14 December 2006

Technical aspects of the management of concentration risk under the supervisory review process - CP 11- 2nd Part

Executive Summary

1. CEBS refers in its guidelines on the Application of the Supervisory Review Process under Pillar 2 issued in January 2006 (GL03) to a structured dialogue between supervisors and institutions that should embrace four types of risks (i) Pillar 1 risks, (ii) risks not fully captured under Pillar 1, (iii) risks covered by Pillar 2 and (iv) external factors not already considered in the previous cases[1].

2. In particular, institutions should develop and maintain an ICAAP[2] that identifies risks they are or might be exposed to and allocate adequate financial resources against those risks.

3. This paper addresses concentration risk, one of those risks mainly captured under Pillar 2.

4. The document puts the emphasis on high level guidance, some of which is applicable to institutions (both credit institutions and investment firms) and some to supervisors. It is not meant to provide detailed guidance on whether and how quantitative tools and models should be used or developed.

5. CEBS survey of market practices[3] carried out in 2006 shows that there is a wide range of practices, from simple methodologies of measuring and managing concentration risk to sophisticated economic models. In economic capital models, concentration risk is not necessarily taken into account as a separate component but is rather modelled implicitly under a wider risk assessment. These guidelines have been developed with this in mind. It is therefore important for supervisors to adopt a flexible and proportionate approach when undertaking their supervisory review, allowing in particular for the complexity of an institution's business and the sophistication of the methodologies it uses.

6. It is also recognised that as market practices are still developing, there is a need to ensure that such a technical paper is kept under review and, to

[1] See Chapter 4: the SREP-ICAAP interaction and prudential measures. Dialogue 2. page 34.
[2] ICAAP stands for Internal Capital Adequacy Assessment Process
[3] See http://www.c-ebs.org/Advice/LE_industryreport.pdf

the extent necessary, adapted in the light of any future developments and experience.

7. The document sets out general considerations including current international thinking, a definition of what concentration risk might cover, the relevant legal requirements of the Capital Requirements Directive[4], and a summary of current market practices. This, together with the supervisory considerations, explains the context that has led to the guidelines.

8. The paper then sets out technical guidelines as follow-up to CEBS GL03, addressing institutions as well as supervisors:

   a. the guidance for institutions sets out what institutions should take into account in relation to concentration risk in their ICAAP, under which it is the institution's own responsibility to adequately manage (i.e. identify, measure, monitor and control) these risks and allocate internal capital, where considered necessary, in support of concentration risk in a structured manner,

   b. the guidance for supervisors outlines how concentration risk should addressed in the context of the Supervisory Review and Evaluation Process (SREP) dialogue. Supervisors will require institutions to show that their internal capital, where considered necessary, is commensurate with the level of concentration risk.

9. The concept of proportionality, as laid down in the provisions of the Directive 2006/48/EC related to Pillar 2 and underlined in the introductory statements of CEBS GL03, applies also to concentration risk measurement and management, the complexity of which will be expected to be related to the size of the institutions as well as to the sophistication and diversification of their activities.

10. Therefore, both in relation to points (a) and (b) above, and in accordance with CEBS GL03, the supervisory authorities will adapt their approach to ensure it is proportionate to the nature, scale and complexity of the activities of an institution. Similarly, the depth, frequency and intensity of the supervisory evaluation will be determined by the risks posed to the supervisor's statutory objectives of ensuring the soundness of the banking sector and protecting depositors.

11. CEBS guidelines on the management and mitigation of concentration risk should not be considered as a tick-box list of requirements. As noted earlier, supervisors should adopt a flexible approach when undertaking their supervisory review and consider the appropriateness of the following guidelines to the nature and context of the institution's business. Specifically, in accordance with the principle of proportionality, it is important to note that when the paper refers to internal capital, it is not required that institutions use economic capital models.

[4] Which recasts the Directive 2006/48/EC and the Directive 2006/49/EC

12. It is noted that the large exposures review by the European Commission[5] is still under way and since large exposure and concentration risk are closely related, it will probably be necessary to review the present guidelines in light of the outcome of that review. In these circumstances it has been questioned whether it would make more sense to defer issuing these guidelines until the Commission has completed its review of large exposures. However, CEBS considers that it is necessary to have these guidelines as part of the CRD implementation process and therefore to publish them in 2006.

13. The draft guidelines went through a three-month public consultation as the second part of the 11th Consultation paper of CEBS (CP11). As mentioned, the finalisation of the guidelines has also benefited from information gathered by CEBS in its survey of industry practices carried out in the context of the large exposures review. This explained the extension of the timeline for publishing final guidelines.

14. The guidelines have finally been informed by further dialogue with a panel of experts nominated by the CEBS Consultative Panel.

15. Attached to this paper is a feedback which contains a summary of the key points arising from the consultation and the responses made to address them. It includes an annex reflecting CEBS' views on the detailed comments received.

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Appendix I Basel Committee on Banking Supervision-International Convergence of Capital measurement and Capital Standards, para 770-777 – June 2004.

[5] Article 119 of the CRD states that by 31 December 2007, the Commission shall submit to the European Parliament and to the Council a report on the functioning of the large exposures regime in the CRD, together with any appropriate proposals.

GENERAL CONSIDERATIONS

16. Concentration risk is regarded as one of the most important potential causes of major institutions losses, which may become large enough to jeopardise an institution's on-going operations.

17. Concentration risk is viewed in terms of both traditional on balance sheet exposures and those embodied in a range of financial instruments and off-balance sheet exposures (e.g. credit default swaps). Concentration risk is understood as being intimately related to credit risk, which is analysed and measured as part of the broader credit risk management process, but can also arise in any risk type. As such, concentration risk may arise in both the banking and trading books, with the latter arising in terms of counterparty risk and significant exposure to particular instrument types or instruments whose value is driven by the same common factors.

18. Although it is important for all institutions to monitor and control concentration risk both across portfolios and on a consolidated basis, its relative importance will vary. For example, it is likely that it will be relatively less important from a capital adequacy perspective for large internationally active institutions with well diversified portfolios, as Pillar 1 has already been calibrated on the basis of such institutions. On the other hand, it will be relatively more important for institutions with less diversified portfolios - either because they are geographically concentrated or are specialised lenders in particular sectors - to consider the extent to which their business is concentrated and the consequent role of capital in relation to comparative advantages such as expertise and local knowledge. In this respect, it is important to recognise that specialised institutions should not necessarily be assumed to be more risky in comparison with larger institutions doing the same business.

19. The concept of proportionality, as laid down in the provisions of the Directive 2006/48/EC related to Pillar 2 and underlined in the introductory statements of CEBS GL03, applies also to Concentration risk measurement and management, the complexity of which will be expected to be related to the size of the institutions as well as to the sophistication and diversification of their activities.

20. Therefore, both in relation to points (a) and (b) above, and in accordance with CEBS GL03, the supervisory authorities will adapt their approach to ensure it is proportionate to the nature, scale and complexity of the activities of an institution. Similarly, the depth, frequency and intensity of the supervisory evaluation will be determined by the risks posed to the supervisor's statutory objectives of ensuring the soundness of the banking sector and protecting depositors.

21. CEBS guidelines on the management and mitigation of concentration risk should not be considered as a tick-box list of requirements. As noted earlier, supervisors should adopt a flexible approach when undertaking their supervisory review and consider the appropriateness of the following guidelines to the nature and context of the institution's business. Specifically, in accordance with the principle of proportionality, it is important to note that when the paper refers to internal capital, it is not required that institutions use economic capital models.

22. The obverse to concentration is diversification, so it is important to understand the potential of correlation analysis to measure both concentration and diversification. An insufficiently granular analysis or analysis that does not explore to a sufficient degree the common factors affecting exposures, and their correlation, will not adequately capture or measure concentration risk.

International context

23. Concentration risk is set out in Articles 770-777 of the Basel text of June 2004 (See Appendix I below). It has been ensured that the guidelines below are consistent with current international thinking as set out in the Basel text.

Definition

24. For the purpose of this paper, concentration risk is any single (direct and/or indirect) exposure or group of exposures with the potential to produce losses large enough to threaten an institutions health or its ability to maintain its core business.

25. Concentration risk arises from:

- large (possibly connected[6]) individual exposures - the definition of connected for these purposes needs to be sufficiently broad to capture exposures which are connected through, for example, common ownership/management/guarantors. This kind of concentration may be broadly covered, in particular in institutions which use quantitative modeling techniques, via granularity adjustments in the context of Pillar 2 measures, and

- significant exposures to groups of counterparts whose likelihood of default is driven by common underlying factors, for example:

    - economic sector,

[6] As defined by Article 4(45) of Directive 2006/48/EC.

- geographical location,
- currency,
- credit risk mitigation measures (including, for example, risks associated with large indirect credit exposures to a single collateral issuer).

Legal Basis

26. Under Directive 2006/48/EC, concentration risk is addressed in particular as follows:

> *Annex V - Technical criteria on organisation and treatment of risks.*
>
> Para. 7 The concentration risk arising from exposures to counterparties, groups of connected counterparties, and counterparties in the same economic sector, geographic region or from the same activity or commodity, the application of credit risk mitigation techniques, including in particular risks associated with large indirect credit exposures (e.g. to a single collateral issuer) shall be addressed and controlled by means of written policies and procedures.
>
> *Annex XI- Technical criteria on review and evaluation by the competent authorities.*
>
> 1. In addition to credit, market and operational risks, the review and evaluation performed by competent authorities pursuant to Article 124 shall include the following: (a)…
>
> > b) the exposure to and management of concentration risk by the credit institutions, including their compliance with the requirements laid down in Articles 108 to 118.

27. Such requirements fall under the more general provisions of Article 123 for institutions to have sound, effective and complete strategies and processes to assess and maintain on an ongoing basis the amounts, types and distribution of internal capital that they consider adequate to cover the nature and level of the risks to which they are or might be exposed; and for these strategies and processes to be subject to regular internal review to ensure that they remain comprehensive and proportionate to the nature, scale and complexity of the activities of the credit institution concerned.

28. In addition to the specific provisions on concentration risk included in the Directive 2006/48/EC, institutions will continue to be subject to the rules on monitoring and control of large exposures provided for in Articles 106 to 118.

Current Market Practices

29. As indicated in the CEBS survey of industry practices[7], there are numerous ways that financial institutions currently identify and measure concentration risk.

30. The complexity and the degree of the sophistication of the methodologies reflect both the specific form of the risk in question, and the nature, scale and complexity of institution involved, and are typically a product of the approach being taken to credit risk measurement and management by the individual institution.

31. With regard to the single-name concentration risk, almost all respondents to the CEBS survey indicated that they used an approach based on notional/nominal exposure limits. A significant number of respondents – mostly but not exclusively larger or more sophisticated institutions – indicated that they also use approaches based on economic capital models.

32. In economic capital models, concentration risk is not necessarily taken into account as a separate component but is rather modelled implicitly under a wider risk assessment.

33. With respect to the connectedness of counterparties, institutions work on the basis of common/legal direct or indirect ownership, management control or financial dependencies. It is determined, for many institutions, case-by-case with the aid of both quantitative tools and qualitative judgements.

34. Some institutions consider two kinds of concentrations risk: single name and what is called 'other concentration risk', namely the risk arising from a group of exposures that share the same underlying risk factors (exposures in the same sector or the same geographical region) such that a deterioration in the common risk factors could affect the ability of all the counterparties to service their debt.

35. Based on that classification institutions perform specific approaches and have different tools. Stress testing techniques are also conducted by a number of institutions – mostly large and medium-sized institutions.

36. Defining the relevant sectors and geographical areas was identified by respondents as one of the first steps in managing concentration risk. From a review of the responses to the CEBS survey, institutions seem to identify the country risk mainly with objective/factual indicators, however, delineating a 'sector' seems to prove more judgmental.

37. Most of the institutions which participated in the CEBS survey of market practices with regard to the measurement and management of large exposures and other concentration risk indicated that measurement of concentration risk is a part of an institution's overall

[7] http://www.c-ebs.org/Advice/LE_industryreport.pdf

approach to credit risk management, and the approach adopted will usually reflect the nature, scale and complexity of the institution in question. A mixture of tools and approaches are used to address 'other concentration risk,' including limits, distribution charts by sectors, reporting and judgemental considerations around high-risk areas. Some of the more sophisticated institutions reported they use methodologies based on economic capital or VaR models.

38. The more sophisticated institutions reported conducting stress tests using economic capital models. When using stress tests, less sophisticated institutions reported they take different scenarios into account in their analysis, but using simpler methods. Respondents noted that stress tests are a tool adopted to help identify and manage a broad spectrum of risks (including concentration risk), but they are not targeted specifically at concentration risks.

(i) Identification and measurement of concentration risk

39. A range of methods are used for the measurement of concentration risk including:

(a) **Single/connected counterparties/exposure types** are readily measured in terms of simple metrics that reflect the size discrepancies embodied in concentration risk. Individual counterparty metrics, such as notional exposure or a combination of notional exposure and LGD relative to a balance sheet total can be calculated. In addition, a range of portfolio indicators e.g. rankings of the largest exposures, diversity scores[8] or concentration curves[9] can also be calculated.

(b) **Common or correlated underlying factors**. A more sophisticated portfolio based approach is sometimes adopted where common risk factors have been analysed, whereby correlations in probability of default can be identified. Taking a portfolio view, concentration reflects an interaction between individual exposures and correlation. The data available when more sophisticated credit risk modeling is undertaken should allow the assessment of correlations and the calculation of diversification effects.

40. Examples of tools include the following:

- Size of top 'x' large exposures relative to relevant numeraire (e.g. balance sheet/own funds/net profit numeraire);

[8] Diversity Scores are analogous to the Herfindahl-Hirschmann index (HHI) used in market structure analysis. The HHI is calculated from the sum of the squares of the percentages of the shares of the exposures. The value of the HHI must lie between 0 and 10,000, with larger values indicating higher concentration. It measures the extent to which a small number of sectors/countries/counterparties account for a large proportion of exposure. HHI is related to exposure concentration or, if appropriately modified, to expected losses.

[9] A concentration curve provides a means of assessing for instance whether a certain risk is more concentrated in some countries/sectors than in others.

- Size of top 'x' connected exposures relative to relevant numeraire;

- Size of key sectoral/geographical concentrations relative to relevant numeraire;

- As examples of contributory factors in economic capital models : Portfolio concentration ratios, Diversity scores, Concentration curves, Gini coefficients[10]; Portfolio correlations and variance / covariance measures.

(ii) Mitigation of concentration risk

41. Many respondents to the CEBS survey reported that they use credit risk mitigation to reduce their concentration risk, using a range of tools, both quantitative (e.g. limit structures) and qualitative (e.g. management actions such as reporting and escalation procedures), that are used for balance sheet management more broadly.

42. Some institutions capture and monitor correlated exposures, both on and off balance sheet, and set risk based limits accordingly. Limits might be risk sensitive regarding the counterparty's creditworthiness or the perceived risk of a certain sector or region and may take into account other factors such as the nature of the product, maturity/tenor, the purpose of credit and sources of payment.

43. The sophistication of the methods used by institutions appears to vary depending on the size of the institution. Some respondents to the CEBS survey flagged that there is a gap between the range of credit risk mitigation techniques developed by part of the industry and the credit risk mitigation techniques eligible for regulatory purposes laid down in the Capital Requirements Directive.

44. There is a range of mitigants for concentration risk used by institutions, including, but not limited to, combinations of:

- **Limits:** comprehensive credit limit systems which identify large individual exposures/connected counterparties; and reflect ongoing portfolio monitoring and risk appetite in terms of concentration risk. The Large Exposures requirements of the CRD may be a useful starting point but may not, in themselves, be sufficient for institutions in defining their own internal limits. Most institutions set sector, country and product line limits. Some capture and monitor correlated exposures, both on and off balance sheet, and set limits accordingly.

- **Portfolio management**: monitoring of risk concentrations through active portfolio management enables institutions to adjust their new

[10] Gini coefficient can be used to measure any form of uneven distribution. It is a number between 0 and 1, where 0 corresponds with complete risk homogeneity (where every exposure has the same risk) and 1 corresponds with absolute concentration (where one exposure carries all the risks, and the other exposures have zero risks).

business acquisition to correct for undue concentrations which have arisen, or may arise.

- **Risk transfer:** using a systematic approach to transferring credit risk to another party, either directly by selling down the assets or as part of structured securitisation transactions or by buying protection from other parties (examples include credit derivatives, collateral, guarantees, sub-participation, assignment).

- **Capital buffers:** it is common for some institutions to hold additional capital buffers above their required minimum regulatory capital, making an additional general rather than specific capital allocation for concentration risk in the portfolio.

(iii) Stress testing

45. As indicated in paragraphs 35 and 38 above, some institutions reported using stress testing as a tool for the assessment and management of concentration risk.

46. During periods of economic calm, concentrations in an institution's portfolio are unlikely to have any noticeable adverse effects on performance or credit quality as usually measured and, as such, can remain latent. However, the real threat arises in an adverse economic scenario, where connected or correlated exposures all show increased risk of default or actually default at the same time. Stress testing may reveal previously undetected linkages between different elements of an institution's portfolio. In this context, well designed, comprehensive and regular stress tests of institutions' portfolios may serve as a useful tool in managing concentration risk.

GUIDANCE FOR INSTITUTIONS

Concentration 1

All institutions should have clear policies and key procedures ultimately approved by the management body[11] in relation to exposure to concentration risk

Institutions should have a clear and transparent concentration risk policy, as part of the broader credit risk process, which is clearly and properly documented and approved by the management body. It should be subject to regular review to take account of changes in risk appetite and the business environment.

When devising their policies and procedures and when carrying out their review, institutions should bear in mind the CEBS guidelines on internal governance[12].

Concentration 2

In application of Article 22 of the Capital Requirements Directive, institutions should have appropriate internal processes to identify, manage, monitor and report concentration risk which are suitable to the nature, scale and complexity of their business.

Institutions should have internal processes that identify, measure and monitor concentration risk encompassing, for example:

- individual large exposures to a single counterparty, connected counterparties and related clusters - the definition of connected for these purposes needs to be sufficiently broad to capture exposures which are connected through, for example, common ownership / management / guarantors / syndication techniques,
- exposures to counterparties in the same economic sector or geographic region, or
- CRM techniques, collateral type or single protection seller.

For more complex businesses and for sophisticated institutions, this might also encompass common or correlated risk factors that reflect more subtle or situation-specific factors, that require more sophisticated analysis for measurement and control. These concentrations may reflect correlations in underlying risk factors or exposure to common factors that are embedded in financial structures and may only become apparent in stress situations (see below).

[11] As referred to in Article 11 of the Capital Requirements Directive
[12] See CEBS guidelines on the Application of the supervisory review process under Pillar 2, Chapter 2.1

Concentration 3

Institutions should use internal limits, thresholds or similar concepts, as appropriate, having regard to their overall risk management and measurement.

Institutions should establish, as appropriate, a set of limits thresholds or similar concepts for credit risk management. Procedures should be in place for the utilisation of such limits thresholds or similar concepts ensuring that the degree of credit risk stipulated by the management body is not exceeded.

Institutions should carry out analyses of the credit portfolio, including estimates of its trends, and should take account of the results of these analyses in setting and verifying the adequacy of the procedures and limits, thresholds or similar concepts for credit risk management.

The following sets out some examples for the expression of limits thresholds or similar concepts:

- Size of top `x´ large exposures relative to relevant numeraire (e.g. balance sheet/own funds/net profit numeraire);
- Size of top `x´ connected exposures relative to relevant numeraire;
- Size of key sectoral/geographical concentrations relative to relevant numeraire;
- As contributory factors in economic capital model: Portfolio concentration ratios, Diversity scores, Concentration curves, Gini coefficients[13]; Portfolio correlations and variance/ covariance measures.

Concentration 4

Institutions should have adequate arrangements in place for actively monitoring, managing and mitigating concentration risk against agreed policies and limits, thresholds or similar concepts.

Monitoring should be incorporated into the institution's usual risk management and reporting systems and be undertaken sufficiently frequently to reflect the nature of the business(es) and at a sufficiently senior level within the institution.

Given that concentration risk, by its nature, tends to relate to aggregation of risk it is essential that appropriate oversight is exercised by the management body ultimately at a strategic level.

[13] Gini coefficient can be used to measure any form of uneven distribution. It is a number between 0 and 1, where 0 corresponds with complete risk homogeneity (where every exposure has the same risk) and 1 corresponds with absolute concentration (where one exposure carries all the risks, and the other exposures have zero risks).

If issues of concern are identified by the monitoring activity, an institution's management should consider those issues and the appropriate response. Management responses might, for example, include but are not limited to:

- proceeding to a more detailed review of the risk environment in the particular sector(s),
- applying additional stress tests and scenario analyses,
- reviewing with greater intensity the economic performance of existing borrowers,
- reviewing approval levels for new business, or
- regularly reviewing risk mitigation techniques, their value and their legal enforceability.

Having assessed an issue, an institutions management may conclude that it is appropriate to take mitigating action. For example, one or more of the following might be considered appropriate:

- reducing limits or thresholds on risk concentrations,
- adjusting new business acquisition to address undue concentrations,
- transferring credit risk to other parties, buying protection from other parties (examples include credit derivatives, collateral, guarantees, sub-participation, assignment) or selling down either directly or as part of securitization transactions, or
- allocating additional internal capital (see Concentration 5 below).

Concentration 5

Institutions should assess the amount of internal capital which they consider to be adequate to hold against the level of concentration risk in their portfolio.

Institutions should undertake this assessment as part of their ICAAP, in a transparent way. In doing so, they should take account of a range of relevant factors, including the quality of their risk management and other internal systems and controls, ability to take effective management action to adjust levels of concentration risk and the implications of stress-testing and scenario analysis.

While the role of capital therefore needs to be assessed within this broader context, and keeping in mind that the weight attached to the different factors will vary from institution to institution, the expectation is that the higher the levels of concentration, the greater the onus will be on institutions to demonstrate how they have assessed the implications in terms of internal capital.

Concentration 6

Supervisors will collect sufficient information from institutions on which to base their assessment.

This information should come from a variety of sources, both on-site and off-site.

Off-site supervision (i.e. desk analysis) allows supervisors to draw on a combination of institutions' own internal reports, standardised supervisory and statistical returns (e.g. as used for reporting individual large exposures and sectoral analysis) and specifically designed questionnaires for thematic purposes.

On-site supervision enables supervisors to (i) make first-hand assessments of the quality of an institution's policies and procedures and how effectively the institution manages and controls concentration risk, including management of risk mitigation techniques, and to (ii) verify as necessary the accuracy of reported data. Supervisors will usually have quantitative and qualitative methods for conducting such on-site assessments.

This information will assist supervisors to assess individual institutions in relation to their peers.

Concentration 7

The scope of application of the supervisors' assessment of concentration risk is that used for the Supervisory Review Process (SRP)[14].

Where necessary, supervisors will also have the discretion to apply an assessment at the level of individual entities.

Concentration 8

Supervisors will use quantitative indicators, where appropriate, within their Risk Assessment Systems to assess degrees of concentration risk.

Supervisors can build up these indicators based on the set of limits, thresholds or similar concepts defined internally by institutions (see Concentration 3). They may also develop their own models and tools such as indicators based on the existing regular reporting from institutions, including the reporting of large exposures or geographical / sectoral risks against regulatory capital.

[14] The Scope of application of the SRP is set out on page 9 of the CEBS guidelines on the Application of the Supervisory review Process under Pillar 2 – January 2006

These indicators may be used within the supervisor's risk assessment systems to carry out peer comparisons and identify outliers.

Concentration 9

The supervisory review should encompass not only quantitative aspects but also the qualitative and organisational aspects of concentration risk management.

Supervisors recognise that the assessment and management of concentration risk does not only rely on quantitative modelling techniques but also on qualitative factors e.g. the expertise of people with regard to the identification and management of risks in individual sectors or sub-sectors .

Concentration 10

Supervisors can draw on stress tests performed by institutions to assess the impact of specific economic scenarios on concentrated portfolios.

Supervisors will use the results of stress testing to assess the full extent to which adverse economic conditions impact on highly connected or correlated exposures.

Concentration 11

Supervisors will pay particular attention to those institutions which are highly concentrated by customer type or specialized nature of product.

In doing so, supervisors note that such institutions should not necessarily be assumed to be more risky in comparison with larger and / or more complex institutions doing the same business given the possible existence of comparative advantages such as expertise and local knowledge. At the same time, however, it will be relatively more important in such circumstances for supervisors to consider whether such institutions have adequately assessed the role of capital in conjunction with other relevant factors such as expertise and local knowledge.

Appendix I

Basel Committee on Banking Supervision

International Convergence of Capital measurement and Capital Standards – June 2004

Credit concentration risk

770. A risk concentration is any single exposure or group of exposures with the potential to produce losses large enough (relative to a bank's capital, total assets, or overall risk level) to threaten a bank's health or ability to maintain its core operations. Risk concentrations are arguably the single most important cause of major problems in banks.

771. Risk concentrations can arise in a bank's assets, liabilities, or off-balance sheet items, through the execution or processing of transactions (either product or service), or through a combination of exposures across these broad categories. Because lending is the primary activity of most banks, credit risk concentrations are often the most material risk concentrations within a bank.

772. Credit risk concentrations, by their nature, are based on common or correlated risk factors, which, in times of stress, have an adverse effect on the creditworthiness of each of the individual counterparties making up the concentration. Such concentrations are not addressed in the Pillar 1 capital charge for credit risk.

773. Banks should have in place effective internal policies, systems and controls to identify, measure, monitor, and control their credit risk concentrations. Banks should explicitly consider the extent of their credit risk concentrations in their assessment of capital adequacy under Pillar 2. These policies should cover the different forms of credit risk concentrations to which a bank may be exposed. Such concentrations include:

Significant exposures to an individual counterparty or group of related counterparties. In many jurisdictions, supervisors define a limit for exposures of this nature, commonly referred to as a large exposure limit. Banks might also establish an aggregate limit for the management and control of all of its large exposures as a group;

Credit exposures to counterparties in the same economic sector or geographic region;

Credit exposures to counterparties whose financial performance is dependent on the same activity or commodity; and

Indirect credit exposures arising from a bank's CRM activities (e.g. exposure to a single collateral type or to credit protection provided by a single counterparty).

774. A bank's framework for managing credit risk concentrations should be clearly documented and should include a definition of the credit risk concentrations relevant to the bank and how these concentrations and their corresponding limits are calculated. Limits should be defined in relation to a bank's capital, total assets or, where adequate measures exist, its overall risk level.

775. A bank's management should conduct periodic stress tests of its major credit risk concentrations and review the results of those tests to identify and respond to potential changes in market conditions that could adversely impact the bank's performance.

776. A bank should ensure that, in respect of credit risk concentrations, it complies with the Committee document *Principles for the Management of Credit Risk* (September 2000) and the more detailed guidance in the Appendix to that paper.

777. In the course of their activities, supervisors should assess the extent of a bank's credit risk concentrations, how they are managed, and the extent to which the bank considers them in its internal assessment of capital adequacy under Pillar 2. Such assessments should include reviews of the results of a bank's stress tests. Supervisors should take appropriate actions where the risks arising from a bank's credit risk concentrations are not adequately addressed by the bank.