

Monetary Policy and Macro Prudential Regulation: Whither Emerging Markets

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Introduction

Until the onset of the global financial crisis, there was convergence in thinking toward 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. Confidence was rising 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.

The close relationship between inflation targeting and macroeconomic stability led to the belief that financial stability should be solely pursued by micro prudential regulatory and supervisory measures. Monetary policy would take care of inflation by acting upon expectations of future interest rates and, thus, the yield curve and long-term interest rates that affect aggregate demand. Flexible exchange rates would ensure smoother balance-of-payments adjustments. Micro prudential regulation of bank capital and banking supervision would, in turn, prevent excessive risk-taking.

Confidence in such a combination of an inflation-targeting-cum-flexible-exchange-rates regime and independent financial regulation and supervision has been shattered by the scale and synchronization of asset price booms and busts that led to the current global financial crisis. It is now increasingly accepted that,

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to some extent, the interdependence between macroeconomic and financial stability calls for coordination between monetary policy and macro prudential regulation. Additionally, the magnitude of cross-border spillovers of asset price booms and busts, as well as corresponding country policy responses in the case of large countries, have undermined the belief in the sufficiency of flexible exchange rates as a shock absorber.

The purpose of this chapter is twofold. First, we take stock of where monetary and exchange-rate policies are heading as a consequence of recent practical experiences, and revisit theoretical monetary policy tenets. After outlining the received wisdom, we address the implications of monetary policy's neglect of asset price booms and busts. We then approach the challenges faced by any attempt to consider asset price booms and busts and spillovers from abroad, as well as to integrate macro prudential policy into monetary policy.

The second purpose is to point out some of the challenges faced particularly by monetary authorities in emerging markets under the new monetary policy paradigm (see "New Challenges Faced by Central Banking in Emerging Markets," the fourth section). On a perennial basis, like their counterparts in advanced economies, they face the challenges of adjusting their blueprints for decision making after the revealed insufficiencies of the received wisdom. Besides analytical and empirical knowledge gaps, the issues of time consistency, central bank independence, and international policy coordination are becoming more complex. Furthermore, over a (hopefully) more temporary horizon, emerging market monetary authorities are having to deal with an additional set of challenges, given that the current scenario of debt overhang and unconventional monetary policies in advanced economies is likely to last, and a global low-growth environment tends to exacerbate economic losses derived from exchange-rate misalignments.

Flexible Inflation Targeting and Micro Prudential Regulation: What Was Missing?

This section looks at some of the elements that were missing or underappreciated in the policy framework that prevailed prior to the crisis in the areas of prudential regulation, asset price booms and busts, cross-border spillovers from these booms and busts, and the policy responses of large countries.

Flexible Inflation Targeting Regimes and Isolated Prudential Regulation

Before the global financial crisis, a set of core principles for monetary policy had reached a high degree of acceptance. As a consequence, an increasing number of countries—both advanced countries and emerging markets—had converged toward a combination of inflation-targeting regimes and floating exchange rates.¹ In that context, provided that monetary and macroeconomic stability could be taken for granted, responsibility for the stability of the financial system belonged to another policy realm, namely that of micro prudential tools, concerned with ensuring the soundness of individual institutions and the protection of depositors (Canuto 2011a).

Mishkin (2011) proposed a set of monetary policy principles around which a degree of consensus had emerged before the crisis. First, the classic “inflation is always and everywhere a monetary phenomenon” principle gave the central bank the responsibility to manage the inflation rate. This principle did not mean that all economists agreed that money growth determines the pace of price evolution. As both supply and demand sides of the money market are prone to continuous change, managing monetary aggregates had come to be seen as inefficient, contrary to what early monetarists once argued (Friedman and Meiselman 1963; Friedman and Schwartz 1963). The short-term interest rate appeared as the main instrument to be wielded, at least in normal situations, while other instruments were available to deal with stress situations. However, the majority of economists believed that the source of sustained inflation is an overexpansionary monetary phenomenon.

Second, stable inflation at low levels should be pursued. Substantial costs of high inflation could be identified as distortions in resource allocation, regressive redistribution of wealth, taxes on cash holdings, and nominal illusion, among others.²

Third, there should be no long-term trade-off between unemployment and inflation. The augmented Phillips curve (Friedman 1968; Phelps 1968) was to be part of the toolkit of almost every central banker, as monetary policy could be used to shift the level of inflation in the short run, but with no free lunch in the long run as people will adapt their expectations. In this sense, only inflation surprises could have an impact on the real economy. In other words, the money illusion could be generated only temporarily.³

Fourth, the role of expectations is fundamental in macroeconomics. The rational expectations revolution had won the case in favor of the importance of market expectations regarding policy measures, as people would react and incorporate their systematic component. In this sense, managing expectations about future policies becomes a central component of monetary policy making (Svensson 2005; Woodford 2003). In other words, “the radical element is the implication that central bank secrecy ought to be replaced by central bank transparency” (Wyplosz 2009, 9).

Fifth, central bankers would need to increase (reduce) nominal interest rates by more than the rise (decline) in inflation to keep inflation under control. Intuitively, *ex ante* real interest rates must increase (lower) after a positive (negative) inflationary shock to bring down (up) inflation to its target, as the output gap widens (becomes negative). This corollary is known as the Taylor Principle (Taylor 1993; Woodford 2003). In a world with more than one policy instrument, the full set needs to be considered. Intuitively, the net impact of the manipulation of all monetary tools on the economy after an inflationary (deflationary) shock should be contractionary (expansionary).

Sixth, the time-inconsistency problem is highly relevant, as agents would recognize if policy makers tried to exploit the short-run Phillips curve to obtain short-run political goals.⁴ Private agents learn about the inconsistency of policy makers and adapt their decisions. This notion “has led to a number of important

insights regarding central bank behavior—such as the importance of reputation (formalized in the concept of reputational equilibria) and institutional design” (Mishkin 2011, 8).

Seventh, since people recognize inconsistent policy makers and adapt their expectations, a central bank should have a credible commitment to its targets. A nominal anchor, determined by the government, would help coordinate those expectations, making it harder to bend to a temptation of adopting time-inconsistent behavior. Additionally, an independent monetary authority would help make this process more credible, and avoid possible political interventions (Mishkin and Westelius 2008). To improve efficiency, clear and consistent objectives with respect to monetary policy transparency are desirable.

By following this list of principles, the consensus view was that economies could achieve the best macroeconomic outcome possible. Controlled monetary expansion, low inflation to keep output in line with its potential, no temptation to overexploit the short-run trade-off between inflation and employment, and anchored inflation expectations managed without inconsistency by an independent central bank were necessary and sufficient conditions to sustain macroeconomic stability. Even in the presence of asset bubbles, the best option would be to intervene to address the subsequent impact on the output gap and inflation.

Accordingly, the move toward a policy framework of flexible inflation targeting, if widely adopted, would ensure macroeconomic stability at both national and international levels. Large nominal exchange-rate adjustments and overshooting should become a rarer phenomenon. By fostering exchange-rate variability, the adjustment of international positions would become faster and smoother, with demand shocks dealt with through interest- and exchange-rate changes. Global demand would remain at appropriate levels as a corollary to widespread and successful application of such a monetary regime. On top of that, the necessity for costly self-insurance in the form of international foreign-exchange reserves could be minimized, as intervention on exchange rates would be necessary only for short-lived market disruptions.

Prior to the global financial crisis, financial stability was also taken as assured by individual financial institutions adopting sound micro prudential rules, maintaining adequate levels of capital commensurate with the risks they faced. Competition in financial markets under an appropriate set of micro prudential rules would ensure financial stability. Low and stable inflation achieved through flexible inflation targeting would reduce the inflation-risk premium and financial regulation and supervision could be provided as an independent function. The “Great Moderation” in developed economies, with relatively low inflation rates and small output fluctuations from the mid-1980s onward, seemed to vindicate that confidence (Canuto 2011a).

As we now know, this world of presumed stable monetary and financial conditions was severely shaken by the global financial crisis. Asset price booms and busts were acknowledged as both pervasive and harmful: real estate and stock-market bubbles contributed to excess U.S. household debt and to fragile asset-liability structures; the interconnectedness of financial firms’ balance sheets

became too deep; and the danger of too-big-to-fail institutions dramatically rose. The rapid global transmission of an asset price bust pushed the world economy to the edge of quasi collapse in 2008.

Many economists hold the view that nothing substantial was missing from the framework just outlined. The global financial crisis could be attributed to deviations from the blueprint, either on the monetary policy or financial supervision and regulation sides. For some, like Taylor (2009), it was lax monetary policy that led to the creation of asset bubbles and then to financial instability and its impact on growth and macroeconomic stability. For others, like Svensson (2010), the financial crisis was caused by factors other than monetary policy; monetary policy and financial stability policy are distinct and it was the latter that failed. Financial stability policy failed due to distorted incentives for excessive leverage, lack of due diligence, lax regulation and supervision, rapid growth of securitization, myopic and asymmetric remuneration contracts, idiosyncratic features of the U.S. housing policy (such as government-sponsored enterprises), information problems, hidden risks in complex securities, and underestimation of correlated systemic risks. These causes should not be associated with any shortcomings of monetary policy.

Conversely, many economists pointed out missing dimensions in the analytical underpinnings of the received wisdom on both monetary and prudential policies. Asset price booms and busts, in particular, seemed to be too pervasive and too severe to be dismissed as an anomaly. As well put by Frankel (2009), it became harder to sustain the orthodox view according to which “central banks should essentially pay no attention to asset prices, the exchange rate, or export prices, except to the extent that they are harbingers of inflation.”

Asset Price Booms and Busts as a Missing Dimension

The blueprint of basic principles for a monetary policy framework, outlined earlier, did not give due attention to how financial markets and their channels of interconnectivity are relevant for macroeconomic stability. It had been long held that asymmetric information and market failures played a significant role in financial systems and in business cycles. Nonetheless, the mainstream view remained 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 started to be acknowledged, the belief was that attempts to detect and prick them at an early stage would be impossible to accomplish and potentially harmful. If necessary, resorting to interest rate cuts to safeguard the economy after bubble bursts would be the optimum procedure, conditional on subsequent impact on inflation and output gap (Bernanke and Gertler 2000).

In fact, the issue was the object of an intensive debate for sometime before the crisis—the so-called “lean versus clean” debate (Mishkin 2009). Although many argued in favor of monetary policy “leaning against the wind” from financial

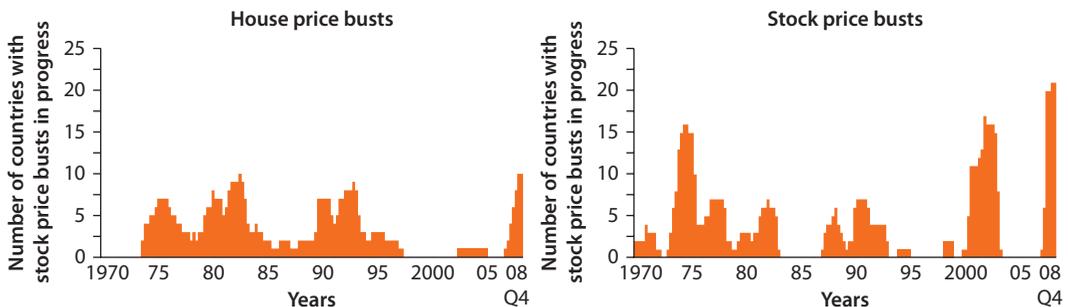
developments, the prevalent opinion was that difficulties in detecting bubbles would outweigh the advantages of doing so. Furthermore, monetary policy tools would be too a blunt way to curb the rise of bubbles, as correspondingly sharp interest rate hikes would have harmful unintended consequences on output growth and volatility. The best approach would then be to have monetary policy react only if and when “mopping up” or “cleaning up” the financial mess after bubble bursts was necessary.

As the evidence on the significant presence of real estate and stock-market asset price busts over the past 40 years became clear—see, for example, IMF (2009)—the pendulum swung toward arguments in favor of some “leaning against the wind.” The experience with widespread busting of both house and stock price bubbles beginning in 2007 is indeed singular in the past 40 years (figure 4.1). However, one can observe not only the frequency of previous episodes, but also that those “asset price busts are relatively evenly distributed before and after 1985—a year that broadly marks the beginning of the Great Moderation” (IMF 2009, 95).

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*.” It has now become clear that if monetary policy makers and prudential regulators are to succeed in their stabilization missions, complacency with respect to asset price cycles will have to be left behind.

The pervasiveness and magnitude of asset price booms and busts led to the acknowledgment of a distinction between *micro financial risks*, which arise due to specific problems in individual financial institutions, and *macro financial risks*,

Figure 4.1 Asset Price Busts



Source: World Economic Outlook, 2009, 96.

which affect the financial system as a whole because of the interconnectedness of the institutions within the system. The conceptual innovation from the past five years is that micro prudential 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.

Despite well-designed micro prudential rules, there might be spillovers and externalities across institutions that affect the financial system as a whole (for example, bank panics, fire sale of assets, and credit crunches). Either because of interlinkages among balance sheets of financial institutions or because of contagion in terms of confidence, risks taken by a single financial institution can affect the entire financial system.

For example, a financial system composed of large, interconnected firms is likely to produce moral hazard in the face of the (now) standard too-big-to-fail dilemma for policy makers. Even if all firms are soundly regulated, the possibility of one failure in this interconnected system creates contagion and negative externalities to the whole system. But this can also happen in a system composed of small, perfectly regulated firms without direct links among financial firms' balance sheets. It suffices that all firms use the same identical risk-assessment model, one not considering a specific tail event. If this event materializes, the whole system could be at risk, regardless of its apparent robustness and lack of connectedness.⁵

Asset price booms and busts may well establish a feedback loop with procyclical risk assessments present in traditional micro prudential rules. Suppose, for example, that there is an increase in house prices due to a demand shock. The rise in the value of real estate used as collateral raises the probability of repayment for housing loans and lowers the risk premium. Additionally, if financial institutions follow their own assessment of risks when estimating appropriate ratios between capital and risk-weighted assets to be held, capital costs associated with such credits decline. Reduced borrowing costs then stimulate borrowing for other purposes, potentially leading to further increases in real estate prices. If bubbles develop, the whole network of larger interlinked balance sheets may look sound, despite its dependence on overvalued collateral.

By the same token, the importance of financial intermediation and market segmentation to monetary policy decisions was underestimated before the financial crisis (Blanchard, Dell'Ariccia, and Mauro 2010). Most of the time, the connection among specialized investors is done by arbitrage (for example, securities lending, repo markets and commercial mortgage back securities). However, this link among markets can stop working during moments of acute lack of confidence or information. As a consequence, the transmission of monetary policy through short-term interest rates to other credit assets may become obstructed. In extreme situations, the central bank has to step in, despite moral hazard risks, to avoid downward spirals of destruction of liquidity.

Wholesale funding, which is often outside the perimeter of conventional micro prudential regulation, can carry similar risks to deposits, and can pose systemic risks beyond the banking sector. It represented 40 percent of total liabilities of the Euro area banking system and 25 percent in the United States, the United Kingdom, and Japan as of mid-2010 (GSFR 2010). The literature on bank runs can illustrate the importance of aggregate liquidity risk management and how high the costs of countervailing such runs can end up in taxpayers' pockets (Goodhart and Perotti 2012).

The so-called shadow-banking system had an important role in the creation of liquidity during the "Great Leveraging," absorbing assets in the process of maturity and liquidity transformation and search for leverage and higher yields. Some benefits from nonbank financial intermediation include (1) increasing efficiency, innovation, and specialization; (2) enabling investors to diversify and mitigate risks; (3) providing greater flexibility and investment opportunities; and (4) supplying liquidity and funding (IIF 2012b; Ghosh, del Mazo, and Ötoker-Robe 2012). Conversely, as market participants generally try to minimize the impact of regulation and its associated costs, the interconnection of regulated banks and these institutions highlighted the narrowness of previously defined micro prudential rules.

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 flexible inflation targeting regime and micro prudential regulation is not necessarily sufficient to avoid asset price booms and busts because of *macro financial 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 from Asset Price Booms and Busts and Large-Country Policy Responses as a Missing Dimension

The neglect of asset price booms and busts by the received wisdom regarding inflation targeting and micro prudential regulation acquires an additional dimension in the case of capital-receiving countries, such as most emerging markets. Even if these countries succeed in avoiding domestic generation of *macro financial risks*, they may experience asset price booms and busts caused by net capital-flow ebbs and tides derived from asset price cycles abroad. Because those countries are incorporated 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 taken procyclically in large countries end up affecting the entire global system. By the same token, policy responses taken at the countries where asset price booms and busts unfold affect capital-receiving countries.

The framework of flexible inflation targeting and micro prudential 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 outweigh by far 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, as their persistent disequilibrium may have long-lasting effects on the domestic allocation of resources.

In what follows, we try to sketch some of the frontiers along which the flexible inflation targeting regime will need to evolve to integrate neglected macro financial risks.

Challenges to Integrate Macro Financial Linkages and Macro Prudential Regulation into Monetary Policy

Challenges to integrating macro financial linkages and macro prudential regulation into monetary policy include: integration of asset prices into monetary policy reaction functions, integration with macro prudential regulation, discretion versus rules, and dealing with cross-country spillovers.

Integration of Asset Prices into Monetary Policy Reaction Functions

Asset price booms and busts are now considered too important to be left in financial supervisors' hands. As mentioned, the pendulum of opinions has moved in favor of those arguing for monetary policy "leaning against the wind" to prevent asset price bubbles, rather than the "mop-up-afterwards" approach.

Evidence suggests that financial cycles are more pronounced in emerging market economies than in developed economies (Calderon and Serven 2011; Claessens and Ghosh 2012). Whereas there is no significant difference between those two groups of economies in the duration of recessions or recoveries during financial cycles, downturns in activity are larger and more intense in emerging markets. The same observation can be seen for asset price cycles—durations are similar, but the median peak-to-trough amplitudes for stock prices, housing prices, and real exchange rates are larger for emerging markets.

Although 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 emerging economies integrate these aspects into monetary policy.

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-afterwards” approach would still be appropriate for equity bubbles not fueled by borrowing, but the central bank should try to limit credit-based bubbles—though probably combining regulatory instruments and interest rates. This view may eventually become the new consensus on how to deal with asset price bubbles; indeed, 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* [emphasis added]” (IMF 2009, 116).

Such a cautious approach does not mean complacency. On the contrary, signs of rising macro financial 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 (annex 4A) and to identify financial instability risks (annex 4B).

Integration with Macro Prudential Regulation

One takeaway of the above discussion is the relevance for both macroeconomic and financial stability of macro prudential regulation commensurate with the acknowledged macro financial risks. As a complement to micro prudential regulation, macro prudential 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 vis-à-vis endogenous propagation and exogenous shocks. It 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 procyclical and crises typically follow booms).

The objective of macro prudential regulation is not to eliminate the financial cycle but to reduce its amplitude and associated systemic risk. Procyclicality is linked to all business cycles and goes *pari passu* with most fundamentals and behaviors (for example, investments and “animal spirits”). What macro prudential rules can do is reduce procyclicality 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 macro prudential policy have been discussed long before the recent financial crisis. However, despite an overall convergence around a definition, there is no consensus about which macro prudential policy targets and instruments should be prioritized. In terms of specific targets for macro prudential policies, one may attempt to countervail measured risks during business cycles (Brunnermeier and Sannikov 2009); to stabilize the provision of financial intermediation services (Bank of England 2009); or to avoid bubble creation processes. One could also highlight options to limit macroeconomic costs of system distress, to address interlinkages and exposures of financial institutions and the procyclicality of the system (Caruana 2010); to discourage individual institutions to generate systemic risk and negative externalities (Perotti and Suarez 2009); to control social costs of a generalized drop in asset prices caused by credit crunches and/or fire-sales (Hanson, Kashyap, and Stein 2010); or to enhance financial system resilience (CGFS 2010). There are many ways to approach the objective, and policy makers have a range of macro prudential tools to cope with each angle.

One of the main ideas that emerged as suitable for implementation after the 2008 crisis was to enhance capital and liquidity regulations since both problems were at the origin of the quasi meltdown of the global financial system after the Lehman Brothers collapse. A more robust banking system (in terms of capital and liquidity) would be less subject to crises (or, at the very least, not require the magnitude of transfers from taxpayers that was observed). 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 for 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 it is available to absorb losses in bad times. Countercyclical capital buffers would limit (1) the risk of large-scale accidents in the banking system and (2) the amplification of macroeconomic fluctuations during crises.⁶ The macro

prudential rationale is the time-inconsistency argument that risks tend to build up in good times, but their negative consequences materialize only with a lag. This feature reveals the limitations of current risk measurement practices as well as distortions in the micro prudential incentives of individual firms.

There is a perception that risk-sensitive minimum capital requirements embedded in Basel II could lead to excessive procyclicality.⁷ Conversely, some 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 (see 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, the second related to the mismatch in the maturity of assets and liabilities.

At the international level, there has been progress toward 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 Basel Committee 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 the maximum value for the countercyclical capital buffer is taken into account (BCBS 2011).

Macro prudential instruments can be discussed in a time-series dimension or in cross section (Borio 2011), mirroring the types of macro financial risks mentioned previously. 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. As discussed, such feedback loops are a crucial component of endogenously generated business cycles. In its turn, the cross-section dimension relates to the common exposure of institutions at each point of time. Correlated assets, or even counterparty interrelations, create such a link among financial institutions.

Table 4.1 shows a typology of macro prudential instruments offered by Galati and Moessner (2011). Whether macro prudential instruments are expected to tackle time-series or cross-section dimensions, they overlap with micro prudential ones.

Can we reduce financial instability without using monetary policy, relying only on prudential and regulatory rules incorporating macro financial risks? Would that guarantee both financial and macroeconomic stability? Most practitioners have expressed the view that a combined (articulate) use of both monetary and macro prudential policies and rules is superior to a standalone implementation of either (Canuto 2011a). Instead of “a corner solution where one instrument is devoted entirely to one objective, the macro-stabilization exercise must be viewed as a joint optimization problem where monetary and regulatory policies

Table 4.1 Macro Prudential Tools

	<i>Examples</i>
1. Risk measurement methodologies	
<i>By banks</i>	Risk measures calibrated through the cycle or to the cyclical trough
<i>By supervisors</i>	Cyclical conditionality in supervisory ratings of firms; Develop measures of systemic vulnerability (for example commonality of exposures and risk profiles. Intensity of inter-firm linkages) as basis for calibration of prudential tools; Communication of official assessments of systemic vulnerability and outcomes of macro stress tests;
2. Financial reporting	
Accounting standards	Use of less procyclical accounting standards; dynamic provisions
Prudential filters	Adjust accounting figures as a basis for calibration of prudential tools; Prudential provisions as add-on to capital: smoothing via moving averages of such measures; time-varying target for provisions or for maximum provision rate
Disclosures	Disclosures of various types of risk (for example credit, liquidity), and of uncertainty about risk estimates and valuations in financial reports or disclosures
3. Regulatory capital	
Pillar 1	Systemic capital surcharge; Reduce sensitivity of regulatory capital requirements to current point in the cycle and with respect to movements in measured risk; Introduce cycle-dependent multiplier to the point-in-time capital figure; Increased regulatory capital requirements for particular exposure types (higher risk weights than on the basis of Basel II, for macroprudential reasons)
Pillar 2	Link of supervisory review to state of the cycle
4. Funding liquidity standards	Cyclically-dependent funding liquidity requirements; Concentration limits; FX lending restrictions; FX reserve requirements; currency mismatch limits; open FX position limits
5. Collateral arrangements	Time-varying Loan-to-value (LTV) ratios; Conservative maximum loan-to-value ratios and valuation methodologies for collateral; Limit extension of credit based on increases in asset values; Through-the-cycle margining
6. Risk concentration limits	Quantitative limits to growth of individual types of exposures; (Time-varying) interest rate surcharges to particular types of loans
7. Compensation schemes	Guidelines linking performance-related pay to ex ante longer-horizon measures of risk; back-loading of pay-offs; Use of supervisory review process for enforcement
8. Profit distribution restrictions	Limit dividend payments in good times to help build up capital buffers in bad times
9. Insurance mechanisms	Contingent capital infusions; Pre-funded systemic risk insurance schemes financed by levy related to bank asset growth beyond certain allowance; Pre-funded deposit insurance with premia sensitive to macro (systemic risk) in addition to micro (institution specific) parameters
10. Managing failure and resolution	Exit management policy conditional on systemic strength; Trigger points for supervisory intervention stricter in booms than in periods of systemic distress

Source: Galati and Moessler 2011, 10.

Note: FX = foreign exchange.

are used in concert in pursuit of both objectives” (CIEPR 2011, 7). Prudential rules and monetary policy are parameters to each other, as their standalone stances affect the evolution of asset prices. Therefore, a joint optimization pursuit is likely superior to isolated “corner solutions.”

In the time-series dimension of macro prudential issues, monetary policy and macro prudential tools can clearly be complementary in reducing procyclicality. 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 calibrating jointly their intensities.⁸

Additionally, when the short-term interest rate reaches a lower bound, macro prudential policies can be used to cope with specific financial vulnerabilities, or even to increase traction of monetary policy. As mentioned, the nominal zero bound is now taken more seriously as an issue than it was 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 macro prudential tool to be used should be the central bank’s own balance sheet. This issue has not been as relevant for most emerging markets, as average inflation has been higher, the crisis’s collateral effects milder, and fiscal policy more available.

In fact, we have witnessed major central banks using balance sheets in the last few years when other tools—like lower capital requirements in order 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 can be used in parallel with interest rate cuts as China, Brazil, and Turkey have recently done.

The scope for joint calibration may be less obvious in the case of cross-sectional macro prudential regulation, in which the calibration of the latter must be done top down. The calibration must also consider that diverse institutions have different contributions to systemic risk, with institutions with greater systemic relevance receiving tighter macro prudential requirements. Estimating the individual contribution to systemic risk is always a challenge. In any case, from the cross-section perspective, it is clearly easier to cope with vulnerabilities through macro prudential 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 is probably not the most efficient option.

Discretion versus Rules

How effective are the macro prudential instruments just described? A recent study of country experiences found that they can be effective in mitigating systemic risk (Lim and others 2011). Some instruments were shown to be particularly effective in reducing procyclicality (for example, caps on loan-to-value or on

debt-to-income ratios, ceilings on credit or credit growth, 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 macro prudential tools makes it necessary to tailor policy designs to specific purposes. However, too much uncertainty about changes implemented by the government may be counterproductive and costly in terms of less credit provided if rules and regulations change very often. The trade-off is on the one hand, more discretionary, time-varying macro prudential policies and on the other hand, less uncertainty from stable and general macro prudential rules. Moreover, too many ad-hoc changes make it harder to assess interactions among different macro prudential tools, and between them and monetary transmission mechanism.

The issue of how best to calibrate tools to avoid excessive procyclicality of the financial system involves a trade-off 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 vis-à-vis nonfinancial shocks—such as 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 or political pressures, in addition to increasing regulatory uncertainty and encouraging financial disintermediation. In practice, a combination of both macro prudential built-in stabilizers and discretionary measures are used.

A rule of thumb for integrating monetary policy and macro prudential 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 macro prudential 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 with parsimony and caution, as distinguishing between transitory and permanent shocks in real time is always challenging.

Such division of labor may also be justified by the fact that macro prudential 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.

It is worth highlighting the departure from the rule-based world of policy making of the conventional framework described at the beginning of this paper.

Even if the flexible inflation targeting maintains its basic rationale and principles, the consideration of asset prices and the complementarity with macro prudential regulation in monetary policy decisions introduces a degree of discretion. This is a flipside of the discovery that the relevant dimension of asset price cycles was ignored by the earlier paradigm. With discretion, though, all those policy and political risks expected to be precluded via rules, return.

Dealing with Cross-Country Spillovers

Cross-border capital flows and the potential transmission of asset price booms and busts via interconnected balance sheets imply additional layers of complexity as compared to purely domestic asset price cycles. As surges in capital inflows can have collateral macroeconomic effects, potentially increasing financial vulnerabilities, macroeconomic and/or macro prudential policies could be adopted as a response to those surges. As discussed, asset and credit bubbles may originate from abroad and dwarf a prevailing macro prudential regulation designed to tame 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.⁹

Magud and Reinhart (2006) pointed out four fears that motivate policy makers to be proactive in managing capital flows: fear of exchange-rate appreciation, of hot money, of large inflows, and of loss of monetary autonomy. Higher levels of the exchange rate could damage the competitiveness of domestic industries. Sudden inflows of hot money pose risks of sudden reversals, increasing the volatility of exchange rates. "If capital controls and related macro prudential 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 rather their size. A surge in foreign capital poses risks of asset price or credit bubbles if the economy has limited capacity to absorb.¹⁰ At the same time, cash-rich agents could be encouraged to excessive risk-taking and 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.

A sequential approach to cope with surges of capital inflows is offered by Ostry and others (2010). As per macroeconomic concerns, policy makers should ask themselves whether the exchange rate is undervalued and should be allowed to float upwards, as a first step. If it 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 inflationary concern, policy makers should sterilize these interventions.¹¹ If inflation is under control, another option would be simply to cut interest rates. As costs are 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 macro prudential toolkit may be more efficient and should be used before capital controls. If policy makers are able to identify the source of concern, a macro prudential measure could be better targeted than is the case for 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.

A substantial controversy about effectiveness of interventions in foreign exchange markets exists in the literature. As such interventions often become inevitable, at least in situations like one of significant temporary inflows, it is worth reviewing their channels of influence.

Interventions in exchange markets can be sterilized or not sterilized. The latter has an impact on the nominal exchange rate. At least until recently, the conventional wisdom was in favor of the sterilization option, so that monetary policy could deal with inflationary issues separately.

How does a sterilized intervention work? Two channels can be mentioned: the portfolio balance channel and the expectation—or signaling—channel (Mussa 1981). By the portfolio balance channel, government interventions change the composition of agents' portfolios, altering the relative price of foreign assets relative to domestic assets. The impact on the exchange rate depends on whether those assets are perfect substitutes, in which case there would be no impact on the exchange rate, or otherwise there is an impact as agents try to rebalance their portfolios. Additionally, if Ricardian equivalence does not hold, even if the assets are perfectly substitutable, interventions should have a net effect on the level of exchange rate through this channel because of tax issues (Sarno and Taylor 2001).

The signaling channel is based on the possibility that agents can see interventions (sterilized or not) as a signal about future economic policy. Different expectations about policies in the future affect present variables in a forward-looking perspective. This perception could occur because agents change their view about future actions by monetary authorities or because they change their assessment about the impact of interventions. It suggests that hidden interventions should tend to be less effective than the public and transparent ones.

In theory, exchange interventions can be effective, but what about the practical evidence? The conventional wisdom of ineffectiveness has been challenged. A review of empirical evidence led "to conclude cautiously that official intervention can be effective, especially if the intervention is publicly announced and concerted and provided that it is consistent with the underlying stance of monetary and fiscal policy" (Sarno and Taylor 2001, 862).

The effectiveness of capital controls is also an important issue because it is one of the ultimate options to address potential risks to financial and macroeconomic stabilities derived from capital inflow surges. As an illustration, large capital inflows could encourage domestic overborrowing and excessive exchange-rate

exposure. The usual objectives to establish capital controls are to reduce the volume of these flows, to modify their composition toward a longer maturity profile, to diminish real exchange-rate pressures, to strengthen the autonomy of monetary policy, or to use a combination of these objectives.

Magud and Reinhart (2006) made an effort to find common ground among noncomparable results in the empirical literature. They suggest that capital controls on inflows have been successful in altering the composition of flows in favor of longer maturity and to increase monetary policy independence, but there is no clear evidence for the other objectives. However, by doing their own exercise, they not only confirmed those two influences, but also found some evidence of reducing exchange-rate pressure. In any case, capital controls seem not to lower the volume of net flows (Ostry and others 2010). In sum, there is evidence in favor of the effectiveness of capital controls depending on country-specific needs and the availability of options.¹²

For our purposes, capital controls and exchange-rate interventions can be seen as options to be combined with monetary and macro prudential policies, options that can even increase, or at least help, the effectiveness of the latter. Depending on the vulnerability identified, policy makers could choose those measures that can be most efficient and appropriate to circumstances. Consideration has to be given, though, to costs associated with curbing capital inflows in the case of countries with low saving rates.

In any case, it is fundamental to keep in sight the differences in managing capital inflows that are expected to be temporary or permanent. The former calls for policies aiming at ring-fencing 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 check 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 become one—highly or lowly effective—item of the toolkit of combined monetary-cum-macro-prudential 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 turn a narrow set of prudential and monetary policies insufficient to ring-fence the economy. Nevertheless, one has to take into account the shorter life of capital-control

effectiveness, as volatility will migrate and show up elsewhere, given the ultimately fungible character of capital flows and its creativity to design circumvention strategies.

New Challenges Faced by Central Banking in Emerging Markets

The significant number of emerging markets economies whose central banks adopted flexible inflation targeting prior to the crisis reflected a perception that such a regime could work well despite distinctive differences with advanced economies. To what extent would differences in stages of financial development and asset price cycles change that perception? What would be the implications of the current situation with many large advanced economies facing a protracted public debt overhang and adopting unconventional monetary policies? Given the incomplete global adoption of flexible exchange rates, what are the risks associated with widespread exchange-rate interventions with global growth lower than prior to the crisis? As we leave behind the hypothesis of a world of fully rule-based monetary and prudential policies, what are the political economy challenges faced by emerging markets' policy makers?

How Different Are Emerging Markets' Asset Price Booms and Busts?

Agénor and Pereira da Silva (2012) highlighted four features of financial systems in most emerging markets (or "middle-income countries") that differentiate them from advanced economies. First, commercial banking is still by far predominant in financial intermediation. Despite deepening local capital markets in recent years, nonbank financial intermediation (hedge funds, commodities funds, private equity groups, and money market funds) is not yet a full-fledged alternative.¹³

Second, as a flipside of the absence of diversification, bank credit has strong impacts on the supply side of the economy. This situation creates a complication for the transmission of monetary policy since interest-rate variations aiming at controlling aggregate demand also have a supply-side effect in a countervailing direction, given that firms borrow short term to finance working capital needs.

Third, the financial system is "often highly vulnerable to small domestic or external disturbances, even more so to global financial cycles, as a result of increased financial integration. Abrupt reversals in short-term capital movements tend to exacerbate financial volatility, particularly in countries with relatively fragile financial systems, weak regulatory and supervision structures, and policy regimes that lack flexibility" (Agénor and Pereira da Silva, 2012, 4).

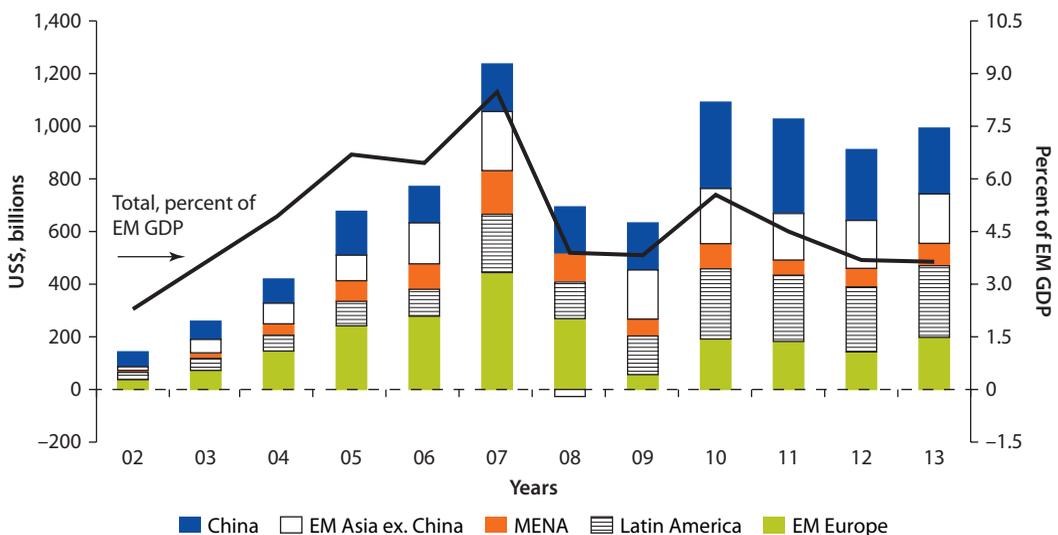
Finally, the experience with costly banking crises over the last decades was marked by highly asymmetric effects among output drops, depth and duration of credit crunches, and impacts on unemployment and poverty. In any case, as a result of the harshness of lessons learned, banking supervision and regulation has since strengthened substantially in many emerging markets (Canuto 2010).

Notwithstanding the size and higher degree of sophistication that financial systems have acquired in large emerging markets, one may expect spillovers from abroad to acquire an importance as a generator of domestic asset price booms and

busts that outweighs domestically generated asset price movements. This is particularly the case when, like recently, the global context of excess liquidity makes most emerging economies potential recipients of massive inflows of foreign capital. In effect, such inflows have ebbed and flowed following the adoption of unconventional monetary policies in advanced economies (Canuto, Garcia-Kilroy, and Silva 2012a). These flows have had a structural component: they have been related to the perception of improvement (and, later, relative disappointment) of emerging markets' growth prospects. However, these flows also have had a temporary component: portfolio investments and short-term deposits. In a context of high liquidity in international markets and an uncertain outlook for mature economies, many have seen this component as excessive and mostly reflective of "push" factors in its origins, rather than of "pull" factors on the absorptive side.

Part of this large inflow to many emerging markets has been absorbed by the accumulation of central bank reserves. Reserve accumulation policies have usually been implemented together with a policy of sterilization, in order to maintain an independent monetary policy. However, the intensity and magnitude of present inflows can make it difficult to sterilize them fully and resources that remain available to market participants may end up contributing to a significant expansion in credit. Net private capital inflow into emerging countries rose from less than US\$200 billion in 2002 to just under US\$1 trillion in 2012. In 2007, this amount reached almost 9 percent of emerging markets' GDP (figure 4.2). Low-cost external funding creates incentives to increase risk-taking and can result in asset price distortions, including of the exchange rate. Hence, excessive capital inflows have often contributed to a brisk pace of domestic credit growth in emerging markets, which potentially fuels inflationary pressures and aggravates financial instability.

Figure 4.2 Emerging Market Private Capital Inflow, Net



Source: IIF 2012a, 1.

Unconventional Monetary Policies and the “Politicization of Finance” in Advanced Economies

High (and unsustainable) levels of public debt in several large advanced economies—as well as debt overhangs in the financial sector and/or households—are not likely to be fully reversed in the near future (Canuto 2010). Difficulties in rapidly tackling the issue through flow adjustments (fiscal consolidation, bank deleveraging, household savings) sizable enough to matter are immense and would lead to deeper growth slowdown and unemployment. Therefore, policies and credit events leading to asset/liability adjustments (public or interstate absorption of debts, or debt restructuring) have taken place and are likely to continue in the near future (Canuto, Garcia-Kilroy, and Silva 2012a).

One now sees the hands of governments and central banks all over the place in finance, sustaining markets with their maneuvers on quantities and prices of available assets. One might view such a process as “politicization of finance,” in the sense that market fundamentals are not weighing in as they would under normal conditions, and decisions on whether to hold assets and institutions are intertwined with political factors:

1. Central banks’ balance sheets in countries at the core of the crisis have expanded dramatically because of purchases of domestic assets to ease monetary conditions and contain asset fire sales.
2. Yield curves have flattened to maintain long-term yields close to historically low levels.
3. Support to banks via bailouts or broad liquidity facilities has avoided the collapse that funding costs imposed by private creditors would lead to.
4. Regulatory requirements of liquidity have been tweaked, and in practice, have created a captive demand for government bonds, pushing down yields.
5. Currency markets have been subject to systematic interventions by heretofore hands-off governments, no longer comfortable with free floating under current conditions.

An open “politicization” of finance has occurred in the sense that the dynamics of financial asset prices are now influenced by the political sphere. Consider the Euro zone in the first half of 2012. Policy makers in those member countries under financial stress held the view that the chances of success would rise with the support of supplementary creation of public money by the European Central Bank (ECB). Conversely, the ECB’s actions were constrained by, among other factors, the political view predominant in other Euro-zone countries according to which such a support could only go to a certain level before undermining the political willingness to reform. Until mid-2012, financial markets moved between the poles of collapse and stability, in accordance with signals of the balance of those political views—backing or pushing back ECB’s debt purchases. Risk premiums moved down only after the ECB’s pledge to do “what it takes” to save the euro, during the summer, reflecting an apparent political support of such attitude.

Consider the U.S. fiscal retrenchment—the so-called fiscal cliff—poised to be reached in 2013 in case an agreement between government and Congress is not definitely reached. The possibility of a “cliff” has been created by the battle between political views in Congress, instead of private investors requiring higher yields to buy U.S. Treasuries. As additional distortion, the Federal Reserve has conducted Operation Twist since late 2011 aiming to compress long-term interest rates by buying long-term Treasuries and simultaneously sterilizing with short-term debt. As monetary easing can be less effective without a concurrent fiscal stimulus from now on, a precocious fiscal adjustment may well harm the prospects of economic and financial recovery.

In such context, emerging-market central bankers face a double challenge, in addition to normal ones: (1) the likelihood of large capital flow swings in the future will remain high, with corresponding spillovers on domestic financial and asset price dynamics; and (2) domestic political pressure undermining central bank autonomy may rise substantially, as a mirror of what is happening in advanced economies.

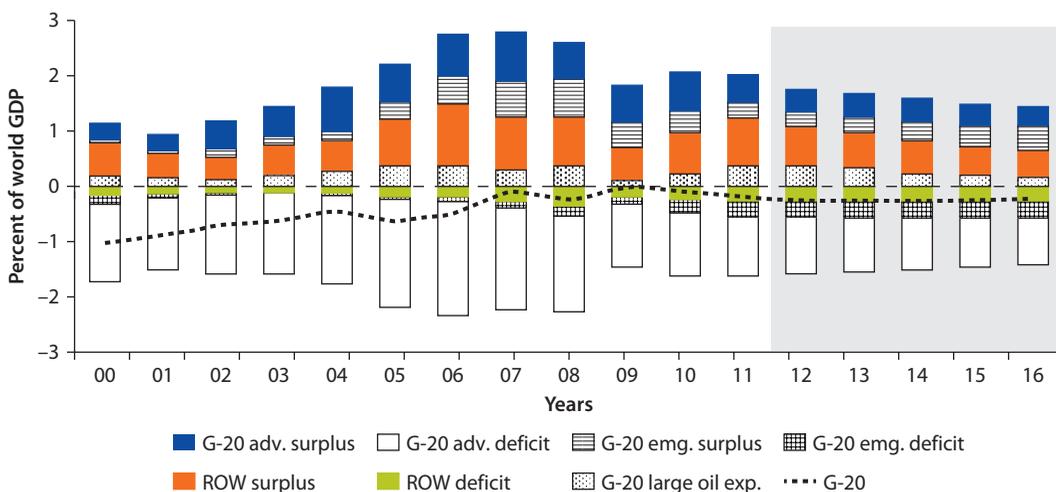
Unwinding of Global Imbalances and Interventions on Exchange Rate Markets

Another source of departure from the flexible inflation-targeting blueprint is associated with the unwinding of global imbalances poised to take place—either virtuously or not. Given prospects for global economic growth lower than before the crisis, policy attempts to interfere with the evolution of exchange rates are more likely to be undertaken making it even harder for other central banks to adhere to the conventional blueprint.

With the benefit of hindsight, we are now better informed of the fragilities of the global growth prior to the crisis (Canuto 2010). High levels of domestic absorption (consumption and investment) in some large countries were accompanied by overindebtedness of households, banks and/or governments, which was in turn backed by correspondingly appreciated assets (house prices, acquisition of low-risk status by integration to the Euro zone and others). Other countries grew substantially by exporting goods to attend that appetite contributing to substantial current-account imbalances (figure 4.3). Such a combined pattern of current-account deficits-surpluses also materialized within the Euro area.

The flipside of such a high and prolonged current-account pattern was the resistance to exchange-rate appreciation by surplus countries, compounded by the fact that many surplus countries also became poles attracting foreign capital. Some countries resorted to stringent capital controls and other barriers to capital entry, whereas most piled up huge foreign reserves. These reserves were in turn put back as liquid assets acquired from deficit countries, which became one of the factors sustaining persistent current-account imbalances.

The global financial crisis has essentially been the unfolding of the unsoundness of balance sheets once the widespread asset price overvaluation came to a halt (as previously discussed). Debt-deleveraging dynamics and macroeconomic

Figure 4.3 Current Account Balances, 2012

Source: IMF staff estimates.

slowdown in deficit countries explain the shrinkage of imbalances in the wake of the crisis (figure 4.3). It is still to be seen whether surplus countries will increase their domestic absorption with intensity and speed enough to compensate for the retrenchment of absorption in heretofore deficit countries, and thus settle the forecast of unwinding global imbalances on a global growth path higher than the current one.

One may guess is that as “fear of floating (upward)” tends to rise in the next few years, an environment much less benign than that prevailing before the crisis is likely to manifest itself. Some exchange rate “floaters” will become more like “fixers,” which will affect not only monetary policy in those countries but also the dynamics of cross-border movement of liquidity and asset trade.¹⁴ For instance, in combination with the unconventional monetary policies pursued in several large advanced economies, more frequent tinkering with exchange rates will set the stage for potential “currency wars.”

Waning Rule-Based Policy Making and Political Economy Pressures on Central Banks

As we have argued earlier, the acknowledgment that asset price cycles and cross-border spillovers lead to weakening the belief that monetary policy making and prudential regulation could eventually become entirely based on rules. Without denying the benefits accrued by rules and clear communication, we remarked the inevitability of some discretionary policy choices even under normal conditions.

We have added several reasons why discretion and off-the-rule central banking decisions in emerging countries may become more frequent. In this case, gains derived from central bank credibility will inevitably risk erosion, which will substantially increase the requirement in terms of communication and justification

of measures taken. In addition to the analytical and implementation challenges not fully realized by the “flexible-inflation-targeting-*cum*-isolated-prudential-regulation” framework, discretionary policy decisions may open a venue for political economy pressures against central bank autonomy.

Concluding Remarks

Until the outbreak of the global financial crisis, there was some convergence of thinking toward flexible inflation targeting. Controlled monetary expansion, low inflation with output being kept in line with its potential, defenses against the temptation to overexploit the short-run trade-off between inflation and employment, inflation expectations anchored and managed without inconsistency by an independent central bank, and a central bank that manipulates *ex ante* real interest rates to pursue a nominal target would be necessary and sufficient conditions to sustain macroeconomic stability. Flexible exchange rates and micro prudential tools would complement this framework to safeguard macroeconomic and financial system stabilities.

Monetary policy tools are too blunt to curb asset price bubbles, as correspondingly sharp interest rate hikes would have harmful unintended consequences on output growth and volatility. For some time, the prevailing opinion became that the best approach would be to use monetary policy only to “clean up” the financial mess after bubble bursts. As the debate evolved, an intermediary position gained prominence: the “mop-up-afterwards” approach would be appropriate for equity bubbles not fueled by overborrowing, whereas the central bank should try to limit credit-based bubbles—though probably combining microregulatory instruments and interest rates.

We also remarked how the crisis has undermined the belief in the sufficiency of the conventional framework. Even if implemented in accordance with those blueprints, the framework would not necessarily be capable of avoiding significant asset price booms and busts because of macro financial risks that may develop beyond its scope. And given the high costs associated with significant asset price busts—including the possibility of protracted negative feedback loops between overleveraged private balance sheets, public sector imbalances, and/or foregone employment and GDP—that negligence must be corrected. Additionally, cross-border capital flows and macroeconomic policy spillovers were disregarded. And both types of overflows and spillovers may bring implications in terms of higher volatility of activity on the real side, more complicated monetary policy management and augmented financial-sector risks.

How could we adjust the framework to take into account asset price booms and busts and spillovers? First of all, acknowledge that signs of rising macro financial risks may demand a particular response from monetary policy makers. However, it is necessary to properly identify the reasons behind rising asset prices and credit—a task that is far from simple.

As a complement to micro prudential regulation, macro prudential regulation should be concerned with ensuring the stability of the financial system as a whole

and the mitigation of risks to the real economy. It should aim to make the overall incentive structure for financial firms coherent and consistent so that externalities are internalized by the system.

In fact, most practitioners have expressed a belief that a combined use of monetary and macro prudential policies and rules tends to be superior to a stand-alone implementation of either. Therefore, a joint optimization pursuit is likely superior to isolated “corner solutions.”

Clearly, over time, monetary policy and macro prudential tools can be complementary in the pursuit of less procyclicality. For example, during simultaneous asset price and macroeconomic booms, one could combine higher contingent capital requirements and additional liquidity surcharges with interest rate hikes. There is imperfect substitutability between these measures, so best effectiveness should be considered when calibrating jointly their intensities.

The scope for joint calibration may be less obvious in the case of cross-sectional macro prudential regulation, in which the calibration of the latter must be done top down. In this case, it is clearly easier to cope with vulnerabilities through macro prudential tools than with short-term interest-rate instruments. Policy makers can focus directly on their concern, for example, real estate credit or leveraged loans or currency mismatches, and tighten or loosen the respective rules. One may wonder about the alternative of containing high growth of real estate credit just by hiking interest rates, but this measure reaches every credit line and most often will not be the most efficient option.

The huge variety of macro prudential tools makes possible policy designs tailored for specific purposes. But too much uncertainty may be counterproductive and costly if rules and regulations change often. There is thus a trade-off between, on the one hand, more discretionary, time-varying macro prudential policies, as more effective tools to cope with specific types of shocks and, on the other hand, less uncertainty associated with stable and general macro prudential rules. Moreover, too many ad hoc changes make it harder to assess interactions among different macro prudential tools, and between them and the monetary transmission mechanism.

A rule of thumb for integrating monetary policy and macro prudential regulation may be to retain some labor division, even if their articulated combination is now considered to be 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 to automatic macro prudential rules, in turn, are to be made in cases of permanent shocks that alter major parameters of the economic system. More discretionary prudential policies should be resorted to in cases of specific, but systemically significant, disturbances from a cross section perspective. Lasting countercyclical tools should be used with parsimony and caution, as distinguishing between transitory and permanent shocks in real time is always challenging.

Such division of labor may also be justified by the fact that macro prudential instruments tend to be more demanding in terms of implementation lags and transaction costs to financial institutions. Conversely, movements in short-term

interest rates are faster, simpler to carry out and easier to communicate to the general public. Likewise, managing expectations about policy makers' intentions is essential to improving policy effectiveness.

Once asset price booms and busts and cross-country spillovers are acknowledged as a fact of life, capital flow management policies become one item of the toolkit of combined monetary-cum-macro prudential policies to address macro-economic and financial instability risks. This is particularly the case in economies subject to significant spillovers from asset price dynamics and policies from abroad, and in which the scale and duration of spillovers turn a narrow set of prudential and monetary policies insufficient to ring-fence the economy. Capital controls and exchange-rate interventions can be seen as options to be combined with fiscal, monetary, and macro prudential policies in the face of spillovers. The former can even increase, or at least help, the effectiveness of the latter. Consideration has to be given, though, to costs associated with curbing capital inflows in the case of countries with low saving rates. One must also take into account the short shelf life of capital-control effectiveness, as volatility will migrate and show up elsewhere, given the ultimately fungible character of capital flows and the creativity of agents to design circumvention strategies.

To approach the current set of challenges faced by central banks in emerging markets, we highlighted two aspects. First, four features make financial systems in most emerging market economies different than in advanced economies: (1) commercial banking is still by far predominant in financial intermediation; (2) as a flipside of the absence of diversification, bank credit has strong impacts on the supply side of the economy; (3) the financial system is frequently vulnerable to small domestic or external disturbances—even more so than to global financial cycles—as a result of increased financial integration; and (4) as a result of the harshness of lessons learned, banking supervision and regulation has strengthened substantially in emerging markets. Notwithstanding the size and higher degree of sophistication that financial systems have acquired in large emerging markets, domestically generated asset price dynamics tend to be dominated by those associated with spillovers from abroad.

A second trait of the current global environment worth highlighting is the "politicization of finance." One now sees the hands of governments and central banks all over the place in finance, sustaining markets with maneuvers upon quantities and prices of assets. Market fundamentals are not weighing in as under normal conditions, and decisions to support assets and institutions are intertwined with political factors.

In such a context, emerging-market central bankers face a double challenge: (1) the likelihood that large capital-flow swings in the future will remain high, with corresponding spillovers on domestic financial and asset price dynamics; and (2) domestic political pressure undermining central bank autonomy, as a mirror of what is happening in advanced economies.

Asset price booms and busts and cross-border spillovers lead to some weakening of the belief that monetary policy and prudential regulation could eventually become entirely based on rules. Without denying the benefits accrued by rules and

clear communication, we remarked on the inevitability of some discretionary policy even under normal conditions. Central bank discretion in emerging countries may become more frequent. In addition to the analytical and implementation challenges not fully realized at the time of the “flexible-inflation-targeting-cum-separate-prudential-regulation” framework, discretionary policy decisions may also open a venue for political economy pressures against central bank autonomy.

Annex 4A: Integration of Financial Frictions into Forecast Models

Inflation targeting is a forecast-based framework for monetary policy decisions and thus strongly dependent on the quality of economic modeling, and therefore on the interpretation of underlying trends in the economy. A functionally useful model should not be overly complex and must draw on both empirical evidence and macroeconomic intuition about the transmission channels of shocks.

This chapter stressed the importance of adequately incorporating financial frictions into the conduct of monetary policy. A vast literature considering the importance of market failures as generators of financial frictions existed well before the crisis (Bernanke 1983; Calomiris 1993; Stiglitz and Weiss 1981; Bernanke, Gertler, and Gilchrist 1999, among many others). However, its integration into monetary policy remained fragmented in the Dynamic Stochastic General Equilibrium (DSGE) models that comprise the workhorses of central banks, including the Federal Reserve Bank (Mishkin 2011).

Take the case of macroeconomic models used for simulating stress test conditions, where the treatment of macro financial linkages is undertaken in three sequential phases. The first step is to forecast key macro variables in one scenario and, second, assess the impact of financial risks in banks’ asset quality with other independent models (satellite models). Finally, the impacts on banks’ balance sheets, earnings, and levels of capital necessary to cope with the stress simulated are estimated (Cihak 2007; Schmieder, Puhr, and Hasan 2011).

What is missing is an assessment of the feedback loops from the third step (financial institutions) to the first scenario (macroeconomy). Additionally, there is no consideration of the interconnectedness among financial institutions (for example, network effects).¹⁵

Some advances have been made in this area. One can mention quantile regression methods to model extreme stress (Koenker and Hallock 2001), which use more granular data to improve the details of the banking analysis, change focus from credit risk exclusively to incorporate more about liquidity risk, and consider banks’ income nonlinearities or credit migration and comovement of bank profits (BCBS 2012). However, the most challenging aspect remains how to model the feedback loop and shock contagion within financial institutions, as well as between them and the real economy. Such contagion is key to understanding the depth of the recent global financial shocks.

In their turn, DSGE models are constructed using microeconomic-consistent foundations in a general equilibrium framework, assuming rational forward-looking optimizing behavior. Some numerical calibrations are used to mimic the

dynamics observed in the real economy. Then one can assess the impact of exogenous shocks, or compare the outcomes of different policy designs. Some imperfections can be introduced in the decision making of consumers, firms, and policy makers. Recent efforts incorporate financial frictions in DSGE models (BCSB 2012). Notwithstanding such developments, by construction it is hard to incorporate any kind of irrational behavior, inefficient markets, or formation of asset price bubbles in those models.¹⁶ All these elements could generate endogenous mechanisms of crisis propagation, as they were decisive in the recent period.

Many challenges remain for future use of DSGE models. We can highlight the need to incorporate welfare cost/benefit analyses between different economic agents, transitions and impacts in reducing the volatility of the business cycle. The interaction and tradeoff of different mixes of stabilization policies is not also sufficiently explored.¹⁷ The maturity mismatch between assets and liabilities and the effects of market valuation are not satisfactorily incorporated. Furthermore, different degrees of borrower riskiness and sector diversification should be important to analyze interactions among heterogeneous agents (BCBS 2012).

Because DSGE are linearly approximated around a unique model's steady state, they pose additional challenges to deal with tail events. In these cases, one can argue in favor of multiple equilibriums and nonlinearity. "Because economic downturns typically result in even greater uncertainty about asset values, such episodes may involve an adverse feedback loop whereby financial disruptions cause investment and consumer spending to decline, which in turn, causes economic activity to contract." (Mishkin 2011, 22). Such circularity generates nonlinearities, as new rounds of uncertainty make financial disruptions even worse. The implied domino effect can generate different equilibriums depending on, among other factors, the government's capacity to stabilize private expectations in the middle of a perverse cycle.

Tail events could result from a complete coordination failure in private confidence, for example, this is one of the main explanations for the recent financial crisis pointed out by Akerlof and Shiller (2010). Methods for complex systems developed in areas such as physics, engineering, and biology may provide new ways to cope with collective behavior and nonlinear interconnections between the financial sector and the real economy. Some researchers have recognized the dynamic behavior in the economy as producing nonlinearities as responses to specific shocks, but this complexity is far from incorporated in the toolkit of central bankers.

Annex 4B: Identification of Financial Instability Risks

Many different approaches have been developed to identify and better understand potential vulnerabilities and systemic risks. Part of the literature focus on early indicator models, while other studies search for the main stylized economic patterns associated with past precrisis periods. Both may be useful as tools to identify fragilities and motivate preemptive action before crises.

Qualitative and quantitative intelligence can be very useful to better advise and improve policy making, but determining timing and triggers is more difficult. In general, quantitative indicators are based on aggregate or sectors/institutions data. One set of measures commonly used is the estimates of deviations of variables from their long-term trends, for example, credit-to-GDP, housing prices, and equity prices. Intuitively, as an economy moves away from its trend, the probability of building up imbalances increases, and consequently the chances of a crisis also rise. However, there are doubts about the capacity of these models to produce valid out-of-sample forecasts (BCBS 2012)—among other reasons because structural changes may explain the apparent deviation from the trend. Another group of indicators uses micro data, for example, balance sheet data, banks' capital and liquidity positions, and distance-to-default ratios. These indicators are constructed from medians, means, or correlations.

The IMF's early warning exercise (EWE) is a systematic effort to combine quantitative analysis of vulnerabilities and transmission channels with feedback from financial professionals, academics, and policy makers (IMF 2010). The models and indicators are grouped in three blocks: sectoral and market vulnerabilities, country risk, and systemic implications. The first block assesses external-sector risks (for example, cross-border capital flows, external imbalances, and exchange-rate misalignments), fiscal risks (for example, rollover and financing risks, market perception of sovereign risk, and sensitivity of the public sector to shocks), corporate sector risks (for example, leverage and liquidity, and profitability), asset price and market valuation (for example, real estate and equity market bubbles), and financial market risk attitudes (for example, asset and market volatility and the global financial stability map). The second block of models intends to empirically quantify macro tail risks and worst outcomes, attributing probabilities. Finally, in the third block, systemic implications from models of cross-border bank contagion and distress dependence framework are drawn from financial market data. Large complex financial institutions and different global scenario simulations are also considered in this block.

Another initiative is the financial stress index (FSI), which aggregates five indicators: the spread of the three-month interbank rate over government bills for the same maturity, negative quarterly equity returns multiplied by minus one, realized volatility on the equity index, the same indicator for nominal exchange rate, and the volatility of the yield in the three-month government bill. Duca and Peltonen (2011) did a "quartile" standardization to create an indicator between zero and three, in which higher values mean deeper stress. Then, optimal thresholds for policy interventions were calculated for standalone indicators and probabilities of systemic events. Their results showed that asset price misalignments and credit booms are useful leading indicators for systemic events and that models outperform standalone indicators because they consider domestic and global macro financial vulnerabilities.

The Self-Organizing Financial Stability Map (SOFSM) is another tool to identify vulnerabilities. The changing nature of the numerical forecasts motivated this initiative. The effort was the "development of tools with clear visual capabilities

to complement numerical predictions.” (ECB 2010, 1). SOFSM allows a two-dimensional representation of a multidimensional financial stability space in colorful maps. The systemic financial crisis metrics is based on a financial stress index from Duca and Peltonen (2011), as mentioned earlier.

Another example of a visual instrument is illustrated in IMF (2010), as the early-warning exercise results are aggregated depending on the number of flags in each sector, considering the distance of the current situation in standard deviations from the models’ forecast. Then each sector assessments are aggregated with equal weights to an overall rating. Colors (red, orange, or green) are attributed to different levels of vulnerabilities. In the case of missing data and/or models, judgment and qualitative feedback are used to provide a final country rating.

Notes

1. The concept of *flexible inflation targeting* refers to a credible central bank committed to stabilize inflation at an explicit or implicit target in the long run, but that may also be pursued to stabilize output around its natural rate level in the short run, as per Svensson (1997) and Mishkin (2011). Very recently, Woodford (2011) proposed an extension of this concept, arguing that objectives for financial stability, inflation, and output gap may be balanced jointly when setting short-term interest rates.
2. Some debate about exactly how low inflation should be emerged after the onset of the current financial crisis (Blanchard, Dell’Ariccia, and Mauro 2010). Many central bankers have worked with inflation targets around 2 percent as an optimum (Romer and Romer 2002). However, in deflationary recessions, a *lower bound for nominal interest rates* could become an additional constraint to stimulate the economy, as nominal interest target rates cannot go below zero. A liquidity trap may likely emerge in the context of severe financial crises, as the effectiveness of monetary policy through short-term interest rate manipulation becomes limited when a lower bound is reached. Although no central banker would advocate in favor of high inflation, it is difficult to assess the marginal cost of 1 or 2 percent higher inflation relative to the benefit of having an additional buffer for extreme crises. In emerging markets, where credibility is often a work in progress and inflation targets are often higher, the potential cost of permanently higher inflation should overcome the flexibility gains in situations of extreme crisis.
3. It is worth noticing however the dissent already expressed by behavioral economists who were then putting some doubts in people’s capacity to correctly assess money illusion, arguing that monetary policy could have an even more significant effectiveness by exploring this friction, as later systematized by Akerlof and Shiller (2010).
4. A time-inconsistency problem appears when policy makers prefer one policy in advance but a different one when the time comes to it. In the context of monetary policy, policy makers may want to announce their commitment to low-inflation targets years ahead. However, once in a high-inflation environment today, policy makers move away from incurring costs of disinflation. Because private decision makers would recognize this inconsistent conduct, the announcement would be worthless.
5. de la Torre and Ize (2009) offer a three-pronged approach to factors underlying the global financial boom-bust cycle: “(i) managers of financial institutions understood the risks they were taking but made the bet because they thought they could capture the upside windfalls and leave the downside risks to others (*the agency paradigm*);

- (ii) managers understood the risks they were taking, yet went ahead because they did not internalize the social risks and costs of their actions (*the externalities paradigm*); and (iii) managers did not fully understand the risks they were running into; instead, they reacted emotionally to a constantly evolving, uncertain world of rapid financial innovation, with an excess of optimism on the way up and, once unexpected icebergs were spotted on the path, a gripping fear of the unknown on the way down (*the mood swings paradigm*)” (de la Torre and Ize 2009, 2).
6. “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.” Drehmann and others (2010, 1).
 7. A series of quantitative exercises conducted by the BCBS has assessed the impact of the cyclicity of capital requirements regimes taking risk-sensitivity into account. 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.
 8. Appropriate models that account for how macro prudential tools affect monetary policy transmission are fundamental to such coordinated policies. Bean and others (2010) show that variations on incentives to banks’ capital offer better outcomes than the stand-alone use of monetary policy to lean against bubbles. Agénor, Koray, and Pereira da Silva (2011) develop a general-equilibrium framework for analyzing a similar issue. They conclude that if monetary policy can react strongly to deviations of inflation from target, the best policy is an aggressive augmented interest rate rule—regardless of the degree of persistence in the policy rate. If monetary policy cannot react sufficiently strongly (because the central bank fears destabilizing markets by raising interest rates sharply while inflation remains subdued, for instance), combining a credit-augmented interest rate rule and a countercyclical capital regulatory rule is optimal for promoting economic stability.
 9. 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 micro prudential tools as well as macroeconomic policies are obviously the means to deal with them.
 10. 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).
 11. Garcia (2011) shows how sterilized interventions by the central bank in an inflation-targeting regime tend to have an expansionary effect on aggregate demand. This is, for example, the case when capital inflows correspond to a strong demand for domestic

- private assets. This means that full sterilization of domestic monetary impacts may ultimately need a local-currency bond purchase larger than the size of the original foreign exchange acquisition. See more on sterilization later in this section.
12. Klein (2012, 2) has found a distinction of effects between “long-standing controls on a wide range of assets and episodic controls that are imposed and removed.” The former contribute to lower values of variables related to financial vulnerability, while that is not the case with the latter. Furthermore, “neither long-standing nor episodic controls significantly affect exchange rates.” These results are consistent with findings that show decreasing effectiveness of controls with higher degrees of domestic financial sophistication and international integration. These features make easier the development of circumvent strategies, which anyway tend to appear as time elapses.
 13. See Ghosh, del Mazo, and Ötoker-Robe (2012) on recent developments of “shadow banking” in some emerging markets, although with forms and nature very different than the case of advanced economies.
 14. “(...) there is an element of externality in capital controls in that one country’s success in evading capital inflows only increases the difficulty of other countries doing the same. This is certainly a problem at the level of emerging markets as a group.” (CIEPR 2011, 27).
 15. Alfaro and Drehmann (2009) investigated the reasons for the poor performance of macro stress tests by comparing the outcomes of these tests with actual events for a large sample of historical banking crises.
 16. See for instance Gelain, Lansing, and Mendicino (2012), as an alternative approach to the standard DSGE with fully rational expectations, intended to capture the links between asset prices, credit expansion, and real economic activity in a more realistic model.
 17. Angelini, Neri, and Paneta (2012) discussed the interactions between monetary and macro prudential policies and also potential gains to jointly manage them.

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