

**Response to the Basel Committee's request for
comments on the consultative document:
Proposed Enhancements to the Basel II Framework**

April 8, 2009

Algorithmics



Secretariat of the Basel Committee
on Banking Supervision
Bank for International Settlements
CH-4002 Basel
Switzerland

April 8, 2009

Response to the Basel Committee's request for comments on the consultative document: Proposed Enhancements to the Basel II Framework

Dear Members of the Basel Committee for Banking Supervision:

As a worldwide leading vendor of risk management software solutions, we are extremely interested in the developments of regulations and best practice for risk management. As a matter of fact, it is our prime interest to provide our clients with systems and solutions that effectively address the needs of risk-taking institutions and favour risk awareness, assessment and management.

To this end, we have been steadily devoting significant effort into understanding market phenomena. Accordingly, we feel contributing to the development of methodologies and practices for effective risk management as a responsibility. Our White Papers on Liquidity Risk, published in the early times of the crisis (December 2007) and still available on our website, were intended as a step in this direction.

In this spirit we respectfully submit the following suggestions as a response to your request for comments to your consultative paper: Proposed Enhancements to the Basel II Framework, issued for comments on 16 January 2009.

Please note that our comments will concentrate on Liquidity Risk, and especially on Pillar 2.

General introductory remarks

1. We strongly endorse Basel Committee's view that strengthening of supervision is necessary. We have noted from BCBS's press release of 12 March 2009¹ that additional actions will be taken to tighten the capital requirements by addressing such issues as risk coverage, procyclicality, and capital quality. We welcome this development, which we understand will likely further affect the Basel II framework.
2. Some of the following comments actually refer to the extent to which capital measures can be effective for liquidity risk management and can therefore play a role also in the perspective of the new envisaged developments.
3. We believe that as much effort as possible should be posed in the convergence of local supervisory regimes of liquidity risk supervision. F. Battaglia and M. Onorato (2007) showed that local regimes currently show significant differentiation in such core

¹ Basel Committee on Banking Supervision Initiatives on Capital Announced by the Basel Committee, Press Release, 12 March 2009

dimensions as: standard quantitative requirements; reliance on firms' internal models; liquidity risk indicators used; supervisory guidance; etc. Some analysts have expressed their concern about the fact that some national supervisors are instead going ahead individually with local overhaul projects as this could undermine co-operation between regulators internationally. We share this concern. As a matter of fact, differentiation of regulations has at least two notable implications:

- It generates an uneven playing field that may affect cross-border competition. In extreme cases, very tough local regulations could create a pressure for supervisory arbitrage. For instance, the new UK regulatory regime for liquidity risk which is scheduled to be enforced in October 2009 is expected by the FSA itself to generate substantial compliance costs². If no similar requirement were imposed in other countries, some firms may be tempted to relocate operations elsewhere in search for lighter regulatory burdens.
- From a more qualitative perspective, but even more importantly in a sense, the differentiation in supervisory styles is the sign of still lacking agreement among supervisors about best practice of liquidity risk management and tools for liquidity risk mitigation.

Quantitative requirements for liquidity risk

The effectiveness of capital measures as a protection for liquidity risk has been the subject of a vast debate. Most analysts have concluded that although strong capital is important, a capital requirement should not be considered as an adequate tool for liquidity risk mitigation.

We only partially agree with this conclusion and believe it should be more clearly qualified. As a matter of fact, liquidity risk can be split into different components that should be measured with different metrics and addressed with different counterbalancing measures:

- A first component of liquidity risk is actually a consequential risk, i.e. an outcome of other risk types. This includes the liquidity implications of price risk of liquid assets, market liquidity risk (i.e. the risk that marketable assets cannot be sold, if at all, without seriously affecting the sale price), margin calls, credit risk, etc. These "primary" risks can be measured in terms of a synthetic measure based on value. Therefore, for this component of liquidity risk an economic capital approach is suitable and capital requirements should be considered adequate.
- The maturity mismatch component of liquidity risk (funding liquidity risk), instead cannot be treated as a consequential risk. For this component, a capital measure should not be seen as an effective mitigant. The core reason for this is that value, on which capital measures are based, is an unsuitable metric for maturity mismatch risk. Indeed, the specific analytic for measuring maturity mismatch risk is net expected cash flows occurring on each of a series of defined time buckets in the future. Here the time dimension can never be disregarded: it is important to know whether a cash deficit will occur in one time bucket or in another, nor can a cash flow deficit in one particular time bucket necessarily be "swapped" against a surplus in another. As a result, any attempt to consolidate cash flows into a synthetic measure based on value would inevitably expose a firm to hidden risks and distorting risk mitigation

² Financial Services Authority, CP 08/22: Strengthening Liquidity Standard, December 2008, 9.20 and 9.28

decisions. For this component of liquidity risk, liquid asset buffers are the most effective protection.

As a result, we question the consistency of including Liquidity Risk among the risks for which banks are required to calculate and hold Internal Capital.

On the other hand, we endorse the idea that liquidity risk should be subject to quantitative requirements.

In many jurisdictions where quantitative requirements are applied, the basis for these is the obligation for banks to maintain a certain amount of liquid assets to compensate for the deficit in expected cumulated cash flows over a selected time horizon. We believe that such an approach is helpful but in itself not sufficient as a protection against liquidity stresses – indeed this is what recent history has taught.

Already in our White Papers of 2007 we expressed the view that: “*A regulatory requirement might be designed to directly address the availability of adequate liquidity sources in view of stress scenarios*”³. We are pleased that the UK’s FSA followed this approach in building up its new regulatory framework for liquidity risk. This approach effectively addresses some critical conditions for effectiveness:

- It recognizes the need to maintain a liquid asset buffer as a liquidity reserve to preserve stability
- It assumes that the amount of liquid assets to be considered “adequate” for each bank has to be defined under stress assumptions, in recognition that the characteristic of liquidity risk of referring to low-frequency, high impact events makes it unsuitable to rely on models and requirements that would suffice during “normal” times.

However, we should recognize that even stress testing is no panacea – especially in view of model risk, which we will address later in this document. The approach described above might still be compatible with still excessive leverage ratios. As a result, we endorse complementing the above approach with a cap on leverage – an idea that is already being extensively considered, lately by the Financial Stability Forum⁴.

In this context, we favour the approach proposed by M. Onorato and J. Spronk (1993), where it is shown that leverage caps should not be set uniformly for all banks in view of risk mitigation. In fact, it can be demonstrated that the relationship between risk and leverage is not linear and is a function of firm size, so that limits to leverage ratios should be dependent on balance sheet dimensions and should be set stricter for big banks than for smaller ones.

An additional indicator for a minimum liquid asset reserve

A useful indicator to assess adequacy of the liquid asset portfolio in view of liquidity risk obligations in “normal” times could come from stochastic analytics of the gap between expected cash flows and liquid asset value. This way, the informative potential of Forward Liquidity Exposure and Counterbalancing Capacity would be combined and enhanced into a single, probabilistic view.

³ F. Battaglia and M. Onorato, Liquidity Risk: Comparing Regulations Across Jurisdictions and The Role of Central Banks, December 2007, page 7

⁴ Report of the Financial Stability Forum on Addressing Procyclicality in the Financial System, 2 April 2009

Under this approach, a probability distribution of the above mentioned gap can be obtained for each of the time buckets within a selected time horizon. (Ideally, this should be done for each day in the time horizon in which daily cash flows are prescribed, e.g. 30 days or even 90 days as under the new FSA approach. This should be set considering possible technology issues.) The total of all the figures corresponding to a predefined percentile in the distribution (e.g. 95% LT) can be set as the minimum value of liquid assets to be maintained as a cushion for liquidity risk in the short term.

Such an indicator is, in a sense, a stochastic/dynamic evolution of a basic supervisory indicator for liquidity risk that is currently in use in several jurisdictions, i.e. the ratio of the sum of liquid assets + expected cash inflows within a selected time horizon to expected cash outflows in the same time horizon. The advantage of using probability distributions based on stochastic scenarios for both liquid asset values and expected cash flows is that it enhances risk assessment. As a matter of fact, it allows taking into account not only the static “base case” (expected value) but also a more unfavourable percentile that includes unexpected adverse variations of cash flows.

Ideally, the cash flows considered here should be comprehensive, i.e. comprise of all contractual, behavioural, contingent and hypothetical cash flows – therefore including business simulations. This would be important to ensure adherence of the resulting indicator to the individual firm’s business model and actual risk.

If coupled with a minimum regulatory liquid asset requirement based on stress test results, such an indicator could be used to monitor on a daily basis the adequacy of liquid assets in view of expected cash flows in the short term. If the amount of liquid assets defined by means of the stress test result appears to be insufficient under this approach, this could be seen as a warning that the results of the latest stress test have gone out of date and a new stress test should be run.

Model risk

We believe that a more extensive analysis of model risk would be necessary.

Models used for pricing and risk management purposes are comprised of three elements: assumptions, parameter calibration, and risk factors. Model risk can hide in each of these, and obviously tends to be greater when product complexity increases. Complexity often depends on sophisticated embedded optionality, especially if valued over the long term, or to non-transparent credit information.

Complexity of bank products has been steadily increasing in latest years, both in the trading and the banking book. As a result, risk assessment and representation is to a growing extent depending on models – i.e., on assumptions.

This has made model risk a major challenge for a realistic representation of risk in banks’ balance sheets. It should be recognized that, however sophisticated models can be, model risk cannot be completely eliminated. This not only affects ordinary risk assessment, but may even undermine the significance of stress testing, whose results inherently depend on how the impact of risk factors has been modeled. In addition, markets in times of stress tend to

behave differently than in normal times so that even probability distributions based on history can lose their predictive capacity⁵.

As a consequence, we endorse the view that model risk should be a factor for consideration in determining banks' capital charges.

Referring specifically to liquidity risk, we see two perspectives for addressing model risk more extensively: behavioural models and pricing models for trading instruments.

1. **Behavioural models:** these are increasingly relied upon by banks to obtain a realistic representation of risk and rewards especially of the banking book, as the actual impact of such instruments as demand deposits, prepayable mortgages, mortgage pipelines, revolving facilities, etc. depends on the customers' behaviour and can be substantially different than that suggested by contractual clauses. Accordingly, supervisors increasingly expect banks to have adequate behavioural models in place for their products, and in some cases allow consideration of such models for regulatory reporting on liquidity risk.

In response to the growing complexity of optionality structures and banks' dependency on third parties' behaviour, model accuracy is obviously crucial. However, it should be acknowledged that there will always be an issue in the extent to which behavioural models, however sophisticated and accurate, can trustfully predict customers' behaviour over time and especially in times of stress.

2. **Pricing models for trading instruments:** we note that market liquidity risk (i.e. the possible increase of the transaction cost for trading a particular instrument) is not normally considered as an explicit risk factor in building pricing models, although it can very substantially alter the actual price. Quite to the contrary, many derivatives pricing models usually assume no constraints on liquidity. This makes pricing models for most trading instruments basically incorrect in the context of potentially severe liquidity shocks and may contribute to spreading uncontrolled and unremunerated risk around the market.

Market liquidity risk should in turn be properly modeled as a function of risk factors. The complexity of the instrument, and particularly of the embedded long-term optionality structure, should be a factor in determining market liquidity risk and pricing as a consequence.

We thank the Committee for its diligent review of our concerns and comments. We would welcome queries or requests for further detail on any of the topics raised, or related issues. We can be reached by telephone at +44 207 392 5917. Alternatively, we are available via e-mail to mario.onorato@Algorithmics.com or fabio.battaglia@Algorithmics.com.

Sincerely,

Mario Onorato, Senior Director
Balance Sheet Risk Management

Fabio Battaglia, Senior Business Analyst
Balance Sheet Risk Management

⁵ See for example Jean-Claude Trichet, President of the ECB: *"The dominant models rely on simplified hypotheses, consisting of laws of probabilities about future events. In periods of crisis [...] the behaviour of markets and prices does not appear to follow any probabilistic model ex ante but rather reflects a more fundamental Knightian uncertainty in which even probabilities are unknown."* (Speech at the Coface Country Risk Conference, 19 Jan 2009).

References

- Mario Onorato and Jaap Spronk, Measuring Bank Performance, Working Paper – Erasmus University, Rotterdam, 1993
- Fabio Battaglia and Mario Onorato, Liquidity Risk: Comparing Regulations Across Jurisdictions and The Role of Central Banks, December 2007
Web: <http://www.algorithmics.com/EN/publications/whitepapers/>
- Fabio Battaglia, Mario Onorato and Steven Good, Liquidity Risk Management – Assessing and Planning for Adverse Events, December 2007
Web: <http://www.algorithmics.com/EN/publications/whitepapers/>
- Financial Services Authority, CP 08/22: Strengthening Liquidity Standards, December 2008
- Jean-Claude Trichet, Speech at the Coface Country Risk Conference, 19 Jan 2009
- Financial Stability Forum, Report of the Financial Stability Forum on Addressing Procyclicality in the Financial System, 2 April 2009