate hikes. Because of the imperfect substitutability between these measures, the greatest effectiveness should be considered when jointly calibrating their intensities.

Additionally, when the short-term interest rate reaches a lower bound, macroprudential policies can be used to cope with specific financial vulnerabilities, or even to increase the traction of monetary policy. As mentioned earlier, the nominal zero bound is now taken more seriously as an issue than before the crisis, as witnessed by the recent use of “quantitative easing” and other unconventional monetary policies (Brahmbhatt, Canuto, and Ghosh 2010). In such situations, Goodhart (2011) argued that the first macroprudential tool to be used should be the central bank’s own balance sheet. This issue has not been as relevant for most emerging markets, because average inflation has been higher, the crisis’s collateral effects milder, and fiscal policy more available.

In fact, major central banks have been using balance sheets in the last few years when other tools—like lower capital requirements to alleviate banks’ capital burden and compress credit spreads to the final borrower—are out of reach because of generalized fears of bank insolvency. As many emerging economies have held historically higher capital ratios, this instrument often can be used in parallel with interest rate cuts; China, Brazil, and Turkey are recent examples.

The scope for joint calibration may be less obvious in the case of cross-sectional macroprudential regulation, in which the calibration must be conducted top down. The calibration must also consider that diverse institutions have different contributions to systemic risk, with institutions with greater systemic relevance receiving tighter macroprudential requirements. Estimating institutions’ individual contributions to systemic risk is always a challenge. In any case, from the cross-section perspective, it is clearly easier to cope with vulnerabilities through macroprudential tools than with short-term interest rate instruments. Policy makers can go directly to their area of concern (for example, real estate credit, leveraged loans, or currency mismatches) and tighten or loosen the respective rules, whereas the alternative of containing high growth of real estate credit just by hiking interest rates reaches every credit line and probably will not be the most efficient option.

Discretion versus Rules

How effective are macroprudential instruments? A recent study of country experiences found that they can be effective

in mitigating systemic risk (Lim et al. 2011). Some instruments were shown to be particularly effective in reducing pro-cyclicality (for example, caps on loan-to-value ratios, debt-to-income ratio, ceilings on credit or credit growth, and reserve requirements). The evidence of effectiveness did not depend on the exchange rate regime or the size of the financial sector, but differed according to types of shock.

The huge variety of macroprudential tools makes it necessary to tailor policy designs to specific purposes. However, too much uncertainty regarding government-implemented changes may be counterproductive and costly in terms of less credit provided if rules and regulations change too often. The tradeoff is, on the one hand, more discretionary, time-varying macroprudential policies, and on the other hand, less uncertainty from stable and general macroprudential rules. Moreover, too many ad hoc changes make it harder to assess interactions among different macroprudential tools, and between them and monetary transmission mechanisms.

The issue of how best to calibrate tools to avoid excessive pro-cyclicality of the financial system involves a tradeoff between discretion and rules (Borio and Shim 2007). Take, for instance, the case of *dynamic provisioning* rules (that is, capital requirements of financial institutions that rise/fall faster than leverage) versus a discretionary setting of required reserves, in both cases reinforcing—and reducing the burden of—the direction taken by monetary policies. There is no consensus on whether its calibration should be discretionary or in the form of built-in stabilizers, like reaction functions used in monetary policy. Because imbalances are infrequent and specific to each period, discretionary measures may be more useful to fine-tune or target specificities. The system may also become too rigid regarding nonfinancial shocks—like real side productivity shocks—in the presence of automatic rules. As with discretionary monetary policy, discretionary calibration may be more subject to policy error or public/political pressures, in addition to increasing regulatory uncertainty and encouraging financial disintermediation. In practice, a combination of both macroprudential built-in stabilizers and discretionary measures are used.

A rule of thumb for integrating monetary policy and macroprudential regulation may be to retain some division of labor, even if their combination is considered the best way to go. Fine-tuning via monetary policy should be favored when stability issues are of a homogeneous and reversible nature, like those associated with generalized waves of market euphoria or panic. Changes in automatic macroprudential rules, in turn, are to be made in cases of permanent, structural shocks. More ad hoc discretionary prudential policies should be used for specific, but systemically significant, disturbances from a cross-section perspective. Countercyclical tools should be used judiciously, because distinguishing between transitory and permanent shocks in real time is always challenging. Divi-

sion of labor may also be justified by the fact that macroprudential instruments tend to be more demanding in terms of implementation lags and transaction costs to financial institutions, whereas movements in short-term interest rates are faster, simpler to carry out, and easier to communicate to the general public.

Dealing with Cross-Border Spillovers

Compared to purely domestic asset price cycles, cross-border capital flows and the potential transmission of asset price booms and busts through interconnected balance sheets add additional layers of complexity. As surges in capital inflows can have collateral macroeconomic effects, potentially increasing financial vulnerabilities, macroeconomic and/or macroprudential policies could be adopted to respond to those surges. As discussed, asset and credit bubbles may originate from abroad and overwhelm a prevailing macroprudential regulation designed for purely domestic asset price booms. Furthermore, if capital inflow surges lead to prolonged far-from-equilibrium real exchange rates, they may have distortive and long-lasting effects on the domestic allocation of resources.⁴

Magud and Reinhart (2006) pointed out four fears that motivate policy makers to be proactive in managing capital flows: (i) fear of exchange rate appreciation, (ii) of hot money, (iii) of large inflows, and (iv) of loss of monetary autonomy. Higher levels of a country's exchange rate could damage the competitiveness of its domestic industries. Sudden inflows of hot money pose risks of sudden reversals, increasing the volatility of exchange rates.

If capital controls and related macroprudential measures are seen not as instruments of exchange rate management but as part of a package of policies targeted at financial stability, then it is the *composition* of capital flows that takes center stage rather than their volume (CIEPR 2011, 11).

However, sometimes the problem is not one of an undesirable composition of inflows, but their size. A surge in foreign capital poses risks of asset price or credit bubbles if the economy has limited capacity to absorb.⁵ At the same time, cash-rich agents could be encouraged to take excessive risks or exhibit herd behavior, which suggests that some restrictions or taxes on capital flows could be useful—including as a way to gain additional freedom in setting short-term interest rates.

Ostry et al. (2010) offer a sequential approach to cope with surges of capital inflows. As per macroeconomic concerns, policy makers should ask themselves whether the exchange rate is undervalued and should be allowed to float upward, as a first step. If that is not the case, the country could start with a policy of accumulation of reserves, provided that increasing their levels is desirable. But if there is an inflation-

ary concern, policy makers should sterilize these interventions. If inflation is under control, another option would be simply to cut interest rates. Because there are costs incurred by the sterilization process, there are limits beyond which it is no longer attractive to keep buying foreign currency. In this case, fiscal tightening may be an option to attenuate the external stimulus. If the scope for fiscal contraction is limited, then capital controls could be useful to deal with the situation.

In parallel, if capital inflows cause prudential concerns, the macroprudential toolkit may be more efficient and should be used before capital controls. If policy makers are able to identify the source of concern, a macroprudential measure could be better targeted than a broader restriction. As an illustration, if the concern is excessive borrowing from abroad or its impact on domestic credit growth, increasing capital requirements for these activities may be more transparent, efficient, and easier to implement than taxing all foreign sources of funding. Additionally, if the country's capital account is too open and financial markets too deep, it could be very difficult to implement effective capital controls, given circumvention strategies.

For the purpose of this note, capital controls and exchange rate interventions can be seen as options to be combined with monetary and macroprudential policies, options that can even increase, or at least help, the effectiveness of the latter. Depending on the vulnerability identified, policy makers could choose measures that are most efficient and appropriate for the circumstance. Consideration has to be given, though, to costs associated with curbing capital inflows in countries with low saving rates.

In any case, it is important note the differences in managing capital inflows that are expected to be temporary or permanent. Temporary capital inflows call for policies to ring-fence the economy from volatility. However, even if inflow surges are permanent, some action may be implemented to postpone adjustments in the economy and/or smooth transitional effects. For example, an important discovery of natural resources could change the fundamentals of an economy toward higher current account surplus, which in turn would lead to more appreciated exchange rates in the near future. Notwithstanding the fact that a resource reallocation is hard to avoid at the end, or at least not without increasing difficulties, some measures could be in place to slow the pace of transfers. In the same sense, a consolidation of better fundamentals in emerging markets tends to attract abnormally high inflows of capital for some time during the transition, as investors adjust their portfolio (stock) exposure to the new reality. Furthermore, the inevitable sluggishness to adjust on the side of the supply of new assets may lead to a price overshooting of existing assets, with some negative side effects (Canuto 2011b).

In sum, once asset price cycles and spillovers are acknowledged as a fact of life, capital flow management policies be-

come one—highly or lowly effective—item in the toolkit of combined monetary-cum-macroprudential policies used to address macroeconomic and financial instability risks. This is particularly the case in economies subject to significant spillovers from asset price cycles and policies from abroad, and in which the scale and duration of spillovers make a narrow set of prudential and monetary policies insufficient to ring-fence the economy. Nevertheless, one has to take into account the shorter lifespan of capital-control effectiveness, because volatility will migrate and show up elsewhere, given the ultimately fungible character of capital flows and their creativity in designing circumvention strategies.

Conclusions

Given the implications of asset price cycles to achieving monetary policy objectives, the way to go seems to be to consider asset prices in monetary policy decisions, as well as to use macroprudential regulation as a complement to monetary policy.

Macroprudential regulation should aim to make the incentive structure for individual firms coherent and consistent so that externalities are internalized. The idea is to design a set of principles and rules that can reduce each institution's contribution to systemic risk. Thus, this set would smooth the financial cycle, that is, reducing the systemic risk that inherently builds up in booms and has damaging consequences in slumps, since leverage, risk taking, credit, and asset prices are pro-cyclical and crises typically follow booms.

In the time series dimension of macroprudential issues, monetary policy and macroprudential tools clearly can be complementary in reducing pro-cyclicality. However, the scope for joint calibration may be less obvious in the case of cross-sectional macroprudential regulation, in which the calibration must be conducted top down.

A rule of thumb for integrating monetary policy and macroprudential regulation may be to retain some division of labor, even if their combination is considered the best way to go. Fine-tuning via monetary policy should be favored when stability issues are of a homogeneous and reversible nature. Moreover, macroprudential instruments tend to be more demanding in terms of implementation lags and transaction costs to financial institutions, whereas movements in short-term interest rates are faster, simpler to carry out, and easier to communicate to the general public.

Compared to purely domestic asset price cycles, cross-border capital flows and the potential transmission of asset price booms and busts imposes additional layers of complexity. Capital flow management policies become one—highly or lowly effective—item in the toolkit of combined monetary-cum-macroprudential policies used to address macroeconomic and financial instability risks. This is particularly the case in economies subject to significant spillovers from asset

price cycles and policies from abroad, and in which the macroprudential and monetary policies are insufficient to ring-fence the economy.

Three broad guidelines can be taken from this discussion: first, as far as integrating asset prices into monetary policy reaction functions, credit-fueled bubbles should be differentiated from equity-type bubbles. Second, retain some division of labor when combining macroprudential regulation and monetary policy. Third, when dealing with cross-border spillovers, the macroprudential toolkit often will be more efficient and should be used before capital controls.

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Notes

1. See annexes I and II of Canuto and Cavallari (2013).
2. As noted by Drehmann et al. (2010, 1): "Any effective scheme would need to have a number of features. First, it would identify the correct timing for the accumulation and release of the capital buffer. This means correctly identifying good and bad times. Second, it would ensure that the size of the buffer built up in good times is sufficiently large to absorb losses without triggering serious strains. Third, it would be robust to regulatory arbitrage, including manipulation. Fourth, it would be enforceable internationally. Fifth, it would be as rule-based as possible, acting as an automatic stabilizer. In particular, this would ease the pressure on prudential authorities to refrain from taking restrictive measures in good times. Sixth, it should have a low cost of implementation. Finally, it would be simple and transparent."
3. BCBS conducted a series of quantitative exercises that, taking risk-sensitivity into account, assessed the impact of the cyclicity of capital requirement regimes. One of the methodologies used adjusted for the compression of probability of default (PD) estimates in the internal ratings-based approach during benign credit conditions by using PD estimates for a bank's portfolios in downturns. Using higher PD (for risk) during upturns would provide—by subtraction with actual data—an estimate of cyclical effects.
4. Asset price booms and busts may be transmitted without actual capital flows, not only indirectly through synthetic operations that may not require cash transfers, but also through pure contagion of expectations and risk behavior. In the latter case, macro- and microprudential tools as well as macroeconomic policies are the obvious means to deal with them.

5. Recently, for example, “because the creation of new assets in developing countries will be slower than the increase in demand for them, the price of existing assets in those markets—equities, bonds, real estate, and human capital—are likely to overshoot their long-term equilibrium value. Recent history is full of examples of the negative side-effects that can arise” (Canuto 2011b, 1).

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