

**Addressing financial system procyclicality:
a possible framework**

Note for the FSF Working Group
on Market and Institutional Resilience

1 September 2008



1 September 2008

Addressing financial system procyclicality: a possible framework

Note for the FSF Working Group on Market and Institutional Resilience

This note aims to provide an overall framework that could help evaluate policy options to address the procyclicality of the financial system. While the framework is general in nature, the note focuses exclusively on options for prudential and financial reporting arrangements and the associated risk management and incentives issues. It therefore excludes other possible policy levers, not least taxation/fiscal policy and monetary policy, including the provision of central bank liquidity. Likewise, the note does not consider any potential implications for the institutional set-up for the authorities responsible for financial stability.

The structure of the note is the following. The first section sets the stage by briefly defining the concept of procyclicality, outlining the mechanisms at work and their ultimate sources. The second section highlights the basic rationale for policy intervention and its guiding principle. It also explains how the policy fits with the macroprudential approach to financial stability. The third section puts forward a possible, quite general set of desirable features that could be used to assess the pros and cons of policy options. The final section lays out a set of such options and *illustrates* how the framework can be used to evaluate them.

I. Procyclicality: definition, manifestations and sources

The term “procyclicality” is generally used to refer to the mutually reinforcing (“*positive feedback*”) mechanisms through which the financial system can *amplify* business fluctuations and possibly cause or exacerbate financial instability.

These feedback mechanisms are particularly disruptive and apparent during an economic downturn or when the financial system is facing strains. For instance, as institutions incur losses and their capital cushions decline, the terms at which they can raise external funding worsen. This, in turn, can induce them to cut credit extension and/or dispose of assets. Their retrenchment can thus weaken economic activity, thereby raising the risk of a further deterioration in their financial strength. In particular, the threat of default and bankruptcy heighten the defensive response of market participants.

The key problem here is that the financial system has not built up sufficient buffers during benign economic conditions, when it is easier and cheaper to do so, to face more challenging times. This prevents it from absorbing losses without causing amplifying retrenchment. As a result, the system acts as a shock amplifier rather than playing its usual shock absorber role.

All those concerned with procyclicality share this preoccupation with the amplifying effects of financial strains in the contraction phase; they may, however, have different views about the role of the expansion phase. Some see the financial strains as the natural result of excessive risk-taking during the expansion, which leads to the build-up in vulnerabilities. They also regard amplifying feedback mechanisms during the expansion as a significant contributing factor. Thus, as the economy grows, cash flows, incomes and asset prices rise, risk appetite increases and external funding constraints are eased, which in turn facilitates risk-taking. As evidence, they would argue that financial sector distress is often preceded by unusually strong credit and asset price growth and by prolonged periods of unusually low risk premia. Others play down these statistical regularities and see financial sector strains as possibly



independent of the expansion phase. They stress the role of shocks external to the financial system and the inherent unpredictability of these crisis episodes.

Financial system procyclicality can be traced to two possible fundamental sources.

The first source is limitations in the *measurement of risk*. At the most general level, economic agents may be subject to bouts of optimism and pessimism. Moreover, while events are unfolding it is very hard to distinguish changes in underlying trends from more cyclical or transitory influences, especially when the mutually reinforcing mechanisms between financial conditions and the real economy are operating strongly. More technically, the pronounced procyclicality of measures of risk in prevailing risk measurement practices has been extensively documented.¹ Near-horizon estimates of short-term volatility, asset and default correlations, probabilities of default and loss given default, all move procyclically. As a result, measures of risk often spike once tensions arise, triggering strains, but may be quite low *even as* vulnerabilities and risk build-up during the expansion phase. For example, the credit risk embedded in traded portfolios can be easily underestimated if measured over short holding periods and on data that do not capture full credit cycles. As suggested by the current turmoil, this may lull participants into a false sense of security.

The second source is distortions in *incentives*. Even if risk measurement is *not* a problem, distorted incentives can by themselves induce procyclicality.

A first distortion involves conflicts of interest between providers and users of funds (“principal-agent” issues). Financial contracts address these conflicts only imperfectly. For example, collateral-based lending or margin requirements are a way for lenders/traders to protect themselves from actions taken by the borrowers/counterparties that could erode the value of the loans/claims traded. But by establishing a direct link between asset valuations and funding, they can exacerbate procyclicality.

A second incentive distortion involves actions that may be rational from the perspective of individual agents but, collectively, may result in undesirable outcomes. For instance, individual retrenchment at times of stress can be self-defeating, by inducing fire sales or a credit crunch that can exacerbate financial strains. Individual agents naturally treat prices and macroeconomic conditions as independent of their actions, and usually fail to take into account the fact that, *collectively*, they can strongly influence them. Likewise, in the expansion phase, it may be difficult for agents to refrain from lending or investing in risky assets for fear of losing market share, even if this implies taking excessive risk for the system as a whole.

Some would argue that short horizons play a significant role in these two sources of procyclicality. For instance, short horizons for risk measurement – varying from a few days for market instruments to roughly a year for non-traded loans – can add to procyclicality by making it more natural to extrapolate current conditions; this downplays the tendency for measures to revert to their long-term averages. Furthermore, short horizons may themselves be the outcome of ways to address principal-agent problems, such as through the frequent benchmarking and monitoring of performance.

Alongside the fundamental sources of procyclicality, elements of the policy framework may act as *contributing* factors. Depending on their characteristics, prudential and accounting regimes can add to, or offset, the inherent procyclicality of the financial system. For example,

¹ For current purposes, a financial variable is said to behave procyclically if its co-movement with the real economy is such as to strengthen the evolution of the latter. For example, if measures of risk *increase* as the economy *contracts*, they are said to be procyclical (even if they actually move counter-cyclically in a numerical sense) because they would tend to strengthen the contraction.



other things equal, the more procyclical are the measures of risk embedded in prudential arrangements (eg, in minimum requirements for capital or liquidity), the more likely it is that they would strengthen the positive feedback mechanisms between credit and the business cycle. In the contraction phase, regulatory constraints may bite well before the bankruptcy constraint does, as financial institutions regard violating minimum capital requirements as extremely costly.² Similarly, compared with historical accounting, fair value accounting (FVA) may add to procyclicality by making valuations more sensitive to the economic cycle, as it embeds evolving estimates of future cash flows and risk premia in the accounting figures.

II. Policy: rationale, objective and guiding principle

The main rationale for policy intervention is to limit the unwelcome amplification resulting from the limitations in risk measurement and/or distortions in incentives. Success does *not* require the authorities to have better information than the private sector. However, it does imply overcoming the incentive problems faced by individual economic agents. The authorities can do so because of the different objectives and incentives they have.

A key objective of policy would be to reduce the incidence of serious stress for the financial system *as a whole* (“systemic events”). The complete elimination of “cycles” is clearly an unrealistic, and arguably undesirable, goal.

The guiding principle would be to seek to (i) limit the costs of financial distress in the contraction phase and, possibly, (ii) restrain the build-up of risk-taking during the expansion phase. One key mechanism would be to build up buffers in the system during expansions and to provide for their *controlled* run down during periods of stress. The build-up of buffers would strengthen the resilience of the system to the emergence of incipient distress *as long as* the buffers were allowed to operate *as such* when this happens. Crucially, this implies a willingness to allow them to be run down. Otherwise, buffers *de facto* become minima, and from shock absorbers turn into shock amplifiers. In addition, to the extent that it behaved as a kind of “dragging anchor”, the build-up of buffers could also restrain risk-taking and any balance sheet overextension in the expansion. This, in turn, could mitigate the influence of any incentives to take on risk resulting from the anticipation of public support in the event of systemic distress (“moral hazard”).

Addressing procyclicality would be an integral part of a move to strengthen the “*macroprudential*” orientation of regulatory and supervisory frameworks relative to their “*microprudential*” one. It would focus policy on the damage to the *system as a whole*, as opposed to individual institutions, with a particular eye to the impact on the real economy. Here, common exposures across financial institutions to macro-economic factors play a key role. And it would explicitly take into account the *impact of the collective behaviour of economic agents on aggregate risk*, rather than treating aggregate risk and asset prices as independent of their actions, as individual market participants and financial institutions would do. Table 1 presents in more detail a stylised distinction between the macro- and micro-prudential perspectives.

² It has been pointed out that the desire to meet minimum ratings by credit rating agencies can “bite” well before the regulatory capital minimum. If this is true, then it is not clear what the role of that minimum is. At the same time, rating agencies may take that minimum, and the buffers above it, as an input in their ratings decision. Moreover, regardless of this effect, the regulatory capital framework can influence procyclicality by influencing the way firms actually measure risk more generally.



Table 1*
The macro- and microprudential perspectives compared

	Macroprudential	Microprudential
Proximate objective	limit financial system-wide distress	limit distress of individual institutions
Ultimate objective	avoid output (GDP) costs linked to financial instability	consumer (investor/depositor) protection
Characterisation of risk	Seen as dependent on collective behaviour (“endogenous”)	Seen as independent of individual agents’ behaviour (“exogenous”)
Correlations and common exposures across institutions	important	irrelevant
Calibration of prudential controls	in terms of system-wide risk; top-down	in terms of risks of individual institutions; bottom-up
* As defined, the two perspectives are intentionally stylised. They are intended to highlight two orientations that inevitably <i>coexist</i> in current prudential frameworks.		

III. Policy: a possible set of desirable features for policy options

Any policy measure would need to be evaluated against a set of desirable features. What follows suggests a few, of general applicability, that would seem to merit attention. While several of them are quite obvious, some can raise particularly difficult issues in the context of procyclicality.

Clearly, the measures should be *effective* in promoting the goal of limiting procyclicality. Assessing effectiveness, however, can be particularly challenging for measures for which there is no prior history.

The measures should seek to be *fair* in the sense of preserving a level playing field across financial market players, both within and across national jurisdictions. First and foremost, this means avoiding competitive distortions, to the extent that financial stability concerns allow. This raises thorny questions about the institutional coverage of the measures, especially given the limited reach of prudential regulation. Both effectiveness and fairness would suggest a broad institutional and geographical coverage, but tools may be limited. More specifically, it also raises issues concerning the operational definition of the “cycle”. Financial and real conditions may and do differ across countries. For institutions with international operations, this would suggest, for instance, calibrating instruments with respect to their individual consolidated exposures to the corresponding country’s conditions rather than based on the nationality/residence of the firm. These exposures could derive from cross-border lending or direct operations in host countries. Challenging issues of home-host coordination would arise.

Measures that are *simple* to understand and implement are preferable to more complex ones. Indeed, one common charge against some recent policy initiatives is that they are excessively complex. Similar criticisms have also been levied against risk measurement practices themselves. The concern is that excessive complexity may have undermined effectiveness, by making it hard for senior management and supervisors to understand the



underlying risks. All this points to a strong demand for simplicity, to the extent that it is achievable.

Measures should be *transparent*. Transparency implies that the measures should allow outsiders to identify them separately from other forms of intervention. Transparency and simplicity are mutually supportive. Transparency can contribute to the effectiveness of the measures. It is essential for the accountability of those implementing them. And, in line with the micro/macprudential distinction, it may help to highlight the wedge between risk as seen from the perspective of the individual institution and the system as a whole.

To the extent possible, the measures should have *low implementation costs*. This implies effective enforcement at limited expense. It suggests that policy tools should build as far as possible on existing structures and instruments, such as through recalibration and “overlays”. And that it is preferable to use instruments in line with their original purpose rather than for goals for which they were not originally designed.

The measures should seek to *limit evasion* and hence regulatory arbitrage. Admittedly, for a measure to be effective it needs to change behaviour and, hence, incentives. And to the extent that a measure relies on “taxes” rather than “subsidies”, it generates incentives for evasion. Indeed, regulatory cushions that rise during the expansion can be regarded as a form of “tax” -- a progressive one if risk perceptions decline as the expansion proceeds. This is inevitable if the objective is to restrain risk-taking. At the same time, the incentive and ability to evade depend in part on the structure of the measures.

To the extent possible, policy tools that are based on rules and that *limit the degree of discretion* in their application and calibration are preferable. If feasible, and provided they are linked to robust and relevant aspects of the financial cycle, they leave less room for policy error. Moreover, once in place, they do not require continuous justification, and hence can act as an effective pre-commitment device. As a result, they can relieve pressure on the supervisors not to take action during the expansion phase, as a tightening of prudential standards would inevitably be seen as going against the manifest view of the markets.

At the same time, automatic stabilisers and discretionary measures should not necessarily be seen as mutually exclusive. Discretionary measures could complement automatic stabilisers if the latter faced design limitations or if shocks outside the normal range envisaged by the system materialised. Likewise, discretionary measures might be more easily tailored to the nature of the build-up in risk-taking and vulnerabilities *as long as* these are identifiable in real time. They may also be harder to arbitrage away, as circumvention becomes easier over time. The key issue would be how to constrain and discipline any such discretion, such as through a process that puts a premium on transparency and accountability.

IV. A range of potential policy measures: a roadmap for an evaluation

The framework outlined above could be used to evaluate the costs and benefits of specific policy measures. What follows, however, is only intended to provide a *basis* for such a structured analysis. It lays out a range of possible options for categories of policy tools and, for each, some key considerations that would need further analysis.³ The discussion is organised based on several areas that policy could target. The Table in Annex 1 includes a

³ The note does not discuss measures to strengthen the infrastructure of the financial system, such as improvements in trading, payment and settlement systems. Their important benefits are widely understood and uncontroversial.



more detailed list of possible options. Annex 2 illustrates briefly how one might actually use the framework, in the context of three particular options that are specified more explicitly.

1. Risk measurement methodologies

If limitations in risk measurement are a source of procyclicality, then encouraging improvements in this area is a natural policy option. The overall objective would be to improve the way low-frequency, system-wide risks are evaluated.

A range of possible risk measurement tools, all seen as complements to more judgemental information, fall under this category. Some of these target directly systemic risks linked to broad macro conditions, including macro-stress tests and early warning indicators of systemic financial distress. Others could target enhancements to credit risk models of individual financial institutions, by better incorporating macro/system-wide conditions as drivers of default risk.

The role of the authorities is multifaceted. It includes: developing better methods to assess systemic vulnerabilities, possibly also based on confidential information; providing the output of their analysis as input for firms' own risk measurement; encouraging firms to rely on better methodologies; and using their own assessments to calibrate the intensity of the supervisory review process or other instruments to offset procyclicality (see below).

The pros and cons of the various options would depend on the specifics of the risk measurement tools and on the way they are used. For instance, encouraging firms to improve risk measurement appears to be a low cost option, to involve limited potential for evasion, not least because peer-pressure could support enforcement, and to have the merit of addressing a root cause of the problem. At the same time, incentive distortions would still be an issue. They would hinder the lengthening of the horizon and may induce firms to target levels of risk tolerance and risk-taking that, from the perspective of the system as a whole, could be inappropriate.

2. Financial reporting

For present purposes, financial reporting is defined to comprise accounting and public disclosures more generally.

One key question concerning *accounting* is how far it would be desirable to make adjustments in this area relative to others. Recent events appear to confirm that accounting can have a first-order effect on procyclicality. This suggests that adjustments could be effective. At the same time, the primary objective of accounting is not financial stability. This suggests that measures in this area would involve comparatively high implementation costs, as they would imply saddling accounting with an additional goal.

If adjustments to accounting were made to address procyclicality, the merit of the measures would need to be assessed with reference to their implications over the whole financial cycle, not just the contraction phase. For instance, some observers have raised the possibility of suspending marking-to-market in illiquid conditions. A relevant consideration here, of more general applicability, is the distinction between *ex post* and *ex ante* effects. *Ex post*, the suspension could conceivably alleviate procyclicality if it limited distress sales. *Ex ante*, however, anticipation of the suspension could actually encourage further risk-taking during calm periods. Moreover, suspension could make it harder to intervene in a timely way to restructure institutions in distress and could delay necessary adjustments in the system.

The smaller the adjustments to accounting, the larger would be the burden of adjustment on prudential authorities. Maintaining a *given* degree of financial system procyclicality in the face of the current trend towards FVA would call for a recalibration of prudential tools.



One possible basis for this recalibration is adjustments to accounting figures before using them in the calibration of prudential tools (“*prudential filters*”).

One notable example is “prudential provisions”.⁴ Supervisors may consider that accounting standards do not allow for sufficiently forward-looking or prudent provisions (eg, through-the-cycle⁵ provisions for loans, sometimes known as “dynamic provisions”). In that case, they can add the difference between what they find appropriate and the accounting figures to minimum capital requirements. Admittedly, even if publicly disclosed, such “prudential provisions” may be less effective in reducing procyclicality than if dynamic provisions were allowed for accounting purposes: since they are not charged against current income, prudential provisions forgo the disciplinary effect that operates through the market’s focus on the earnings (bottom line) figure. Even so, they can help constrain dividend payments during expansions, thereby increasing the size of the capital buffers, and they release buffers when losses materialise, and accounting provisions spike.

Better public disclosure about risks can dampen procyclicality. Examples include strengthened disclosures about risk profiles, about the uncertainty surrounding accounting valuations (eg, marking-to-model numbers) and about a firm’s strategy to cope with systemic distress. These can induce better informed responses and temper indiscriminate reactions (“herding” behaviour).⁶ For instance, they may provide more prudently managed firms with greater leeway to run down buffers without being penalised by the market, as the reduction would be seen as an integral part of the firms’ strategy. At the same time, their effectiveness may sometimes be limited, as they do not necessarily address some of the incentive limitations that are a source of procyclicality.

3. Regulatory capital standards

In principle, the spectrum of options for regulatory capital ranges from reducing its cyclical risk sensitivity to deliberately introducing elements of countercyclicality. There are various ways in which this can be done. Examples include: strengthening the through-the-cycle orientation of minimum capital requirements; setting the corresponding risk parameters based on smoothed outputs of financial institutions’ internal risk models; and adding a countercyclical “macroprudential overlay” to the minima based on measures of the financial cycle. The adjustments could be made based on formulae (rules), or could be done on a more discretionary basis. They could be hardwired to the minima (Pillar 1 in Basel II) or encouraged through the supervisory review process (Pillar 2). Depending on their specific features, the arrangements would score differently against the template set above (see the Annex 2 for a possible illustration).

Beyond this, some common issues deserve highlighting. First, while reducing the cyclical risk sensitivity of minimum capital requirements reduces their impact on procyclicality, it does not

⁴ Another important example involves adjustments that exclude from the change in the fair value of a firm’s liabilities that component which is due to the change in its own creditworthiness.

⁵ Through-the-cycle estimates of risk seek to remove the influence of the cycle on measures of risk, such as probabilities of default or expected losses. Taking long-term averages is a simple, if crude, way of doing so. So-called point-in-time estimates, by contrast, seek to include all the information available concerning conditions when the estimates are made. For example, rating agencies ratings are said to be of the through-the-cycle variety, although the extent to which they succeed appears to be imperfect. By contrast, probabilities of default based on approaches that rely on prevailing market prices are of the point-in-time variety (eg, KMV’s expected default frequencies).

⁶ The definition of disclosures could be broadened to include elements not covered by financial reports, such as indicators of system-wide vulnerabilities (eg, risk concentrations, see below). These, too, could have a beneficial effect.



eliminate it. For example, a minimum leverage ratio⁷ *taken in isolation* would still imply procyclical behaviour in the downward phase of the cycle, as the constraint threatens to become more binding. This is somewhat different from the effect of such a ratio as a *complement* to more risk-sensitive measures. In that case, provided it became binding in the upswing, it could limit risk-taking and mitigate the build-up in vulnerabilities.

Second, just as with any type of regulation, questions of scope in the application loom large. Supervisory coordination can mitigate evasion of the measures, but the gap between the regulated and unregulated sectors is harder to bridge. This is especially important given that the unregulated sector has been playing a growing role in the provision of finance.

Finally, the phase of the *controlled* release of the capital buffers is crucial. If aggregate feedback effects are disregarded, drawing down the buffers is likely to be seen as unambiguously weakening the financial position of institutions. Thus, the temptation to actually insist on tighter requirements is very strong. This puts a premium on the choice of triggers for the reduction (eg, for the downward adjustment of the minimum capital requirements or any “soft” targets above them). It highlights the importance of rule-based adjustments: seeing the reduction as part of the *normal* operation of the framework should minimise the risk of destabilising market reactions to the decline in the buffers. Ex ante disclosures can reinforce this effect. And it points to the relevance of the choice of sanctions that would accompany any “excessive” consumption of capital. A graduated response is preferable as it can help to avoid too sharp a reaction. The interaction with failure resolution rules plays an important role here (see below).

4. Funding liquidity standards

The issues concerning prudential measures targeting funding liquidity are conceptually analogous to those concerning regulatory capital. The availability of funding liquidity tends to move procyclically, alongside credit terms and market liquidity conditions. Indeed, the current financial turmoil has highlighted the need for better management of liquidity risk by financial institutions, especially the need for the build-up of liquidity buffers in good times to face adverse systemic conditions. A potential issue here is that time- and cycle-invariant minimum liquidity requirements, especially if they take the form of *hard* constraints, can exacerbate procyclicality: when they are hit, or even approached, they cease to act as buffers.

The question is how far liquidity regulation can and should be structured with these specific concerns in mind, as part of the steps underway to improve liquidity management. The range of options is broadly similar to that for capital. The starting point, however, is quite different: standards for funding liquidity rely far less on hard minimum quantitative requirements and have been less harmonised internationally.

5. Collateral arrangements

Arrangements concerning collateral comprise loan-to-value ratios and margin requirements (eg, for securities and derivative transactions).⁸ The potential procyclicality of loan-to-value ratios arises from the fact that the ability to obtain credit varies in line with changes in the value of collateral. This effect is larger, the greater the cyclical sensitivity of the valuations (ie whether these reflect current market values or historical prices) and the higher the loan-

⁷ A minimum leverage ratio constrains a measure of equity in relation to total assets, not adjusted for their risk.

⁸ The loan-to-value ratio is the ratio of the amount lent to the value of the underlying collateral at origination. Margin requirements refer to the minimum posting of collateral for the purchase of a security or in a derivatives transaction. The posting can vary after the trade with the value of the underlying security.



to-value ratio. In addition, a tendency for loan-to-value ratios to be tightened during contractions and to rise during aggressive lending booms, as part of a weakening of underwriting standards, would further amplify this effect. The most common procyclical impact of margin requirements arises from their mechanical link with measures of short-term volatility and from more discretionary adjustments in margins at times of stress, as a defence against counterparty risk (eg, initial and variation margins in exchanges).

Policy options range widely. Policy could encourage rules that are less sensitive to the cycle (eg, for LTVs, low minimum ratios as well as conservative and less market-value oriented valuations of the collateral; through-the-cycle margining requirements). It might also introduce time-varying, countercyclical adjustments, either based on rules or on a discretionary basis. The instruments could be used in isolation or linked to others, such as capital requirements.

In evaluating these measures, issues of enforcement, as part of implementation costs, and ease of evasion loom large. The power to adjust these instruments may not lie with prudential authorities, although they may influence market structure (eg, the degree of centralisation in clearing arrangements). And the possibility of evasion can be quite high in very developed, market-based financial systems.

6. Risk concentration limits

Risk concentration limits could potentially help to contain the exposure of institutions to major macroeconomic risk factors. The focus here would be on common exposures *across* financial institutions rather than on risk concentrations in the portfolio of *individual* institutions. It is common exposures that affect the *correlation* in the performance of the institutions and hence their potential to raise system-wide risk. Examples include exposures to sectors/industries (eg, real estate) and types of particularly cyclically-sensitive activities (eg, LBOs). The exposures could also be measured through more sophisticated but less transparent procedures (eg, derived through statistical techniques that capture the sensitivity of an institution's return on assets to common risk factors). The limits themselves could be "hard" (eg, ceilings) or "soft" (eg, a tightening of the supervisory review process). Discretion is difficult to avoid. As a result, the limits put a premium on real-time risk assessments.

7. Compensation schemes

Compensation schemes affect procyclicality through their influence on incentives and risk measurement. The schemes translate measures of financial performance and risks into pay and hence incentives. Procyclical effects can arise, for instance, if the schemes embed biased and very cyclically-sensitive measures of risk/valuations or cyclical sensitivity in the risk appetite of those that determine compensation. In addition, the schemes can also influence risk measurement directly, by affecting the *horizon* over which outcomes affect risk and rewards.

A key objective of policy would be to promote compensation schemes that reflect the underlying risks taken. Seeking to back-load pay-offs, including through claw-back clauses that retroactively adjust initial bonuses on the basis of future position losses, is critical. This could induce more prudence, not least by effectively lengthening the decision and risk measurement horizons. Given the typically long lag between risk-taking and the materialisation of its consequences, the horizon would effectively need to be quite long. Another possibility is to link compensation to *ex ante* measures of risk (eg, charge a risk spread for the internal use of capital by traders). Its effectiveness, however, would depend on how well risks are measured.

As in the case of collateral arrangements, issues of enforcement and evasion would call for careful consideration. Prudential authorities do not have direct responsibility for remuneration



schemes, although they may be able to influence them indirectly through the instruments at their disposal. Moreover, the ease of evasion can be a serious constraint in highly competitive markets.

8. Insurance mechanisms

The structure of *deposit insurance schemes* can affect procyclicality. In general, the effectiveness of the arrangements can influence the cost of distress (eg, speed of payouts, etc.). More specifically, though, the timing of contributions and hence the funding of the schemes is key. Ex post funding (survivors pay) mechanisms can add to procyclicality as they require payments precisely at the time when failures occur. While this need not be an issue in the case of isolated failures (provided the institution concerned is not very large), it can be a problem when several failures occur at the same time, such as during the turn of a pronounced financial cycle. From this perspective, pre-funded schemes are better.

Other varieties of insurance mechanisms could address procyclicality per se, by targeting the costs of *system-wide* financial distress. For example, one possibility might be to tie the payout of insurance not so much to the condition of individual institutions but to indicators of system-wide distress (eg, aggregate losses in the industry, etc.). Issues to be addressed in any such schemes include triggers, pricing, funding, compulsory vs. optional nature, and the relative roles of the public and private sectors.

Compared with some of the other policy measures, including countercyclical regulatory capital buffers and collateral arrangements, such insurance schemes may have a limited restraining effect on risk-taking, although they would generate less of an incentive to evade. Beyond this, their architecture would also affect their impact on procyclicality. For example, to the extent that limitations in risk measurement or incentives would result in too favourable a pricing and too abundant a supply of insurance during the upswing of the cycle, it might add to procyclicality by encouraging risk-taking by the insured.

9. Managing failure and resolution

The way the failure of financial institutions is managed can affect procyclicality through its link with system-wide distress and its interaction with elements of the prudential framework. Comparatively tough procedures that could be appropriate for the failure of individual (non-systemically relevant) institutions may be less appropriate if several institutions experience stress at the same time. In addition, greater procyclicality in capital or accounting measures could interact with the procedures in unintended ways (eg, by increasing the speed with which particular thresholds are reached).

Potential policy options to address these issues include: (i) making the procedures, notably trigger points for corrective action, not only conditional on the systemic relevance of individual financial institutions but also on an assessment of system-wide distress, and (ii) recalibrating the arrangements so as to take into account the impact of other policy measures on procyclicality. Making the procedures dependent on the degree of system-wide distress is likely to involve a significant degree of judgement and discretion.



Annex 1: Range of possible policy options

The table provides a more detailed list of possible policy options in the prudential and financial reporting areas that can be used to dampen financial system procyclicality. The list is intended to be quite broad: it covers a range of proposals that have or could be made without in any way implying endorsement. There is no evaluation of the instruments' relative merits and drawbacks.

Possible policy options	
1. Risk measurement methodologies	
<i>By banks</i>	
Promote through-the-cycle measures	Encourage the use of risk measures that focus on longer horizons, such as Credit VaR calibrated through the cycle (ie representing the average loss experience of the entire cycle rather than conditional on the current cyclical phase)
Promote measures (eg VaR) calibrated to the cyclical trough	Same as above, but calibrated to the cyclical trough independently of the current cyclical phase.
Promote use of model inputs that reflect the trough	The use of “worse case scenarios” in terms of the inputs (eg downturn LGD, correlations etc) provides an estimate of maximum potential losses.
Promote the integration of ranges of measurement error/uncertainty about valuations in internal risk management and decision making processes	The explicit assessment of uncertainty around value estimates is a useful element in the dialog inside financial firms. Senior management that is more informed about the range of uncertainty would be more likely to reach decisions that are robust to changes in current point estimates embedded in market risk premia.
<i>By supervisors</i>	
Introduce cyclical conditionality in supervisory ratings of individual firms	Supervisory ratings (scoring) of firm's strength can be compared to benchmarks that are conditional on the cycle. These can be stricter in upswings and weaker in downturns. Cyclical dependence can also be used in scenario analysis that involves cyclical factors.
Collect data and build assessments of systemic vulnerability	Developing measures of systemic vulnerability (eg commonality in exposures and risk profiles, intensity of inter-firm linkages etc) enriches the systemic risk assessment of supervisors, can inform their attitude towards market practices and risk-taking, and can be a basis for the calibration of tools at their disposal



Develop a view to benchmark values for risk-premia, asset prices and/or credit growth	Similar to the above, benchmarks provide a way of comparing the sustainability of market valuations
Communicate regularly official assessments of systemic vulnerability and outcomes of macro-stress tests	To the extent that policymakers' perspective and incentives differ from those of the private sector, the outcome of the evaluation of risks by the former should be informative to the latter.
2. Financial reporting	
<i>Accounting standards</i>	
Revert to potentially less procyclical accounting standards (for the whole portfolio of the institution, or parts thereof)	Neutralise the potential for self-reinforcing spirals between procyclical market valuations, on the one hand, and risk management practices and prudential arrangements, on the other.
"Dynamic" provisions	Depending on the specification, can encourage the earlier recognition of future losses through greater reliance on statistical estimates. These are informed by historical experience but are more forward looking in the sense that they rely less on backward-looking proof that risks have already materialised (eg, credit event). Estimates can be either through-the-cycle (eg equal to the average experience through a complete cycle) or point-in-time but forward-looking over a sufficiently long horizon.
Suspend the applicability of fair value accounting (marking-to-market) in the event of a systemic market dislocation	It severs the link between procyclical valuations and investment decisions but focuses only on the periods when market valuations may be "unreasonably pessimistic". It therefore disregards the possibility that valuations may have been "unreasonably optimistic" during the expansion.
<i>Prudential filters</i>	
Adjust accounting figures as a basis for the calibration of prudential tools (including, eg the calculation of regulatory capital to mimic dynamic provisions)	Prudential indicators of performance and financial strength can thus be allowed to differ from those calculated on the basis of accounting figures. For instance, both the required and available capital for regulatory purposes can differ from the one based on accounting reports. Required capital may include prudential (conservative) provisions that are not allowed under accounting rules, and the supply of capital may underweight capital that is not viewed as high quality even if it is allowed under financial reporting standards.
Prudential provisions (in addition to accounting provisions) booked as add-on to capital	A concrete example of the general case above.



Smoothing (eg, a moving average)	Calculating prudential provisions as moving averages of point-in-time measures will produce a time-smoothing that tends to delay the turning points of the smoothed series and thus provide relief after the peak and restraint after the trough.
Time-varying target for provisions	A prudential target provisioning rate can be established that is higher than actual provisions in upturns and lower during downturns.
Time-varying minimum provision rate – universal – bank-specific	Similar to above except that it refers to a conservative level which effectively serves as a floor below which actual provisions should not fall. This floor can depend on aggregate conditions and applicable to all banks uniformly or be also tied to bank specific variables such as past performance and growth indicators.
<i>Disclosures</i>	
Risk profile of individual institutions	This would cover various types of risk (eg, credit, liquidity, etc)
Range of measurement error/uncertainty about valuations included in financial reports or disclosures	Communicating externally the degree of uncertainty around risk and value estimates could better inform assessments of the robustness of a firm's performance by external stakeholders.
3. Regulatory capital	
<i>Pillar 1</i>	
Flatten the capital curve linking capital charges to probabilities of default	Reduce the sensitivity of minimum capital requirements with respect to movements in measured risk. (It reduces the sensitivity over time as well as in the cross section at a point in time). In Basel II this was achieved through a reduction in the elasticity of regulatory capital to PDs (lower systematic component for high PDs)
Smooth the inputs to Internal ratings Based (IRB) formula (eg through-the-cycle ratings/probabilities of default (PDs))	Relying on cyclically smoothed inputs would tend to push upwards measured risk during the boom and push it downward during the downturn.
Adjust the output of the formula	Reduce the sensitivity of the regulatory capital requirement to the current point in the cycle
Introduce autoregressive smoothing	Set the requirement as a moving average of the point-in-time capital figure.



Introduce macro-prudential add-ons	Introduce a cycle-dependent multiplier to the point-in-time capital figure
- Conditional on the cycle (macro)	The multiplier can be linked to indicators of the aggregate performance of the economy (including output, credit, asset prices, in isolation or various combinations, through a variety of techniques).
- Conditional on credit expansion (micro)	The multiplier can be adjusted based on indicators of past performance of the institution, such as excessive asset growth or other estimates of its exposure to macro factors.
Increase regulatory capital requirement for particular items/exposure types	Individual types of exposure can be subject to higher risk weights than on the basis of Basel II, for macro-prudential reasons.
Set target regulatory capital in addition to minimum and expect that banks will be above it during expansions	Institutionalise the notion of buffers in addition to the regulatory minima by introducing targets and expected behaviour with respect to these targets
<i>Pillar 2</i>	Introduce supervisory review and intervention patterns that are explicitly linked to the state of the cycle (for examples of conditioning criteria, see the Risk Measurement and Management category above).
4. Funding liquidity standards	
Cyclically-dependent funding liquidity requirements/standards	Minimum liquidity requirements/liquidity standards conditional on system-wide indicators (macro) in addition to on the past performance of individual firms (micro). Conditioning mechanisms can be similar to those listed for Capital.
5. Collateral arrangements	
Time-varying maximum Loan-to-value (LTV) ratios	Collateral requirements can be conditioned on the overall behaviour of the economy, asset (property) prices and/or growth of credit. Adjustments can be rule-based or discretionary.
Conservative maximum loan-to-value ratios	Limit the extension of credit based on increases in asset values. This addresses only with the expansion phase.
Conservative valuation methodologies for collateral	By not relying on market valuations minimum collateral restrictions can be less procyclical. Various specifications are possible (and have been used in practice). This addresses only the expansion phase.
Minimum margin requirements	Through-the-cycle margining



6. Risk concentration limits	
Set quantitative limits to growth of individual types of exposures	Targeted measures to markets/instruments or system exposures seen to raise unwelcome system-wide risks based on sensitivity to specific risk factors. The limits can be “hard” or “soft”
Set (time-varying) interest rate surcharges to particular types of loans	Same as above, but price based intervention (eg surcharge on mortgage rates)
7. Compensation schemes	
Develop guidelines on compensation schemes	Guidelines that link performance-related pay to ex ante longer-horizon measures of risk and/or back-load payoffs to allow risks associated with individual decisions to materialise.
Use the supervisory review process for enforcement	Firms that fail to follow the guidelines may be subject to closer scrutiny and/or tougher supervisory standards.
8. Insurance mechanisms	
Contingent capital infusions	Ex ante, pre-funded arrangements that increase the capital of firms in times of stress.
– By purchasing “insurance” in the form of a capital infusion conditional on a systemic event	Mandatory contingent private sector arrangements where outside investors agree to inject capital in the event of distress in exchange for a steady stream of premium.
– By issuing reverse convertible bonds	Mandatory issuance of bonds automatically convertible to equity in capital ratio falls below threshold.
Pre-funded systemic risk insurance schemes financed by levy related to bank asset growth beyond certain allowance	A tax on “excessive” bank asset growth that finances an insurance fund. Can be tailored to the individual bank profile. Accumulated funds can be used to help re-capitalise banks (or provide a floor for asset values) in times of systemic stress.
Adopt pre-funded deposit insurance with premia sensitive to macro (systemic risk) in addition to micro (institution specific parameters)	Pre-funded schemes avoid calling on surviving institutions to provide funds for losses incurred to the scheme by failing banks.
8. Managing failure and resolution	
Exit management policy conditional on systemic strength	Trigger points for supervisory intervention can be made stricter in booms than in periods of systemic stress.



Annex 2: An illustrative comparison of regulatory capital instruments

This Annex compares three possible options concerning the minimum capital requirement as prescribed by the Internal Ratings Based (IRB) approach under the rule-based Pillar 1 of the Basel Committee's framework. The choice is highly selective and the aim is only to illustrate the use of the criteria laid out in Section III. What follows does not provide a full discussion of the costs and benefits of each option or reach a final judgment.

The three, not necessarily mutually exclusive, options are:

- i. A (further) reduction in the risk sensitivity of the capital charges embedded in the IRB formula. This sensitivity is determined by the "*risk curve*", a function linking the charges to the probabilities of default (PDs) of obligors.
- ii. For a given risk curve a (greater) use of less cyclically-sensitive *inputs*, such as through-the-cycle, rather than point-in-time, estimates of PDs.
- iii. For a given risk curve and inputs, adjustments applied to the final *outputs* of the IRB (the capital charges) in order to reduce their cyclical sensitivity. Examples include smoothing their variation over time through re-defining the capital charge as some moving average of the cyclically-unadjusted output, or having a cyclically-sensitive multiplier that could generate any desired degree of *countercyclicality* in the charges. The value of the multiplier could depend on system-wide indicators of the financial/business cycle and, could also be adjusted for bank-specific characteristics (eg, estimates of the bank's exposure to the cycle, etc). This multiplier would represent a kind of "macroprudential" overlay to the cyclically-unadjusted output of the current IRB formula.

Elements of options (i) and (ii) have already been implemented to some extent. The Basel Committee has reduced the sensitivity of the risk curve relative to the initial proposals, by lowering the charge for high PDs. It has also encouraged the use of cyclically-adjusted inputs, most notably by requiring the use of estimates of loss given default (LGDs) derived from recessions ("downturn LGDs"). By contrast, measures that would fall under option (iii) have not been pursued. The outputs of the IRB formula, however obtained, feed straight into the minimum capital requirement.

While all the options reduce the procyclicality of the minimum requirements, they differ fundamentally in how they treat risk. Critical here is the distinction between the cross-sectional and the time dimensions of risk. The first refers to the risk sensitivity/differentiation in a *cross section* of obligors at a given time and the latter to the risk sensitivity to the evolution of credit risk *over time*. Options (ii) and (iii) target only the sensitivity to the time, and hence cyclical, dimension of risk (ie, how capital charges would evolve with measures of risk through expansions and contractions), but does not interfere with the cross-sectional dimension. As a result, these options preserve the sensitivity to the relative risk in the cross section at a given time. By contrast, option (i) reduces the cyclical sensitivity over time precisely because it reduces it in the cross section.

The **effectiveness** of the options is, of course, an empirical issue but the potential degree to which they can dampen procyclicality varies. This potential is lowest for option (i). In the limit, complete risk insensitivity would imply the same capital charge irrespective of risk, as in Basel I or for a leverage ratio. Option (ii) has a higher potential in reducing procyclicality. For example, full through-the-cycle PDs and downturn LGDs would imply little, if any, sensitivity. The migration through rating classes would in principle reflect purely firm-specific, rather than economy-wide risk and LGDs would be effectively fixed. Option (iii) allows for the highest degree of dampening procyclical capital charges. In fact, the macroprudential overlay could even be calibrated to achieve any desired degree of *countercyclicality* in the minima.



In terms of **transparency**, option (iii) and, in particular the macroprudential overlay, arguably scores the highest. This assumes that the basic elements of the capital requirements are publicly disclosed for all three options. The reason is that the multiplier acts as an “overlay” to the output of the original (not cyclically-adjusted) formula, making it easy for bank analysts and other interested parties to identify the additional counter-cyclical component in the financial reports. This would also highlight the wedge between risk as perceived and managed by individual institutions and risk for the financial system as a whole, typical of the micro/macroprudential distinction.

In terms of **implementation costs**, as well as **simplicity**, option (i) might score highest and (iii) lowest, with (ii) somewhere in between, but this depends in part on the specifics. Questions of validation and the nature of the adjustments are relevant here. The through-the-cycle measures in option (ii) may be relatively difficult to validate: there is a scarcity of data over at least one full business and credit cycle. At the same time, the disadvantage of option (ii) may not be that great: the validation of point-in-time estimates in options (i) and (iii) may be only deceptively less demanding, if it assumes that samples shorter than one cycle are representative of an underlying cycle-varying probability distribution. As regards the adjustments, option (iii) could be the most complex and have the highest implementation costs. It would call for a judgment on the appropriate level and sensitivity of the multiplier to the parameters that represent the “cycle”. Beyond this, complexity would vary with the type of adjustment.¹ The adjustment in option (i) would be the simplest. It would, however, be harder to reconcile with the desire for increased risk sensitivity of Basel II.

In terms of **fairness** (ie levelling the playing field) the ranking of options is not so obvious. All of them would seem equivalent with respect to avoiding competitive distortions among banks, as long as the adjustments are consistently made on an exposure-by-exposure basis (see discussion on the operational definition of the “cycle” in page 4 of the main text). The level playing field between regulated and unregulated institutions will depend on the calibration of the requirements. This could favour options (i) and (ii) if the degree of countercyclical in option (iii) was significant.

In terms of **evasion**, the measure that is closest to the way risk would otherwise be priced and managed by the bank is likely to perform best. This would seemingly argue for option (iii), as it would take as a starting point the PDs actually used by banks, without any adjustments. At the same time, the final outcome depends on the calibration of the requirement and hence on the “tax” that it implies. The incentive to evade could in fact be highest for option (iii), if it implied a substantial degree of countercyclical.

Option (i) **limits discretion** the most. Validation of the cyclically adjusted inputs in option (ii) is likely to be more demanding (see above). The scope for discretion in option (iii) depends on the specification of the regulatory capital multiplier, but would be larger than for option (i).

¹ The phases of the “cycle” could be proxied in different ways, ranging from simple deviations from a long-term trend to more sophisticated techniques. And the parameter could differentiate between only two states (eg, “expansion” and “contraction”) or take the form of a smoother function.