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Policies to Mitigate Procyclicality

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Policies to Mitigate Procyclicality[1]

Prepared by the Monetary and Capital Markets Department
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[1]The views expressed herein are those of the authors and should not be attributed to the IMF, its Executive Board, or its management.

EXECUTIVE SUMMARY

The present crisis has focused attention on how procyclicality in the financial system can have outsized effects. This paper examines the reasons for this, specifically focusing on regulations or market practices that can accentuate economic cycles. In this light, the paper thus discusses the role of private sector risk management practices (including liquidity risk management), compensation practices, capital adequacy requirements and provisioning rules, deposit insurance regimes, and monetary policy actions. While recognizing various practical limitations, new policy responses are identified that could help to mitigate procyclicality.

I. INTRODUCTION[2]

The current crisis has highlighted a number of mechanisms that accentuate cyclical movements. Although economic cycles are taken as a natural and recurring phenomenon, there are ways in which private sector behavior and practices, prudential regulation, and macroeconomic policies can act to magnify such cycles. Several of these mechanisms are discussed below alongside recommendations or policy actions to help to mitigate their detrimental effects. The range of potential options to mitigate procyclicality is large, and the subset below does not include all the possibilities, although the potentially most damaging mechanisms are addressed.[3]

A key challenge for policymakers will be to counter the exacerbating effects of prudential regulations while at the same time keeping the risk-based decision-making processes that are increasingly used in the private sector. Risk sensitivity will need to remain despite its association with some cyclicality. Of the topics covered below two stand out as areas that require immediate and concentrated attention: (1) adapting prudential regulations so as to explicitly counter cyclical tendencies; (2) encouraging larger liquidity buffers, perhaps even formal liquid asset minimums, to offset the underpricing of liquidity risk by financial firms in upturns. Although there are a number of policy recommendations below that can be achieved in the short run, fully implementing the recommendations in these two areas will take some time.

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[2] Members of the working group consist of Laura Kodres and Aditya Narain (co-heads), Jochen Andritsky, John Kiff, Pamela Madrid, Andrea Maechler, Noel Sacasa, and Jodi Scarlata.

[3] Because some notion of leverage underlies many of the ways in which procyclicality manifests itself (e.g., through private risk management systems, fair value (FV) accounting methods, and prudential regulation), the presentation below integrates a discussion of leverage in the relevant forms rather than treating it as a separate topic.

It is also worth noting that mitigating procyclicality will take the efforts of various parties. The private sector should better control its own behavior by setting forth the correct incentives; the regulatory environment should attempt to prevent excesses from building up in various institutions through prudential rules and norms; and central banks can act to rein in the underpinnings of excessive leverage by controlling aggregate liquidity and interest rates.

In the current fragile setting, however, the private sector and policymakers will need to take care to introduce some of changes suggested below gradually, since rapid implementation may inadvertently serve to further destabilize financial markets and harm weak institutions. For instance, encouraging larger liquidity buffers during a period in which interbank markets are functioning poorly could be counterproductive. Requiring high capital ratios now to limit leverage in the medium term would also serve to forestall the deleveraging process that is still in train. Moreover, by addressing procyclicality in one area (or sector), it will be important to ensure that there are no unintended consequences in other areas, or that still leave part of the system overly procyclical.

Some of the suggested policy recommendations may be more powerful than others, but unfortunately, little research has been conducted that can verify which solutions are most likely to work and under what circumstances. Thus, more work will need to be conducted to evaluate the potential effects of various policies—for instance, would altering prudential regulations for underlying risk weights be more effective than an overall countercyclical capital ratio? Or would changing private sector compensation schemes be a more direct method?

Fortunately, many institutions and academics have recognized the value of examining how cyclicality can be exacerbated and what can mitigate its adverse effects. The Financial Stability Forum (FSF) established a number of working groups in the spring of 2008, three of which are examining different aspects of procyclicality. IMF staff are members of two of these working groups, contributing to various phases of this work. Some of the recommendations in the area of capital regulation and liquidity are already being formulated by the Basel Committee. In addition, the IMF has already conducted research on the procyclicality of fair value accounting methods (IMF, 2008) and of private sector market risk management methods, such as the Value-at-Risk (VaR) model (IMF, 2007). IMF staff are also working to identify the connections between procyclicality in the financial system and in the economy at large—so-called macrofinancial linkages.

In each of the sections below, how procyclicality is identified or achieved—that is, how it works in practice—is first discussed. Recommendations for either the private sector or policies for the official sector then follow alongside a short discussion of the implementation challenges.

II. Procyclicality Associated with Private Sector Risk Management

A. Market and Credit Risk Management Systems

The potentially destabilizing impact of market risk management systems is rooted in the application of the underlying models. For instance, the VaR methodology can encourage firms to increase their risk appetite in benign low-volatility environments, and reduce it in high-volatility environments.[4] This is because VaR makes assumptions about the volatility and correlation of future price changes of the firm's financial instruments, estimated using historical profit and loss data. More weight is usually given to recent observations, so that, during benign periods, VaR-based systems will give a financial institution more room to extend risky asset positions, and encourage retrenchment during subsequent high-volatility or high-correlation periods.

Procyclicality is also embedded in credit risk management systems and guidelines, because the inputs (default probabilities, loss severities, default correlations, and credit ratings) tend to vary positively with economic cycles. Credit ratings are supposed to be assigned on a "through-the-cycle" basis, and not according to transitory fluctuations in credit quality.[5] However, empirical studies have shown that rating changes tend to follow various fundamental factors and market-based risk metrics (see Amato and Furfine, 2004; and Löffler, 2008). Market participants tend to pull back from credits that have been downgraded (or increase exposures to credits that have been upgraded). Hence, firms will tend to prescribe tighter lending conditions during economic downturns and when capital markets are stressed, and vice versa.

Recommendations to alleviate procyclicality in market and credit risk management

- *Improve and diversify market risk management models.* To counter the effects of potentially volatility-reinforcing market risk management systems, risk management models should be tailored to individual firms' characteristics and business lines and supervisors should encourage these efforts to innovate and diversify.[6]

- *Be aware of mechanisms that amplify cycles*. For securities and derivatives transactions, privately imposed margin requirements or haircuts applied to collateral

[4] VaR is an estimated portfolio loss that a firm is unlikely to exceed, over a given time horizon, at a given probability level. For instance, if a firm's one-day estimated VaR is $10 million, at a confidence level of 95 percent, this implies that a loss of $10 million or greater is expected on five trading days out of 100.

[5] Through-the-cycle ratings are driven by investor preferences arising from portfolio governance rules that lead to high transaction costs if ratings change frequently.

[6] See IMF 2007 for more detailed recommendations.

may vary to exacerbate cycles. To avoid this, margins or haircuts should be measured in a through-the-cycle manner or should be forward-looking over a sufficiently long time horizon (e.g., moving averages that delay turning points and provide relief after the peak and restraint after the trough).

- *Undertake more rigorous stress testing.* Stress tests could be more "stressful" by making more austere assumptions than in previous crises. Firm-specific scenarios and more systemwide scenarios (the inclusion of the reaction of other important counterparties) would also help avert the procyclical responses that can be the result of assuming that only one's own responses matter.

- *Apply smoothing techniques to credit risk capital allocations.* Consideration should be given to applying smoothing rules or forward-looking procedures to capital calculations to dampen their inherent procyclicality. One possibility is an autoregressive smoothing process, whereby some weight is given to previous periods slowing the adjustment process in both upswings and downturns. Moreover, a time-varying multiplier could also be reduced during economic downturns to offset the impact of higher default probabilities, loss severities, and correlations.[7]

Already firms are improving their risk management systems in light of the problems discovered in the current crisis, and such efforts are likely to continue without additional regulation or pressure. More rigorous stress testing and new guidelines have been promulgated by the Basel Committee and other supervisors, and the private sector is adopting them. Fostering diversity among risk management techniques is more difficult as there is a tendency to adopt well-proven, established techniques that are more easily understood by senior management, shareholders, and supervisors. Supervisors will need to counter this tendency and encourage adoption of risk management systems tailored to individual firms' characteristics and businesses.

B. Funding Liquidity Risk

Funding liquidity risk may be procyclical because of the links with market and credit risks, and their link to "accelerator" factors, such as mark-to-market effects on asset values and net

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[7] The following simplistic smoothing equation could be used, where C_t is the period *t* unsmoothed VaR-based limit or capital charge, and $\hat{C}_t$ is the actual limit or charge applied. The multiplier (α_t) would be reduced during downturns or volatile periods in line with broad macroeconomic or systemwide indicators:

$$\hat{C}_t = \hat{C}_{t-1} + \alpha_t \left(C_t - \hat{C}_{t-1} \right).$$

worth.[8] The increased structural reliance on short-term wholesale market funding, collateral, and securitization has increased the sensitivity of banks' balance sheets and cost of funds to fluctuations in credit ratings, the trading or market liquidity of assets, and aggregate liquidity—all of which tend to be procyclical. The recent events have also emphasized the destabilizing links between funding and market liquidity risk, and between funding liquidity risk and credit risk.[9] Examples include the following:

- Market or aggregate liquidity tends to be cyclical—volumes rise and bid-ask spreads narrow during upswings and reverse in downturns (Jones, 2002).

- The value and marketability of some "liquid" assets and secured market funding, particularly of assets that are more heterogeneous or complex (i.e., may be more likely to be subject to asymmetric information), tend to be overstated during good times. Collateral and capital constraints during stressed market conditions may then lead to illiquidity and adverse market and funding liquidity interactions (Mitchell, Pedersen, and Pulvino, 2007; Brunnermeier and Pedersen, forthcoming).[10]

- Adverse interactions can be amplified when confronted with systemic (correlated) shocks. Private markets may not always provide adequate liquidity on their own (Holstrom and Tirole, 1998), and hoarding may occur during extreme model uncertainty (Caballero and Krishnamurthy, forthcoming).

These examples occur for various reasons. Among them are

- stress tests that are too "mechanical," that is, reliant on historical volatility or change in liquidity that may not take into account structural changes or the abrupt nature of default risks and correlations that are likely to underestimate the sensitivity of wholesale funding and loan commitments to market liquidity and credit risks;

- risk management and compensation systems that provide incentives to managers to understate contingency costs and contingency insurance for funding liquidity, especially when fees for contingent loans or credit lines reflect point-in-time, rather

[8] Funding liquidity risk is the risk that a firm will not be able to meet its current and future cash flow and collateral needs, both expected and unexpected, without materially affecting its daily operations or overall financial condition.

[9] These links appear nonlinear, e.g., credit rating downgrades can trigger collateral calls and forced sales of assets, potentially adding to funding pressures.

[10] VaR measures that do not adequately account for liquidity risk premiums of less traded or riskier assets may lead to capital adequacy violations (Bangia and others, 1999).

than through-the-cycle, credit risk and funding costs. Furthermore, banks may not be holding enough cash equivalents to meet these commitments, which, if subject to a common shock, would then require the bank to fund its commitments at exactly the point in time when funding costs are highest and asset values are depressed;

- the expectation that public sector liquidity will be provided in extreme events. Given the systemic risks associated with illiquidity, banks may anticipate the provision of public sector liquidity, underinsuring themselves for such cases; and

- some behavioral estimates for maturity or cash-flow gap measures between assets and liabilities may be procyclical (or inadequately countercyclical) owing to assumptions (e.g., statistically independent as opposed to correlated shocks), as well as to the time frame used for estimates (i.e., one that does not cover a full economic cycle).[11] The former are in particular unlikely to capture market illiquidity or extreme event risks.

Recommendations to alleviate procyclicality of funding liquidity risk

- *Improve funding liquidity risk management.* By strengthening governance and controls, some problems recently encountered may be alleviated. In particular, stress tests' assumptions and estimates of risks of liquid assets, cash flow and funding costs need to be more sensitive to firms' credit ratings and collateral triggers, correlated credit risk events, and funding market breakdowns. The liquidity risk management principles and recommendations of the Basel Committee on Banking Supervision (BCBS) and International Institute of Finance (IIF) should be implemented and monitored and compliance publicly reported.

- *Encourage better pricing of contingent liquidity risk.* Risk management systems need to address the incentive problem of capturing the costs of contingent liquidity risk, within the context of an appropriate distribution of responsibility for liquidity risk management and insurance between commercial banks and a central bank (see Section III). Private risk management should ensure that liquidity risks are priced reflecting the risks involved and reserved to meet potential market, funding, and contingent liquidity shocks.

- *Better contingency planning for liquidity events.* Risk management should take into account contingency costs of liquidity events and incentives to manage such risks through the cycle. In particular, stress tests and scenario analysis should be more strategic about potential contingencies and be better coordinated with contingency

[11] Many firms or regulatory regimes use a five-year window, which while long may not necessarily capture a cycle (e.g., by 2008, the 2001–02 downturn may be lost).

funding plans (Stultz, 2008; BCBS, September 2008). Longer stressed periods during which liquidity is essentially unavailable should be considered in these exercises.

- *Evaluate the benefits of a minimum quantitative buffer.* A minimum required stock of highly liquid assets (less prone to illiquidity in extreme events) could limit the decline in liquidity during a boom and provide some insurance during a bust. Though a medium-term goal, a Pillar 1–type requirement for funding liquidity risk like for credit risk in Basel II should be given serious consideration. Individual country circumstances, given the availability of liquid assets and the prevalence of foreign current funding, would need to be taken into account in its formulation and implementation. This could be applied to systemically important institutions, defined widely, and take account of their balance sheet structure (such as the stability of their liabilities).

- *Improve disclosure of liquidity risks.* In addition to basic information about a firm's liquidity risk management approach, disclosure of off-balance-sheet liquidity risk should increase. While improving disclosure is viewed as expensive, well-informed depositors and shareholders may be less inclined to "run" on the bank and liquidity costs could well be lower in the medium term. Demonstrating a robust funding structure and a through-the-cycle costing of liquidity would help reduce uncertainty in funding markets surrounding liquidity events.

As with other types of risk management, firms are consciously attempting to implement the promulgated recommendations to improve liquidity risk management practices, including those associated with contingent funding requirements. The possible decision to introduce a set of Pillar I–type liquidity risk requirements, including perhaps a liquid asset ratio, rests with the BCBS and, while there are discussions, the Committee has yet to formally endorse the idea. Given the cross-border funding abilities of many global banks, guidance from the BCBS about how a set of minimum standards might be implemented would be highly useful. Some individual countries are considering (or in some cases, reconsidering) their toolkit for limiting funding liquidity risks among their regulated financial entities.

C. Compensation Practices

Compensation schemes in many financial firms reward performance based on the annual profits generated from various business activities and are not typically risk-based. An annual bonus pool accumulates profits throughout the year and disburses the proceeds to employees based on their relative contributions to the firms' return performance. Moreover, because the period over which the profits are accumulating for performance payouts is relatively short, compensation practices do not tend to reward managers and traders who take a through-the-cycle, longer-term view of business prospects and their risks. Compensation is thus procyclical because returns tend to rise during economic upswings, encouraging additional position-taking in those assets or activities that yield the highest returns—often without

attention to the risks that appear in downturns. The consequences of limited liability for incorporated entities also means the top management is somewhat insulated from results that lead to the bankruptcy of their firm.

Recommendations to mitigate the procyclicality of compensation practices

Broadly speaking, compensation policies should become more risk-based and reward long-term objectives of maintaining the financial institutions as an ongoing concern. A key objective is to develop international best practices for compensation schemes that reflect these objectives. In accordance with the characteristics described by the FSF (2008), the private sector should aim to implement the following to mitigate procyclicality arising from compensation schemes:

- *More clearly align performance metrics with the firm's risk management system.* Firms should focus on profitability after taking into account the capital allocated and the risks incurred in the various business lines. In principle, all risks (e.g., credit, market, and liquidity risks) and all costs (e.g., funding and capital costs) should be incorporated.

- *Better align longer-term objectives of the firms, placing less emphasis on annual results.* Firms should delink annual bonus pool payouts from annual results, providing partial and deferred disbursements in line with the realization of risks. Retroactively adjusting initial bonuses on the basis of future losses through clawback clauses (i.e., back-load payoffs) is another way to align the horizon over which performance is measured and the horizon over which the risk associated with this performance materializes.

- *Compensation schemes should be transparent, and the shareholders should understand their risk-taking incentives.* The effectiveness of compensation schemes will rest in part on market discipline, which will entail the clear presentation of the schemes in place and their results. Disclosures of compensation plans and aggregated results beyond the top several executives will permit shareholders and other counterparties to observe the alignment between the longer-term objectives of the firm and payments to its employees.

Implementation prospects are good. In April 2008, the FSF recommended that "the financial industry should align compensation models with long-term firm-wide profitability. Regulators and supervisory should work with market participants to mitigate the risks arising from remuneration policies" (see the "Report on Enhancing Market and Institutional Resilience," p. 24). Compensation advisory firms confirm that financial institutions are already moving to make compensation more risk-based and with longer horizons as recent events have sensitized senior management to the risks of products that take several years to materialize. Larger firms that already allocate economic capital based on risk management

metrics will be better placed to adapt their compensation schemes. Other firms will likely use simpler methods, but are also considering ways of tying compensation to risks. Some firms have already moved to a three-year payout period, but this time frame is not yet long enough to fully offset the procyclical elements. Nonetheless, it is a step in the correct direction. To be fully effective, such compensation schemes would need to be applied across a wide spectrum of institutions to avoid excessive competition across firms for retaining the best staff.

To guarantee actions are taken, supervisors and regulators should monitor the role compensation policies play in overall risk management systems. Although prudential authorities do not have (and should not have) direct responsibility for designing remuneration schemes, they must develop the expertise to assess and monitor the influence of such schemes on risk taking, especially in highly competitive business lines, where pressure to base compensation on returns (as opposed to also risks) will be especially acute. Financial institutions that do not comply with best practices should be subject to standard supervisory disciplining devices (e.g., closer supervisory scrutiny, tougher supervisory standards). Supervisors' ability to evaluate compensation practices will take some time to develop, but would be line with the desired improvement of oversight for risk management systems, including the governance structure of such systems.

III. Procyclicality Associated with Supervision and Regulation

A. Prudential Regulation, Accounting, and Valuation

Procyclical bank capital regulation is often seen as a key factor in amplifying economic booms and busts. A too-short time horizon for assessing risks leads to a systematic underestimation of risks that build up in a business upswing but only translate into losses during the downswing. First, expected losses are underestimated during an upswing, so that provisions tend to be insufficient and book equity overstated. Second, unexpected losses, and therefore capital requirements relative to assets, also tend to be underestimated during an upswing. These in turn facilitate an expansion in risky assets and leverage during an upswing, thus increasing potential losses in the downswing. Once the downswing sets in, materializing losses and belatedly increased provisions reduce equity, while belatedly acknowledged risks lead to higher capital requirements relative to assets, potentially forcing sharp downward adjustments in credit and other risky assets. When this sequence affects many market players, the intensity of both booms and busts may be amplified.[12]

In the banking book, accounting and taxation rules and practices often result in insufficient, backward-looking provisioning in the upswing, since they are based on the principle that financial statements should reflect events that have already occurred, and not those that may

[12] See, for the main part of the argument, Borio and others (2001). Shin and Adrian (2008) argue for the amplifying effects at the economy-wide level.

happen. In addition, collateral values may be inflated during an upswing, potentially contributing further to insufficient provisioning and to the overstatement of earnings and capital. Conversely, earnings and capital could come under pressure in the downturn as deflation in asset and/or collateral values leads to increased provisioning charges.

In the trading book, the application of fair value accounting (FVA) has also had a procyclical impact on bank capital. In illiquid markets, the application of FVA can accentuate a downward price spiral, since price movements tend to be larger, triggering a vicious cycle of asset sales and further price declines, which lower bank equity, with negative externalities on the financial sector's balance sheets and the wider economy.[13] Although its application during upswings in the cycle has not received equal attention, FVA can contribute to price acceleration when bank income statements become inflated, collateral values increase, riskier positions are entered, and credit expands.

In addition to regulatory requirements and accounting standards, shareholder and bondholder pressures also have a bearing on bank capital levels, requiring lower capital ratios in good times and higher ones in bad times. Even if capital regulation procyclicality can be mitigated, capital adequacy requirements (CARs) may thus still fall in economic upswings and increase in downturns. Shareholders and managers of leveraged financial institutions may have incentives to boost the short-run return on equity through increasing leverage, even though this increases the risk of default, as long as creditors do not figure in this risk in the cost of debt (e.g., because of deposit insurance and/or lack of transparency), and as long as the shareholders' and managers' own exposure to losses is small.

Capital regulation

Insufficient recognition in capital requirements of risk buildup during upswings, together with risk-taking incentives in leveraged financial institutions, can result in procyclical bank leverage.[14] The invariant credit risk weights of Basel I do not contribute per se to amplifying the cycle, though the need to meet the target capital ratio may still lead to pressures on capital in the downturn. The standardized approaches in Basel II relate required capital to credit risks as measured by external ratings that are constructed to be through the cycle, but that in practice do tend to show more downgrades during downturns (Figure).[15] The internal-ratings-

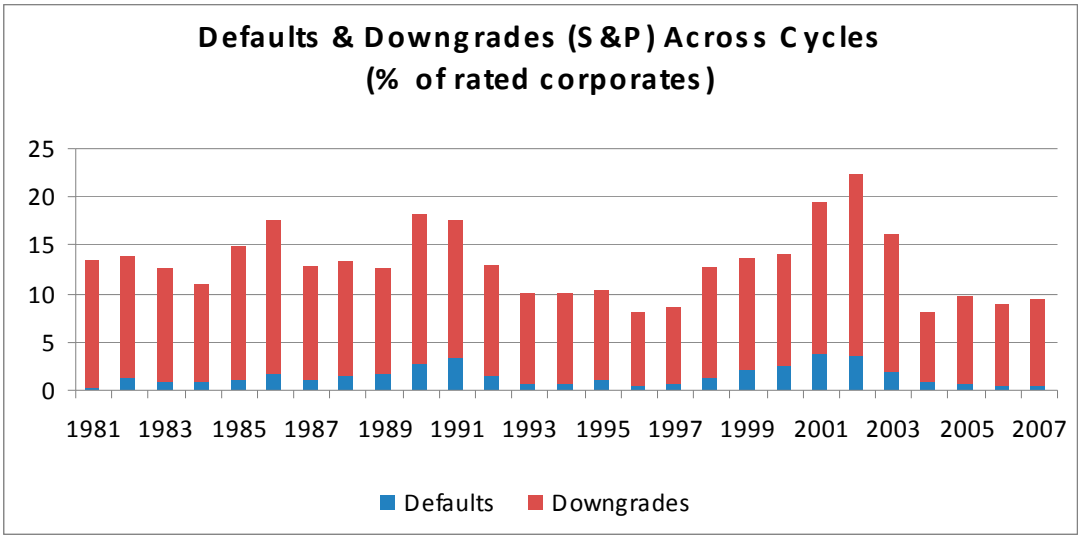
[13] Although a partial analysis, simulations in the IMF's October *Global Financial Stability Report* show that FVA can introduce financial statement volatility and provide a first indication that buffers of around 2-4 percent percentage points of additional capital would help banks weather normal cyclical downturns, whereas higher buffers—on the order of 30–40 percent extra capital—would be needed to offset more severe shocks.

[14] Statistics may not show clear evidence of the procyclicality of bank leverage. However, this may be partly due to the fact that provisions tend to underestimate expected losses during economic expansions, thus overstating equity and understating leverage in that phase of the cycle.

[15] External credit ratings are also used to identify and limit assets and exposures, and determine disclosure requirements and prospectus eligibility.

based (IRB) approach seeks to align required capital to a measure derived from risk components (default probabilities, loss severities, and exposures at default)—all of which can potentially render capital requirements even more procyclical than the other approaches because most risk models in use tend to extrapolate from recent history and have short time horizons (typically one year).

Current capital regulations (Pillar I) also require capital to be held against market and operational risk and provide methodologies to measure them with differing cyclical impact. For market risk capital, the underlying Value at Risk (VaR) based models typically respond swiftly to increased volatility in downturns, with higher capital charges making them procyclical. The operational risk models are, however, mainly driven by gross income and are thus countercyclical. The major contribution to the overall capital requirements still comes from credit risk, and its procyclical effects may continue to dominate.



For loans, collateral arrangements can induce procyclicality, as the ability to obtain credit varies with changes in the value of the underlying collateral. This effect is further amplified by the tendency for loan-to-value ratios to rise during aggressive lending booms, as part of a weakening of underwriting standards, and to tighten during contractions. Similarly, for securities and derivatives transactions, margin requirements introduce potential sources of procyclicality as that they tend to rise during times of stress (either mechanically in line with measures of short-term volatility or from more discretionary adjustments), as defense against counterparty risk. Ratings-based triggers introduce another element of procyclicality, particularly with respect to over-the-counter derivative contracts, such as those that took AIG to the brink of bankruptcy. It is common for the highest-rated counterparties (e.g., "AA–" and higher) to be exempt from posting collateral against unrealized losses on such contracts. However, if a firm is downgraded through a trigger point, an extreme liquidity shock can result as collateral is then needed for all existing contracts.

In principle, Basel II, Pillar 2, could be used to counter some of the procyclicality arising from Pillar 1 capital requirements. Pillar 2 requires that all banks make their own assessments of capital required, including risks not properly captured in Pillar 1 (e.g., credit concentration risk); those risks not covered in Pillar 1 (e.g., interest rate risk in the banking book); and risks in the external environment (e.g., business cycle effects). Thus, while the measurement techniques of some risks may lend themselves to procyclical effects, the expectation is that, under Pillar 2, supervisors make an overall assessment, keeping other risks and business cycle effects in mind, and require banks to hold capital buffers or otherwise mitigate against them.

Policy Recommendations for supervisors and regulators

- *Establish countercyclical CARs.* Supervisors could use discretion currently provided for under Pillar 2 of Basel II to require higher capital than that resulting from the standardized or IRB approaches (Pillar 1), if this is necessary to adequately cover unexpected losses through the cycle. There is merit, however, to applying a more rules-based approach that would link capital requirements to some indicator of cyclical pressure. While more research is needed to develop a calibrating methodology that can be applied globally, one potential way of implementing this approach could be to determine two levels of regulatory CAR: (1) a minimum level that would be required and strictly enforced at all times; and (2) a desirable (variable) level that would be required in good times and would be allowed to be drawn down to absorb losses materializing in bad times.

- *Aim for procyclical risk-weights.* Over the longer term, methodologies could be developed to complement the above approach through calibrating risk weights (and related risk parameters) so that they lead to better estimates of unexpected losses through the cycle, as well as to a greater and potentially time-variant differentiation among asset classes with respect to their exposure to macro- or sector-level common risk factors.[16]

- *Introduce a supplementary leverage ratio for banks.* A limit on bank leverage based on a measure akin to the equity/asset ratio but with enhanced sensitivity to off-balance-sheet exposures should be introduced in the capital framework to constrain excessive growth in the upswing. Rather than a maximal leverage limit, in a similar way as suggested above for CARs, a countercylical leverage ratio could be the goal so that it is relaxed during downswings.

[16] E.g., macroeconomic imbalances, exchange rate misalignments, credit booms, asset price booms, sector-level excessive indebtedness and/or excess capacity, etc.

- *Require more conservative collateral valuations for the purpose of determining provisions and capital buffers.* For instance, where misvaluations are likely, collateral valuations used to satisfy prudential requirements should rely less on contemporaneous market price fluctuations and make greater use of longer series of historical prices (i.e., smoothing rules). To the extent possible, the adjustments should be forward-looking, with rules based on measurable indicators of the mean-reverting potential in current prices related to the overall behavior of the economy and/or asset markets (e.g., in the presence of asset price bubbles or fast credit growth). Supervisors may implement such adjustments by, for instance, setting maximum loan-to-value ratios or minimum haircuts from current market prices and periodically updating them, though private contracts would still set their own levels.

- *Add reserves or capital to counter ratings-based changes.* Prudential regulations should take account of ratings-based triggers, and appropriate capital or reserves should be charged to ensure sufficient resources are available when such events occur.

The key challenge will be calibrating the movement in the system CAR with the movement in the business cycle and developing methodologies to align this with bank-specific risk profiles. Another challenge will be mitigating against the tendency of market participants to second-guess the upper bound and converting this into the new minimum. Collateral pricing is also largely in the private sector, but where regulation plays a role, collateral valuations could be adjusted to help dampen credit cycles.

The ability to require additional capital (bank specific and system wide) is already included in Pillar 2 of Basel II, which more than 100 countries are implementing. Effective implementation will go a long way in addressing the recommendations made earlier, though supervisors have not yet made full use of this tool. The IMF could play an important role by examining the effectiveness of Basel II implementation in general and steps taken to address procyclicality in regulation in particular in the context of its Financial Sector Assessment Program, drawing attention to the supervisors' actions (or inactions).

Provisioning requirements

Provisioning requirements for credit risk, as well as capital, may also be procyclical: as credit losses mount in a downturn, banks are typically required to provision more, thus reducing earnings and the banks' ability to bolster their capital. The ability of some banks to create additional provisions in the upswing, which can be drawn down later, is now constrained after the introduction of IAS 39, which recognizes impairment only on the basis of incurred losses, not of expected losses. Supervisory guidance continues to favor provisions based on expected losses, but accountants and auditors contend that these concepts hinder transparency and fair value and can give rise to smoothing (manipulation) of earnings.

The use by banks of forward-looking provisioning could also mitigate the procyclical forces on the balance sheet. The early recognition of expected credit losses in the loan portfolio before a downward cycle sets in would contribute to building up buffers when earnings are still good, and thus to lessening the impact of higher provisioning during the downturn, which could amplify the downward economic trend. Collateral (both financial and physical) also feeds into provisioning requirements, either directly by reducing specific provisions, or indirectly by changing the loan classification. An additional aim should be to encourage firms to distribute dividends only when they come from realized earnings that are not biased by upward but reversible cyclical moves.

Policy recommendations

Accounting standards should be reviewed (and altered, if needed) to permit forward-looking provisioning in the held-to-maturity part of a bank's balance sheet.

- *Ensure that total provisions on loans reflect through-the-cycle expected losses*. The sum of specific and general provisions should cover, for each type of portfolio, "through-the-cycle" expected losses, estimated in a forward-looking way.[17] Models or rules used to determine provisions should take into account not only idiosyncratic risk factors (in specific provisions) but also relevant macroprudential and/or sector-level measurable indicators of common underlying risk factors.[18] Although provisions should be determined on a through-the-cycle basis, they should be adjusted upward whenever updated short-term risk measures indicate the need for higher provisions (short-term risk measures should not, however, lead to lowering provisions below their through-the-cycle level), thus raising the average level of provisions. General provisions should cover any remaining provisioning needs after expected credit losses attributable to individual loans (specific provisions) have been determined. Both general and specific provisions should reduce income and equity and be tax deductible to the extent possible as an incentive.

- *Supplement FV methods with greater information to ensure that specific provisions reflect, as far as possible, expected losses through the life of each individual loan*. Specific provisions are meant to cover the present value of expected credit losses through the remaining life of each loan in excess of those covered by the default risk

[17] The Spanish model of dynamic provisioning is a good example of such an approach and its wider application is currently being discussed in several regulatory forums.

[18] To the extent possible, the estimation of expected losses (provisions) and unexpected losses (risk weights determining capital requirements) should be done within a single, consistent conceptual framework and considering the same risk factors (e.g., as common risk factors: macroeconomic imbalances, exchange rate misalignments, credit booms, asset price booms, sector-level excessive indebtedness and/or excess capacity, etc.).

premium built into the lending interest rate. They should include an estimate of expected losses based not only on past history but also on the best forward-looking information and expert judgment available.

- *Both general and specific provisions should be transparently presented.* Transparency would be further enhanced by disclosing to market participants any relevant details on the methodologies used to arrive at through-the-cycle provisions for different asset classes and how they differ from their respective fair values.

Trading book issues

Fair value accounting of trading book financial assets and liabilities can be procyclical while at the same time still providing a measure that best reflects a financial institution's current financial condition. To reduce procyclical tendencies, various enhancements are needed.

Policy recommendations

- *Permit firms to allocate "valuation reserves" for trading book assets.* While maintaining FVA, accounting standards should allow for the establishment of "valuation reserves" that allow for circumstances in which market prices deviate from the perception of underlying value, building up a buffer during upswings to be drawn down in downturns. It should be reported in financial statements in direct association with the broad set of positions for which the provision is allocated, in a similar way as for loan provisioning, and these valuation reserves should also reduce income and equity.

- *Supplement FV estimates with additional information.* In light of the doubts that can surround valuations, FV estimates should be supplemented by information on a financial instrument's price history, the variance around the FV calculations, and management's forward-looking view of asset price progression and how it will impact the institution's balance sheet. Reporting a range within which the FV price could fall would help users of financial statements better understand and utilize the volatilities with which they are dealing. Mark-to-model estimates should be supplemented with notes on the assumptions underlying the valuations and sensitivity analyses, so that investors can conduct their own scenario analyses and determine whether the FV price is representative of market conditions.

While accountants may be disinclined to pursue a valuation reserves concept, broadening the current narrow concept of provisions would provide prudential and tax incentives to retain profits (or support profits by releasing provisions, respectively), as well as a way of better offsetting balance sheets' procyclical effects. The creation of a buffer better linked to the expected volatility, higher risks, and potentially larger losses of an asset could better anticipate the potential negative cyclical effects on the balance sheet, as long as the buildup is not used for manipulating earnings, and is consistent with compensation incentives.

Although entailing additional costs, more refined disclosures are crucial. They could meet the expanding needs of various users, including investors, supervisors, and depositors, and result in less uncertainty and disruptive asset price dynamics. A common international framework of disclosure would be beneficial to facilitate comparability.[19] Because market participants and supervisors are increasingly turning to cash-flow statements, income and equity statements, and risk measures to provide enhanced information, disclosures must evolve in response to users' needs. Removal of less important ones could be considered to help alleviate the additional reporting burdens. A common framework for reporting losses on structured credit products and U.S. subprime mortgages has already been put into place and could serve as a prototype for such supplemental information.[20] Additional guidance on FV implementation has also been released, providing a starting point for these recommendations.

B. Procyclicality of Deposit Insurance Programs

Three operational elements of domestic deposit insurance (DI) programs are potentially procyclical: the structure of funding mechanisms, the nature of assessed premiums, and fund targets for accumulated reserves.

The choice between a reserve fund established in advance of or after a bank failure has procyclical implications. Ex post funding of DI is based on the provision of guarantees by financial institutions to cover deposits in case of a bank's failure, relying on assessments after the bank has failed. If bank failure occurs, ex post assessments can further weaken the remaining banks' financial condition and raise the potential for other bank failures. This systemic effect is particularly problematic if ex post funding is assessed during a wider financial downturn, whereby the DI assessments are occurring when banks' financial positions have already deteriorated, reducing credit availability, weakening public confidence, and contributing to further economic weakness.[21]

Risk-based premiums can be procyclical. They help enhance market monitoring among banks by tying a bank's contribution to the DI fund to its level of risk exposure—the greater the level of risk on a bank's balance sheet, the greater will be the premium assessed. Risk-

[19] For example, a series of shorter reports that would be available on websites and issued more frequently (e.g., quarterly) and cater to a narrower group of users' needs could highlight the most relevant information, with a particular emphasis on risk developments.

[20] For example, in March 2008, FAS 161 on "Disclosures about Derivative Instruments and Hedging Activities" was introduced, and the new standard included increased transparency not only in the amounts, and particularly the location, of derivative instruments in financial statements, but also in how they affect the financial position, financial performance, and cash flows of the institution.

[21] As an indicator of the impact of some of the recent financial turmoil, in 2008, the balance of the Deposit Insurance Fund of the U.S. Federal Deposit Insurance Corporation (FDIC) fell by $33.5 billion (64 percent), primarily because of $40.2 billion in loss provisions, with a fourth quarter decline of $15.7 billion alone (unaudited).

based premiums can reduce the subsidization of weak banks by strong banks that characterizes flat-rate premiums. Unfortunately, risk-based premiums tend to increase during downswings in the economy when bank balance sheets weaken, shrinking banks' available funding for credit expansion at a time when the economy needs it most.

Similarly, point targets for the optimal level of reserves in the DI fund can also have a procyclical influence. Targets that require an immediate replenishment and/or rebate once the level of the fund deviates from a narrow or point target can result in swings in banks' premiums. As a result, in times of distress, banks must pay increased premiums at a time when they and the economy can least afford it.

Policy recommendations

- *Establish an ex ante deposit insurance fund that has mandatory membership for all deposit-taking institutions.* An ex ante reserve fund can alleviate procyclicality by requiring regular premium contributions by financial institutions prior to bank failures, smoothing premiums over the business cycle and thereby averting assessments during times of distress. It can also engender public confidence that there is a fund already in place for prompt reimbursement of deposits.

- *If a risk-based approach is used, in order to mitigate associated procyclicality* deposit insurance funds should have a target range (instead of point target) for the optimal level of their reserves, which could be gradually replenished if below the target so as to lessen the impact on credit growth in a downturn.[22]

There are some implementation difficulties and offsetting considerations in deposit insurance schemes. The cost of ex ante funding can be seen in (1) underutilized resources that might have fostered credit expansion and growth, (2) the difficulty smaller financial systems might have in establishing a reserve fund based solely on bank contributions of sufficient size to provide depositor protection, and (3) an increase in moral hazard as weaker institutions may be inclined to maintain riskier balance sheets with a pre-established safety net to fall back on.

IV. PROCYCLICALITY ASSOCIATED WITH CENTRAL BANK BEHAVIOR

Monetary policy may be procyclical if policy interest rates or liquidity levels are significant factors amplifying risk-taking leading to a boom-bust cycle in asset prices and leverage. Monetary policy has an effect on asset prices, debt, and leverage through banks' balance sheets or external channels, which may then affect asset prices, risk taking, credit growth,

[22] For example, the U.S. FDIC introduced such a system in the Reform Act of 2005. When DI reserves fall outside of this range, a surcharge (or rebate) of some percentage of the deviation from the lower (or upper) bound is assessed (reimbursed).

and leverage. However, for it to be procyclical the level (or change in level) of interest rates must be an important factor *amplifying* cyclical effects beyond what fundamentals may warrant—i.e., interest rates that are too low for too long may result in misaligned asset prices (bubbles), overinvestment, and overindebtedness that require a large correction to bring markets back into equilibrium.[23,24] However, if monetary policy alone cannot adequately influence the supply and demand for credit or asset prices, then other macroprudential tools (e.g., leverage, provisioning, and capital reserve or liquidity targets or costs) may need to be employed to ensure that the possible negative externalities of credit growth do not outweigh the benefits (see Section II).[25]

Some analysts posit that monetary policy may be procyclical because central banks (1) choose to focus on a narrow definition of price stability and not to "lean against the wind" of asset price inflation and credit (leverage) growth or "lean against imbalances" of current account deficits and external indebtedness; and (2) employ asymmetrical responses to asset prices by not raising interest rates as asset prices boom, but lowering them to cushion the impact of an asset price bust. For instance, inflation-targeting central banks typically base policy decisions on forecasts of consumer prices one to three years out (Wadhani, 2008, p. 30). By focusing on consumer price inflation over a relatively short period, monetary policy may not react soon enough during a noninflationary economic expansion.[26] In particular, ample liquidity conditions appear to affect perceptions of risk and risk taking (e.g., by increasing "search for yield"), which then impact the supply and demand for assets and financing. Without sufficient income and capital buffers, a tightening of monetary policy may then lead to asset price declines and a large number of defaults that put in motion a self-reinforcing spiral of deleveraging, asset price deflation, and further defaults—i.e., a bust cycle.

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[23] Between 2001 and 2005 nominal interest rates were the lowest in almost four decades and below what a Taylor rule would imply in many countries, while real interest rates were negative. Ahrend, Cournède, and Price (2008); Taylor (2007); Borio and Zhu (2008); Dell'Ariccia, Igan, and Laeven (2008); Rajan (2006); and numerous others conjecture that low interest rates may result in more risk taking. However, Shiller (2007) notes that long-term interest rates were not especially low, but that the public has ignored the concept of real interest rate and that money illusion is an important to factor to consider with respect to high asset prices.

[24] It should be noted that asset price bubbles need not be related to fundamentals, at least not theoretically, if they are rational price bubbles (see Filardo, 2004, p. 2). Bubbles may be beneficial if they provide domestic store in value and reduce capital outflows, although they come at a cost of vulnerability to a bust and capital outflows (Caballero and Krishnamurthy, 2005).

[25] Public sector intervention is needed in the case of negative externalities (i.e., market failures) that cannot be dealt with by market mechanisms.

[26] There is often an underlying assumption by policymakers that financial markets are efficient so that policy intervention with regard to asset prices would be suboptimal (see Wadhwani, 2008, for a discussion of this). However, as recent events have shown, market failures resulting from agency, coordination, and informational problems may exaggerate asset price movements and financial imbalances.

An asymmetrical policy response to asset prices may further create conditions for procyclicality because it creates moral hazard. With central bank lender-of-last-resort facilities available, agents do not internalize the full costs of their risk taking, which increases risk taking ex-ante. While there is a role for public provision of liquidity when markets fail, this failure is related to the private sector's risk management capacity and incentives, including perceptions of the availability of public liquidity insurance. Thus, it is important to create the correct private risk management incentives (Goodhart, 2008).

Changes in the structure and dynamics of finance (e.g., securitization, complex products, increased wholesale market funding) and the global economy may have increased the challenge faced by policymakers. Financial fragility and imbalances may be more quickly built up, even in a low-inflation environment, so that innovation and globalization may have increased the interdependence between monetary and prudential policies, including across borders.[27] Furthermore, even these policy tools may be inadequate in the face of large imbalances, which then may also require changes to fiscal and exchange rate policies to mitigate the procyclical propagation of shocks.

Policy recommendations

- *Monitor responses of the private sector to central bank policies.* Monetary authorities could be more aware of their own biases (e.g., efficient market assumptions) and of market failures, in particular negative externalities, agency problems, and behavioral psychology that affect risk-taking. Developing more structured, transparent research programs to assess the impact of these on asset prices, leverage, and consumption would be useful.

- *Apply policy tools symmetrically across an economic cycle.* In addition to providing liquidity assistance in the case of an asset price bust, monetary authorities could consider withdrawing liquidity during a boom to better internalize the costs of negative externalities from excess leverage and asset price speculation—so-called leaning against the wind. Where other factors beyond funding costs and liquidity are thought to affect asset values and risk taking, other macroprudential tools may be needed.

- *Improve the distribution of responsibility for liquidity risk management and insurance between commercial banks and a central bank.* Given the incentives of the private sector to underinsure, consideration could be given to imposing a surcharge on commercial banks to provide an ex ante cost to encourage better liquidity risk management. In theory, such a charge could vary based on the quality of the liquidity risk management in the bank—better liquidity risk management would be associated

[27] See Borio and Shim (2007), and Borio and Zhu (2008).

with a lower surcharge. The charges could provide a partial pool at the central bank or other entity for emergency liquidity support or alternatively they could be part of the bank's capital base. Defining the target pool of banks and the pricing of this surcharge would be challenging and require periodic re-assessment.

- *Coordinate policies with prudential supervisors and other central banks.* Given the increasing interdependence between monetary and prudential policies, monetary policymakers should better coordinate domestically and internationally with supervisors and safety net providers, as well as with other central banks. Central banks should be aware of the safety and soundness of individual institutions, and supervisors should be able to take into account the larger macroeconomic context in which their prudential oversight takes place. Central banks in charge of financial stability should take a holistic view of the range and intensity of macroprudential and monetary policy implementation goals. In large, open economies, international policy coordination may be necessary.

- *Increase information sharing and coordination of monitoring and corrective actions.* With respect to private sector liquidity risk monitoring, both supervisors and central banks should increase information sharing and coordination. The linkages between insolvency and illiquidity are increasingly blurred, and knowledge of exposures, maturity structures, and the general health of various institutions will help both parties manage any difficulties induced by procyclicality more efficiently and in a timely fashion.

- *Define powers and objectives of central banks clearly.* Further work should be done to determine whether monetary policymakers need better legally defined roles and responsibilities in terms of financial stability. These would imply powers beyond financial stability reports and emergency liquidity assistance, and clarification of how these responsibilities would be effectively linked with price stability monitoring frameworks and other policy tools.

Implementing these policies will first require central banks to acknowledge the potential procyclicality of their actions and second to assess the usefulness of monetary policy tools. Some central bankers have stated that the changes required to stop an asset price bubble would be large, and thus have a larger social costs in terms of reduced output (Greenspan, 2004). In particular, asset price bubbles may be difficult to detect at an appropriately early point. Furthermore, if monetary policy has little impact on the demand for assets (Shiller, 2007) or if institutional/supply factors (e.g., financial innovation/contract technology, risk taking) are more important, other macroprudential tools may be more appropriate.

With open capital accounts, however, it may be difficult for a central bank to lean against domestic imbalances. It is not clear that monetary policy could play a stabilizing role against

asset price bubbles or credit/leverage-induced financial fragility in a small open economy. Increasing interest rates could induce greater capital inflow and lead to an increase in foreign indebtedness of banks and the corporate sector, without decelerating asset price inflation or credit spread compression. In high-interest-rate countries, this could also lead to an increase in the carry trade. The increase in foreign indebtedness then makes the economy vulnerable to an unwinding in the carry trade or a sudden stop in capital flows. This may require more effort from macroprudential tools or fiscal policy, as well as international cooperation and coordination.

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