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## **FI's methods for assessing individual types of risk within Pillar 2**

### **Summary**

Finansinspektionen (Swedish Financial Supervisory Authority – FI) published a memorandum entitled *Capital Requirements for Swedish Banks* (FI Ref. 14-6258) ('the Capital Requirements Memorandum') in September 2014 which, among other things, describes FI's position relating to a number of the capital requirement provisions introduced into Swedish law as a consequence of the implementation of the Capital Requirements Directive ('CRD'). As described in the Capital Requirements Memorandum, capital requirements can be divided into two pillars. The capital requirement calculations regulated in detail in the Capital Requirements Regulation (CRR) are often referred to as Pillar 1. Pillar 2 is the umbrella term for the rules governing firms' internal capital adequacy assessment process, and FI's supervisory review and evaluation process, of which FI's supervisory capital assessment forms a key component.

This memorandum describes FI's methods for assessing the capital adequacy requirement within the framework of Pillar 2 (more precisely, the 'Pillar 2 basic requirement'; see the Capital Requirement Memorandum for further explanation) for three different types of risk. These types of risk are 'credit-related concentration risk', 'interest rate risk in the banking book' and 'pension risk'.

- For concentration risk, FI intends to assess the capital requirement for single-name concentration, industry concentration and geographical concentration using a method based on the Herfindahl Index for firms that use the Standardised Approach for credit risk, and a method that represents a combination of the Herfindahl Index and the Gordy and Lütkebohmert method for firms with permission to use the Internal Rating Based (IRB) Approach for credit risk.
- For interest rate risk in the banking book, FI intends to assess the capital requirement using a method that measures the effect that differences in re-pricing dates and maturities between the firm's assets and liabilities have on the firm's economic value in different interest rate scenarios.

- As regards pension risk, FI intends to assess the capital requirement using a ‘traffic light method’ that is similar to the method used by FI within the area of insurance. Certain adjustments are required to adapt the method to the area of banking.

FI intends to use the methods described in this memorandum, after they have been referred for consultation and finalised, for its supervisory capital assessments in the course of the supervisory review and evaluation process in 2015. As described in the Capital Requirements Memorandum, FI then intends to publish the results of the assessments at a firm level (group level).

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# 1 Introduction and background

## 1.1 Background and purpose

In its memorandum entitled *Capital Requirements for Swedish Banks*<sup>1</sup> ('the Capital Requirements Memorandum'), Finansinspektionen (Swedish Financial Supervisory Authority - FI) describes its position relating to a number of the capital requirement provisions introduced into Swedish law as a consequence of the implementation of the Capital Requirements Directive.<sup>2</sup> As described in the Capital Requirements Memorandum, capital requirements can be divided into two pillars. The capital requirement calculations regulated in detail in the Capital Requirements Regulation<sup>3</sup> are often referred to as 'Pillar 1'. 'Pillar 2' is the umbrella term for the rules governing the firms' internal capital adequacy assessment process (ICAAP) and FI's supervisory review and evaluation process, of which FI's supervisory capital assessment forms a key component.

The supervisory capital assessment is based on a comprehensive analysis of the firm and takes account of the extent to which a firm needs to hold additional capital to cover risks or risk elements not covered by Pillar 1. This additional capital is referred to hereafter as the *Pillar 2 basic requirement*.

FI states in its Capital Requirements Memorandum that the authority intends to publish a document describing FI's detailed methods for assessing the capital requirement for individual risk types within the framework of the supervisory capital assessment. The memorandum now being referred for consultation describes the methods that FI intends to use to assess capital requirements within the Pillar 2 basic requirement for three important types of risk. The risks in question are 'pension risk', 'credit-related concentration risks' and 'interest rate risk in the banking book (IRRBB)'.<sup>4</sup>

Firms may choose to use FI's methods when assessing their own capital requirement, although this is not a requirement. As described in Sub-section '1.5 General legal basis', firms must consider in their ICAAP the risks to which they are or may become exposed. This also applies to risks and risk elements that are not taken into account in the methods described in this

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<sup>1</sup> FI Ref. 14-6258. Published on *fi.se* on 10 September 2014.

<sup>2</sup> Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC.

<sup>3</sup> Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012.

<sup>4</sup> The Capital Requirements Regulation makes a distinction between interest rate risk in the trading book and interest rate risk on positions not included in the trading book. 'Interest rate risk on positions not included in the trading book' is often referred to as 'interest rate risk arising from non-trading activities' or 'interest rate risk in the banking book'. FI has chosen to use the term 'interest rate risk in the banking book' in this memorandum.

memorandum, in the event that such risks are important to individual firms (see Sub-section 1.3).

After this memorandum has been referred for consultation, FI will consider the consultation comments submitted and then finalise the methods. FI will use these methods in the supervisory capital assessment during the supervisory review and evaluation process as of 2015. FI then intends to publish the capital requirements that the methods result in on a quarterly basis for the ten largest firms at consolidated level (see Section 6).

## 1.2 Scope of the methods

FI intends to use the methods described in this memorandum as a starting point for the supervisory capital assessment when assessing all of the banks, credit market firms and investment firms supervised by FI (collectively referred to as 'firms' in this memorandum).

A supervisory capital assessment is conducted for the ten largest groups at least annually. Other firms and groups will be subject to a less frequent supervisory capital assessment, provided there are no signs of an increased risk at the firm. The same applies at an individual level for most of the individual firms that form part of large groups. The European Banking Authority (EBA) is in the process of finalising guidelines for the supervisory review and evaluation process. These guidelines are expected to include provisions stating that the supervisory review and evaluation process should be implemented at least annually for large firms, and especially the systemically important ones, and at least every three years for small firms.<sup>5</sup>

FI's intention in respect of the firms' capital requirements for the risk types described in this memorandum is to primarily conduct the assessment at consolidated level, based on the group's consolidated situation and the methods referred to in the memorandum. Consequently, the point of departure in the supervisory capital assessment at individual level for those firms forming part of a group will be the capital requirement at consolidated level for each risk type. On this basis, an assessment will be made of how much of the share of the capital requirement determined at consolidated level will be assigned to each firm within the group. The assignment will be based on separate assessments. These assessments may be conducted on the basis of the methods presented in this memorandum or based on alternative assignment methods not described to in this memorandum.

When FI implements a supervisory capital assessment for small firms, FI may, considering the proportionality principle, refrain from assessing certain individual risk types, including those covered by the methods in this memorandum, if these risk types are assessed to be of minor importance in an overall assessment of the firm's risk level.

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<sup>5</sup> See Consultation Paper on Draft Guidelines for common procedures and methodologies for the supervisory review and evaluation process under Article 107 (3) of Directive 2013/36/EU, EBA/CP/2014/14, published on 7 July 2014.

### 1.3 Alternative methods

#### 1.3.1 Background

There are many different methods for assessing the risk types described in this memorandum. In certain cases, the internal methods used by firms are more finely calibrated than the methods that FI intends to use. Up until now FI has often based its supervisory capital assessment on the methods the firms use in their ICAAP. Consequently, FI needs to adopt a position on whether, and if so to what extent, the result of the firms' ICAAP in individual cases will affect FI's supervisory capital assessment for the three risk types described in this memorandum. More finely calibrated methods may be more accurate in certain cases, but are also more complicated and could therefore pose a 'model risk', that is, a risk of the models becoming misleading.

#### 1.3.2 FI's position

FI intends to use FI's methods when assessing the firms' capital requirements within Pillar 2 ('the Pillar 2 basic requirement') for concentration risk, IRRBB and pension risk. This means that the firms' capital requirements in the supervisory capital assessment may exceed or fall below the capital requirement calculated by the firms themselves in their ICAAP.

FI expects that a firm employs in its ICAAP the methods that it considers most appropriate and that best take account of their risk profile, operational conditions or other factors. Such methods may differ from the methods described by FI in this memorandum. In the event that FI's methods do not take account of certain risk elements that FI normally considers are of subordinate importance, but where these risk elements are considered to be important to an individual firm, FI expects that the firm in question will take account of such risk elements in the methods on which the firm's ICAAP is based.

#### 1.3.3 Reasons for FI's position

In its choice of methods for assessing different types of risk within Pillar 2, FI considered, on the one hand, the appropriate level of detail and accuracy against, on the other, the benefits of simplicity, transparency and the need for sufficient capital adequacy. When striking this balance, FI has considered that it may be assumed that the more finely calibrated a method is, the greater the increase of inherent model risk. Such balancing considerations resulted in methods that are robust and sufficiently accurate, and that clearly satisfy FI's objective for the supervisory capital assessment.

It is of great importance that firms, when making their internal capital adequacy assessments, continue to use those methods for calculating their capital requirements that they consider most appropriate and that best take into consideration their risk profile, operational conditions or other factors. Such methods may differ from the methods employed by FI in its supervisory capital

assessment. However, FI's own methods will form the basis of its assessment of the firms' capital requirement in order to produce a consistent assessment of the firms' capital requirements.

In the methods now proposed, FI has decided not to consider certain risk elements that FI normally considers are of subordinate importance for firms. In the event that risk elements that are not taken into account in the methods presented in this memorandum are important to individual firms, it is critical that the firms take such risk elements into account as part of their ICAAP.

#### **1.4 Type of capital**

FI states in the Capital Requirements Memorandum that the Pillar 2 basic requirement should as a main rule be covered according to the same allocation of capital as the Pillar 1 capital requirement. This also applies to the static buffer requirements (capital conservation buffer, systemic risk buffer and buffers for other and global systemically important institutions). However, it is stated in the Capital Requirements Memorandum that a divergence from the main rule may be made for specific risk types. For this reason, FI wishes to clarify that the authority considers that it is the main rule that should apply to the capital requirement for credit-related concentration risk, IRRBB and pension risk. This means that these capital requirements must be covered at least 75 per cent Common Equity Tier 1 capital for the four major banks and at least 65 per cent Common Equity Tier 1 capital for other firms.

#### **1.5 General legal basis**

This memorandum describes FI's detailed methods for assessing capital requirements within the framework of Pillar 2 for pension risk, credit-related concentration risks and IRRBB. The legal basis described below is the same for these three risk types.

The Capital Requirements Directive and the Capital Requirements Regulation<sup>6</sup> comprise a transposition at EU level of the new capital and liquidity rules in the global Basel III agreement. The provisions of the Capital Requirements Directive have been implemented through new laws, ordinances and official regulations or by adjusting the existing framework (see Government Bill 2013/14:228) to the extent that they are not covered by applicable law. Certain constitutional amendments have also been made to supplement the provisions of the Capital Requirements Regulation. The Capital Requirements Directive has, among other things, been implemented through the new Special Supervision of Credit Institutions and Investment Firms Act (2014:968) ('the Supervision Act'). The Capital Requirements Regulation and the implementation of the Capital Requirements Directive have also involved the revocation of a number of laws and rules, including the Capital Adequacy and Large Exposures Act (2006:1371).

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<sup>6</sup> Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012.

Pillar 2 is the umbrella term for the rules governing the firms' ICAAP and FI's supervisory review and evaluation process, of which FI's supervisory capital assessment forms a key component. The supervisory capital assessment is the term used for FI's assessment of an individual firm's risks and capital requirements, and takes account of both risks covered by Pillar 1 and those that are not. Provisions concerning the supervisory review and evaluation process are included in Articles 97 to 101 of the Capital Requirements Directive.

Chapter 10, Section 2 of the Supervision Act authorises the Government, or the authority appointed by the Government, to issue regulations about those circumstances that are to be taken into account when determining an appropriate level for own funds in conjunction with FI reviewing and evaluating a firm under the Capital Requirements Directive.

The Government prescribed in Section 9 of the Special Supervision and Capital Buffers Ordinance (2014:993) that FI is to comply with the provisions contained in Articles 97 to 101 of the Capital Requirements Directive in the course of its supervision. It is stated in, among other things, Article 97 of the Directive that, on the basis of their review and evaluation, the competent authorities are to determine whether the own funds held by the institution are sufficient to cover the institution's risks, the 'supervisory capital assessment'. This assessment is based on a unilateral analysis of the firm and covers all of the requirements under the Capital Requirements Directive and the Capital Requirements Regulation. The Capital Requirements Directive specifically mentions the risks covered by Pillar 1 and certain risks that are not covered by Pillar 1 in Articles 74 to 87.

Article 73 of the Capital Requirements Directive includes a requirement for the institution to have in place sound, effective and comprehensive 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 become exposed. The Article deals with the firm's ICAAP and is not referred to any further in this memorandum (see, however, Sub-sections 1.1 and 1.3). The purpose of this memorandum is to describe FI's methods for assessing the three risk types, which are not taken into account in Pillar 1, during the supervisory capital assessment.

The requirements contained in Articles 73 to 87 have been implemented through Chapter 6, Sections 1 to 3, 4 a, 4 b and 5 of the Banking and Financing Business Act (2004:297) ('LBF') and also Chapter 8, Sections 3 to 8 of the Securities Market Act (2007:528) ('LV'), Chapter 5, Section 6 of the Supervision Act and in subordinate legislation.

The technical criteria for the supervisory review and evaluation process are laid down in Article 98 of the Capital Requirements Directive. Among other things, it is stated in the Article that the institution's exposure to and management of concentration risk and also the institution's exposure to interest rate risk arising from non-trading activities are to be covered. However, FI's risk assessment



within the framework of the supervisory review and evaluation process is to cover all risks to which an institution is exposed and is not limited to the risk categories mentioned in the Capital Requirements Directive. Pension risk comprises an example of such a material risk that FI takes into account within the framework of the supervisory review and evaluation process, but which is not specifically mentioned in the Directive.

The Directive does not regulate which method is to be applied in the risk assessment within the framework of the supervisory review and evaluation process. This issue is thus left for FI to determine. However, EBA has been authorised to issue guidelines for national supervisory authorities to further specify the common procedures and methodologies for the supervisory review and evaluation process (Article 107.3). These guidelines have been submitted for final consultation but have not yet been adopted by EBA.<sup>7</sup> The guidelines issued by EBA are not legally binding, but national supervisory authorities and the institutions covered must "... make every effort to comply with these".<sup>8</sup> The methods that FI intends to use correspond with the fundamental principles in the guidelines from EBA, that is, that a capital requirement for Pillar 2 risks is included in addition to Pillar 1. The guidelines from EBA are principle-based and are not intended to regulate the application of specific methods in detail. EBA has also been assigned to draw up a European supervision handbook for the supervision of financial institutions in the EU, which may have some impact on the design of FI's supervisory review and evaluation process.

The Government emphasises on page 229 of Government Bill 2013/14:228 the importance of the 'Pillar 2 process' being transparent. FI has been given power under Chapter 2, Section 1 of the Supervision Act to decide on a specific own-funds requirement that is firm-specific, which might suggest that FI cannot provide general information about its risk assessment. However, it is the case that certain risks that are not covered by Pillar 1 are common for all firms with the type of exposures at issue. The development by FI of methods and a general assessment practice for individual risk types ensures the equal treatment of firms. Section 3 of the Special Supervision and Capital Buffers Ordinance also indicates that FI should provide the general criteria and methods that are applied during the supervisory review and evaluation process on its website.

The provision in Chapter 2, Section 1 of the Supervision Act concerning a specific own funds requirement empowers FI to decide that a firm should have an own-funds requirement in addition to the minimum level that otherwise applies (that is, over and above what is required under the Capital Requirements Regulation and Capital Buffers Act [2014:966]). FI is entitled to decide on a specific own-funds requirement if FI considers in conjunction with

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<sup>7</sup> See Consultation Paper on Draft Guidelines for common procedures and methodologies for the supervisory review and evaluation process under Article 107 (3) of Directive 2013/36/EU, EBA/CP/2014/14, published on 7 July 2014.

<sup>8</sup> Article 16.3 of Regulation (EU) No 1093/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Banking Authority).

a review and evaluation that this is required to cover risks to which the firm is or may be exposed and risks to which the firm exposes its financial system. A decision on a specific own-funds requirement may also be made if the firm does not satisfy, or it is likely that the institution within twelve months will no longer satisfy, the requirements of Chapter 6, Sections 1 to 3, 4 a, 4 b and 5 LBF concerning, among other things, solvency and liquidity, risk management and transparency or corresponding provisions in Chapter 8, Sections 3 to 8 LV.

FI has described the specific own-funds requirement and FI's supervisory capital assessment in the Capital Requirements Memorandum. FI states, among other things, that FI will not normally make a formal decision about a specific own-funds requirement. Instead, FI will inform each firm about FI's supervisory capital assessment in respect of the firm. A formal decision will only be made in the event that this is considered necessary.

FI needs to obtain and analyse information from individual firms for its risk assessment within the framework of the supervisory review and evaluation process. FI also has the power within the framework of its supervisory activities to require information from individual firms (see, for example, Chapter 13, Section 3 LBF and Chapter 6, Section 1 of the Supervision Act).

## 2 Credit-related concentration risk

### 2.1 Background and purpose

The capital requirement for credit risks in Pillar 1 has been designed based on an assumption that the firms' credit portfolios are fully diversified in all dimensions. The assumption regarding full diversification applies to the assessment of a capital requirement for credit risk in Pillar 1 in accordance with both the Standardised and Internal Rating Based (IRB) Approaches. Credit-related concentration risks arise when individual exposures, or groups of exposures, whose risk of default demonstrates a significant level of covariation, are so great that the risk weight formula does not fully capture the risk of these exposures, or groups of exposures. As the additional risks to which such a concentration gives rise are not taken into account in Pillar 1, FI needs a method to assess the capital requirements that such risks involve within Pillar 2.

Concentration risk may thus arise in different ways. This memorandum deals with concentration risk in respect of concentration to individual counterparties (single-name concentration), concentration to individual industries (industry concentration) and concentration to individual countries or regions (geographical concentration).

The method that FI intends to use to assess the credit requirement for concentration risk within the Pillar 2 basic requirement replaces the method described overall in three previous memorandums concerning concentration risks, namely:

- 'Credit-related concentration risks', dated 31 March 2009, relating to firms with IRB permits.<sup>9</sup>
- 'Credit-related concentration risks', dated 31 March 2009, relating to firms that use the Standardised Approach.<sup>10</sup>
- 'Assessment of capital requirement for concentration risks', dated 1 October 2009.<sup>11</sup>

### 2.2 FI's position

FI intends to calculate the firms' capital requirement for concentration risk with respect to single-name concentration, industry concentration and geographical concentration. FI intends to use a method based on the Herfindahl Index for firms that use the Standardised Approach for credit risk,

<sup>9</sup> [http://www.fi.se/upload/30\\_Regler/50\\_Kapitaltackning/metod\\_IRK\\_090331NY.pdf](http://www.fi.se/upload/30_Regler/50_Kapitaltackning/metod_IRK_090331NY.pdf)

<sup>10</sup> [http://www.fi.se/upload/30\\_Regler/50\\_Kapitaltackning/metod\\_schablon\\_090331NY.pdf](http://www.fi.se/upload/30_Regler/50_Kapitaltackning/metod_schablon_090331NY.pdf)

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[http://www.fi.se/upload/30\\_Regler/50\\_Kapitaltackning/riskbedomning\\_tillsyn/bedomning\\_SKB\\_091001.pdf](http://www.fi.se/upload/30_Regler/50_Kapitaltackning/riskbedomning_tillsyn/bedomning_SKB_091001.pdf)

and a combination of the Herfindahl Index and the Gordy and Lütkebohmert method for firms that have a permit to use an IRB Approach for credit risk.<sup>12</sup>

### 2.3 Comparison with FI's previous method

The method described in this memorandum differs from the previous method from 2009 in four main respects:

- The formula has been changed, whereby the capital requirement becomes a continuous function of the level of concentration. FI's previous method involved 'step effects', which could lead to major differences in capital requirement notwithstanding small differences in concentration.
- The method permits certain adjustments when calculating single-name concentration for firms with an IRB permit in the event that FI's method for single-name concentration is inapplicable owing to the limited size of the portfolios.
- The method does not include a capital requirement for volatile industries (but takes account of industry concentration generally).
- The method does not include a capital requirement for volatile geographical regions (but takes account of geographical concentration generally).

The change in method for risks relating to volatile industries and volatile regions results from FI considering that a capital requirement for such risks at an industry and regional level should primarily be considered within Pillar 1 for firms with an IRB permit. FI expects firms to take sufficient account of all credit-related risks in their internal models in Pillar 1, including such risks that specifically arise in exposures to industries and regions with an increased risk. FI intends to request that firms change their Pillar 1 methods in the event that FI considers that capital requirements in Pillar 1 do not take sufficient account of such risks at an industry and regional level. If Pillar 1 is not adjusted to a sufficient extent, FI may take account of such risks through further firm-specific capital requirements within the Pillar 2 basic requirement. This also applies to firms using the Standardised Approach, to the extent that FI considers that this does not take sufficient account of all credit-related risks, including such risks that arise in exposures to industries and regions with an increased risk.

Any such additional capital requirements for volatile industries or volatile regions for firms with an IRB permit and for firms that use the Standardised Approach will not be standardised but firm-specific, in the event that such

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<sup>12</sup> These are firms granted a permit by FI to use internal models (IRB models) to estimate the capital requirement for credit risk. As described in Sub-section 2.5.1, FI will make certain adjustments to the calculation of single-name concentration for a firm with an IRB permit in the event that the approach chosen is inapplicable. This is the case when there are an insufficient number of exposures in the corporate and institutional portfolio.

requirements are necessary. For this reason they are not dealt with further in this memorandum.

## 2.4 Reasons for FI's position

As mentioned in Sub-section 1.5, FI has the power to make a decision about a specific own-funds requirement for risks that are not taken into account in the Capital Requirements Regulation and the Capital Buffers Act, or that are not taken into account to a sufficient extent.

Taking account of concentration risk in the credit portfolio within the framework of Pillar 2 is justified by the assumptions relating to perfect diversification on which the IRB formula and Standardised Approach are founded. The high diversification assumed within Pillar 1 does not reflect the actual situation in the firms' credit portfolios. The supervisory capital assessment therefore needs to take account of the risks arising as a consequence of the firm's concentration of credit risks in relation to individual counterparties, industries and countries.

FI considers that the method presented in this section captures the most essential aspects of concentration risk in the credit portfolio. A large number of methods have been developed to assess the various components of concentration risk.<sup>13</sup> FI has chosen a method based solely on the Herfindahl Index for firms that use the Standardised Approach for credit risk. Methods based on the Herfindahl Index are certainly rather simplified but have the advantage that they can be applied to firms using the Standardised Approach where it cannot be assumed that more detailed data at exposure level is available. Methods based on the Herfindahl Index are founded on the assumption that the exposures taken into account only differ in terms of exposure amount, while assumptions concerning losses, maturities and other important factors are identical. This may be deemed to comply with the simplified basic assumption of the standardised model that all exposures within each exposure class carry the same risk (prior to credit risk-mitigating measures).

FI also intends to use methods based on the Herfindahl Index for firms with an IRB permit as regards the assessment of credit risk for industry and geographical concentration. The alternative methods available for assessing such risks are significantly more complicated and require, among other things, assumptions of correlations between industries and geographical areas. Correlations are difficult to estimate and there is often a high variance in

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<sup>13</sup> For general methods for calculating capital requirement for concentration risk, see for example the Basel Committee's report *Studies on credit risk concentration*, Basel Committee on Banking Supervision, November 2006 ([http://www.bis.org/publ/bcbs\\_wp15.pdf](http://www.bis.org/publ/bcbs_wp15.pdf)). For single-name concentration, see for example *Calculating credit risk capital charges with the one-factor model*, S. Emmer & D. Tasche, *Journal of Risk*, Vol. 7, No. 2, pp 85-103, Winter 2004/5, or *The distribution of loan portfolio value*, O.A Vasicek, *RISK*, Vol. 15, No. 12, pp. 160–162, December 2002, or *Granularity adjustment for regulatory capital assessment*, E. Lütkebohmert & M. Gordy, *International Journal of Central Banking*, September 2013.

correlation estimates. It is also difficult to validate correlation assumptions, and as a rule the outcome of the model is influenced to a high degree by the correlation assumptions made. This poses a significant model risk. FI considers that the advantages of methods based on the Herfindahl Index, in terms of relative simplicity, stability and lower model risk, compensate for them being less finely calibrated.

FI intends to use the Gordy and Lütkebohmert method to assess single-name concentration for firms with an IRB permit. As explained below, the Gordy and Lütkebohmert method takes account of the exposures' size and individual credit risk, and largely complies with the IRB Approach. FI considers that the effect of the Gordy and Lütkebohmert method is comparable between different banks despite it partly being based on data from the firms' IRB models. FI bases this position on sensitivity analyses, where a study was conducted of the outcome of the model for different choices of critical input data, such as loss given default. FI has concluded on the basis of these sensitivity analyses that the Gordy and Lütkebohmert method is sufficiently stable to provide a true and fair representation of single-name concentration.

## **2.5 Description of FI's method**

FI's method distinguishes the following kinds of concentration risk:

1. assignment of exposures to individual borrowers (single-name concentration);
2. industry-specific assignment of exposures (industry concentration); and
3. geographical assignment of exposures (geographical concentration).

FI's method calculates a capital requirement within Pillar 2 for each of these kinds of concentration risk. Sub-sections 2.4.2 and 2.4.3 below specify the industries and geographical regions that FI's method takes into account.

FI's method to assess the capital requirement within the Pillar 2 basic requirement for concentration risk assumes that FI receives information about the firms' exposures. If the firms' ICAAP does not include the information required, FI intends to request such information separately within the framework of the supervisory capital assessment.

### **2.5.1 *Single-name concentration***

'Single-name concentration' means inadequate counterparty diversification as a consequence of either a portfolio being small in terms of the number of counterparties or of individual exposures within an otherwise diversified portfolio being significantly larger than other exposures.

The risk category 'single-name concentration' takes account of a firm's principal credit-related exposures to specific counterparties. A firm's principal risk exposure in relation to a specific counterparty may include many different kinds of commitment, including lending, holdings of bonds, shares and commitments outside the balance sheet. Account may be taken of collateral,

such as guarantees, credit derivatives and financial collateral, provided these involve a real risk reduction and have been approved as collateral under the Capital Requirements Regulation. This is done by including the portion of an exposure protected as an exposure to the party issuing the protection or, if the protection is financial collateral, the party issuing the security.

Exposures to national governments and central banks are not currently covered by the single-name concentration method. FI may reconsider this in the future.

Firms calculate the capital requirement for credit risks using the Standardised or IRB Approach. FI adapts its approach to the method used by the firm. The method that FI has chosen to use to calculate single-name concentrations for firms with an IRB permit (the Gordy and Lütkebohmert method) is more finely calibrated than the method that FI intends to use for firms using the Standardised Approach. The Gordy and Lütkebohmert method is based on the formula for unexpected losses used in the IRB Approach for capital adequacy. This is based on the assumption that each individual exposure comprises such a small portion of the total portfolio that all idiosyncratic risk (that is, such risk that specifically takes account of an individual exposure and does not reflect systemic risks such as macroeconomic or market-related risks) has been eliminated by diversification. In that case only the systemic risk remains. In other words, the IRB Approach includes an assumption of complete diversification, that is, the portfolio comprises an infinite number of exposures that each comprises an extremely small portion of the portfolio.

The Gordy and Lütkebohmert method differs from the IRB Approach in that it does not include the assumption of complete diversification. The inclusion of idiosyncratic risk in the Gordy and Lütkebohmert method means that it is possible to calculate the proportion of the risk deriving from single-name concentrations.

The reason for FI not intending to use the more finely calibrated Gordy and Lütkebohmert method for firms that use the Standardised Approach is that it cannot be assumed that these firms will be able to provide the extensive data material required by the Gordy and Lütkebohmert method, particularly in respect of loss given default and unexpected loss. For this reason, FI has considered alternative methods for calculating the level of single-name concentration. A common method for these kinds of calculation is to use the Herfindahl Index, which measures the level of concentration among the firm's largest exposures. These exposures are assumed to be identical in all respects with the exception of their size. The number of exposures included, as well as the link between the Herfindahl Index and the capital requirement, are parameters determined by FI.

#### *FI's method when firms use the Standardised Approach*

A Herfindahl Index (*HI*) is initially calculated for the firm's 30 largest exposures to individual customers as follows: Let  $EAD_i$  ( $i = 1, 2, \dots$ ) designate

the  $i$ th largest exposure. If  $\sigma_i$  designates the proportion that exposure  $i$  comprises of the total value of the largest exposures, that is

$$\sigma_i = \frac{EAD_i}{\sum_{j=1}^{30} EAD_j},$$

the Herfindahl Index for the 30 largest exposures is defined as follows:

$$HI = \sum_{i=1}^{30} \sigma_i^2.$$

This index is lowest for granular portfolios (such as mortgage portfolios) and highest for a portfolio with just one counterparty. A portfolio with thirty identical exposures would have an index value of  $1/30$  ( $(30 \cdot (1/30)^2) = 1/30$ ), which is the lowest possible value for HI. The index can be used as a simplified measure for the extent of single-name concentration the firm has in its credit portfolio. However, increased precision is achieved when account is taken of the proportion of the total portfolio that the 30 largest exposures comprise. Multiplying a firm's Herfindahl Index for the 30 largest exposures by this proportion generates an *Adjusted Herfindahl Index* (AHI):

$$AHI = HI \cdot \frac{\sum_{i=1}^{30} EAD_i}{\sum_{i=1}^n EAD_i}$$

Here  $n$  designates the total number of exposures in the credit portfolio.

The Adjusted Herfindahl Index is translated into a capital requirement for single-name concentrations according to

$$p_{NK} = 9 \cdot (1 - e^{-18 \cdot AHI}),$$

where  $p_{NK}$  is the capital requirement for single-name concentrations as a percentage of the capital requirement for credit risk in Pillar 1, where  $e$  is the base for the natural logarithm and where  $AHI$  is the Adjusted Herfindahl Index. The above formula has been produced by FI and is a continuous approximation of the previous formula, which could result in large differences in capital requirements between portfolios with little difference in concentration risk. The continuous function avoids situations where small differences in risk result in major differences in the increase in capital. The exponential function was chosen to achieve a reasonable relationship – in FI's opinion – between capital requirements and concentration for a span of concentration level that FI considers relevant. The formula limits the capital surcharge that is theoretically possible. There are alternative formulae that avoid such a limitation, although these are significantly more complicated. FI considers that the formula is appropriate, as no firm to which FI has applied the model so far lies outside the span where FI considers that the relationship between capital requirement and concentration is reasonable. If this were not the case, FI may make appropriate adjustments on a case to case basis.

#### *FI's method when firms have a permit to use the IRB Approach*

Single-name concentrations in the exposure class 'household exposures' are relatively small, as individual counterparties are normally small in relation to



total volume of household exposures. Consequently, there is generally no significant single-name concentration risk. FI therefore does not intend to take account of household exposures when calculating the capital requirement for concentration risk for IRB banks. However, FI considers that firms can normally be assumed to exhibit credit-related single-name concentration risks in the exposure classes ‘institutional exposures’ and ‘corporate exposures’. These two exposure classes are hereafter referred to as *the exposure classes*.

The method that FI intends to use is described in detail by Michael Gordy and Eva Lütkebohmert in their article *Granularity adjustment for regulatory capital assessment*.<sup>14</sup> Only a brief description of the method is provided here.

The analytical expression (the ‘Gordy and Lütkebohmert formula’) for the function that FI uses to calculate the capital requirement for single-name concentrations is:

$$p_{NK} = 100 \cdot \frac{1}{2K^2} \cdot \sum_{i=1}^n s_i^2 \cdot (0.25 + 0.75 \cdot LGD_i) \cdot (4,83 \cdot (K_i + R_i) - K_i)$$

where the input variables are presented below. The Gordy and Lütkebohmert formula is intended for large portfolios and may have an undesirable effect on smaller portfolios.<sup>15</sup> If required FI will make adjustments to the definition of the corporate exposure class to avoid such undesirable effects<sup>16</sup> for firms with less than 500 high-quality single-name exposures.<sup>17</sup>

<i>Variable</i>	<i>Explanation</i>
$p_{NK}$	The capital requirement for single-name concentrations as a percentage of the capital requirement for credit risks in Pillar 1 for the exposure classes. <sup>18</sup>
$n$	The number of exposures in the exposure classes.
$LGD_i$	The $i$ th exposure’s level of loss given default. Note that $LGD_i$ is an integer between 0 and 1.

Furthermore, if  $EAD_i$  designates the size of the  $i$ th exposure in the event of a default and if  $EL_i$  and  $UL_i$  designate the  $i$ th exposure’s expected or unexpected loss<sup>19</sup> respectively, calculated according to the Basel II framework, then the other input variables are defined according to

<sup>14</sup>International Journal of Central Banking, September 2013. This article is available at <http://www.ijcb.org/journal/ijcb13q3a2.htm>

<sup>15</sup>For an explanation, see *Studies on credit risk concentration*, November 2006, BCBS (<http://www.ijcb.org/journal/ijcb13q3a2.htm>)

<sup>16</sup>This may include moving a number of corporate exposures that a firm is accounting for as household exposures to the ‘corporate exposures’ exposure class.

<sup>17</sup>Alternatively fewer than 200 exposures in portfolios with lower credit quality.

<sup>18</sup>The increase is expressed as a percentage of EAD in Gordy and Lütkebohmert’s article. As FI has chosen to express the increase as a percentage of the capital requirement, the formula has been adjusted by multiplying the denominator by the factor  $K$ .

<sup>19</sup>‘Unexpected loss’ means the capital requirement (see BCBS document *An Explanatory Note on the Basel II IRB Risk Weight Function*) multiplied by EAD.

<i>Variable</i>	<i>Explanation</i>
$R_i = \frac{EL_i}{EAD_i}$	The <i>i</i> th exposure's expected loss as a portion of $EAD_i$ .
$K_i = \frac{UL_i}{EAD_i}$	The <i>i</i> th exposure's unexpected loss as a portion of $EAD_i$ .
$K = \frac{\sum_{i=1}^n UL_i}{\sum_{i=1}^n EAD_i}$	The portfolio's <sup>20</sup> total unexpected loss as a portion of the portfolio's total exposure.
$s_i = \frac{EAD_i}{\sum_{i=1}^n EAD_i}$	The <i>i</i> th exposure's portion of the portfolio's total $EAD$ .

According to FI's method, the percentage rate  $p_{NK}$  in the formula above multiplied by the firm's total capital requirement for credit risk in Pillar 1 for the exposure classes comprises the firm's capital requirement for single-name concentrations.

FI assesses separately the size of the capital requirement for single-name concentration for exposure class(es) where the firm does not have its own IRB estimate (i.e. is exempt from the IRB Approach), to the extent that this is justified by the composition and size of the exposures in the exposure class(es) affected.

### **2.5.2 Industry concentration**

'Industry concentration' means inadequate diversification at industry level as a consequence of a firm's portfolio being exposed to a small number of industries or because the portfolio is significantly more exposed to a certain industry or certain industries than others. FI considers that all Swedish firms have significant industry concentration.

The exposures must be assigned at industry level in order to be able to calculate the capital requirement for industry concentration. FI intends to calculate the capital requirement for industry-related concentration using a Herfindahl Index for the 13 different industries that FI considers most relevant. The industries that FI considers relevant for assessing the firm's industry-related concentration risks are: credit institutions; municipal authorities/county councils; housing loans; other lending to households; real estate activities; commerce; hotels and restaurants; construction; manufacturing; transportation; forestry and agriculture; other service activities; and other corporate lending.

Exposures to national governments and central banks are not currently covered by the industry concentration method. FI may reconsider this in the future.

The Herfindahl Index is defined as

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<sup>20</sup> 'Portfolio' means the portfolio that comprises all exposures in the two exposure classes 'corporate exposures' and 'institutional exposures'.

$$HI = \sum_{j=1}^{13} \sigma_j^2,$$

where  $\sigma_j$  equates to each industry's proportion of the portfolio, defined as exposure to industry  $j$  divided by the total of all exposures for the 13 industries.

A percentage rate is obtained by using the firm's  $HI$  in the following formula, the design and choice of parameter for which has been determined by FI; this states the firm's capital requirement for industry concentration risk as a percentage of the total capital requirement for credit risk in Pillar 1,

$$p_{BK} = 8 \cdot (1 - \exp(-5 \cdot HI^{1.5})).$$

Note that  $p_{BK}$  in the formula above is expressed as percentage units. See the section 'FI's method when firms use the Standardised Approach' above for a further explanation of the formula.

### 2.5.3 Geographical concentration

'Geographical concentration' means inadequate geographical diversification as a consequence of a firm's portfolio being exposed to a small number of countries or because the portfolio has a significantly greater exposure to a certain country or certain countries than others.

The exposures must be assigned to different countries/regions in order to be able to calculate the capital requirement for geographical concentrations. FI intends to calculate the capital requirement for geographical concentration using a Herfindahl Index for the 16 different regions that FI considers most relevant. These regions are: Sweden; Norway; Denmark; Finland; Estonia; Latvia; Lithuania; Germany; Poland; Great Britain; Rest of Europe; Russia; Japan; North America; and Other countries.

The Herfindahl Index is defined as

$$HI = \sum_{j=1}^{16} \sigma_j^2,$$

where  $\sigma_j$  equates to exposure to region  $j$  divided by the total of all exposures for the 16 regions.

The firm's  $HI$  is used to calculate

$$p_{GK} = 8 \cdot (1 - \exp(-2 \cdot HI^{1.7})),$$

which is expressed as percentage units. The design of the formula and choice of parameter has been determined by FI. The firm's capital requirement for geographical concentration risk under Pillar 2 is obtained by multiplying  $p_{GK}$  by the total capital requirement for credit risk in Pillar 1. See the section 'FI's method when firms use the Standardised Approach' above for a further explanation of the formula.

### *Firms concentrated in Sweden*

FI intends to make a separate assessment of the capital requirement for a firm's concentration within Sweden in the event that FI conducts a supervisory capital assessment for a firm where more than 90 per cent of its total exposure amount is within Sweden. FI intends to assess the capital requirement for these firms on the basis of how well-diversified the specific firm is within the region. The capital requirement for geographical concentration risk for these firms is considered to be not less than eight per cent of the risk-weighted assets for credit risk for the relevant portfolio.

### 3 Interest rate risk in the banking book

#### 3.1 Background and purpose

Interest rate risk relates to a firm's sensitivity to changes in the levels of interest rates and the structure of the yield curve. Interest rate risk is a structural risk that naturally derives from the firm taking deposits and granting loans and is therefore of considerable importance for many of the firms supervised by FI. The capital adequacy framework makes a distinction between interest rate risk in the trading book, as described in Pillar 1, and interest rate risk relating to positions not included in the trading book.

Positions outside the trading book normally largely comprise the firms' lending to individuals and firms together with client deposits and other financing of such lending. Interest rate risk relating to positions not included in the trading book is often referred to as 'interest rate risk in other activities' or 'interest rate risk in the banking book'. FI has chosen to use the term 'interest rate risk in the banking book' (IRRBB) for this memorandum.

The current framework does not include any capital requirement for IRRBB in Pillar 1, and for this reason IRRBB is dealt with within the framework of Pillar 2.

The assets and liabilities included in the banking book are not normally marked to market. For this reason, interest rate risk for these instruments does not largely arise as immediate changes in the valuation of these instruments in the firms' balance sheets. Instead, the risk takes the form of more gradual changes in the firms' net interest income/expense, which may affect their operating profit/loss and capital strength in both the short and long term.

IRRBB is a result of a firm granting loans and taking deposits with different re-pricing dates. This is often a consequence of maturity transformation, that is, firms providing loans with longer maturities than the maturity of their financing. Given that differences in re-pricing dates and maturities between assets and liabilities give rise to interest rate risk, it is of considerable importance that this risk is measured in a satisfactory manner, that the firms hold corresponding capital in an adequate way and that clear control structures are in place. As IRRBB is not taken into account in Pillar 1, there should be capital allocated for this risk within the framework of Pillar 2.

EBA has published draft guidelines<sup>21</sup> for the supervision of IRRBB that, if implemented in line with the consultation document, will include provisions stipulating that the supervisory authorities are to analyse IRRBB in detail. The guidelines state that the risks for both the firms' earnings (shorter perspective)

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<sup>21</sup> See Consultation Paper on revision of the *Guidelines on Technical aspects of the management of interest rate risk arising from non trading activities in the context of the supervisory review process* from 3 October 2006, under Articles 123, 124 and Annex 5 of Directive 2006/48/EC of the European Parliament and the European Council published on 27 June 2013.

and economic value (longer perspective) are taken into account, but include no specific method for assessing the capital requirement for interest rate risk.

In this section FI describes its method for ensuring that IRRBB is dealt with and analysed in a consistent way and that Swedish firms hold sufficient capital to cover this risk.

### ***3.1.1 Impact of interest rate risk on firms***

Interest rate risk may be manifested as changes in the firms' operating result, principally their net interest income, in both the short- and long-term, or as changes in items outside their operating profit/loss. Such changes outside operating profit/loss mainly refer to mark-to-market changes.

Interest rate risk may result in a deterioration of its net interest income and consequently its operating result, for example when there is no exact correspondence between the repricing dates on the liability and asset side of the firms' balance sheets. A common example of such a situation arising is when a firm chooses to obtain financing at a short-term interest rate and lends funds with a long fixed-interest term.<sup>22</sup> Interest rate risk will then arise given that the firm's sensitivity to interest rate changes differs on the liability and asset side of the balance sheet. In this case, an increase in interest rates raises borrowing costs, while not affecting lending revenue at all, or not increasing it to the same extent. This results in a deterioration of the net interest income and operating result for the firm.

Interest rate risk may also be manifested by changes in market prices for mark-to-market items where their value depends on interest rate levels and the structure of the yield curve. Such risk is normally of considerable importance for the firms' trading books, and capital adequacy for market risk within the trading book, which includes interest rate risk, is covered in Pillar 1. Such mark-to-market risk is therefore not dealt with in this memorandum.

Yield curve risk, credit spread risk, basis risk and option risk are differentiated as separate risk elements within the risk type 'interest rate risk', and further explanations are provided in the following section.

### ***3.1.2 Yield curve risk***

'Yield curve risk' is defined in this memorandum as the sensitivity of the firms' net interest income to changes in market interest rates. The interest rate for a certain loan can largely be viewed as an expression of the loan's credit risk and its maturity. The function that expresses the interest rates applicable to different interest rate adjustment periods, given the same credit risk, is referred to a 'yield curve'. The form of the yield curve is sensitive to changes in expectations, risk appetite and demand for credit risk. The yield curve

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<sup>22</sup> The example assumes that the firm has not eliminated interest rate risk that arises in the firm's hedging positions, for example, interest rate forwards or interest rate swaps.

continually moves up and down, and its form may change drastically and suddenly even though it may also be stable for long periods. The firms' net interest income/expense for interest-bearing assets and liabilities with fixed interest rates is sensitive to changes in both the level and form of the yield curve.

### **3.1.3 Credit spread risk**

'Credit spread risk' is defined in this memorandum as the sensitivity of the firms' net interest income/expense to changes in the firms' credit spread.

'Credit spread' is defined in its turn as the difference between a firm's borrowing cost and the market interest rate for a corresponding maturity. The market interest rate, as taken into account in FI's method for interest rate risk, can be measured using different reference instruments, for example, the treasury rate or the swap rate. The credit spread constitutes an additional cost that the firm has to pay for its financing in addition to the usual market interest rate, and its magnitude depends on the market's assessment of the firm's creditworthiness.

Credit spread risk may arise when a firm has a maturity mismatch<sup>23</sup> between liabilities and assets and its credit spread is changed.<sup>24</sup> A firm's credit spread is sensitive to confidence and other credit-related factors, and may be affected by both sector-general and firm-specific factors. A firm will become sensitive to the impairment of its own creditworthiness and a consequential increase in the credit spread in the event that the firm obtains financing with maturities that are shorter than those for its assets. This is the case regardless of whether the increase in credit spread is sector-general or firm-specific, but sensitivity may further increase if the firm's competitors are not adversely affected by the same increase (that is, that the credit spread increase is specific to the firm), as it then becomes more difficult for the firm to compensate for its higher financing cost by increasing the yield on its assets.

### **3.1.4 Additional IRRBB**

Additional risk elements may be included, primarily option risk and basis risk, which are briefly described below:

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<sup>23</sup> 'Maturity' normally means the period until the repayment date. However, this period refers to the next agreed repricing date for lending without an agreed repayment date, where the firm has full control over the setting of interest rates.

<sup>24</sup> 'Credit spread risk' may also arise, despite good maturity matching, in a more long-term way if firms cannot fully adjust pricing of future new lending for higher financing costs. This may be the case, for example, when confidence or other factors result in financing costs for an individual firm that are permanently higher than for its competitors.

### *Option risk*

Option risk arises from an interest rate risk perspective when the firm's customers or financial counterparties have options relating to fixed interest term or maturity. Such optionality can be found on both the liability and asset side and can be either contracted or behavioural.

### *Basis risk*

Basis risk<sup>25</sup> in the banking book arises from an interest rate risk perspective when positions with similar repricing dates are repriced in relation to different indexes of rates on the liability or asset side respectively.

## **3.1.5 Items without a contracted fixed interest term**

### *3.1.5.1 Introduction*

As described above, interest rate risk arises owing to a difference in the repricing structure for the firms' assets and liabilities. However, firms have significant items without contracted re-pricing dates, where behaviour and other factors may affect the actual re-pricing dates. The main examples of this are equity and non-maturity deposits (NMD) from the general public. The absence of a contracted repricing date means that FI needs to determine actual repricing dates assumptions for those items in the method for assessing capital requirement for IRRBB.

### *3.1.5.2 Equity*

There is no contracted repricing date for the firms' equity. However, the assets in which the equity is invested often contribute to interest rate risk for the firms.

### *3.1.5.3 Non-maturity deposits*

Non-maturity deposits (NMD) account for a significant portion of the activities and financing of Swedish firms. The interest that firms pay to their depositors for these funds is not generally fixed and often changes in line with the market interest rate, and possibly with the firms' credit spread. However, the interest rate for deposits often does not change immediately, and in some cases not fully, which results in certain firms adopting a modelled repricing profile on NMD in their internal measurements of IRRBB. The modelling of a repricing profile for NMD may reduce the difference between the firms' repricing dates on the asset and liability side.

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<sup>25</sup> 'Basis risk' is often defined as the risk of the value of an underlying asset or liability developing in a different way than the value of the asset's or liability's hedge. An asset's financing in the banking book may be viewed as the hedging of the interest rate risk that the asset gives rise to depending on how well the financing's repricing dates corresponds to the asset's repricing dates.



### 3.2 EBA's forthcoming guidelines

As mentioned above, EBA is currently drawing up guidelines for the management and supervision of IRRBB. The draft guidelines state that the risks for both the firms' earnings (shorter perspective) and economic value (longer perspective) are to be taken into account. FI considers that it is already clear that the new supervision guidelines, if fully applied, will involve significantly stricter requirements for the supervisory authorities' analysis of IRRBB. FI considers that the improved analysis made possible by the method described in this section, and the information that FI obtains as part of its assessment, corresponds well to the provisions of the consultation document.

### 3.3 FI's positions

FI intends to calculate the firms' capital requirement for IRRBB using a method that takes account of the sensitivity in the firm's economic value. The capital requirement will be calculated using the scenario for changes in the yield curve and for differences between the firm's financing cost and market rate of interest. The repricing date for the firms' equity and NMD is set at zero. FI will use a simplified method for smaller firms with limited sensitivity to interest rates.

Firms shall take account of all of the risk elements within their ICAAP, even those that FI's method does not take into account, in the event that these are important to the individual firm. FI's method for assessing IRRBB does not include option risk and basis risk. In the event that these risk elements are important for an individual firm, FI can assess these risk elements separately, which may result in an increase in the capital requirement in addition to that prescribed by FI's method for IRRBB as described in this memorandum.

### 3.4 Reasons for FI's positions

There is justification for taking account of IRRBB within the framework of Pillar 2 as this type of risk is one of the fundamental risks that the firms manage without a capital requirement in Pillar 1. In terms of magnitude, 75 to 90 per cent of the assets and liabilities of major banks are interest-bearing and thus subject to interest rate risk. The way in which interest rates are structured in this portion of the balance sheet has a significant effect on the operating profit/loss of these firms, 45 to 70 per cent of which comprises net interest income, and thereby their capital position. Given the importance of the interest-bearing positions in the banking book for the firms' operating result and capital position, it is therefore of great importance that there is sufficient capital for the interest rate risk posed by these positions. This risk needs to be taken into account within Pillar 2, as there is no capital requirement for IRRBB in Pillar 1.

The interest rate risks that primarily arise outside the trading book arise as a consequence of a mismatch of repricing dates and maturities between assets and liabilities. Such mismatches involve a possible deterioration in stability for

the firms' operating result and capital position. In the opinion of FI, changes in the result as a consequence of changes in the yield curve or the firms' credit spread normally comprise the main IRRBB for Swedish firms.

Changes in the yield curve or the firms' credit spread may affect the firms' net interest income, and thereby the operating result and capital position, in both the short- and long-term. For this reason, FI intends to calculate the capital requirement for IRRBB using a method that measures the effect of the present value of the firm's future net interest income in various kinds of interest rate risk scenario. This present value is referred to as 'economic value' in this memorandum. This approach takes account of both the short- and long-term effects of interest rate changes. The more specific short-term effects of interest rate risk, which may differ from the way in which interest rate risk is taken into account through its effect on the firms' economic value, are considered separately in FI's supervision, for example in stress tests and in the capital planning buffer, and are not dealt with further in this report.

Interest rate risk may also affect the value of both instruments that are marked to market and instruments that are not marked to market in addition to its effect on the firms' net interest income. Marking-to-market may give rise to an additional capital impact, besides the effect on the net interest income. However, FI considers that this issue is normally less significant for Swedish firms, as most of the assets and liabilities within the banking book are not marked to market for most Swedish firms. For this reason, FI's method does not take account of such specific mark-to-market risks.

FI considers that equity and NMD do not have any properties that justify the assumption of a fixed interest term above zero. For this reason, FI intends to give such items a repricing date of zero in FI's method. FI's position regarding NMD may be regarded as cautious. FI does not consider that these assumptions normally have any substantial consequences for Swedish firms, primarily owing to these firms having significant portfolios on the asset side, including mortgages, where short-term fixed interest terms are common. However, this may change, and FI's method may result in an additional capital requirement for this kind of risk if there is an increase in the firms' exposure to credit spread risk.

FI's method measures interest rate risk in respect of yield curve risk and credit spread risk based on existing positions and fixed interest terms in the firms' balance sheets. The risk of a further deterioration in the firms' net interest income/expense and capital strength in the future, which may arise after existing assets and liabilities have expired (for example, in the event that confidence in the firm in question is impaired during an extended period of time) is taken account of in other ways in FI's supervisory and evaluation process and is not taken into account in FI's method for assessing IRRBB.

FI considers that the method proposed in this memorandum captures the most significant aspects of IRRBB. In the event that risk elements that are not taken into account in FI's method are, or may become, important to an individual

firm, the firm should take such risk elements into account in its ICAAP (see Sub-sections 1.1 and 1.3).

FI's method for assessing IRRBB does not include two specific risk elements: option risk and basis risk. FI considers that these risk elements are not normally important to Swedish firms and that the additional complexity that would result from taking these risk elements into account is therefore not justified.

However, there may be firms for which these risk elements are important, and there may be a risk of firms increasing their exposure to these risk elements in the future. In the event that these risk elements are or may become important to an individual firm, FI may assess these risk elements as part of its supervisory capital assessment, which may result in an increase in capital in addition to that prescribed by FI's method.

### **3.5 Description of FI's method**

FI's method for assessing IRRBB takes account of the consequences of a repricing date mismatch between a firm's assets and liabilities. The sensitivity of the economic value of the firms' net interest income/expense is used as a tool for this in various curve scenarios for market interest rates and the firms' credit spread. The following section describes FI's method relating to fundamental choice of method, yield curve and the stress scenarios that FI intends to use.

#### **3.5.1 *Economic value***

FI's method calculates the capital requirement for IRRBB through the effect of interest rate risk on the economic value of the firms' future net interest income. This economic value is calculated as the present value of the future net interest income for interest-bearing positions in a firm's banking book. The change in economic value takes account of the long-term effect that the given scenarios have on the firms' net interest income, and thereby capital strength. It is thus not the level of the economic value itself, but its sensitivity and the change in the economic value that results from the application of the different scenarios that is taken into account. Interest rate risk arises as a consequence of the effect that changes in yield curves ('yield curve risk') and the firms' credit spread ('credit spread risk') may have on the firms' net interest income and operating result. These risk categories are described in the following section. The calculation of the economic value and resultant capital requirement are described in more detail in Sub-section 3.5.5 below.

#### **3.5.2 *Yield curve***

The yield curve used in FI's method is a 'zero coupon yield curve'. This means that the interest at each point of the curve corresponds to the interest at which a bond with a zero-per-cent interest rate and with a final due date at a corresponding point in time should be priced.

The advantage of using a zero coupon yield curve is that it is very easy to calculate the present value of a cashflow that falls on a certain date. The

present value depends on the discounting factor for that point in time, and this is determined unambiguously by the zero-coupon interest rate. The present value is determined as

$$PV_C = C \cdot df(t)$$

$$df(t) = \frac{1}{(1 + r_z(t))^t}$$

where the input variables are defined as follows:

<i>Variable</i>	<i>Explanation</i>
$C$	The size of a cashflow that falls at point in time $t$ .
$df(t)$	The discounting factor at point in time $t$ .
$PV_C$	Present value of the cashflow $C$ .
$r_z(t)$	Zero coupon rate at point in time $t$ .

FI's method uses a yield curve for each currency of importance to the individual firm and does not take account of different levels of credit and other risk factors for assets and liabilities using the same currency, which would otherwise require separate yield curves for different kinds of asset and liability. This is meant to achieve a simplification of the method. This simplification is justified by the fact that the method focuses on the mismatch between repricing dates between assets and liabilities. The method thus does not intend to primarily measure the actual market value, but rather the sensitivity of the market value to different changes in the curve. In the opinion of FI, the increasing complexity that separate curves based on the specific creditworthiness of individual assets and liabilities would give rise to would not be justified given the marginal improvement in precision that FI considers that such a change would result in.

### *Design of the yield curve*

FI intends to use market quotations for liquid interest rate swaps with maturities of between one and ten years, and with maturities of 12, 15 and 20 years in each currency as basis for building the zero coupon yield curve on which the method is based. The market quotation for an interest rate swap with a certain maturity  $t$  is expressed in terms of an interest rate  $r_s(t)$ . The market quotations for the maturities mentioned above are translated into discounting factors and further into zero coupon rates. This is done, subject to certain exceptions as described below, in a similar way as for the discount curves that FI publishes for solvency and traffic light reporting.<sup>26</sup> However, the calculation of yield curves used to estimate IRRBB differs from the calculation of discount curves for solvency and traffic light reporting in the following ways:

<sup>26</sup> A comprehensive description of the method for designing the discount curves for solvency and traffic light reporting is available on FI's website:

<http://www.fi.se/Rapportering/Periodiskt/Forsakring/Diskonteringsrantekurva/>

- No credit risk adjustment is made for the market quotations. When calculating a discount curve for solvency and traffic light reporting, a credit risk adjustment of minus 35 basis points is made for the occupational pension curve. However, FI considers that such an adjustment is not required to calculate the capital requirement for IRRBB, as FI considers that the swap rate is an appropriate and transparent valuation basis for the economic value of a bank's balance sheet.
- FI's method for assessing IRRBB does not use any assumption of a long-term forward rate in the curve design. The implicit forward rates from the market quotations are fully used for maturities of between ten and 20 years. The implicit forward rate employed in the market quotations for the maturities 15 and 20 years are used for the extrapolation of the zero coupon yield curve in excess of 20 years. This simpler approach is justified by most of the firms' interest-bearing liabilities and assets having maturities of less than ten years, while pension obligations often extend for a much longer time period and thus become sensitive to the non-availability and lack of liquidity of the relevant market quotations. Consequently, a more stable model approach is required for insurance firms and for banks' pension risks than what is considered appropriate by FI for assessing capital requirements for IRRBB.

### ***3.5.3 Calculation of the yield curve stress scenario***

FI's method for assessing IRRBB is based on three kinds of yield curve stress scenarios. These include firstly parallel shifts of the curve, the magnitude of which is determined using historical market data. A number of curve slope changes are produced using this as a point of departure. Secondly, an upward parallel shift of the firm's credit spread is used to measure the firm's sensitivity to changes in its own credit spread.

#### *Calibrated parallel shifts*

Given a certain stress magnitude, the calibration of which is described below, two yield curve stress scenarios are created with upward and downward parallel shifts of the yield curve. The stress magnitude is expressed in basis points and is added to the market quotations used in the curve design. A market quotation stressed in this way is floored at zero. The stressed zero coupon yield curves are then calculated in the same way as described above, but based on the stressed market quotations.

#### *Slope changes*

FI's method uses four scenarios with slope changes. These can be broken down into two flattening scenarios referred to as 'Rising short-term interest rates' and 'Falling long-term interest rates', and in two steepening scenarios referred to as 'Falling short-term interest rates' and 'Rising long-term interest rates'.

FI intends to continually evaluate whether there is a need to use further, or different, yield curve scenarios. FI considers that the detailed information that FI intends to request as part of its supervision work will facilitate studies of the yield curve changes to which firms are most exposed.

FI has chosen a simple model approach when choosing a method to design the slope scenarios. The objective has been to design a robust and replicable model for how the slope scenarios are created.<sup>27</sup>

The method for designing these scenarios is based on the zero coupon yield curves – unstressed and stressed – produced as described above. By gradually weighting together the unstressed zero coupon yield curve with each of the two parallel shifts, and with different weighting factors for each maturity between one and 30 years, four combinations are obtained. Two sets with weightings are used, which are referred to as ‘Significant change for short maturities’ and ‘Significant change for long maturities’.

There is a relatively high correlation between interest rates for long maturities, while interest rates for shorter maturities move more in relation to each other. Consequently, FI has designed the weightings in such a way that the weighting for a certain maturity of between 1 and 30 years in ‘Significant changes for short maturities’  $w_1(t)$  is described using the following formula:

$$w_1(t) = \left(1 - \frac{t}{30}\right)^2$$

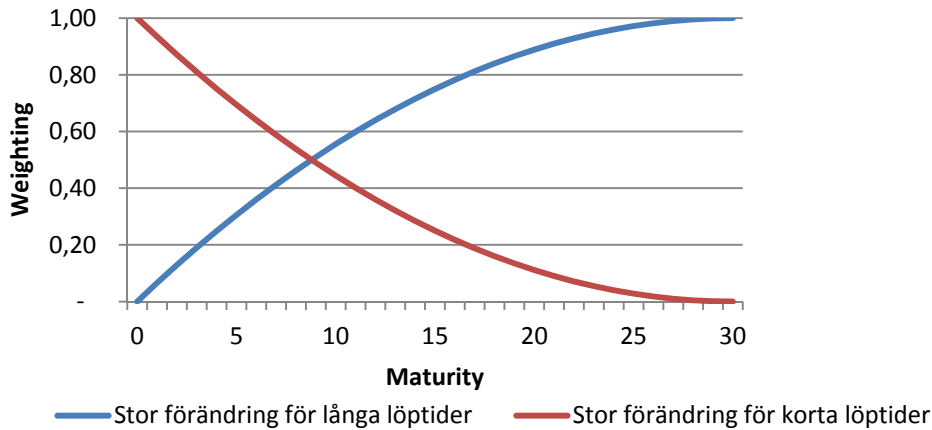
‘Significant changes for long maturities’  $w_2(t)$  is determined by

$$w_2(t) = 1 - w_1(t)$$

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<sup>27</sup> Alternative approaches could have been for example a principal component analysis calculating the most common slope scenarios based on historical data, or applying the worst observed flattening and steepening scenarios over three months for the last ten-year period. However, FI considers that it is important for the model to be easy to replicate.

### 3.1 Weightings for the production of curve slope changes



[Text for key at bottom:  
 Significant change for long maturities  
 Significant change for short maturities]

The zero coupon rate for each of the four slope change scenarios is subsequently determined as a weighted combination of the unstressed zero coupon yield curve  $r_Z(t)$  and the two previously calculated parallel shifts  $r_Z(t)_{Rising}$  and  $r_Z(t)_{Falling}$ .

$$r_Z(t)_{Rising \text{ short-term interest rate}} = w_1(t) \cdot r_Z(t)_{Rising} + (1 - w_1(t)) \cdot r_Z(t)$$

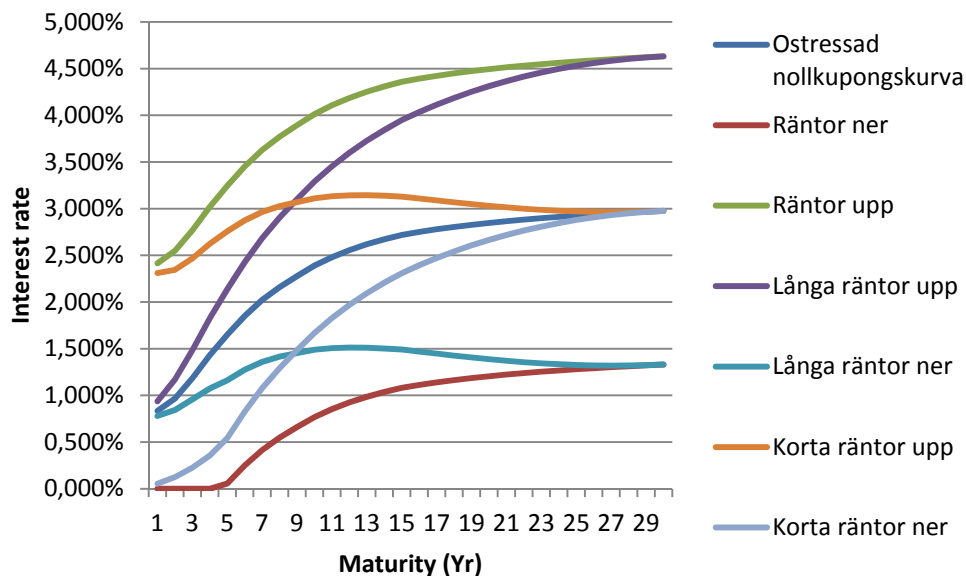
$$r_Z(t)_{Falling \text{ short-term interest rate}} = w_1(t) \cdot r_Z(t)_{Falling} + (1 - w_1(t)) \cdot r_Z(t)$$

$$r_Z(t)_{Rising \text{ long-term interest rate}} = w_2(t) \cdot r_Z(t)_{Rising} + (1 - w_2(t)) \cdot r_Z(t)$$

$$r_Z(t)_{Falling \text{ long-term interest rate}} = w_2(t) \cdot r_Z(t)_{Falling} + (1 - w_2(t)) \cdot r_Z(t)$$

The six curve scenarios for the market interest rates are illustrated in Graph 3.2 below.

### 3.2 Example of the interest scenario in FI's method



[Text for key on right:  
 Unstressed zero coupon yield curve  
 Falling interest rates  
 Rising interest rates  
 Rising long-term interest rates  
 Falling long-term interest rates  
 Rising short-term interest rates  
 Falling short-term interest rates]

### *Upward parallel shift of the firms' credit spread*

FI considers that the magnitude of the parallel shift to be used to stress the banking book's sensitivity to changes in the firms' own credit spread should be 150 basis points. This stress is added to the market quotations forming the basis of the design of the zero coupon yield curve, which thereby obtains the curve scenario used for this purpose.

#### **3.5.4 Information collection template**

FI intends to request information about repricing dates and volumes for the interest-rate sensitive instruments in the balance sheet. This is done in order to facilitate FI's understanding of the firms' interest rate risk and to obtain supporting information for FI's own model for calculating the capital requirement for interest rate risk. The intention is to publish the information collection templates on [www.fi.se](http://www.fi.se) together with this memorandum, following referral for consultation; the templates will be called *InformationsinhämtningRänterisk.xls*.

#### **3.5.5 FI's calculation of capital requirement for IRRBB**

As described in Sub-section 3.5.1 above, the calculation of the capital requirement for IRRBB is based on the sensitivity of the firms' economic value to changes in the yield curve. The economic value of the net interest income relating to the interest-bearing assets and liabilities in the banking book is the sum of the present value of all cashflows according to the following formula. As mentioned above, the model has been simplified so that all cashflows in the same currency are discounted using the same curve.

$$EV = \sum C \cdot df(t)$$

<i>Variable</i>	<i>Explanation</i>
$C$	The size of a cashflow that falls at point in time $t$ .
$df(t)$	The discounting factor at point in time $t$ in the unstressed scenario.
$\sum C \cdot df(t)$	The total of all present values for cashflows in the banking book.
$EV$	The economic value of the banking book.



The change in the economic value given a certain interest rate scenario  $i$  is driven by the extent to which the interest rate change affects the discounting factors for the cashflows in the balance sheet.

$$\Delta EV_i = EV_{\text{scenario } i} - EV_{\text{unstressed scenario}}$$

$$\Delta EV_i = \sum C \cdot df_i(t) - \sum C \cdot df(t)$$

$$\Delta EV_i = \sum C \cdot (df_i(t) - df(t))$$

<i>Variable</i>	<i>Explanation</i>
$\Delta EV_i$	The change in the banking book's economic value given scenario $i$ .
$df_i(t)$	The discounting factor at point in time $t$ in scenario $i$ .

Numerically, the change in economic value in a certain interest rate scenario can thus be calculated by multiplying each cashflow by the difference between its discounting factors in the specific scenario compared with the difference in the unstressed interest rate scenario.

Nominal amounts and coupon payments are grouped into various time buckets according to FI's template. The following principles are used when calculating the present value of all cashflows in a certain time bucket:

- The average of the discounting factors for the time bucket's upper and lower limits is used for time buckets relating to maturities of between one and five years. For example,  $(df(2) + df(3))/2$  is used for the time bucket for cashflows between two and three years.
- The discounting factor for one year  $df(1)$ , adjusted for how large a portion of a year the central point in time of the time bucket represents, is used for time buckets relating to maturities of less than one year. For example,  $df(1) \cdot 4.5/12$  is used as a discounting factor for the time bucket for cashflows of between three and six months.
- An average of all of the annual discounting factors encompassed within the interval is used for time buckets relating to maturities of more than five years. For example, the following expression is used as a discounting factor for all cashflows in time buckets of between 10 and 15 years.

$$\frac{df(10) + df(11) + df(12) + df(13) + df(14) + df(15)}{6}$$

FI considers that it is inappropriate to use such a rough division into time buckets for the ten largest firms, and for this reason FI intends to obtain additional information for them (see Sub-section 3.6.2).

### *Calculation of capital requirement for a mismatch in repricing dates*

One outcome per currency is calculated for each of the six scenarios that FI intends to use to calculate the sensitivity in the banking book to changes in the market interest rate. These calculations include all items in the information collection template, that is, assets, liabilities and derivatives. The outcome for a certain scenario is calculated by multiplying the net positions in each time bucket by the difference in the bucket's discounting factor in the stressed scenario compared with the unstressed scenario. After that, all such products are added together for each currency. The outcome for each currency is then translated into Swedish kronor using the applicable exchange rates on the reporting date to which the positions relate. The outcomes are then added together for each scenario. The capital requirement for a fixed interest term mismatch is calculated as the worst outcome.

### *Calculation of capital requirement for a mismatch in maturities*

One outcome per currency is calculated for the scenario that considers a rising parallel shift of the firms' credit spread. However, this calculation excludes items referred to as derivatives in the information collection templates. The outcome is then translated into Swedish kronor and added together. This total comprises the capital requirement for a maturity mismatch if this is negative. No capital requirement arises for a maturity mismatch if the total is positive.

FI does not expect FI's method to normally generate any capital requirement for a maturity mismatch, at least not for any of the major Swedish firms. This is due to the average maturities for borrowing at major banks exceeding the average maturities for the banks' assets, using the definition of 'maturity' that FI uses in this respect. Long-term financing basically arises through an issue of covered bonds and other fixed-term market financing in Swedish kronor and other currencies. The maturities for housing loans are assumed in this respect to be in line with the repricing date, given the firms' possibility of adapting the pricing of mortgage lending to changes in their credit spread. Although the major banks are currently expected to have a capital requirement of zero for this component, FI considers that it is important for FI's method to also take account of any negative future changes in the banks' structural interest rate risk in this respect.

### *Total capital requirement for IRRBB*

The capital requirement for IRRBB is finally calculated as the sum of the capital requirements for repricing date mismatch and for maturity mismatch.

### **3.5.6 Calibration of stress magnitude**

FI considers that it is important to clearly describe the way in which the model is calibrated. A clear description means that the firms themselves can estimate the capital requirement and predict changes in stress level with an acceptable level of precision.

The calibration method focusses on the changes over three months in the interest rate level at the five-year point on the swap rate curve in a number of critical currencies. FI intends to base this calibration on a trailing time period of ten years. A set of possible stress magnitudes is obtained by working out all of the overlapping three-month changes (approx. 2,500) for each of the critical currencies and then choosing the 25<sup>th</sup> largest movement in absolute terms for each currency. The highest of these possible stress magnitudes is then chosen as the common stress level for all yield curves. The lowest possible stress level will be 100 basis points.

Swedish kronor, Euros and US dollars are the critical currencies for which FI intends to perform the calibration.

FI considers that the magnitude will be approximately 160 basis points based on a preliminary calibration of the stress magnitude performed for the time period 30 April 2004 to 30 April 2014. The result is obtained for three-month changes in the five-year swap rate in US dollars.

## **3.6 The proportionality principle**

### **3.6.1 Calculation bases for the ten largest firms**

FI intends to request a more detailed cashflow statement for each currency from the ten largest firms in addition to detailed balance sheet information for different currencies. Firms only need to differentiate cashflows relating to assets, liabilities and derivatives here, and all cashflows are translated into a common presentation currency.

On the other hand, there is a high level of detail in respect of the repricing date, where FI intends to request the actual date on which the interest rate is reset. The reason behind FI intending to request more detailed information about repricing dates is that FI wants to avoid a situation where the division into time buckets used in the template for the detailed balance sheet information itself has an excessive effect on the final result. This could possibly lead to firms attempting to optimise their net position in each bucket, which could have an undesirable effect on the market prices for various debt instruments in the long run.

When producing discounting factors for specific dates, FI will apply a linear interpolation between the annual zero-coupon interest rates calculated.

### 3.6.2 Calculation bases for small firms

FI intends to use FI's method for assessing IRRBB for small firms if and when FI undertakes a supervisory capital assessment for these firms. See Sub-section 1.2 for a further description of the scope of these methods.

For small firms, FI's method differentiates between firms with significant interest rate risk and firms with limited interest rate risk. The intention is to notify the firms involved about which firms are deemed to have significant interest rate risk at a later date.

FI intends to use ready-to-use measures of sensitivity to interest rates to estimate interest rate risk for small firms with significant interest rate risk. These are based on the sensitivity to interest rates that a bond with a five-per-cent coupon, and a maturity corresponding to the average maturity in the time bucket, has in an interest environment where the interest rate is five per cent for all maturities. This approach has been obtained from the Basel Committee's guidelines for measuring interest rate risk.<sup>28</sup> These small firms with significant interest rate risk will only need to enter nominal amounts in the information collection templates.

In the event that FI undertakes a supervisory capital assessment for small firms for which FI considers that the interest rate risk is insignificant, these firms will not in the opinion of FI have to complete the template, and FI does not intend to estimate any capital requirement for interest rate risk for these firms.

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<sup>28</sup> Principles for the Management and Supervision of Interest Rate Risk, BCBS, July 2004.

## 4 Pension risk

### 4.1 Background and purpose

The firms' post-employment employee benefits largely comprise pensions. Pension benefits are usually provided in accordance with formal plans or other formal agreements between the firm and individual employees, groups of employees or their representatives, such as the firms' collective agreements for occupational pensions (BTP – *Bankernas tjänstepension*).<sup>29</sup> Pillar 1 does not take account of the risks that these obligations and the managed pension assets referable thereto may pose for firms.<sup>30</sup> However, these risks may be significant and for this reason need to be taken into account in the supervisory capital assessment within the framework of Pillar 2.

According to international accounting standards adopted by the EU, plans for post-employment benefits, such as *defined contribution plans* or *defined benefit plans*, are classified depending on the plan's economic substance in accordance with its main rules and conditions.<sup>31</sup> There may also be plans that include elements of both types.

The firm's obligation under *defined contribution plans* is limited to the amount the firm contributes through premiums or provisions that have been reported as an expense. The firm's contribution normally corresponds to a percentage rate of the salary for the employee concerned. Hence, actuarial risk (the risk that benefits will be less than expected) and investment risk (the risk that managed pension assets will be insufficient to meet expected benefits) fall on the employee. However, there are also cases in defined contribution plans where the firm's obligation is not limited to the agreed charges. One example is when the firm has an obligation associated with a guaranteed yield on the charges.

In *defined benefit plans*, the firm has a future obligation to provide the agreed benefits to current and former employees. The firm normally undertakes to pay a certain percentage of the employee's final salary on the attainment of pensionable age or, alternatively, an average of their salaries over a period prior to retirement. Consequently, the firm's future obligation cannot be limited by a transfer of assets or payment of charges to a pension foundation, pension fund or insurance firm, but both actuarial risk (that the benefits will cost more than expected) and investment risk fall on the firm. The firm's obligation may therefore increase if the actuarial or investment experience is worse than expected.

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<sup>29</sup> Pension agreement between the Employers' Association of the Swedish Banking Institutions and the Financial Sector Union of Sweden.

<sup>30</sup> Under the Capital Requirements Regulation, there is only a capital requirement for positive net assets (which is calculated according to IAS 19) that have not been deducted from own funds. This does not currently apply to any of the Swedish firms that FI has considered during the impact analysis in this memorandum.

<sup>31</sup> International Accounting Standard (IAS) 19 *Employee benefits*.

When sufficient information is not available to use defined benefit accounting for a multi-employer defined benefit plan, the firm should account for the plan under IAS 19 *Employee Benefits*, as if it were a defined contribution plan.<sup>32</sup>

The four major Swedish banks reported total gross pension obligations of approximately SEK 91 billion at the end of 2013.<sup>33</sup> Managed pension assets referable to the obligations amounted to approximately SEK 94 billion.<sup>34</sup> As these obligations relate to uncertain cashflows that extend far into the future, they are calculated using recognised actuarial calculation methods based on critical assumptions of, for example, discount rates, length of life and projected salaries. Changes in asset valuations and other market variables and also actuarial assumptions used may have a material effect on the estimated size of the obligations and the pension assets. It is of considerable importance to financial sector stability that the financial firms hold sufficient own funds to cover the risks in the pension obligations made.

In this section, FI reports on its method and measures for ensuring that pension risk is dealt with and analysed in a consistent way, and that Swedish firms have sufficient own funds to cover the risks that these items give rise to.

## 4.2 FI's position

FI will calculate the firms' capital requirement for pension risk using a traffic light method similar to the model used within the insurance area. FI will make certain adjustments to the method to adapt it to the overall framework applicable to firms within the banking area and also firm-specific factors.

## 4.3 Reasons for FI's positions

The risks associated with the firms' pension obligations differ in many respects from the risks managed by firms in their day-to-day credit activities and that are specifically taken into account in the Capital Requirements Regulation and the Capital Buffers Act. Such differences include, for example, the maturities of pension obligations, which are significantly longer than the maturities that normally arise within banking activities, and also the existence of different actuarial risks. There is no capital adequacy for pension risks under the Capital Requirements Regulation and the Capital Buffers Act.<sup>35</sup>

<sup>32</sup> IAS 19, item 34.

<sup>33</sup> The small firms have often insured their obligations with insurance firms despite still reporting net assets or liabilities for their pension plans under IAS 19.

<sup>34</sup> Information about pension obligations and pension assets has been obtained from the annual reports for Nordea, SEB, Svenska Handelsbanken and Swedbank for the financial year 2013 and relate to each banking group.

<sup>35</sup> Any positive net assets are normally deducted from the firms' Common Equity Tier 1 capital under Article 36 of the Capital Requirements Regulation. Such a deduction does not need to be made under certain conditions, and there should be capital adequacy for the remaining amount according to the standardised approach or IRB, which should comprise no more than any positive *net assets* according to IAS 19, in the event that firms report positive net assets in a balance sheet and a deduction from Common Equity Tier 1 capital is not made. Consequently, there is no capital adequacy under the Capital Requirements Regulation for either risks that

In some cases the pension risks are subject to separate regulation. This may, for example, be the case when insurance commitments are hedged at a pension foundation or insured with a pension fund. FI intends to take account of pension risks during the supervisory capital assessment within Pillar 2 through the method presented in this section regardless of whether these risks are subject to separate regulation.

FI considers that the traffic light method that FI already uses within the insurance area takes account of the main risk factors applicable to pension risk. For this reason, FI intends to use a similar traffic light method in its supervision work in respect of pension risk and also when calculating the own funds requirement for pension risk.

However, certain adjustments are required to adapt the traffic light method to FI's supervisory review and evaluation process within the banking area. Such adjustments relate to, for example, the calculation of existing own funds and the method's principal risk calibration, and are described in the following section.

#### **4.4 Description of FI's method – the traffic light method**

##### ***4.4.1 Background – the traffic light method within insurance supervision***

The traffic light method is part of FI's method for supervising Swedish insurance firms. The traffic light measures how well insurance firms can withstand the risks presented by their exposures to various financial and insurance risks.

The method was formulated in 2005 to measure financial risks, and the model was tested on life insurance firms and occupational pension funds during the following year. The method was further developed in 2006, and FI sent out a complete traffic light method for consultation in November 2006. The method related to both life and non-life insurance and covered financial risks, insurance risks and expense risks. The firms had no critical objections and the views submitted related to details regarding how the calculation of the risks had been designed. FI took the experiences of the tests, and to some extent the views submitted, into consideration when designing a new version of the traffic light method in 2007.

There were originally three colours for the Traffic Light (red, amber and green), although the amber light was subsequently removed as there were doubts about how it should be interpreted. A red light means that the insurance firm does not have sufficient own funds to clear the Traffic Light's capital requirement.

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arise owing to *pension obligations* or the managed *pension assets* referable to the pension obligations on a gross basis.

Insurance firms report the traffic light method to FI in the same way as the periodic reporting. The outcome from traffic light reporting for insurance firms is summarised and presented at an overall level in the insurance barometer, which is published twice a year. The insurance barometer is being replaced by a supervision report for the insurance area as of 2015. FI may conduct a more in-depth supervision of insurance firms, of both a quantitative and qualitative kind, based on the results of the traffic light method.

#### ***4.4.2 Traffic light method for pension risk within Pillar 2***

In the traffic light method, which FI intends to use for pension risk within Pillar 2, assets and liabilities are measured at fair value. For fair value, mark-to-market is used for assets, and liabilities are valued according to 'best estimate'. The firm is subsequently exposed to a number of stress scenarios determined by FI. This results in a total capital requirement for pension risk after adding a risk margin adjustment for the scenarios. This total capital requirement is subsequently reduced by any existing own funds for the firms to the extent that these are not included in the firms' Common Equity Tier 1 capital. Existing own funds may be positive or negative. The difference between the total capital requirement and existing own funds comprises the firms' capital requirement for pension risk within the Pillar 2 basic requirement.

##### *4.4.2.1 Gross total capital requirement for pension risk*

A total gross capital requirement, comprising the following parts, is calculated using the traffic light method for pension risk within the framework of Pillar 2.<sup>36</sup>

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<sup>36</sup> See also <http://www.fi.se/Rapportering/Trafikljuset/Anvisningar/>



1. Insurance risks based on a best estimate of provisions in accordance with the 'prudent person' principle<sup>37</sup>
  - Increase of the provisions as a consequence of stressed risk assumptions
  - Increase of the provisions as a consequence of reduced discount rate
  
2. Financial risks in accordance with fair value measurement<sup>38</sup>
  - Interest rate risk
  - Equity risk
  - Property price risk
  - Credit risk
  - Currency risk
  
3. Risk margin in addition to best estimate of provisions in accordance with the 'prudent person' principle

### *Insurance risks*

'Best estimate of provisions in accordance with the prudent person principle' should correspond to the expected value of future discounted cash outflows in respect of the firm's pension risks. The calculations must be made using adequate actuarial techniques and without applying implicit general supplement for security. Finansinspektionen's Regulations and General Guidelines (FFFS 2013:23) regarding insurance firms' chosen rate of interest for calculating technical provisions may provide guidance on how firms are to value their future cash outflows when providing information to FI.

The effect of interest rate risk on the provisions is dealt with as its net impact on the obligations and the managed pension assets referable thereto and is described below in the 'Financial risks' section.

Mortality and morbidity risks are taken into account when stressing the assumptions for insurance risks in the traffic light model for pension risk within the framework of Pillar 2. Lapse risk is not considered to be relevant.<sup>39</sup> A capital requirement based on sampling and parameter errors is calculated during stressing. Sampling error is a measure of the size of deviations from the expected value. Parameter error takes account of other mortality and morbidity assumptions.

<sup>37</sup> <http://www.fi.se/Rapportering/Trafikljuset/Methodik-och-underlag/>

<sup>38</sup> <http://www.fi.se/Rapportering/Trafikljuset/Anvisningar/>

<sup>39</sup> 'Lapse risk' means the risk of assumptions about the behaviour of beneficiaries regarding a break in premium payments or termination, renewal and buy-back of insurance contracts underestimating the actual behaviour of beneficiaries. Cancellation risk may represent an important risk for insurance firms, but does not apply to pension obligations where the firm is responsible for premium payments and risk, and the beneficiary's performance is limited to their employment.

### *Financial risks*

The pension assets managed involve significant risks, both as a consequence of the assets' own risks and the way the assets and liabilities co-vary. The extent of the financial risks may differ significantly between different firms depending on their specific asset assignment and the maturity structure of their interest-bearing assets and pension obligations.

Interest rate risk is the risk of changes in market interest rates having a negative impact on the firm's capital position. The capital requirement for interest rate risk is calculated on the basis of the extent to which assets and liabilities are affected by given changes in the level of the market interest rates. The calculation in the stress test is broken down into interest-bearing assets with associated interest rate derivatives and the best estimate of insurance commitments. Assets and commitments are split into four categories: nominal and inflation-linked interest rate in Swedish kronor, Euro and other foreign currency. The firm will take account of the effect of the assumption that market interest rates for all of the four categories will move in the same direction, that is, either rise or fall. If all market rates falling is the most unfavourable condition for the firm, the firm should calculate the effect of a fall, otherwise the effect of a rise is calculated. The sensitivity of assets and obligations to interest rates is expressed as a parallel shift of the yield curves.

Equity price risk is the risk of a fall in the market value of an equity investment. The capital requirement for equity price risk is measured by calculating the effects of a percentage fall in the market value of the shares. Equity exposure is broken down into Swedish and foreign shares.

Property price risk is the risk of fall in value in the market value of a property investment and is measured as a reduction in the market value.

Credit risk is the risk of a change in the price of interest-bearing assets with credit risk or counterparty risk and is measured by calculating how their value changes if the average credit spread increases according to a certain scenario. Here 'credit spread' means the difference in interest rate between the interest-bearing assets and the risk-free rate,<sup>40</sup> regardless of whether the difference constitutes a premium for credit, counterparty, liquidity risk or something else.

Currency risk is the risk of an increase in (currency) exposure in assets and liabilities as a consequence of changes in currency rates and is measured as an exchange rate fluctuation in relation to Swedish kronor for each foreign currency. The firm's net exposure is calculated on the basis of each individual foreign currency, after matching against the liability side in the balance sheet.

The following is a presentation in tabular form of the parameters for stressing financial risks that applied when this memorandum was referred for

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<sup>40</sup> In this memorandum, 'risk free rate' means applicable market rate of interest for treasury bills or government bonds.

consultation. These parameters may change, and the parameter values applicable for each point in time will be available on FI's website.

**Table 4.1** Stress of financial risks in the traffic light method

<b>Risk category</b>	<b>Scenario</b>
<b>Interest rate risk</b>	
Interest rate risk, nominal interest rate (SEK)	+/- 100 basis points
Interest rate risk, real rate of interest (SEK)	+/- 50 basis points
Interest rate risk (EUR)	+/- 100 basis points
Interest rate risk in other foreign currency	+/- 100 basis points
<b>Equity risk</b>	
<b>Alt. 1</b> (no currency risk to be added),	
Swedish	- 40 per cent
Foreign	- 37 per cent
<b>Alt. 2</b> (currency risk to be added),	
Swedish	- 40 per cent
Foreign	- 35 per cent
<b>Property price risk</b>	- 35 per cent
<b>Credit risk</b> (increase of credit spread)	Max of (100 per cent; 25 basis points)
<b>Currency risk</b>	+/- 10 per cent

### *Risk margin*

The risk margin should correspond to an amount that an external party may be expected to require (in addition to the valuation according to best estimate) for taking over the obligations. The firm must make its own assessment of the risk margin.

An estimate is to be made using a standard parameter if the firm cannot make its own detailed assessment. The risk margin according to the estimate will then comprise the best estimate for the provision, multiplied by the standard parameter of five per cent.

### *Effect of any risk reduction such as, for example, use of derivative instruments*

For derivatives, risk is measured by the change in the underlying asset according to each scenario. For example, the change in value of a share option is thus to be calculated based on the change in value of the underlying share.

### *Chosen rate of interest for calculating future cash outflows in respect of the firm's pension risks*

According to FI's method, interest rates for calculating future cash outflows for the firms' pension risks is to be determined in accordance with Finansinspektionen's Regulations and General Guidelines regarding insurance firms' chosen rate of interest for calculating technical provisions. The discount rate curve is based on market quotations for interest rate swaps and also a

modelled long-term forward rate. The market rates are given full weight up to ten years, after which they are phased out on a straight-line basis up to twenty years. After that, the curve should fully converge to the long-term forward rate.

The level of the modelled long-term yield, expressed by the forward rate, is a measure of the level of the yield expected to be achieved for ‘risk-free assets’<sup>41</sup> over a very long time perspective. The long-term forward rate in Swedish kronor has been set at 4.2 per cent. This level is based on assumptions of a long-term real rate of interest yield of 2.2 per cent and an assumption of two per cent for inflation.

The regulations also include special provisions on how firms are to determine the discount rate curve for Norwegian kroner, Danish kroner, Euros, British pounds and US dollars. The values used for other currencies should be the same as those specified for Swedish kronor.

The discounting method described above differs significantly from the methods that the firms’ reported provisions take account of under IAS 19. IAS 19 prescribes that a firm should use ‘high quality corporate bonds’ and, in the event that these are not available for the maturities being considered, a firm should use the yield on government bonds. The actuarial discounting method normally results in lower valuations of the technical provisions than IAS 19, which means that the net assets are normally higher under FI’s method. All of the four major Swedish banks report negative net assets in accordance with IAS 19 for their pension obligations.

#### *4.4.2.2 Net total capital requirement for pension risk*

The traffic light method gives rise to a total net capital requirement following an adjustment for diversification between various risk categories through coefficients of correlation. The correlations should reflect the correlations under the stressed circumstances measured according to the method. These correlations are difficult to estimate and may only be very approximate. FI has therefore chosen to work with simplified correlation assumptions in the traffic light method.

The net total capital requirement is calculated using a square root formula with the following coefficients of correlation:

- $\rho(\text{Mortality, Morbidity}) = 25\%$
- $\rho(\text{SEK nom, SEK real}) = \rho(\text{SEK nom, EUR}) = 80\%$
- $\rho(\text{SEK real, EUR}) = 50\%$

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<sup>41</sup> The yield curve for government securities (principally long-term government bonds) and also short-term key interest rates constitute an approximation of the yield that may be obtained for ‘risk-free assets’.

FI only accepts diversification effects in limited cases when calculating capital requirements within the banking area. However, diversification effects are an integral part of the overall risk assessment for insurance firms, and FI considers that it is reasonable to take account of diversification effects when assessing the capital requirement for pension risk as FI intends to use a method for pension risk assessment based on the methods used within the insurance area.

#### 4.4.2.3 Existing own funds for pension risk

The net pension obligations for a firm, and their associated managed pension assets, may comprise a net asset or a net liability at any point in time. According to IAS 19, only the net assets (positive or negative) are reported in the balance sheet, while the actual assets and liabilities on a gross basis are provided in footnotes. When calculating the firms' own funds, a deduction is made from the Common Equity Tier 1 capital for the net assets for defined benefit pension plans in the event that these are positive,<sup>42</sup> whereas a negative balance continues to be charged to Common Equity Tier 1 capital and consequently own funds. This could be regarded as a logical consequence of the Capital Requirements Regulation not specifically taking account of the risks in the pension obligations; through the adjustment, Pillar 1 does not take account of the risks that the pension obligations give rise to nor the capital (if this is positive) that the firm has assigned for such risks. However, FI considers that existing own funds for defined benefit pensions should be included when calculating the remaining capital requirement within Pillar 2 in accordance with the following calculation method.

It is proposed that existing own funds for defined benefit pensions, which may be positive or negative, are calculated according to the following table:

**Table 4.2** Calculation of existing own funds for pension risk

+	Any positive net pension assets under IAS 19 that have been deducted from the firm's Common Equity Tier 1 capital
+/-	Effect of changed actuarial assumptions such as adjustment of discounting method from IAS 19 to the traffic light method <sup>43</sup>
+/-	Any other adjustments according to Sub-clauses 4.4.4 and 4.4.5 below
<b>=</b>	<b>Existing own funds for calculating capital requirement for pension risk</b>

<sup>42</sup> The Capital Requirements Regulation allows such a deduction to be reduced under certain conditions.

<sup>43</sup> When choosing a discounting method, the firms can find guidance in Finansinspektionen's Regulations and General Guidelines regarding insurance firms' chosen rate of interest for calculating technical provisions.

### *Net assets according to IAS 19*

Existing own funds are calculated in accordance with FI's method, based on the reporting of net pension assets under IAS 19 in the event that these net assets are positive and have been deducted from the calculation of Common Equity Tier 1 capital. As described above, the firm should state the way in which this surplus or deficit was determined and taken into account in the firm's capital assessment if a firm's defined benefit plans under IAS 19 have been classified as 'defined contribution' in their ICAAP. Such capital should not be included in the calculation of existing capital for calculating the capital requirement for pension risk if it has not been deducted from the own funds reported by the firms.

### *Changed actuarial assumptions*

An adjustment should be made for changed actuarial assumptions such as differences in the discounting method between IAS 19 and Finansinspektionen's Regulations and General Guidelines regarding insurance firms' chosen rate of interest for calculating technical provisions. The effect of adjustments for changed assumptions are added to or deducted from existing own funds.

### *Other adjustments*

Any adjustments for concentration risk and holdings of shares in the firm itself are described in Sub-clauses 4.4.3 and 4.4.4 below.

### *Total existing own funds*

The sum of the net assets under IAS 19, if these are positive and have been deducted in the calculation of the Common Equity Tier 1 capital, the adjustment effect for change to discounting method under IAS 19, the adjustment effect for change to actuarial assumptions and other adjustment effects in accordance with Table 4.2 above, constitutes the bank's existing own funds for the assessment of any additional capital requirement within Pillar 2 for pension risks. Such total existing own funds may be positive or negative, even though the 'net assets' component according to IAS 19 can only be positive or zero.

#### *4.4.2.4 Capital requirements for pension risk within the Pillar 2 basic requirement*

The calculation of insurance risks, financial risks and risk margin used in the traffic light method gives rise to a gross capital requirement. The capital requirement is added together following an adjustment for correlation assumptions and the result provides the total net capital requirement. The firm's existing own funds are subsequently subtracted from the total net capital requirement to assess any further capital requirement within Pillar 2 for pension risk.

If the result of the above-mentioned calculation is positive, it comprises the capital requirement for pension risk within the Pillar 2 basic requirement.

The capital requirement for pension risk within the Pillar 2 basic requirement is set at zero if the result is negative.

The capital requirement within Pillar 2 thus becomes a net capital requirement that corresponds to the remaining capital requirement after deductions for any existing capital that was not included in the firms' reported Common Equity Tier 1 capital.

#### ***4.4.3 Concentration risks***

Capital requirements under the traffic light method are based on an assumption of well-diversified exposures within each class of asset. FI may need to make an assessment of any further capital requirement within Pillar 2 in the event that this assumption does not hold. Such assessments are not taken into account in this memorandum.

#### ***4.4.4 Treasury shares***

Existing capital should be adjusted for any holdings of shares in the firm itself. The amount deducted in the calculation of existing capital for such cases should also be deducted in the calculation of capital requirement for equity risk.

#### ***4.4.5 Taking account of currencies other than Swedish kronor***

Discounting of obligations in currencies other than Swedish kronor should be determined with the guidance of Finansinspektionen's Regulations and General Guidelines regarding insurance firms' chosen rate of interest for calculating technical provisions, where firms are to use market quotations for interest swaps. The Regulations also include special provisions on how firms are to determine the discount rate curve for Norwegian kroner, Danish kroner, Euros, British pounds and US dollars. The same values as specified for Swedish kronor should be used for other currencies.

#### ***4.4.6 Calibration***

The traffic light method used in the area of insurance is based on risk assumptions being chosen so that they approximately correspond to a 99.5 percentage quantile of the possible outcomes for one year. FI intends to increase the capital requirement, compared with the capital requirement in the insurance area's traffic light method, by 20 per cent (based on the assumption that there is a normal allocation of the risk) in order to adjust this to a 99.9 percentage quantile.

#### ***4.4.7 Capital requirements for pension risk within the Pillar 2 basic requirement***

FI's assessment of the firms' capital requirement for pension risk within Pillar 2 will be calculated as the difference between the total net capital requirement for pension risk under Sub-section 4.4.2.2 and the existing own funds for pension risk under Sub-section 4.4.2.3. The capital requirement within the Pillar 2 basic requirement thus becomes zero in the event that a firm has existing capital that is not taken into account in the firm's own funds, corresponding to or exceeding the capital requirement. The capital requirement within the Pillar 2 basic requirement thus becomes a net capital requirement corresponding to the remaining capital requirement following a deduction for any existing capital not included in the firms' reported Common Equity Tier 1 capital.



## 5 Covariation between pension risk and interest rate risk

### 5.1 Introduction

The firms' capital requirement for pension risk normally relates to a significant extent to the risk of low interest rates. However, the firms' capital requirement for IRRBB normally relates to the risk of higher interest rates. As the same risk factor cannot move in two directions there may consequently be a risk-mitigating effect between pension risk and interest rate risk. For this reason, FI needs to adopt a position on whether this risk-mitigating effect is to be taken into account.

### 5.2 FI's position

FI does not intend to take account of any reverse covariation between the different types of risk dealt with in this memorandum in its supervisory capital assessment.

### 5.3 Reasons for FI's position

FI considers that a reverse covariation between different types of risk for the same risk factor (in this case interest rates) may be significant and result in a reduced pooled sensitivity to interest rates for firms. However, the real significance of such a risk-mitigating effect largely depends on the circumstances, not least whether any surplus own funds for pension risk can be transferred to the bank's other activities and vice versa.

The existing capital, where there is any, that is taken into account when assessing a capital requirement for pension risk relates to a significant extent to the change in discounting between the traffic light method and IAS 19. Capital that arises through a change in the valuation of liabilities between IAS 19 and the traffic light method is not available for other activities. Significant changes in methods would also be required if such a covariation were to be taken into account, for example when calculating a capital requirement for pension risk where the interest rate risk contributes to correlation effects that reduce the capital requirement.

Therefore, in the opinion of FI, the pooled impact of any covariation relating to interest rate risk for the firms' capital requirement would be significantly lower if relevant circumstances and the need for further adjustments had been taken into account. For this reason, FI does not intend to take account of such covariation between the different types of risk referred to in this memorandum in the authority's supervisory capital assessment. This approach also complies with FI's general standpoint in the Capital Requirements Memorandum about not reducing the capital requirement in Pillar 2 on account of risk diversification between risk types, even if the reverse covariation between pension risk and interest rate risk may be considered to be more direct than diversification effects generally.

## 6 Transparency

As described in the Capital Requirements Memorandum, FI will publish results of the supervisory capital assessment (including the result of the methods described in this memorandum) quarterly at consolidated level for the ten largest groups. This publication includes all parts of the capital requirement, including systemic risk, risk weight floor for mortgages and the countercyclical buffer.

The risk types described in this memorandum are normally assessed annually within the supervisory capital assessment. The calculation of these parts, based on FI's methods, will therefore not normally be updated in the quarterly report, at least initially. The amount determined annually in Swedish kronor will instead be reported quarterly as a percentage of the risk-weighted exposure amount.

FI may update the assessment of the capital requirement for the risk types described in this memorandum more frequently than annually if and when there is a significant change in the prerequisites for the assessment. The parts of the supervisory capital assessment relating to systemic risk (that is, the risk weight floor, the countercyclical buffer and the capital requirement for systemic risk<sup>44</sup>) will be both updated and reported on a quarterly basis.

FI's supervisory capital assessment for a certain financial year is normally completed during the second half of the following year.

Firms are to publish the result of the firm's internal processes for assessing the capital requirement four times a year.<sup>45</sup> Firms may, but do not have to, choose to use FI's methods when conducting their own assessment of their capital requirement (see also Sub-section 1.3).

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<sup>44</sup> This refers to the two-per-cent Common Equity Tier 1 capital imposed on the four major banks at consolidated level within the framework of Pillar 2. See the Capital Requirements Memorandum for more information.

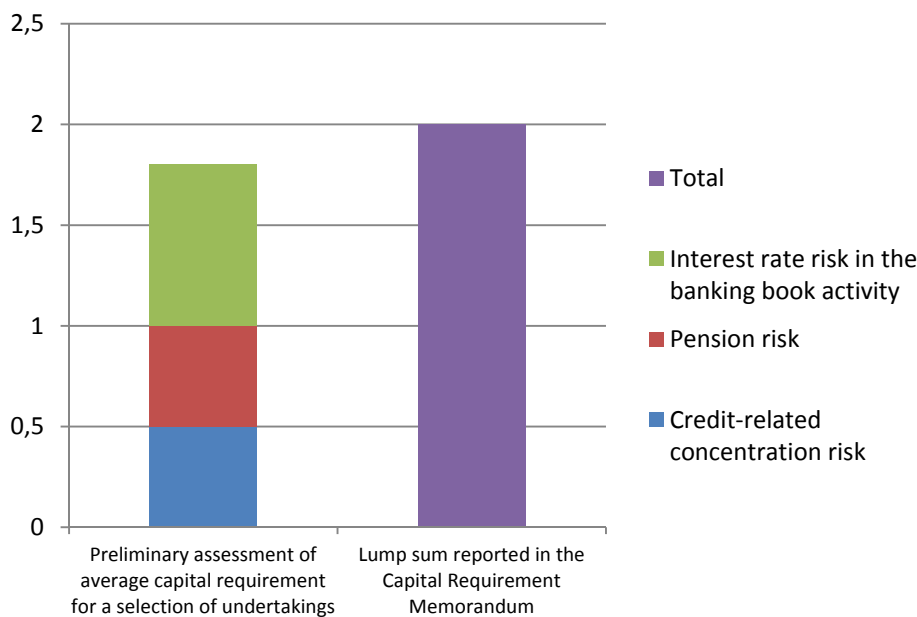
<sup>45</sup> See Chapter 5, Section 8 of Finansinspektionen's Regulations (FFFS 2014:12) regarding prudential requirements and capital buffers.

## 7 Impact analysis

FI reports the overall impact of FI’s proposed application of the new capital adequacy rules in the Capital Requirements Memorandum. In the impact analysis, FI used a combined lump sum for the three risk groups described in this memorandum and, in certain cases, also for other risks,<sup>46</sup> corresponding to 1.5 per cent Common Equity Tier 1 capital and 2.0 per cent total capital for the four major banks, and 1.3 per cent Common Equity Tier 1 capital and 2.0 per cent total capital for the six other firms.<sup>47</sup> All percentages are based on the total risk-weighted exposure amount.

This section describes a preliminary calculation of the total capital requirements for a selection of firms compared with the above-mentioned lump sum. The calculations reported are based on data reported to FI. The names of the firms are not reported and the results should only be seen as indicative, as FI’s data material is preliminary and does not fully reflect FI’s methods, as presented in this memorandum. FI will update the impact analysis when publishing the final memorandum.

### 7.1 Preliminary assessment of total capital requirement according to FI’s methods for credit-related concentration risk, IRRBB and pension risk as a percentage of risk-weighted exposure amount



<sup>46</sup> Such additional capital requirements may relate to, for example, deficiencies in risk management and model risk and are not dealt with in this memorandum.

<sup>47</sup> The higher portion of Common Equity Tier 1 capital as a portion of the total capital requirement for the major banks takes into account the additional systemic risk requirements in the form of Common Equity Tier 1 capital within Pillar 1 and Pillar 2 that are only applied to the major banks in this memorandum. For this reason, these banks have a higher proportion of Common Equity Tier 1 capital.

As shown in Diagram 7.1 above, FI's preliminary calculations show that the capital requirement within Pillar 2 for the three risk types described in this memorandum on average represents 1.8 per cent of the total risk-weighted exposure amount. This is in line with the level of 2.0 per cent stipulated as a lump sum in the Capital Requirements Memorandum. However, the results differ significantly between the firms that FI takes into account in this impact analysis, not least owing to the assessment of capital requirements for pension risk. For several firms, the existing capital for pension obligations, which FI includes in the calculation but that is not taken into account in the firms' reported Common Equity Tier 1 capital, exceeds the estimated capital requirement according to FI's method for pension risk. There is no additional capital requirement for pension risk for these firms within the Pillar 2 basic requirement. The lump sum used in the Capital Requirements Memorandum also takes account of any additional, normally less significant, risks, mainly in respect of deficiencies in risk management or model risk, for those firms covered by such capital requirements. Such additional capital requirements are not considered in this memorandum.

The combined capital requirement for concentration risk, IRRBB and pension risk for the individual firms included in FI's preliminary calculation in Diagram 7.1 varies between 0.8 per cent and 2.3 per cent of the firms' total risk-weighted exposure amount.

As the firms' average capital requirement according to FI's preliminary assessment is in line with the lump sum used by FI in its Capital Requirements Memorandum, FI considers that the Capital Requirements Memorandum's impact analysis still applies. The additional risk calibration that the introduction of FI's methods involves means that the capital requirement for certain firms will exceed the lump sum previously reported. However, FI is of the opinion that the benefit of a more precise risk calibration should exceed the cost of any additional capital requirement for certain firms.

FI also notes that firms were also previously subject to a capital requirement for the risk groups now in question during the supervisory capital assessment. The main difference in relation to previous practice is that future capital requirements will be based on transparent methods, and that future results will be reported publicly in accordance with the 'Transparency' section.

## Glossary

- Pension fund foundation:** A foundation formed by an employer where its exclusive purpose is to safeguard pension obligations for employees or the survivors of employees under the Safeguarding of Pension Commitments, etc. Act (1967:531).
- Pension fund:** Mutual benefit societies (benevolent societies) registered under the Mutual Benefit Societies Act (1972:262). This Act ceased to apply on 1 April 2011. Mutual benefit societies are thereby regulated by the transitional provisions contained in Section 7 of the Act (2010:2044) on the Implementation of the Insurance Business Act (2010:2043).
- IAS 19:** Accounting recommendation issued by the International Accounting Standards Board (IASB) relating to employee benefits, which includes the reporting of pension obligations.
- Supervisory capital assessment:** FI's assessment of the firm's risks and the capital requirement that these risks involve.
- Pillar 2 basic requirement:** Part of the capital requirement prescribed by the supervisory capital assessment. The Pillar 2 basic requirement includes an own funds requirement to cover risks or risk elements that are not covered by Pillar 1 and, in particular cases, capital for deficiencies in governance arrangements, processes and procedures.
- Capital planning buffer:** Part of the capital requirement prescribed by the supervisory capital assessment. The purpose of the capital planning buffer is for the firm to *continuously* be able to preserve a sufficient level of internal own funds.
- The combined buffer requirement:** The total buffer requirement applicable to each firm that comprises the capital conservation buffer (for all), the countercyclical capital buffer (which varies over time and between exposures in different countries) and the systemic risk buffer, the capital buffer for global systemically important institutions (G-SII) and the capital

buffer for other systemically important institutions (O-SII).

**Risk weight:**

Value used when calculating risk-weighted assets. Each credit's exposure amount is multiplied by a risk weight to calculate the bank's risk-weighted assets. The risk weight is determined on the basis of the individual credit's unexpected loss. A high risk weight involves a greater risk than a low risk weight.

## **8 Appendix 1: Instructions for completing the information collection template for IRRBB.**

### **8.1 About the template**

The information collection template comprises a four-sheet Excel document:

- Basic information – a sheet for submitting information about repricing and due date broken down into time buckets and balance sheet instruments.
- Advanced information – a sheet for more detailed cashflow information, where the exact points in time for repricing and due date are specified for broad categories such as assets, liabilities and derivatives.
- Option questionnaire – a sheet for information relating to option risk.
- Basis risk questionnaire – a sheet for information relating to basis risk.

The first two kinds have one sheet per currency in the following groups: Swedish kronor, Norwegian kroner, Danish kroner, Euros and US dollars. The corresponding sheet may be left empty if a firm does not have any interest-bearing exposures within any of these currencies, or if it has exposures corresponding to less than five per cent of the total balance sheet total in a certain currency. All interest-bearing exposures in currencies that comprise less than five per cent of the balance-sheet total can be translated into a common presentation currency and reported in the sheet referred to as 'XXX'. If a firm has an interest-bearing volume that exceeds five per cent of the balance sheet total in the banking book in a certain currency that is not Swedish kronor, Norwegian kroner, Danish kroner, Euros or US dollars, the firm should create a new basic information sheet for that currency, and also for advanced information if this currency is important to the firm.

There is only one option questionnaire and basis risk questionnaire in the information collection template.

### **8.2 Basic information**

The basic information collection sheet is referred as 'XXX', where XXX corresponds to the three-digit currency code for the positions reported in the sheet. All firms must complete the basic information sheet. However, small firms only need to fill in nominal amounts, while medium-sized and large firms also need to specify coupon payments. The information is to be provided at consolidated level for groups unless otherwise stated. Any internal transactions and derivatives within the consolidated banking book are not to be included in the information provided. On the other hand, derivatives and transactions between banking book and the trading book are to be included. It should be

possible to compare the nominal amounts with the information provided by the firm in respect of, for example, loan volumes in their reporting.

The three-digit currency code in each sheet's name states the original currency for the positions reported in each sheet. Firms are to provide the information about nominal amounts and coupon payments in their original currency. The 'conversion factor' field is used by FI to specify standardised exchange rates that are the same for all firms. The following describes how to complete the various instrument groups in the basic information sheet.

### **8.2.1 Assets and liabilities**

#### *8.2.1.1 With a set fixed interest term*

Liabilities and assets with a contracted interest rate are entered in such a way that the nominal amount is registered in the time bucket where the next repricing will take place. Coupons paid during the maturity are entered at their full amount in the time buckets that best correspond to the coupon dates.

#### *8.2.1.2 Without a set fixed interest term*

Indefinite-term commitments and assets are entered at their full amount in the shortest time bucket or, alternatively, if the firm uses a modelled fixed interest term in its internal risk measurement this should be specified. Indefinite-term commitments and assets do not contribute to the outcome in the Finansinspektionen's method, but information about modelled fixed interest terms may be used when evaluating the firms' internal models.

#### *8.2.1.3 FRNs and index-linked deposits and lending*

Floating rate notes (FRNs) are bonds with a maturity that differs from the fixed interest term. FRNs are distinctive in that they have two interest rate components. First, they pay a floating market rate during maturity, whose future value in various scenarios is affected by how the swap rates fluctuate. Second, they include a fixed coupon that may relate to the issuer's creditworthiness at the time the bonds are issued.

By analogy, banks borrow and lend money with a set repayment date, but at an interest rate that is set periodically in relation to a reference rate (e.g. 3M STIBOR).

In FI's method, FRNs are to be represented as two synthetic instruments – a bond with a fixed interest rate and an associated interest swap. The fixed coupon for the synthetic bond should be similar to the estimated swap interest for the remaining maturity of the contract plus the contractual spread in the contract. The fixed coupon in the synthetic swap should be similar to the estimated swap interest for the remaining maturity of the contract. Similarly, a fixed-term, indexed loan should be entered as a synthetic loan with a fixed interest rate, and an associated interest swap.



This decomposition of FRNs facilitates analyses both of how they contribute to the sensitivity of the firms to changes in the market rate of interest and how they contribute to the firm's sensitivity to changes in the firm's credit spread.

## **8.2.2 Derivatives**

### *8.2.2.1 Interest swaps*

Interest swaps are to be registered at two nominal amounts with a reversed sign that are put in the time buckets that best correspond to the fixed interest term in each leg. A recently entered interest swap, where the bank pays fixed interest for four years in return for receiving an interest rate that is repriced quarterly is entered at a negative nominal amount in the four-year bucket, and a positive nominal amount in the three-month bucket. The fixed coupons that the bank is to pay are entered as negative flows in each time bucket. Only the known interest flows in the floating leg are entered.

### *8.2.2.2 Forward rate agreements*

Interest rate derivatives that intend to secure a single interest rate period are entered as two nominal amounts with reversed sign, in such a way that their net position corresponds to the derivative. For example, this means that the positive nominal amount for a purchased forward rate agreement (FRA) is entered in the time bucket that best corresponds to a start date for the underlying interest period. A negative nominal amount is entered in the time bucket that best corresponds to the forward's final date. If the forward is sold, the situation becomes the reverse of what applies to the sign for the amounts. The contracted interest rate in the forward is entered in the subsequent time bucket, with a positive sign if the forward has been purchased.

### *8.2.2.3 Forward bonds*

Forward bonds are a contract to purchase a bond at a certain price in the future. They may be deducted on an ongoing basis or upon expiry of the forward. A purchased forward bond, where the firm has agreed to purchase a bond at a certain price at a future date, is entered in the same way as the underlying bond would have been entered, i.e. with a positive nominal amount in the time bucket that best corresponds with the underlying bond's due date. The negative nominal amount is entered in the time bucket that best corresponds to the forward's expiration date. Only coupon payments between the forwards' expiration date and the bonds' due date are entered in the template.

### *8.2.2.4 FX swaps*

FX swaps, which comprise a spot contract to purchase a certain currency, and a forward contract to sell the same currency (or *vice versa*) are entered at the nominal amounts on each sheet depending on currency.

### 8.2.2.5 *Interests swaps between different currencies*

Interest swaps with different currencies in each leg are a type of derivative that hedges exchange rate risk and interest rate risk simultaneously. These are divided into respective legs entered in respective sheets depending on currency. Each leg in the swap is entered in the same way as a corresponding leg in an interest swap depending on whether the swap has a fixed or floating interest rate.

### 8.2.2.6 *Credit derivatives*

By entering into a credit derivative, where the bank pays or receives a fixed coupon in return for protection or protection issued against a certain counterparty going into bankruptcy, the coupon payments on the asset side may be affected. The nominal amount and the fixed coupons for these derivatives are entered in the templates. When calculating interest rate risk, the coupons will be added to the coupons for the assets. Protection purchased is entered at a negative nominal amount and coupon payments.

## 8.3 **Advanced information**

In addition to the basic information, the most advanced firms are also to provide advanced information and complete a detailed account of the cashflows in the sheet *Detaljerade\_Kassaflöden\_XXX* [*Detailed\_CashFlows\_XXX*], where XXX represents a three-digit currency code. The requirements here are lower to differentiate the sources for the cashflows. The focus is placed instead on specifying in detail when they occur in terms of time.

### 8.3.1 *Time estimate*

The time at which a certain cashflow occurs is to be stated as parts of the year. The point in time for the cashflow is to be inserted as number of years, calculated using ACT/ACT so that a future date with the same month and day as the report date corresponds with an integer.

### 8.3.2 *Cashflows*

The cashflows reported are nominal amounts and coupon payments according to the same principles applicable for completion of the basic information sheet. The difference is that the flows are added together in a number of categories:

- **Assets** – correspond to nominal amounts and coupon payments for interest-bearing assets in the banking book.
- **Liabilities, excluding equity and NMD** - correspond to nominal amounts for interest-bearing liabilities with a contracted fixed interest term.

- **Liabilities with modelled duration** - correspond to nominal amounts in accordance with the possible modelled fixed interest structure for equity and/or NMD.
- **Interest rate derivatives** – correspond to nominal amounts and coupon payments for derivatives that are used to secure interest rate risk and/or currency risk in the banking book.

#### **8.4 Questionnaire relating to option risk**

The questionnaire relating to option risk is to be completed by all firms upon request. Firms specify whether they have exposure to imbedded, explicit (in form of independent contracts), or behavioural options. If the firm has such exposures, the nominal size of the exposure is to be specified. The exposure is always to be expressed as a positive nominal amount in this questionnaire, but such options that the firm has both sold and purchased can be excluded from the net column.

#### **8.5 Questionnaire relating to basis risk**

The questionnaire relating to basis risk is to be completed by all firms upon request. Firms are to specify their net exposure to various interbank rates. An exposure of many years to a certain interbank rate may be achieved by a firm purchasing or issuing FRNs, lending at an interest rate that is indexed in relation to an interbank rate, or by the firm entering into interest swaps. Firms are to specify in each cell the net nominal amount in assets, liabilities and derivatives, where a certain interbank rate is contracted until the final repricing that falls within the period of the cell. Forward rate agreements with underlying interbank rates are reported separately, and in this case the calculation period is to be decisive for the cell into which the nominal amount is to be entered. Tables have been prepared for basis risk in Swedish kronor, Norwegian kroner, Danish kroner, Euros and US dollars. If the firm has interest rate risk exposure in more currencies than these (see criteria above), it should create new tables of its own where this information can be entered.