M E M O R A N D U M

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

Summary

Finansinspektionen (Swedish Financial Supervisory Authority – FI) published a memorandum entitled *Capital Requirements for Swedish Banks* ('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 (ICAAP), and FI's supervisory review and evaluation process (SREP), of which FI's supervisory capital assessment represents a key component.

This memorandum describes FI's methods for assessing the capital adequacy requirement within the framework of Pillar 2 for three different types of risk. These types of risk are 'credit-related concentration risk', 'interest rate risk in the banking book' (IRRBB) and 'pension risk'.

- For credit-related 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 using the Standardised Approach for credit risk, and a method representing 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 IRRBB, FI intends to assess the capital requirement using a method that measures the effect that differences in repricing dates and maturities between the firms' 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' 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 for its supervisory capital assessments from the 2015 SREP onwards. As described in the Capital Requirements Memorandum and in Section 6 of this memorandum, FI then intends to publish the results of the assessments quarterly at a consolidated level for the ten largest groups. The capital requirements published by FI for the ten largest groups up to and including the publication dated 30 June 2015 are based on a lump sum for the risk types described in this memorandum.

1 Introduction and risk-related issues

1.1 Background and purpose

In its memorandum entitled *Capital Requirements for Swedish Banks*[1] ('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.[2] 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[3] 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 (SREP), 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. This memorandum describes the methods that FI intends to use to assess capital requirements within the Pillar 2 basic requirement for three important risk types and takes account of comments received in respect of the consultation memorandum published on 12 December 2014. The risks in question are 'pension risk', 'credit-related concentration risk' and 'interest rate risk in the banking book' (IRRBB).[4]

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[1] FI Ref. 14-6258. Published on *fi.se* on 10 September 2014.

[2] *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*.

[3] *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*.

[4] 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' (IRRBB) in this Memorandum.

1.2 General legal basis

This memorandum describes FI's 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 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)*.

Pillar 2 is the umbrella term for the rules governing the firms' ICAAP and FI's SREP, 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 SREP 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 1.5). 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 the Supervision Act and in subordinate legislation.

The technical criteria for the SREP 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 SREP 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 one example of such a material risk that FI takes into account within the framework of the SREP, 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 SREP. 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 SREP (Article 107.3); see *Guidelines on Common Procedures and Methodologies for the Supervisory Review and Evaluation Process (SREP)*, EBA/GL/2014/13, published on 19 December 2014. 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".[5] The methods that FI intends to use correspond with the fundamental principles in the guidelines from EBA, i.e. 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 choice, design and application of specific methods in detail. EBA has also been

[5] *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), amending Decision No 716/2009/EC and repealing Commission Decision 2009/78/EC*.

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 SREP.

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 applied during the SREP on its website.

The *principle of proportionality* is a general legal principle that means in simple terms that a measure should be reasonable in proportion to the purpose of the measure. The provisions of the Capital Requirements Regulation and the Capital Requirements Directive comply with the principle of proportionality. This is, among other things, expressed in Article 97.4 of the Capital Requirements Directive, which stipulates that competent authorities shall establish the frequency and intensity of the review and evaluation referred to in paragraph 1, having regard to the size, systemic importance, nature, scale and complexity of the activities of the institution concerned and taking into account the principle of proportionality. With reference to this principle, FI may decide not to apply the methods described in this memorandum to certain small firms, for example when FI's information collection might entail a disproportionate burden in relation to the purpose of the methods.

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 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 in 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 SREP. 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).

1.3 Implementation and transparency

FI will use the methods described in this memorandum in the supervisory capital assessment during the 2015 SREP. After the supervisory capital assessment has been completed for 2015, FI intends to publish the capital requirements resulting from FI's methods for each risk type as part of the main publication of the capital requirements for the ten largest firms at consolidated level (see Section 6).

1.4 Scope of the methods

1.4.1 Role of the methods and FI's supervisory capital assessment

FI intends to use the methods described in this memorandum for all banks, credit market firms and investment firms supervised by FI (collectively referred to as 'firms' in this memorandum) when FI conducts a supervisory capital assessment for them and provided this is justified considering the principle of proportionality referred to below.

FI currently only conducts an annual supervisory capital assessment for the ten largest groups. 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 individual level for most of the individual firms that form part of large groups. The European Banking Authority (EBA) has established guidelines for the authorities' SREPs which, when conducted in Sweden, may mean that more firms will be affected by FI's SREP. See further comments regarding this in Sub-section 1.5.4.

When FI implements a supervisory capital assessment for small firms, FI may, considering the principle of proportionality, 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. In this memorandum the term 'small firms' means all firms apart from the ten largest.

1.4.2 Assessment at consolidated and individual level

FI's intention in respect of the firms' capital requirements for the risk types described in this memorandum is to primarily conduct an assessment of this 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. This 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 in this memorandum.

1.4.3 Future design of the methods

There have been extensive changes to the capital requirements for banks, credit market firms and investment firms in recent years. This process is not yet complete. Extensive adjustments are planned for the Pillar 1 capital requirements, for example as a consequence of an overall review of the framework for the Internal Rating Based (IRB) Approach,[6] introduction of new Standardised Approaches,[7] and introduction of a new permanent floor rule.[8] Capital requirements based on the firms' leverage ratio are also in the process of being introduced.[9] Pillar 2 capital requirements may be changed in the future, both as a consequence of international initiatives and as a consequence of Swedish considerations and needs

FI follows and actively participates in the international development of frameworks and method application and intends to evaluate the Swedish capital requirements on an ongoing basis, as well as FI's methods for calculating these requirements, to ensure that there is sufficient capital for those risks to which firms are exposed, as well as those risks that these firms pose to the financial system. It follows from this that the methods presented in this memorandum may change in the future. However, the methods presented in this memorandum will be used until FI notifies otherwise.

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[6] See, for example, *Reducing excessive variability in banks' regulatory capital ratios,* A report to the G20, BCBS, published on 12 November 2014 (*http://www.bis.org/bcbs/publ/d298.pdf*).
[7] For an overview of the proposed new Standardised Approach for credit risk, see *Revisions to the Standardised Approach for Credit Risk*, Consultative Document, BCBS, published on 22 December 2014 (*http://www.bis.org/bcbs/publ/d307.pdf*).
[8] See *Capital Floors: the design of a framework based on standardised approaches*, Consultative Document, BCBS, published 22 December 2014 (*http://www.bis.org/bcbs/publ/d306.pdf*)
[9] See memorandum entitled *Leverage ratio requirement for Swedish banks* (FI Ref. 14-16911), published on 8 December 2014, for a description of a possible leverage ratio requirement and FI's position regarding this.

1.5 Alternative methods

1.5.1 Background

There are many different methods for assessing the risk types described in this memorandum. In certain cases, the internal methods used by firms in their operation and ICAAP differ from the methods that FI intends to use. Up until now FI has often based its supervisory capital assessment for the risk types described in this memorandum 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. The firms' internal methods may be more accurate in certain cases, but they are also more complicated and could therefore pose a greater 'model risk', that is, a risk of the models becoming misleading.

1.5.2 FI's position

FI intends to use FI's methods when the authority assesses the firms' capital requirements within Pillar 2 ('the Pillar 2 basic requirement') for credit-related concentration risk, IRRBB and pension risk. This means that the firms' capital requirements in the supervisory capital assessment may both 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 its 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.

1.5.3 Comments received pursuant to Sub-section 1.5

The *Swedish Bankers' Association* states that standardised methods may mean that banks no longer have any incentive to have internal risk assessment methods. For this reason, the Bankers' Association considers that FI's methods should be used for benchmark analyses and not as a basis for calculating capital requirements.

The *Savings Banks Association* states that firms may eventually transfer to FI's methods, which would result in more standardised assessments of the banks' ICAAP, and that simpler methods are required for those banks that are not included among the ten largest. A request was also made for a more in-depth

description of what FI means by 'small firms' and what is meant by 'less important types of risk' for such firms**.**

Kommuninvest considers that the principle of proportionality should also be used for large firms to the extent that individual risk types are of less importance to them, and that FI's information collection should be adapted accordingly.

The *Association of Swedish Finance Houses* is of the opinion that FI's methods do not necessarily provide results that are relevant for small, specialised institutions and requests a detailed account of the limitations that the various methods may have for such firms. The Association of Swedish Finance Houses also points out that it is important that the simplified methods themselves do not result in stricter capital requirements for small firms, as this might impair their opportunities to compete.

1.5.4 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, level of detail and accuracy against, on the other hand, simplicity, transparency and the need for sufficient capital adequacy and a low model risk. When striking this balance, FI has considered that it may be assumed that the more finely calibrated a method is, the greater the increase in 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, during their ICAAP, continue to use those methods for calculating capital requirements that they consider most appropriate and that best take into consideration their risk profile, operational conditions and 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 course of its ongoing supervision work FI will continue to investigate the firms' risk management and their methods for measuring their risks. FI may take appropriate steps in the event that it observes any signs of deficiencies in the firms' risk measurement. However, this memorandum does not explain what these measures are.

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.

The consultation bodies note that it is unclear how the methods presented in this memorandum are to be applied to firms that are not yet subject to SREP. EBA's SREP guidelines have not yet been implemented in Sweden. Therefore FI has cause to revert as regards how the principle of proportionality should be considered in terms of assessing the capital requirement for specific types of risk in Pillar 2.

In the event that more firms are affected by the methods presented in this memorandum, these firms will be notified of this. In other words, firms do not have to submit the information required for FI to carry out its calculations according to the methods presented in this memorandum unless the firm has received a specific request to do so.

1.6 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, which in this respect includes 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 74 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.

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 IRB Approach. 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 weights do 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 the Pillar 2 basic requirement.

Concentration risk may 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.[10]
- 'Credit-related concentration risks', dated 31 March 2009, relating to firms that use the Standardised Approach.[11]
- 'Assessment of capital requirement for concentration risks', dated 1 October 2009.[12]

[10] http://www.fi.se/upload/30_Regler/50_Kapitaltackning/metod_IRK_090331NY.pdf
[11] http://www.fi.se/upload/30_Regler/50_Kapitaltackning/metod_schablon_090331NY.pdf
[12]http://www.fi.se/upload/30_Regler/50_Kapitaltackning/riskbedomning_tillsyn/bedomning_SKB_091001.pdf

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 using the Standardised Approach for credit risk, and a combination of the Herfindahl Index and the Gordy and Lütkebohmert method for firms with permission to use the IRB Approach for credit risk.[13]

2.3 Comments received pursuant to Section 2

The *Swedish Bankers' Association* wants a Herfindahl Index to be based on a measure that is more risk-sensitive than the exposure amount, and is of the opinion that the seriousness of a concentration rises with the actual risk of the exposures within a given sector. The Bankers' Association is also of the opinion that mortgages should be excluded from the industry concentration calculation, as mortgages are a type of product and not a sector *per se*. The Bankers' Association also considers that the systemic risk presented by mortgages is dealt with in the form of the risk weight floor for mortgages and systemic risk buffers. The Bankers' Association considers that the division into industries is unclear and that this may result in certain arbitrariness as well as an undesired incentive. Finally, the Bankers' Association considers that institutional exposures in the form of secured mortgage bonds should be excluded when the underlying exposure comprises a large quantity of small exposures and counterparties.

The *Savings Banks Association* considers, like the Bankers' Association, that mortgages should be excluded from the calculation of industry concentration on account of the low risk associated with these loans, and considers that exposures to municipal authorities and county councils should also be excluded for similar reasons. The Savings Banks Association also considers that covered bonds should be excluded from single-name and industry concentration as the underlying exposure relates to a large number of counterparties. Finally, the Savings Banks Association considers that firms with more than 90 per cent of their total exposure amount in Sweden should not calculate a further capital requirement in Pillar 2 for geographical concentration.

Kommuninvest asks for a number of clarifications and points out that there is a close link between the Swedish Government and the Swedish municipal sector as a result of FI's position that exposures to central governments and central banks are not encompassed by the method for single-name and industry concentration.

[13] The Herfindahl Index and Gordy and Lütkebohmert method are described in Sub-section 2.6.

2.4 Comparison with FI's previous method

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

- A 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 result in major differences in capital requirement notwithstanding small differences in concentration.

- The method permits certain adjustments when calculating single-name concentration for firms with permission to use the IRB Approach 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 industries with an increased risk (but takes account of industry concentration generally).

- The method does not include a capital requirement for geographical regions with an increased risk (but takes account of geographical concentration generally).

The change in method for risks associated with industries and regions with an increased risk results from the consideration made by FI that a capital requirement for such risks at an industry and regional level should primarily be considered within Pillar 1 for firms with permission to use the IRB Approach. 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 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. There may be additional firm-specific capital requirements within the Pillar 2 basic requirement for firms using the Standardised Approach, and in those cases where FI considers that the Standardised Approach does not take sufficient account of all credit-related risks. These requirements include 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 permission to use the IRB Approach and for firms using the Standardised Approach will not be standardised but firm-specific, in the event that such requirements are necessary. For this reason they are not dealt with further in this memorandum.

2.5 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 Pillar 2 basic requirement is justified by the assumptions relating to perfect diversification on which the IRB and Standardised Approaches are based. 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.[14] FI has chosen a method based solely on the Herfindahl Index for firms using the Standardised Approach for credit risk. Although methods based on the Herfindahl Index are indeed rather simplified, they 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 Approach 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 permission use the IRB Approach 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 correlation estimates. It is also difficult to validate correlation assumptions, and

[14] 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*). 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.

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 simplicity, stability and lower model risk, compensate for them being less finely calibrated.

FI quite understands the view provided during the consultation that the Herfindahl Index should be based on risk weight rather than unweighted exposure amount, but makes the assessment in the current situation that the exposure's unweighted size is normally better suited as a starting point as it results in a lower model risk. As regards mortgages, the consultation bodies have proposed that these should be excluded from the assessment of industry concentration in view of them relating to a type of product and not an industry, and also that other parts of capital requirements take account of the risk associated with mortgages. However, FI considers that this type of product is directly referable to the residential mortgage market, which is a specific industry. Furthermore, FI considers that neither the systemic risk buffer nor mortgage floor take account of the concentration risk that arises from a high concentration in relation to the residential mortgage market for the individual firm. FI will therefore retain mortgages as an industry when calculating industry concentration. FI adjusts the exposure amount for covered bonds to ten per cent of their nominal value in order to achieve consistency with the framework for large exposures.[15] A further description of how exposure amounts should be calculated can be found in the glossary. This revision means that FI is meeting the consultation bodies halfway in this respect.

FI intends to use the Gordy and Lütkebohmert method to assess single-name concentration for firms with permission to use the IRB Approach. As explained below, the Gordy and Lütkebohmert method takes account of the exposures' size and individual credit risk, and largely complies with the rules for the IRB. Although the Gordy and Lütkebohmert method is partly based on data from the firms' internal models, FI considers that the effect of the method is comparable between different banks. 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 the level of single-name concentration.

FI considers that firms mainly exposed to Sweden pose a geographical concentration risk and therefore has no intention of changing the pre-existing method for assessing concentration risk for such firms, which the Savings Banks Association proposed in its opinion during the consultation.

[15] See definition of 'Exposure Amount' and 'Covered Bonds' in the glossary.

2.6 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 the Pillar 2 basic requirement 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 for assessing 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.

2.6.1 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 total 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 central 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 choice of approach to the method used by the firm. The method that FI has chosen to use to calculate single-name concentrations for firms with permission to use the IRB Approach is more finely calibrated than the method that FI intends to use for firms using the Standardised Approach. The method that FI intends to use (the Gordy and

Lütkebohmert method) is based on the formula for unexpected losses used in the risk weight formulae 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 rules for the IRB Approach are based on the assumption of complete diversification.

The Gordy and Lütkebohmert method quantifies the difference in capital requirement between the IRB Approach and an otherwise corresponding assessment of capital requirement that is not based on the assumption that the portfolio is fully diversified. It is possible to attribute this difference to the effect of single-name concentrations and FI uses this difference to calculate the capital requirement for single-name concentrations.

The reason for FI not intending to use the Gordy and Lütkebohmert method for firms using 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 the level of loss given default. 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 aspects with the exception of their size. The number of exposures included, as well as the link between the Herfindahl Index and increase in capital, 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, measured as exposure amount,[16] to individual counterparties as follows: Let $Exposure_i$ ($i = 1,2,\ldots$) designate the ith largest exposure. If σ_i designates the proportion that exposure i comprises of the total value of the 30 largest exposures to individual counterparties, that is

$$\sigma_i = \frac{Exposure_i}{\sum_{j=1}^{30} Exposure_j},$$

the Herfindahl index for the 30 largest exposures to individual counterparties is defined as follows:

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

[16] See Glossary for definition.

This index is lowest for granular portfolios (that is, portfolios with a large number of exposures, 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 ($(30*(1/30)^2=1/30$), which is the lowest possible value for HI as used here. 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 to individual counterparties comprise. Multiplying a firm's Herfindahl Index for the 30 largest exposures to individual counterparties by this proportion generates an *Adjusted Herfindahl Index* (AHI):

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

Here n designates the total number of exposures to individual counterparties 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, and where AHI is the Adjusted Herfindahl Index. The above formula has been produced by FI and is a continuous approximation of the previous partially constant function that determined the capital requirement in FI's previous method. 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 the opinion of FI, between capital requirements and concentration. The formula means that the theoretically possible increase in capital is limited to nine per cent of each firm's capital requirement for credit risk. There are alternative formulae that avoid such a limitation, although these are 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 was not the case in individual cases in the future, FI could adjust the formula to ensure that the capital requirement in such situations also reflects the level of concentration in a reasonable way.

FI's method when firms have permission to use the IRB Approach

Single-name concentrations in the exposure class 'retail exposures' are relatively small, as individual counterparties are normally small in relation to total volume of retail exposures. Consequently, there is generally no significant single-name concentration risk in the retail exposure class. FI therefore does not intend to take account of retail exposures when calculating the capital

requirement for single-name concentration risk for banks with permission to use the IRB Approach. 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 referred to hereafter 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.*[17] Only a brief description of the method is provided here.

The analytical expression (the '*Gordy and Lütkebohmert formula*') used by FI to calculate the capital requirement for single-name concentration risk 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 (for an explanation, see for example *Studies on credit risk concentration*, BCBS (2006)).[18] If required FI will adapt the method to the specific preconditions prevailing for firms with less than 500 high-quality single-name exposures (defined in the BCBS study as at least 'investment grade') or alternatively fewer than 200 exposures in portfolios with lower credit quality. Such adjustments may include moving a number of corporate exposures that a firm is accounting for as 'retail exposures' to the 'corporate exposure' class.

Variable	*Explanation*
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.[19]
n	The number of exposures in the exposure classes.
LGD_i	The *i*th exposure's level of loss given default. Exposure-weighted LGD is to be used if exposure to a certain counterparty can actually be divided up into a number of exposures with different LGD values.

Furthermore, if EAD_i designates the expected size of the *i*th exposure in the event of a default and if EL_i and UL_i designate *i*th exposure's expected or

[17] International Journal of Central Banking, September 2013. This article is available at *http://www.ijcb.org/journal/ijcb13q3a2.htm*

[18] See *http://www.bis.org/publ/bcbs_wp15.pdf.*

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.

unexpected loss[20] respectively, calculated according to the Basel II framework, then the other input variables are defined according to

Variable	*Explanation*
$R_i = \frac{EL_i}{EAD_i}$	The *i*th exposure's expected loss as a portion of EAD_i.
$K_i = \frac{UL_i}{EAD_i}$	The *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[21] 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*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.

The firm shall use the parameter values prescribed by the IRB Approach for exposure class(es) where the firm does not have its own IRB estimate (i.e. is exempt from the Capital Requirements Regulation's requirement for estimates for IRB Approaches). The firm shall calculate the capital requirement for single-name concentration using FI's method for firms using the Standardised Approach in the event that the firm does not have permission to use the IRB Approach for corporate and institutional exposures.

2.6.2 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 calculate the capital requirement for industry concentration, both for firms using the Standardised Approach and firms with permission to use the IRB Approach. FI intends to calculate the capital requirement for industry-related concentration using a Herfindahl Index for the twelve different industries that FI considers most relevant. The industries that FI considers relevant for assessing the firm's

[20] 'Unexpected loss" means the capital requirement (see BCBS document *An Explanatory Note on the Basel II IRB Risk Weight Function*) multiplied by EAD.

[21] 'Portfolio' means the portfolio that comprises all exposures in the two exposure classes 'corporate exposures' and 'institutional exposures'.

industry-related concentration risks are: credit institutions; 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.[22]

Exposures to central governments and central banks and also, after considering the opinion expressed by Kommuninvest, municipalities and county councils, are not currently covered by the industry concentration method. FI may reconsider this in the future.

The Herfindahl index is defined in this context as

$$HI = \sum_{j=1}^{12} \sigma_j^2,$$

where σ_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 twelve industries. 'Exposure' means exposure amount in accordance with Sub-section 2.5.1.

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. This formula yields a maximum capital requirement for industry concentration of eight per cent of the capital requirement for credit risk. If any firm has an industry concentration whereby the formula limits the capital requirement, FI may adjust the formula to avoid such limitations. See the section *FI's method when firms use the Standardised Approach* above for a further explanation of the formula.

2.6.3 Geographical concentration

'Geographical concentration' means inadequate geographical diversification as a consequence of a firm's portfolio being exposed to a small number of

[22] In its consultation response, the Bankers' Association requested clarification regarding the division into industries. At the present time, FI does not intend to make such a specification as this may involve firms having to redo their IT systems. FI does not consider that any problems that may arise when defining boundaries are particularly serious and follow-ups may be conducted to ensure a reasonable and consistent division between industries. However, FI has taken account of Kommuninvest's consultation comments about the close link between exposures to the Swedish Government and to Swedish municipal authorities and county councils (including corporate exposures guaranteed by municipal authorities and county councils) and has removed municipal authorities and county councils from the concentration risk calculation.

countries/regions 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 concentration. FI intends to calculate the capital requirement for geographical concentration using a Herfindahl Index for the 15 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

$$HI = \sum_{j=1}^{15} \sigma_j^2,$$

where σ_j equates to exposure to region *j* divided by the total of all exposures for the 15 regions. 'Exposure' means exposure amount in accordance with Sub-section 2.5.1.

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. This formula yields a maximum capital requirement for geographical concentration of eight per cent of the capital requirement for credit risk. If any firm has a concentration whereby the formula limits the capital requirement, FI will adjust the formula to avoid such limitations. 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 Sweden. The Savings Banks Association stated in its consultation comments that such a capital requirement is not required for the aforementioned firms, as this capital requirement may already be deemed to be included in the credit risk assessed. FI does not share this opinion, as the credit risk assessment, as explained previously in this memorandum, would not consider concentration risk without such a specific capital requirement. FI also notes that the proposed method in this respect is in line with the method for concentration risk assessment used by FI in the past. The capital requirement for geographical concentration risk for

these firms is considered to be not less than eight per cent of the capital requirement for credit risk in Pillar 1 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 largely a structural risk that naturally derives from the firm taking deposits and granting loans. Interest rate risk may also arise as a consequence of a firm's own choice of maturities and repricing dates for their exposures and financing, in addition to what may be deemed to be a natural consequence of their business model. Interest rate risk 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, which are dealt with within the framework of Pillar 2.

Positions outside the trading book normally largely comprise the firms' lending to individuals and firms together with client deposits and other financing of activities not referable to the trading book. The classification of instruments between the trading book and the banking book is partly based on the firm's intention; instruments not intended to be traded are normally classified as instruments within the banking book and can thus also mean market-quoted instruments.[23] 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.

IRRBB normally arises as a result of a firm having different maturities or repricing dates for its assets and liabilities. Interest rate risk mainly affects firms as gradual changes to the firm's net interest income, which may thus affect the operating result and capital ratios in both the short and long term.

EBA has published a consultation document with guidelines[24] 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 time perspective) and economic value (longer time perspective) are taken into account, but include no specific method for assessing the capital requirement for interest rate risk.

[23] For a further description, see for example *Fundamental review of the trading book: A revised market risk framework*, Consultative Document, BCBS, October 2013.

[24] 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.

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 manifest as changes in the firms' net interest income, in the short and long term, or as changes in items outside net interest income. To the extent that income statement items not included in net interest income relate to positions belonging to the banking book, these will be taken into account in FI's method for IRRBB despite the method referring to net interest income.

Interest rate risk may result in a deterioration of its net interest income and consequently its operating result 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 repricing date.[25] 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 manifest by changes in market prices of mark to-market items where their value depends on the interest rate levels and the structure of the yield curve. Such risk is normally of considerable importance for the firms' trading books, and Pillar 1 covers capital adequacy for market risk within the trading book, including interest rate risk. Such mark-to-market risk is therefore not dealt with in this memorandum. Interest rate risk for mark-to-market instruments in the banking book is included in FI's method for IRRBB even if the income statement items are not included in the firm's net interest income.[26]

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. The market interest rate, as taken into account in FI's method for interest rate risk, can be measured using

[25] The example assumes that the firm has not eliminated interest rate risk arising in the firm's hedging positions, for example, interest rate forwards or interest rate swaps.

[26] Positions will be assigned between trading book and banking book from the perspective of intention. If the intention of a position is trading, the capital requirement for the position will be covered within the trading book, otherwise the capital requirement for the position will be covered within the banking book. It is not unusual for positions not intended for trading to still be marked to market.

different reference instruments, for example, the treasury rate or the swap rate, and is described in more detail 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[27] 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 as 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 continually moves up and down, and its form may change drastically and suddenly even though it may also be stable for long periods. The yield curve may change owing to parallel shifts and slope changes, and both of these types of change could have a major impact on firms.

3.1.3 Credit spread risk

'Credit spread risk' is defined in this memorandum as the sensitivity of the firms' net interest income to changes in the firm's own credit spread. 'Credit spread' is defined in turn as the difference between a firm's borrowing cost and the market interest rate for a corresponding maturity. 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[28] between liabilities and assets and its credit spread is changed.[29] 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's financing has maturities that are shorter than those for its assets.

3.1.4 Additional interest rate risk element in the banking book

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

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[27] The sensitivity of any positions referable to the banking book but not affecting net interest income is included in FI's IRRBB method.

[28] '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.

[29] 'Credit spread risk' may also arise, despite good maturity matching, in a more long-term way if firms cannot fully adjust the 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. This specific risk is not encompassed by FI's IRRBB method.

Option risk

Option risk arises from an interest rate risk perspective when the firm's customers or financial counterparties have options relating to repricing date 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[30] 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 repricing date

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 repricing dates, where behaviour and other factors may affect the actual repricing dates. The main examples of this are equity and non-maturity deposits (NMDs) from the general public. The absence of a contracted repricing date means that FI needs to determine actual repricing date assumptions for those items in the method for assessing the capital requirement for IRRBB.

3.1.5.2 Equity

There is no contracted repricing date for the firms' equity, and dividends and other payments that take place in respect of the firms' equity are not contracted. However, the assets in which the equity is invested often contribute to interest rate risk for the firms. This results in certain firms attributing the equity an assumed maturity, or alternatively making adjustments to the asset side, with a view to reducing the impact the equity may have on the interest rate risk measured.

3.1.5.3 Non-maturity deposits

Non-maturity deposits (NMDs) 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

[30] 'Basis risk' is often defined as the risk of the value of an underlying asset or liability developing differently to the value of the asset's or liability's hedge. An asset's financing in the banking book may be viewed as hedging of the interest rate risk presented by the asset depending on how well the financing's repricing date corresponds to the asset's repricing date.

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 for NMDs in their internal measurements of IRRBB. The modelling of a repricing profile for NMDs may reduce the difference between the firms' repricing dates on the asset and liability side.

3.2 EBA's guidelines

As mentioned above, EBA has drawn up guidelines for the management and supervision of IRRBB. The 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 the new supervision guidelines 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 EBA's guidelines.[31]

3.3 FI's position

FI intends to calculate the firms' capital requirement for IRRBB using a method that calculates a capital requirement as a function of the mismatch of repricing dates and maturities between liabilities and assets. This is achieved by the method taking account of the sensitivity in the firm's economic value to changes in the yield curve and differences between the firms' financing cost and market rate of interest. The repricing date for the firms' equity and NMDs is set at zero. FI will use different versions of FI's method: an advanced version for the ten largest firms; a basic version for small firms with significant sensitivity to interest rates; and a simple version for small firms with limited (but not insignificant) sensitivity to interest rates.[32] Small firms with insignificant sensitivity to interest rates are not affected by FI's method.

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. For example, 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 in this memorandum.

[31] *Guidelines on common procedures and methodologies for the supervisory review and evaluation process* (SREP), EBA/GL/2014/13, published on 19 December 2014.

[32] FI has made certain changes to and clarifications of the method in this respect compared with how it is presented in the consultation memorandum, among other things as a consequence of considering the views presented during the consultation.

3.4 Comments received pursuant to Section 3

The *Swedish Bankers' Association* considers that FI's method does not estimate the actual risk. A risk measure indicating tendency rather than size is calculated as a result of the simplifications in FI's method. The Bankers' Association mentions as one example of such simplifications that FI's model takes no account of behavioural factors in respect of deposits without a contracted repricing date or equity. Using a linear interpolation to produce discounting factors for specific dates, as well as using just one discount curve for each currency, are also mentioned as simplifications that distort the outcome of the method and make it higher than would otherwise be the case. The Bankers' Association states that FI's decision to include an implicit forward rate based on market quotations results in lower interest rates for longer maturities, which makes the method even more conservative.

The Bankers' Association considers that the calibration of the method proposed by FI needs to be harmonised with the provisions of EBA's guidelines. In particular, the floor of 100 basis points for interest rate stress, as well as the level of stress for credit risk spread, should be reconsidered. In the latter case, the Bankers' Association considers that the proposed level of 150 basis points is too high, given that it corresponds to a quadrupling of the current credit risk spread for the major firms.

The Bankers' Association does not share FI's assessment that it is being cautious when attributing zero to NMDs and equity repricing dates. This choice of method gives rise to a distortion of the assessed risk, as interest rates for NMDs in the current low-interest-rate climate do not generally change on a daily basis. NMDs are placed at the shortest possible repricing date to minimise the outcome of the method, which increases the earnings risk given that borrowing costs actually remain virtually constant. As regards repricing dates for equity, the Bankers' Association considers that FI should permit firms to make assumptions regarding this within certain specific limits. Regarding these issues, the Bankers' Association urges FI to monitor the views of other supervisory authorities, particularly the European Central Bank, regarding this matter.

The Bankers' Association supports FI's proposal that the method should measure the economic value of the balance sheet in various scenarios. The Bankers' Association welcomes the proposed breakdown of cashflows into days which the ten largest firms are to submit. This measure will counteract the distortion that could arise from dividing cashflows into time horizons.

The *Savings Banks Association* states in its consultation response that it is important for small firms to be notified quickly about whether they need to submit information relating to IRRBB together with the level of this information.

The *Association of Swedish Finance Houses* welcomes the application of FI's method being adapted for small firms in various respects. However, the Association of Swedish Finance Houses requests clearer information about how the principle of proportionality will be applied and how firms will be divided up based on their interest rate risk. Furthermore, the Association of Swedish Finance Houses requests a more detailed account of what limitations are included in FI's method for small, specialised institutions, and the Association stresses the importance of FI taking account of international trends so that FI's choice of method follows that applied in other countries.

The *Riksbank* does not have any comments regarding the design of the method but welcomes the cautious choice of method made by FI. The Riksbank recommends that FI monitors the Basel Committee's development of methods for estimating the capital requirement for IRRBB.

Kommuninvest considers that the need to submit information is very extensive for some firms in relation to the additional information they provide concerning the firms' exposures. Thresholds, based on the relationship between the capital requirement for interest rate risk in the simplified method and own funds, are proposed with a view to limiting the burden for firms. This will clarify when a certain firm needs to provide detailed information.

Kommuninvest also proposes that the submission of information be split into two parts, dealing with repricing date and the period during which capital is tied up respectively. In this way, firms would not have to break up floating rate notes (FRNs) or account for these as synthetic cashflows. Kommuninvest also requests separate reporting rows for structured borrowing. Such borrowing often involves embedded derivatives that give the firm or its financiers the option to change the maturities for borrowing, which justifies special treatment in FI's method.

Kommuninvest considers that it should be possible to include currency derivatives when calculating the capital requirement for credit spread risk. It is otherwise highly likely that the result will be misleading on account of currency fluctuations. Perfectly maturity-matched borrowing and lending in two different currencies will actually be reflected in the model in the event that exchange rates have moved in a direction whereby the assets are worth more than the liabilities. This effect would be neutralised if FI were to allow firms to include currency derivatives in the calculation.

A number of firms immediately pointed out to FI that the proposed information collection templates are unnecessarily complicated, which the firms consider will entail significant costs. In particular, breaking FRNs and loans with frequent interest adjustments down into two synthetic parts is considered to be burdensome and unnecessary.

3.5 Reasons for FI's position

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 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 firms' operating income comprises 45 to 70 per cent of net interest income. 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 a sufficient capital for the interest rate risk presented 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 calculates the capital requirement as a function of the repricing date and maturity mismatch between liabilities and assets. This is achieved by the method measuring the effect of the firm's future net interest income on a fictitious present value 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, may be considered separately in FI's supervision, for example in stress tests and in the capital planning buffer.

Interest rate risk may also have a more immediate effect on the value of assets and liabilities, in addition to its effect on the firms' net interest income. Mark-to-market changes may give rise to an additional capital impact, besides their impact on net interest income. FI may decide on additional capital requirements for IRRBB for firms with mark-to-market positions in the banking book that pose a significant risk in addition to those accounted for in FI's method and to the extent that these firms do not have corresponding mark-to-market hedging to reduce such risk. Such additional capital requirements are not dealt with in this memorandum.

FI considers that equity and NMDs may actually have real repricing dates above zero, but that there are no objective methods for determining such

repricing dates that may be expected to remain constant over time. FI therefore considers that an assumption of a repricing date of zero is most appropriate and therefore uses such an assumption in FI's method. FI's position regarding NMDs 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 repricing dates are common.

The Bankers' Association states in its consultation comments that one consequence of FI's method not taking account of a repricing date for NMDs might be that the firm's actual interest rate risk is assessed incorrectly in that the real repricing date for NMDs is higher than zero. The Bankers' Association also emphasises that the incentive to shorten repricing dates for assets to reduce the effect of FI's method would pose an increased interest rate risk given that the frequency at which NMD interest rates change is significantly lower than daily.

As described above, FI does not share the view of the Bankers' Association that it is appropriate to attribute a repricing date of more than zero for NMDs and equity. FI would like to state that an alternative method for reducing the capital requirement for IRRBB may be for firms to increase the proportion of deposits with an agreed repricing date compared with the proportion of NMDs.

FI's method measures interest rate risk in respect of yield curve risk and credit spread risk based on existing positions and repricing dates in the firms' balance sheets. The risk of a further deterioration in the firms' net interest income 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 for an extended period of time), is not taken into account in FI's method for assessing IRRBB.

FI briefly described in the consultation proposal different versions of FI's methods for assessing capital requirements for interest rate risk for: large firms; small firms with significant interest rate risk; small firms with limited interest rate risk; and small firms with insignificant interest rate risk. Several consultation bodies have requested additional information concerning this and for this reason FI has made certain clarifications in this memorandum. Small firms will be classified at a later date and FI cannot currently make any further specific clarifications in this respect. FI refers to Sub-sections 1.4 and 1.5 for a general description of how small firms will be taken into account in the methods described in this memorandum.

FI considers that the method proposed in this memorandum captures the most significant aspects of IRRBB. FI's method for assessing IRRBB does not include two specific risk elements – option risk and basis risk – as FI is of the opinion that consideration of these risk elements would involve further complexity that is not called for at the current time. However, there are 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.

3.6 Description of FI's method

FI's method for assessing IRRBB takes account of the consequences of a mismatch of repricing dates and maturities between a firm's assets and liabilities. The sensitivity of the economic value of the firms' net interest income 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.

FI intends to use three different versions of the method depending on the size of the firm and level of interest rate risk. These versions are referred to as 'the advanced version', 'the basic version' and 'the simple version'.

3.6.1 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 resulting 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. The design of yield curves and scenarios, together with the calculation of the economic value and the resultant capital requirement, are described in more detail in Sub-section 3.6.5 below.

3.6.2 Yield curve

The yield curves used in FI's method are 'zero coupon yield curves'. The interest at each point of these curves corresponds to the interest at which a bond with zero per cent in coupons and a final due date at a corresponding point in time should be priced.

The advantage of using a zero coupon yield curve is that this makes it 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:

Variable	*Explanation*
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 takes no account of the different levels of credit and other risk factors for assets and liabilities in the same currency. The calculation would otherwise require separate yield curves for different kinds of asset and liability. This is appropriate considering the purpose of the method. It is important that cashflows on the liability and asset side are assessed using the same curve, given that the method focuses on calculating a capital requirement based on a repricing date and maturity mismatch. The method thus does not intend to primarily measure the absolute level of the market value, but the sensitivity (change) of the economic value to different changes in the curve.

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 a 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:[33]

- No credit risk adjustment is made for the market quotations as FI considers that the swap rate is an appropriate and transparent valuation basis for the economic value of a bank's balance sheet.

[33] 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/*

- The implicit forward rates from the market quotations are fully used in FI's method for assessing IRRBB for maturities of between 10 and 20 years. The implicit forward rate employed in the market quotations for the maturities 15 and 20 years is used for the extrapolation of the zero coupon yield curve in excess of 20 years.

3.6.3 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 *slope changes* are produced using this as a point of departure. Finally, an upward *parallel shift of the firm's credit spread* is used to measure the firm's sensitivity to changes in the firm's own credit spread.

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 as 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. The resultant curves, referred to as 'falling interest rates' and 'rising interest rates', together with an example of what they might look like, can be found in Diagram 3.2.

Slope changes

FI's method uses four slope change scenarios. These can be broken down into two flattening scenarios referred to as 'Rising short-term interest rates' and 'Falling long-term interest rates', and 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.[34]

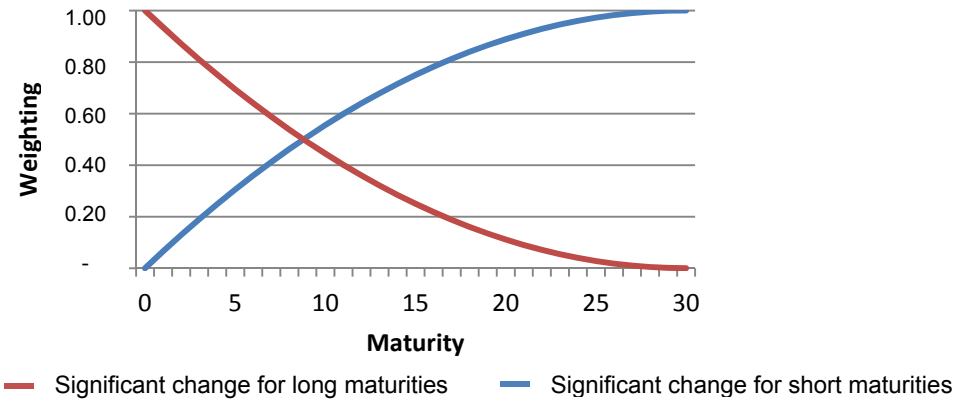
[34] Alternative approaches could have been, for example, a principal component analysis calculating the most common slope scenarios based on historical data, or applying the worst observed flattening and steepening scenarios over three months during the last ten-year period. However, FI considers that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

The method for designing these scenarios is based on the zero coupon yield curves – unstressed and stressed – produced as described above. Four combinations are obtained by gradually weighting together the unstressed zero coupon yield curve with each of the two parallel shifts, and with different weightings for each maturity between one and 30 years. 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' $w_2(t)$ is determined by

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

3.1 Weightings for the production of curve slope changes

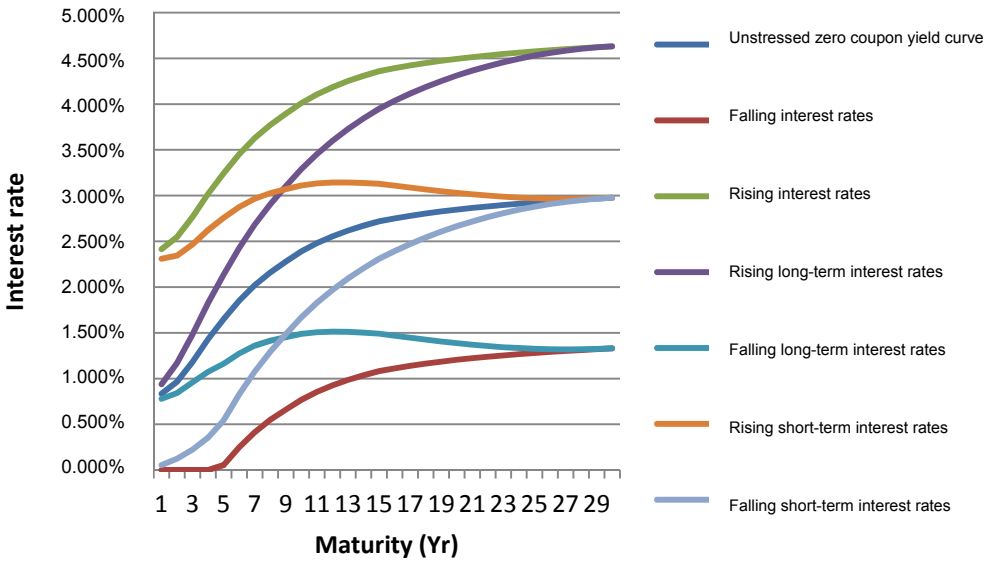


The zero coupon rate for each of the four slope change scenarios is subsequently determined as a weighted combination of the unstressed zero coupon yield curve $r_Z(t)$ and the two previously calculated parallel shifts $r_Z(t)_{Rising}$ and $r_Z(t)_{Falling}$.

$$r_Z(t)_{Rising\ short-term\ interest\ rate=}\ w_1(t) \cdot r_Z(t)_{Rising} + (1 - w_1(t)\ ) \cdot r_Z(t)$$
$$r_Z(t)_{Falling\ short-term\ interest\ rate=}\ w_1(t) \cdot r_Z(t)_{Falling} + (1 - w_1(t)\ ) \cdot r_Z(t)$$
$$r_Z(t)_{Rising\ long-term\ interest\ rate=}\ w_2(t) \cdot r_Z(t)_{Rising} + (1 - w_2(t)\ ) \cdot r_Z(t)$$
$$r_Z(t)_{Falling\ long-term\ interest\ rate=}\ w_2(t) \cdot r_Z(t)_{Falling} + (1 - w_2(t)\ ) \cdot r_Z(t)$$

The unstressed zero coupon yield curve and the six curve scenarios for slope and parallel changes for assumed market interest rates are illustrated in Graph 3.2 below.

3.2 Examples of interest scenarios in FI's method



Upward parallel shift of the firms' credit spread

FI considers that the magnitude of the parallel shift 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.

FI's choice of stress level is an expert assessment based on historical changes in credit spreads for certain financing instruments.

FI has not taken account of the current levels for individual firms' credit spreads. Unlike the Bankers' Association, FI considers that the absolute scope of a potential change to a firm's credit spread is not related to the current level of the firm's credit spread to any significant extent. The level of the firm's credit spread at any time reflects the market's assessment of the firm's financial strength at that point in time. If this assessment changes for the worse, the extent of the change in the credit spread is linked to how much more likely a default would be rather than the level of the earlier assessment of the firm's financial situation. FI also considers that a simple measure that does not have to be frequently calibrated is appropriate for assessing the capital requirement for credit spread risk.

3.6.4 Information collection template

FI intends to request information about repricing dates and volumes for the interest-rate sensitive instruments in the balance sheet with a view to

facilitating FI's assessment of the firms' interest rate risk and as supporting information for FI's method for IRRBB. The information collection templates will be published on fi.se together with this memorandum and will be called *InformationsinhämtningRänterisk.xls*.

3.6.5 FI's method for calculating the capital requirement for IRRBB

As described in Sub-section 3.6.1 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.

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

Variable	*Explanation*
C	The size of the 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 cashflows in the balance sheet.

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

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

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

Variable	*Explanation*
ΔEV_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.

Calculation data

The calculation data used by the method comprises nominal amounts and coupon payments for all assets, liabilities and derivatives in the banking book.

Small firms (all apart from the ten largest) with significant interest rate risk are to aggregate information about nominal amounts and coupon payments in different time horizons according to FI's template. FI's calculation bases and division of firms based on size and sensitivity to interest rates are described in Sub-section 3.7 below. The following principles are used when calculating the present value of all cashflows in a certain time horizon:

- The average of the discounting factors for the time horizon's upper and lower limits is used for time horizons relating to maturities of between one and five years. For example, $(df(2) + df(3))/2$ is used for the time horizon for cashflows between two and three years.

- An interpolation between the discounting factors for zero years $df(0)$ and for one year $df(1)$, adjusted for how large a portion of the year the central point in time of the time horizon represents, is used for time horizons relating to maturities of less than one year. For example, $df(0) - \frac{4.5}{12} \cdot (df(0) - df(1)$ is used as a discounting factor for the time horizon 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 horizons relating to maturities of more than five years. For example, the following expression is used as a discounting factor for all cashflows in time horizons 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 horizons as described above for the ten largest firms, and information about nominal amounts and coupon payments will instead be aggregated per day for

these firms (see Sub-section 3.7.1). However, FI will also request calculation data divided into time horizons, as described above, from the ten largest firms to facilitate a consistent comparison of risk and effect of method for large and small firms.

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. 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 horizon by the difference in the horizon'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 reference date to which the positions relate. The outcomes are then added together for each scenario. The capital requirement for a repricing date mismatch is calculated as the worst outcome.

Calculation of capital requirement for credit spread risk

Items referred to as derivatives in the information collection templates are excluded in the scenario that considers a rising parallel shift of the firm's credit spread. This is done because derivatives change repricing dates or the firm's currency exposure but not normally the actual maturity. There are two components to the interest rate that determine a firm's financing cost: first the market rate of interest, whose currency or repricing date may be hedged using interest rate derivatives; second, the firm's credit spread, which cannot be hedged using interest rate derivatives. Changes in the credit spread affect the firm's financing cost when its actual borrowing expires and needs to be refinanced. This is the case regardless of how the market interest rate has been hedged.

FI proposed in the consultation memorandum that FRNs and other instruments with frequent interest rate adjustments should be divided up into a synthetic bond with a fixed interest rate and an imbedded interest rate derivative that is reported separately. In this way, it should be possible to keep both exposure to the market interest rate and exposure to credit spread separate when assessing the capital requirement for IRRBB. Several firms have stated that this procedure is protracted and costly and FI therefore needs to consider whether the benefit of the procedure exceeds the cost. In this context it is relevant that none of the ten largest firms currently have any capital requirements for credit spread risk in FI's method.

FI has consequently decided to do away with the division of FRNs into two synthetic instruments. Instead firms may enter the nominal amounts for FRNs on a separate row at those points in time corresponding to maturities, which becomes the basis for the calculation of the credit requirement for credit spread

risk. The new row is called 'Maturity FRNs' and an explanation of how data for this is to be entered is provided in Appendix 1. The simple version of FI's method,[35] which is based on pre-determined sensitivity to interest rates applied to nominal amounts, is then used to calculate the capital requirement for credit spread risk.

Similarly FI accommodates Kommuninvest's consultation comments that there is a need for separate rows to report structured borrowing. Structured borrowing is usually characterised by the interest rate risk and other market risk associated with the bonds issued being hedged using an interest rate derivate in conjunction with issue so that the principal repricing date is short.[36] It is also common for bonds issued in this way to have an element of imbedded bonds, where either derivative counterparties or financiers have the option to terminate the firm's financing prematurely. FI is therefore adding new rows to the template where firms are to disclose any structured borrowing. The period during which capital is tied up is to be stated as of the first possible due date. A further description is available in Appendix 1.

The outcome of the scenario that considers an upward parallel shift of the firms' credit spread is calculated separately for each currency using the simple version of FI's method. The outcomes are 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 normally expect FI's method to generate any capital requirement for credit spread risk for any of the major Swedish firms, and this is also demonstrated by the calculations forming the basis of the impact analysis in this memorandum. 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' employed by FI 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.

Kommuninvest states in its consultation comments that FI's method may result in a false picture of credit market risk, given how the method takes account of

[35] See Sub-section 3.7.2 for a more detailed description of the simple version of FI's method.
[36] Structured borrowing also gives rise to significant counterparty risks in those cases where there is limited market risk for the firm resulting from structured borrowing. Account is taken of these in other ways in the firms' capital requirement.

maturity-matched and currency-hedged liabilities and assets in different currencies. The method then has an effect in the case of exchange rate fluctuations, even though maturity matching still applies. In the opinion of Kommuninvest, the problem would be resolved if the method took account of currency derivatives with identical repricing dates in each currency. FI considers that Kommuninvest's consultation comments are justified and that the method previously proposed could become conservative to some extent depending on the positions of firms, but that such differences reflect different levels of risk. FI is therefore amending the method for credit spread risk, and is introducing new rows for nominal amounts relating to derivatives, or combinations of derivatives, that achieve maturity-matched currency hedging for a liability or an asset in a certain currency. The change to the method requested by Kommuninvest is achieved through being able to include these amounts when calculating the capital requirement for credit spread risk. Appendix 1 provides a more detailed description of how these new rows should be completed.

Total capital requirement for IRRBB

The capital requirement for IRRBB is finally calculated as the sum of the capital requirement for repricing date mismatch and for credit spread risk.

3.6.6 Calibration of stress magnitude

FI considers that it is important for the model to be calibrated in a transparent and replicable way. 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.

FI proposed in the consultation memorandum that the stress magnitude should be calibrated on the basis of historical data. However FI found first that the stress magnitude became sensitive to choice of time period for historical data, and second that the stress magnitude using the historical data employed by FI ended up close to the stress magnitude of 200 basis points, which supervisory authorities are to use under Articles 98 of Capital Requirements Directive. FI has consequently simplified its method and chosen to use a stress magnitude of 200 basis points instead.

3.7 Calculation bases

The main method described above, where nominal amounts and coupons for the interest-bearing positions are divided into time horizons corresponding to their payment date, is the basic version of FI's method. FI will also use an advanced version and a simple version to supplement this method when determining the capital requirement for IRRBB to satisfy the need for proportionality.

3.7.1 Calculation bases for the ten largest firms – the advanced version

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, divided into currencies.

FI is requesting a high level of detail in respect of the actual repricing date. The reason behind the request for more detailed information about repricing dates is that FI wants to avoid a situation where the division into time horizons 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 time horizon, which FI considers inappropriate.

This version of the method is referred to as 'the advanced version' and is based on the same scenarios as the basic version. When producing discounting factors for specific dates, FI will apply a linear interpolation between the annual discounting factors calculated.

In individual cases, small firms may also be subject to the more detailed cashflow statement analysis. This will be the case where FI considers that the degree of the firm's general level of risk or the firm's interest rate risk is such that calls for a more detailed analysis. In this event, the individual firms affected will be informed of this separately.

3.7.2 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.

FI normally intends to use the basic version of the method for small firms. In this method the firm's assets and liabilities are divided into time horizons, as described above, reducing the level of detail of the information required compared with the advanced method.

FI intends to use the simple version of the method instead of the basic method for small firms with limited interest rate risk. The simple version includes ready-to-use measures of sensitivity to interest rates for estimating 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 horizon, 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.[37] This version of

[37] *Principles for the Management and Supervision of Interest Rate Risk*, BCBS, July 2004.

FI's method is called 'the simple version' and includes parallel shifts of the market interest rate and credit spread. Unlike the basic version, no slope changes are thus made to the yield curve. Measures of sensitivity to interest rates are applied directly to the balance sheet items' nominal amounts, and small firms with limited interest rate risk will therefore only need to enter nominal amounts in the information collection templates.

In the event that FI undertakes a supervisory capital assessment for small firms considered by FI to have an insignificant interest rate risk on account of the firm's business model or size, 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.

Each firm subject to a supervisory capital assessment will receive information from FI about the version FI will use to assess the firm's interest rate risk and thus also the information the firm should send to FI.

3.7.3 Summarised calculation bases in FI's method

The following table illustrates the various approaches that FI will use to estimate the capital requirement for IRRBB for different kinds of firm.

Table 3.1 Calculation bases for different firms

Type of firm	**Version**
The ten largest firms and other individual firms	Advanced version – discounting of daily cashflows (the basic version as reference)
Firms with significant interest rate risk	Basic version – discounting of cashflows grouped in different time horizons
Firms with limited interest rate risk	Simple version – use of ready-to-use measures of sensitivity to interest rates
Firms with insignificant interest rate risk	The capital requirement for interest rate risk will not be assessed

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 firms' collective agreements for occupational pensions (*Bankernas tjänstepension* – BTP).[38] Pillar 1 does not take account of the risks that these obligations and the managed pension assets referable thereto may pose for firms.[39] 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.

Plans for post-employment benefits are classified as *defined contribution plans* or *defined benefit plans* depending on the plan's economic effect in accordance with its main rules and conditions. 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 charges. 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 plan*s, 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 the 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.

[38] Pension agreement between the Employers' Association of the Swedish Banking Institution and the Financial Sector Union of Sweden.

[39] 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.

The four Swedish major banks reported total gross pension obligations of approximately SEK 110 billion at the end of 2014. Managed pension assets referable to the obligations amounted to approximately SEK 101 billion.[40] As the firms' defined benefit pension 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 to the value of assets and other market variables as well as the actuarial assumptions used may have a material effect on the estimated size of future pension obligations and the pension assets. It is of importance to financial sector stability that the financial firms hold sufficient own funds to cover the firm's pension risks.

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

4.2 FI's position

The firms' capital requirement for pension risk will be calculated using a traffic light method similar to the model used within the insurance area. FI is making certain adjustments to the traffic light method within the Pillar 2 basic requirement to adapt it to the overall framework applicable to firms within the banking area. Such adjustments include a more cautious calibration of the capital requirement as well as a higher standard parameter when calculating risk margin.[41]

4.3 Comments received pursuant to Section 4

Following the consultation, FI has reworked the memorandum to take account of the comments made by the consultation bodies. Comments were received in respect of the following sections.

The *Riksbank* requests that a discussion is held about striking a balance between the proposed traffic light method within the Pillar 2 basic requirement and the forthcoming framework for insurance companies, Solvency II.

The *Swedish Bankers' Association* requests a clarification of how the existing capital is to be calculated. The Bankers' Association objects to the best estimate for pension obligations in the traffic light method within the Pillar 2 basic requirement being calculated in accordance with the International Accounting Standard IAS 19, as stated in FI's original proposal. Instead the Bankers'

[40] 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 2014 and relates to calculations according to IAS 19 for each banking group.
[41] Certain adjustments have been made compared with the consultation memorandum published by FI on 12 December 2014. These changes are explained in the following section.

Association considers that the best estimate for pension obligations in the traffic light method within the Pillar 2 basic requirement should be based on locally prescribed cashflows under the Safeguarding of Pensions Act, or corresponding legislation in other countries, on account of cashflows under the Safeguarding of Pensions Act being more in line with the economic requirements that the beneficiaries can contractually impose in relation to both banks and insurance firms and also the solvency regulations in different countries.

The Bankers' Association also considers that FI should publish complete discount curves, both normal and stressed, for all relevant currencies so that the banks have a better opportunity to model the long-term forward rate. The Bankers' Association also considers that the long-term forward rate should be harmonised between the different currencies and that FI should introduce some form of risk premium to stabilise the model and provide an incentive for more long-term behaviour.

Finally the Bankers' Association considers that for reasons of proportionality a threshold should be introduced for the pension risk calculations because small banks rarely have access to the detailed data required to be able to perform the calculations according to the traffic light method within the Pillar 2 basic requirement.

Kommuninvest considers that if there is no capital requirement for pension risk, there is no need to report any information concerning this to FI.

The *Savings Banks Association* states in its consultation response that it assumes that FI considers that there are no further capital requirements for pension risk for those banks administering their pension obligations via an institution that manages capital requirements in accordance with the traffic light model for the insurance area.

4.4 Reasons for FI's position

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 normal 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, that is, the part of the framework normally referred to as Pillar 1.[42]

[42] 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 requirement for the remaining amount according to the Standardised Approach or IRB, which should comprise no more than

As regards defined benefit pension plans, the firm's future obligations are not limited by transferring assets or paying charges to a pension foundation, pension fund or an insurance firm. The economic effect of the pension obligation, according to its main rules and conditions, determines whether the obligation is to be regarded as 'defined contribution' or 'defined benefit'. Defined benefit pension plans may be reported as defined contribution pension plans under certain conditions and in accordance with the applicable accounting rules. All pension plans classified as defined benefit according to their economic effect are to be taken into account in the traffic light method within the Pillar 2 basic requirement, regardless of how the pension plan is reported under the applicable accounting rules.

Solvency II is the umbrella term for the new rules for insurance firms drawn up within the EU that will start to apply from 1 January 2016. The implementation of the *Solvency II Directive*[43] in Sweden and in other EU countries will involve new solvency rules for insurance firms. Work is also in progress within the EU to revise the Directive on the activities and supervision of the institutions for occupational retirement provision (*Occupational Retirement Provision Directive* – IORP 1).[44] The European Commission submitted a proposal on 27 March 2014 for a new occupational retirement provision directive (IORP 2).[45] Institutions for occupational retirement provision in Sweden encompassed by the occupational retirement provision directive are life insurance firms pursuing occupational retirement provision activities, occupational pension funds and large pension foundations linked to firms. As the development of the occupational retirement provision framework is currently unclear, FI intends to work on the basis of the currently applicable regulations and use a method similar to the traffic light method already being used by FI within the area of insurance when calculating the own-funds requirement for pension risk within the Pillar 2 basic requirement.

However, certain adjustments are required to adapt the traffic light method within the area of insurance to FI's SREP within the banking area. Such adjustments relate to, for example, the calculation of existing own funds for

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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 requirement under the Capital Requirements Regulation for either risks arising owing to *pension obligations* or the managed *pension assets* referable to the pension obligations on a gross basis.

[43] *Directive 2009/138/EC of the European Parliament and of the Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) (Celex 32009L0138)*.

[44] IORP stands for Institutions for Occupational Retirement Provision. *Directive 2003/41/EC of the European Parliament and of the Council of 3 June 2003 on the activities and supervision of institutions for occupational retirement provision (Celex 32003L0041)*.

[45] *Directive of the European Parliament and of the Council on the activities and supervision of institutions for occupation retirement provision (recast)*.

pension risk and the method's principal risk calibration, and are described in the following section.

FI does not intend to introduce formal thresholds for calculating pension risk for reasons of proportionality or relaxations relating to the submission of information to FI for small firms, as requested in the consultation responses from the Swedish Bankers' Association and Kommuninvest. Nor has FI any plans to introduce different versions of the calculation method for small firms, in a similar way as within interest rate risk. FI has designed the traffic light method within the Pillar 2 basic requirement as far as possible on the basis of the firms' reported pension obligations and plan assets which, according to FI, should involve a simplification *per se*. Standard forms and discount rate curves in Swedish kronor have been published on FI's website as support for the firms' calculations.

As shown in Sub-section 1.4.1, FI may refrain from making a specific assessment of individual types of risk if these types of risk are considered to be less important to the overall assessment. This also applies to pension risk. Each firm subject to a supervisory capital assessment will receive information from FI about whether the firm is to provide FI with information for calculating pension risk according to FI's method. Firms without any defined benefit pension obligations do not need to submit any information to FI and will not have any capital requirement for pension risk.

The *Savings Banks Association* states in its consultation response that it assumes that FI considers that there are no further capital requirements for pension risk for those firms administering their pension obligations via an institution that manages capital requirements in accordance with the traffic light model for the insurance area. FI therefore wishes to clarify that all of the firm's defined benefit pension obligations are to be included in the traffic light method within the Pillar 2 basic requirement. This is because FI considers that the firm's pension risk should be treated and analysed in a consistent way between various firms. There are differences between the traffic light model within the insurance area and the traffic light method within the Pillar 2 basic requirement, for example as regards risk margin and calibration, for which reason it is not possible to compare the two calculation methods with each other when calculating the capital requirement within the Pillar 2 basic requirement.

An assignment may be made using a standard model if a firm has insufficient information for identifying plan assets relating to the firm. This may be the case for firms that have transferred assets or paid charges to a pension fund or insurance firm. For example, in such cases a firm may use the distribution key that the insurance institution would probably have used for assigning assets if the pension plan had been immediately wound up, or alternatively if a situation arose where an additional payment was required from the employer as a consequence of insufficient assets.

4.5 Description of FI's method – the traffic light method within the Pillar 2 basic requirement

4.5.1 Background – 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 risks 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.

Up until this year the outcome from the traffic light reporting for insurance firms has been summarised and presented at an overall level in the insurance barometer 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.

4.5.2 Traffic light method for pension risk within the Pillar 2 basic requirement

Assets and liabilities are measured at fair value in the traffic light method that FI intends to use for pension risk within the Pillar 2 basic requirement. 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.

The traffic light method within the Pillar 2 basic requirement provides a total net capital requirement, following an adjustment for diversification between various risk categories through coefficients of correlation. However, the diversification effects may be limited: first between different legal entities; and second between different types of funding, such as through a transfer of assets or payment of charges to a pension foundation, a pension fund or an insurance

firm. The point of departure is therefore that firms should calculate the total net capital requirement separately for each part of the total pension obligation, including associated plan assets, that does not have or only has limited diversification effects with other parts of the obligation. Each calculation is then added together to provide the total net capital requirement at consolidated level.

This total net capital requirement, after calibration in accordance with the traffic light method within the Pillar 2 basic requirement, is subsequently reduced by any existing own funds for pension risk calculated by the firm. Existing own funds for pension risk may be positive or negative. The difference between the total net capital requirement, after calibration, and existing own funds for pension risk comprises the firms' capital requirement for pension risk within the Pillar 2 basic requirement.

The traffic light method within the Pillar 2 basic requirement follows the same methodology as the traffic light model within insurance. The method will be adjusted in accordance with this memorandum. As support for the firms' calculations, it is therefore generally possible to use the same calculation form for the Traffic Light as for the insurance area, which is published on FI's website,[46] including associated instructions.[47] The following sections follow the structure of the calculation form, including relevant references to the same terminology. FI has been asked many questions about the traffic light model. A summary of the most common questions, primarily concerning financial risks, is therefore provided on FI's website.[48]

4.5.2.1 Gross total capital requirement for pension risk

The traffic light method for pension risk within the framework of the Pillar 2 basic requirement calculates a total gross capital requirement, comprising the following parts:

1. Insurance risks based on a best estimate of pension obligations for all defined benefit obligations
    - Increase of pension obligations as a consequence of reduced discount rate
    - Increase of the pension obligations as a consequence of stressed risk assumptions within mortality risk and morbidity risk

2. Financial risks in accordance with fair value measurement of plan assets referable to the pension obligation
    - Interest rate risk
    - Equity risk

[46] See also the document *Beräkningsblankett för riksbolag* [Calculation form for national companies] *http://www.fi.se/Rapportering/Trafikljuset/Anvisningar/*
[47] See also *http://www.fi.se/Rapportering/Trafikljuset/Anvisningar/*
[48] See also *http://www.fi.se/Rapportering/Trafikljuset/Fragor-och-svar/*

- Property price risk
- Credit risk
- Currency risk

Insurance risks

When choosing the underlying data for the traffic light method within the Pillar 2 basic requirement, FI has taken particular account of the consultation bodies' objections to the proposal to use IAS 19 to calculate the best estimate of pension obligations. The actuarial method of calculation according to IAS 19 (Projected Unit Credit Method) includes non-contractual obligations (for example, future salary increases), something that the consultation bodies have pointed out would not arise during a banking crisis. FI is introducing instead a method based on the firms' future obligations to make agreed payments to current and former employees calculated under the *Safeguarding of Pension Commitments, etc. Act (1967:531)* (also referred to as the 'pension protection principles'). Corresponding actuarial principles are used for foreign pension risks to calculate the pension obligation in each country. The actuarial method of calculation according to the pension protection principles is based on contractual obligations Thus the calculation of future cashflows is limited to the economic requirements that the beneficiaries can contractually impose on the firm. This is considered to be consistent with the purpose of a capital requirement, that is, to cover risks that banks cannot avoid during a crisis situation.

The economic effect of the pension obligation, according to its main rules and conditions, determines whether the obligation is to be regarded as 'defined contribution' or 'defined benefit'. Defined benefit pension plans may be reported as defined contribution pension plans under certain conditions and in accordance with applicable accounting rules. All pension plans that are regarded as defined benefit according to their economic effect are to be taken into account in the traffic light method within the Pillar 2 basic requirement, regardless of how the pension plan is reported under the applicable accounting rules.

Under the *Safeguarding of Pension Commitments, etc. Act*, FI determines the actuarial grounds for calculating a best estimate of pension obligations, also referred to as 'capital value'. In the traffic light method within the Pillar 2 basic requirement, the capital value is consequently calculated in light of *Finansinspektionen's Regulations (FFFS 2007:24) regarding technical bases*.

In the traffic light method within the Pillar 2 basic requirement, firms should obtain guidance for interest rate assumptions from *Finansinspektionen's Regulations and general guidelines (FFFS 2013:23) regarding insurance firms' choice of rate of interest for calculating technical provisions*. The reason for FI's choice of interest rate assumption for the traffic light method within the Pillar 2 basic requirement is first that similar risks are to be dealt with consistently within the insurance area, and second that the method for

calculating interest rate risk has been adapted in the Traffic Light as a consequence of the direction chosen by FI through its decision to determine the discount rate in accordance with FFFS 2013:23. As FI intends to deal with similar risks consistently within the insurance area, FI does not intend to harmonise the forward rate between the various currencies, or introduce a risk premium, as advocated by the *Bankers' Association* .

FFFS 2013:23 includes a partly model-based discount rate curve based on macroeconomic assumptions, like the method proposed in the forthcoming Solvency II framework. However, the extrapolation method used in the regulations, that is the method used to extend the yield curve between the longest maturity determined and the long-term forward rate determined, differs from the method evaluated by the European Insurance and Occupational Pension Authority (EIOPA) to determine the discount rate in the Solvency II framework.[49]

FFFS 2013:23 is based on market quotations for interest 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'[50] 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.

FFFS 2013:23 includes separate principles for choice of interest rates for occupational pension insurance and other insurance respectively. FI is publishing discount rate curves in Swedish kronor as support for firms and to encourage uniform calculations.[51] The traffic light method within the Pillar 2 basic requirement relates to occupational pensions, for which reason firms can use interest rates for occupational pensions ('the Occupational Pension Curve'). FI does not intend to publish complete discount curves for all currencies, as requested by the *Bankers' Association*. Reference is made instead to the provisions of the interest regulations concerning 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 same as those specified for Swedish kronor.

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[49] FI's position is also shown in the Decision Memorandum to *Finansinspektionen's Regulations and general guidelines (FFFS 2013:23) regarding insurance undertakings' chosen rate of interest for calculating technical provisions*.

[50] 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'.

[51] *http://www.fi.se/Rapportering/Periodiskt/Forsakring/Diskonteringsrantekurva/*

Interest rate risk is calculated on the traffic light form for the Traffic Light as the net of the stress scenarios for pension obligations and plan assets respectively, and is described below in the 'Financial risks' section.

Mortality risk and morbidity risk are taken into account when stressing the assumptions for insurance risks in the traffic light model within the Pillar 2 basic requirement. Lapse risk is not considered to be relevant.[52] 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 changes to mortality and morbidity assumptions.

Financial risks

The fund assets referable to the pension obligations involve significant risks, both as a consequence of the assets' own risks and the way the fund assets and pension obligations as a whole are affected by interest rate risk. 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, as taken into account in FI's assessment of the capital requirement for pension 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 and the best estimate of pension obligations. Fund assets and pension commitments are split into four categories: nominal and inflation-linked interest rate in Swedish kronor, nominal interest rate in Euro and nominal interest rate in 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 interest 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 fund assets and pension 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

[52] 'Lapse risk' means the risk of assumptions about the behaviour of beneficiaries in respect of a break in premium payments or termination, renewal and buy-back of insurance contracts underestimating the actual behaviour of beneficiaries. Lapse 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 (current and previous) employment.

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 a fall 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 interest-bearing assets and the risk-free rate,[53] 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 applicable parameters for stressing financial risks at the time this memorandum was published. 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 within the Pillar 2 basic requirement

Risk category	Scenario
Interest rate risk	
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
Equity risk	
Alt. 1 (no currency risk to be added),	
Swedish	- 40 per cent
foreign	- 37 per cent
Alt. 2 (currency risk to be added),	
Swedish	- 40 per cent
foreign	- 35 per cent
Property price risk	- 35 per cent
Credit risk (increase of credit spread)	Max of (100 per cent; 25 basis points)
Currency risk	+/- 10 per cent

[53] In this memorandum, 'risk free rate' means applicable market rate of interest for treasury bills or government bonds.

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 calculated based on the change in value of the underlying share.

4.5.2.2 Net total capital requirement for pension risk

The traffic light method's calculation of insurance risks and financial risks gives rise to a total gross capital requirement for pension risk, referred to as 'total gross capital requirement' on the Traffic Light calculation form. The traffic light method within the Pillar 2 basic requirement thereafter calculates a total net capital requirement following 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 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 based on the coefficients of correlation specified in the following table:

Table 4.2 Correlation assumptions in the traffic light method within the Pillar 2 basic requirement

Risk categories	**Coefficient of correlation, ρ**
Mortality, morbidity	0.25
SEK nom, SEK real	0.80
SEK nom, EUR	0.80
SEK real, EUR	0.50

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.

However, the diversification effects may be limited, first between different legal entities, and second between different types of funding, such as through transfer of assets or payment of charges to a pension foundation, a pension fund or an insurance firm. The point of departure is therefore that firms are to calculate the total net capital requirement separately for each part of the total pension obligation, including associated plan assets, that does not have or only has limited diversification effects with other parts of the obligation. Each calculation is then added together to provide the total net capital requirement at consolidated level.

Parts of the pension obligation, including associated plan assets, between which the firm can demonstrate actual diversification effects, may be directly combined when calculating the total net capital requirement. Firms can also, directly combine small parts of the pension obligation upon calculation of the total net capital requirement, including associated plan assets, between which there are no or limited diversification effects, provided that the capital requirement for pension risk at the time of such calculation is not significantly lower than in the case of separate calculations.

4.5.2.3 Calibration

The traffic light method used in the insurance area is based on risk assumptions being chosen so that they approximately correspond to a 99.5 percentile 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 assignment of the risk) in order to adjust this to a 99.9 percentile.

4.5.2.4 Existing own funds for pension risk

Existing own funds for pension risk, which may be positive or negative, are calculated according to the following table. Each item is described in more detail in the following section.

Table 4.2 Calculation of existing own funds for pension risk

+/-	Any positive net pension assets or negative net pension liabilities for defined-benefit pension plans not included in the firms' common equity Tier 1 capital
+/-	Changes to actuarial assumptions
-	Risk margin
-	Any other adjustments
=	**Existing own funds for pension risk**

Any positive net assets

The net defined-benefit pension obligations for a firm, and their associated fund assets, may comprise a net asset or net liability at any point in time. Existing own funds for pension risk are to be adjusted for any positive net pension assets or negative net pension liabilities for defined-benefit pension plans not included in the firms' common equity Tier 1 capital.

Any positive net assets are normally deducted from the firms' Common Equity Tier 1 capital under Article 36 of the Capital Requirements Regulation. Any positive net pension assets deducted from the firm's common equity Tier 1 capital may be included when calculating existing own funds for pension risk.

All pension plans classified as 'defined benefit' according to their economic effect are to be taken into account in the traffic light method within the Pillar 2 basic requirement when calculating existing own funds for pension risk, regardless of how the pension plan is reported under the applicable accounting rules. Any positive net pension assets or negative net pension liabilities for defined-benefit pension plans not included in the firms' common equity Tier 1 capital shall therefore be taken into account when calculating existing own funds for pension risk. Any positive net pension assets not included in the firms' common equity Tier 1 capital increase the firm's existing own funds for pension risk. Correspondingly, any negative net pension liabilities not included in the firms' common equity Tier 1 capital reduce the firm's existing own funds for pension risk.

The firm's positive net pension assets and negative net pension liabilities are to be calculated according to the same actuarial principles as described in the traffic light method within the Pillar 2 basic requirement

Changed actuarial assumptions

Changed actuarial assumptions comprise: first, any translation of pension commitments from IAS 19 to the pension protection principles or corresponding principles for foreign pension risks; second, adjustment of discounting method from pension protection principles or corresponding principles for foreign pension risk to the traffic light method within the Pillar 2 basic requirement.[54]

The first step calculates the difference between the pension obligation under IAS 19 and the pension obligation calculated in accordance with the pension protection principles, or corresponding actuarial principles for foreign pension risks. This result increases or reduces the firm's existing own funds for pension risk.

The second step calculates the difference between the pension obligation under the pension protection principles, or corresponding actuarial principles for foreign pension risks, and the pension obligation calculated in accordance the traffic light method within the Pillar 2 basic requirement. This result increases or reduces the firm's existing own funds for pension risk.

Risk margin

It is the intention of FI that sufficient capital is available if the firms' obligation to provide the agreed payments to current and former employees has to be transferred to another party. The risk margin should therefore correspond to an

[54] Guidance for interest rate assumptions can be obtained from *Finansinspektionen's Regulations and general guidelines (FFFS 2013:23) regarding insurance undertakings' chosen rate of interest for calculating technical provisions*.

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 for insurance firms, comprises the best estimate for the provisions, multiplied by the standard parameter of five per cent. The risk margin for insurance firms is based on the fifth quantitative impact study in the Solvency II work (QIS 5) and represents an average for all insurance firms. As an average for all insurance firms is not considered to be representative for calculating the capital requirement for pension risk within the Pillar 2 basic requirement, FI intends to adjust the risk margin for the traffic light method within the Pillar 2 basic requirement to eight per cent based on an average for just those insurance firms that completely or partly pursue occupational retirement provision activities.

A risk margin of eight per cent within the traffic light method within the Pillar 2 basic requirement is also considered to be a reasonable approximation based on the technical specifications[55] issued by the European Insurance and Occupational Pension Authority (EIOPA) for quantitative impact studies relating to the Occupational Retirement Provision Directive.[56]

Other adjustments

Other adjustments of existing own funds for pension risk include any adjustments for holdings of shares in the firm itself and concentration risk.

Any holdings of shares in the firm itself will reduce the firm's existing own funds for pension risk. The amount deducted in the calculation of existing own funds for pension risk in such cases should also be deducted in the calculation of capital requirement for equity risk on the traffic light form.

The traffic light method within the Pillar 2 basic requirement is based on an assumption of well-diversified exposures within each class of asset. FI may need to make an assessment of any further capital requirements within Pillar 2 for concentration risk in the event that this assumption does not hold. Such assessments are not dealt with in this memorandum.

4.5.2.5 Capital requirements for pension risk within the Pillar 2 basic requirement

The firm's calculation of existing own funds for pension risk is subtracted from the total net capital requirement, after adjustment for calibration. If the result is

[55] *Draft Technical Specifications for the QIS of EIOPA's Advice on the Review of the IORP Directive*.
[56] *Directive 2003/41/EC of the European Parliament and of the Council of 3 June 2003 on the activities and supervision of institutions for occupational retirement pensions.*

positive (that is, if the total net capital requirement exceeds the firm's calculation of existing own funds for pension risk), 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 the Pillar 2 basic requirement thus becomes a net item corresponding to the remaining capital requirement following a deduction for any existing capital not included in the firms' reported Common Equity Tier 1 capital. Net items are also referred to as 'Surplus' or 'Deficit' in the Traffic Light calculation form.

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 owing to 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.

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.

6 Transparency

6.1 Introduction

As described in the Capital Requirements Memorandum, FI will publish results of the supervisory capital assessment (including the results of the methods described in this memorandum) quarterly at consolidated level for the ten largest groups. This publication covers all parts of the capital requirement, including systemic risk, risk weight floor for mortgages and the countercyclical buffer and, when applicable, any additional capital requirement that has not been taken into account in the Capital Requirements Memorandum or in this memorandum.[57]

The risk types described in this memorandum are normally assessed annually within the supervisory capital assessment. The calculation of these parts 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[58]) 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.[59] 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).

6.2 Comments received pursuant to Section 6

The *Swedish Bankers' Association* recommends that firms should not have to publish their internally assessed capital requirement before FI has finished

[57] This applies to, for example, the capital requirement for deficiencies in risk management and model risk as well as any additional capital requirement for basis risk, option risk or credit spread risk for mark-to-market instruments in the banking book.
[58] 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 (which is in addition to the three percentage units imposed within Pillar 1). See the Capital Requirements Memorandum for more information.
[59] See Chapter 5, Section 8 of Finansinspektionen's Regulations (FFFS 2014:12) regarding prudential requirements and capital buffers.

preparing the methods for assessing the Pillar 2 basic requirement, applied these in the supervisory capital assessment, and published the results. The Bankers' Association also requests clarification regarding FI's publication of information and specifically how FI's publication relates to FI's communication to firms about their supervisory capital assessment and the firms' own quarterly accounts.

The *Savings Banks Association* also states that the requirement to publish the firms' internal capital assessment should not be introduced before FI's methods are complete and a decision made concerning them.

6.3 Further clarifications in respect of transparency

Under FFFS 2014:12 firms are to publish their internally assessed capital requirement quarterly, as soon as possible and no later than two months after the reporting date, starting from the reporting date on 31 March 2015. FI explains in Sub-section 1.5 that FI expects firms to use the methods that they consider 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, but it also follows that firms may choose to use similar or identical methods if firms consider these to be most appropriate. FI notes in this respect that option risk, basis risk and credit spread risk for mark-to-market instruments in the banking book should be taken into account in the firms' ICAAP in the event that these risk elements may be deemed important, even if these risk elements are not taken into account in FI's method for assessing IRRBB.

FI does not consider that there is any reason to postpone the implementation of the requirement for firms to publish their internally assessed capital requirement. In the event that firms consider that FI's methods are most appropriate for their situation, they are free to use the methods referred to by FI and adjust these methods to the changes and clarifications that follow from this memorandum.

As regards the Bankers' Association's request for clarification of FI's time schedule for publishing information and how this relates to FI's communication to the banks about the final SREP (FI assumes that the request relates to the final supervisory capital assessment), FI would like to clarify the following:

FI will publish the firms' combined capital requirement for the reporting dates quarterly starting from 30 June 2014. FI needs to wait for relevant data from all of the ten largest firms and up until now has published the capital requirement within two months of each quarterly reporting date. Firms often publish their quarterly reports earlier than FI publishes the capital requirements for the ten largest firms.

So far FI has published lump sums for the risk types presented in this memorandum. FI will communicate the final results of the year's supervisory

capital assessment (including the result of the methods presented in this memorandum) to the ten largest firms, to which the capital assessment for the year relates, as of 30 September 2015. This means that firms will be notified of the actual capital requirements that FI's methods result in before publishing their quarterly reports, regardless of FI's publication of capital requirements for 30 September 2015.

As described above, the amount in Swedish kronor, as determined in the supervisory capital assessment, will normally apply for one year until it has been updated in the following year's supervisory capital assessment.

7 Impact analysis

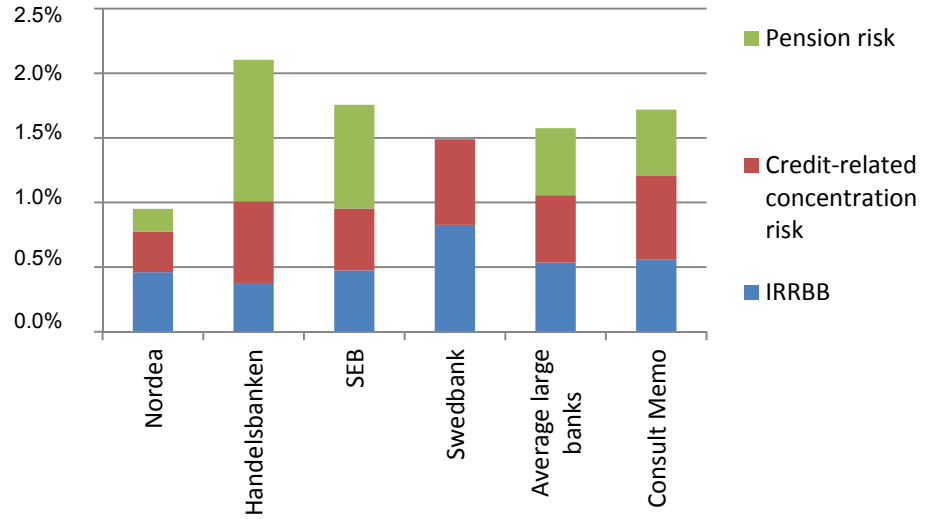
FI reports the overall impact of FI's proposed application of the new capital adequacy rules in the Capital Requirements Memorandum. In the impact analysis, FI uses a combined lump sum for the three risk groups described in this memorandum and, in certain cases, also for other risks,[60] corresponding to 1.5 per cent Common Equity Tier 1 capital and 2.0 per cent total capital for the four major banks, and also 1.3 per cent Common Equity Tier 1 capital and 2.0 per cent total capital for the six other firms[61] (this lump sum was also used in FI's quarterly publication of the capital requirements for the ten largest firms up to and including the second quarter of 2015; see Section 6 for a further description of FI's analysis of capital requirements). All percentages are based on the total risk-weighted exposure amount.

This section describes a calculation of the total capital requirements for the ten largest firms for the types of risk 'credit-related concentration risk', 'IRRBB' and 'pension risk'. Please note that the lump sum of 2.0 per cent takes into account further capital requirements that FI's methods do not take into account; in such cases these capital requirements are additional to those illustrated in Diagrams 7.1 and 7.2 below. The calculations reported are based on data that the banks have submitted to FI.

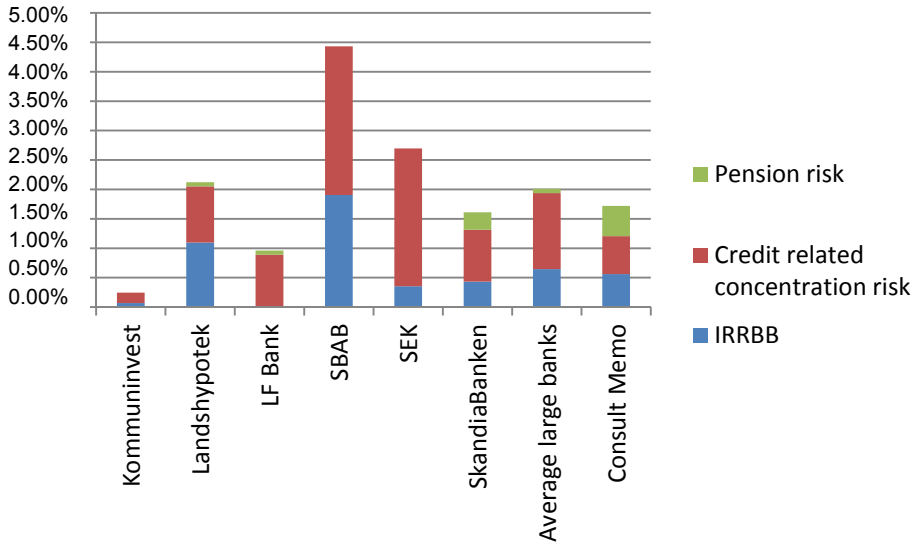
[60] Such additional capital requirements may relate to, for example, deficiencies in risk management and model risk and are not dealt with in this memorandum. Further capital requirements for basis risk, option risk and credit spread risk for mark-to market instruments in the banking book, which are often regarded as sub-components of IRRBB, may be added in the future, as FI's methods takes no account of these risk elements.

[61] 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.

7.1 Total capital requirements according to FI's methods for credit-related concentration risk, IRRBB and pension risk as a percentage of risk-weighted exposure amount for four major banks



7.2 Total capital requirements according to FI's methods for credit-related concentration risk, IRRBB and pension risk as a percentage of risk-weighted exposure amount for six other firms



As shown in Diagrams 7.1 and 7.2 above, FI's calculations indicate that the capital requirement within Pillar 2 for credit-related concentration risk, IRRBB and pension risk represent on average 1.6 per cent for the major banks and 2.0 per cent for the other six firms. Any additional capital requirement for option risk, basis risk and credit spread risk for market-quoted instruments in the banking book is not included in the reported capital requirement for IRRBB and may therefore be additional to the capital requirement reported here.

The average capital requirement for *credit-related concentration risk* according to FI's method is 0.5 per cent of the total risk-weighted exposure amount for major banks and 1.3 per cent for the other six firms. An average capital requirement of 0.5 per cent is reported for concentration risk in the consultation memorandum.

As regards *IRRBB,* the major banks have an average capital requirement of 0.5 per cent and the other six firms an average capital requirement of 0.6 per cent, compared with the 0.6 per cent stated in the consultation memorandum. The preliminary calculation in the consultation memorandum is based on a smaller number of firms than the ten largest.

As regards *pension risk*, the major banks have an average capital requirement of 0.5 per cent and the other six firms an average capital requirement of 0.1 per cent. There are significant differences in the capital requirement between firms depending on differences in risk exposures and capitalisation of the firms' pension plans. An average capital requirement for pension risk of 0.5 per cent is reported in the consultation memorandum based on preliminary estimates for the major banks.

Glossary

Housing loans:	'Housing loans' refers to those exposures affected by the risk weight floor for mortgages, that is, exposures collateralised by property in the exposure class 'retail exposures'; see Articles 147.5 and 154.3 of the Capital Requirements Regulation.
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).
Exposures to central governments and central banks:	Defined in accordance with Article 147 of the Capital Requirements Regulation.
Exposure amount:	An exposure value in accordance with Article 111 of the Capital Requirements Regulation is used for exposures where the Standardised Approach is used. An exposure value in accordance with Articles 166 to 168 of the Capital Requirements Regulation is used for exposures where an IRB Approach is used. An exclusion is made for covered bonds where the exposure amount comprises 10% of the value in accordance with the large exposure framework.
Credit portfolio:	'Credit portfolio' means all exposures that are to be covered by capital in accordance with the framework for credit risks contained the Capital Requirements Regulation, with the exception of non-credit-obligation exposures.
Counterparty:	When calculating single-name concentration, exposure amount shall be aggregated at counterparty level. Here 'counterparty' means

	groups. When banks have permission to use the IRB Approach, PD and LGB for groups are calculated as exposure-weighted average PD and LGD.
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.
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 own funds.
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 not covered by Pillar 1 and, in particular cases, capital for deficiencies in governance arrangements, processes and procedures.
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.

Supervisory capital assessment:	FI's assessment of the firm's risks and the capital requirement that these risks involve.
Covered bonds:	Covered bonds are bonds collateralised by a certain cover pool, usually in the form of housing loans. In FI's method for credit-related concentration risk, covered bonds are to be included at 10% of their full value in accordance with the framework for large exposures.

1 Appendix 1: Instructions for completing the information collection template for IRRBB

1.1 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 horizons 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 its aggregate 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.

1.2 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 books are not to be included in the information provided. On the other hand, derivatives and transactions between the banking book and the trading book are to be included in this information. 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 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.

1.2.1 Assets and liabilities

1.2.1.1 With a set repricing date

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

1.2.1.2 Without a set repricing date

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

1.2.1.3 FRNs and index-linked deposits and lending

Floating rate notes (FRNs) are bonds with a maturity that differs from the repricing date. 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. 1M STIBOR).

There are three rows in the reporting sheet for FRNs and index-linked loans. Nominal amount and known coupon payments are entered in the first two rows. Nominal amount is specified as of the next interest rate reset date, and known spreads are also included when reporting known coupons, even if they are to be paid on a date beyond the next interest rate reset date. The nominal amount is re-entered in the third row, but this time in the time horizon best corresponding to the final due date.

1.2.1.4 Structured borrowing

Structured borrowing is characterised by the firm issuing a bond with a certain yield structure at the same time as concluding a derivative contract reflecting the structure of the bond issued. This form of financing is often arranged by another firm, which is also the counterparty to this derivative transaction. The bond issued together with the associated derivative is hereafter referred to as 'the package'. The package gives rise to an exposure to a short interest rate risk and often includes an element of optionality that affords the financier or derivate counterparty an opportunity to terminate the financing before the final due date.

The reporting sheet has three rows for structured borrowing. Nominal amount and known coupon payments for each package are entered in the first two rows. Nominal amount is specified as of the next interest rate reset date for the package, and known spreads are also included when reporting known coupons, even if they are to be paid on a date beyond the next interest rate reset date. The nominal amount is re-entered in the third row, but this time in the time horizon best corresponding to the first possible due date for the package.

1.2.2 Derivatives

1.2.2.1 Interest swaps

Interests swaps are to be registered with two nominal amounts with a reversed sign that are put in the time horizons best corresponding to the repricing date in each leg. A recently entered interest swap, where the bank pays fixed interest for four years in return for having an interest rate that is repriced quarterly, is entered at a negative nominal amount in the four-year horizon, and a positive nominal amount in the three-month horizon. The fixed coupons that the bank is

to pay are entered as negative flows in each time horizon. Only the known interest flows in the floating leg are entered.

1.2.2.2 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 horizon best corresponding to a start date for the underlying interest period. A negative nominal amount is entered in the time horizon best corresponding 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 horizon, with a positive sign if the forward has been purchased.

1.2.2.3 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 horizon best corresponding with the underlying bond's due date. The negative nominal amount is entered in the time horizon best corresponding to the forward's expiration date. Only coupon payments between the forwards' expiration date and the bonds' due date are entered in the template.

1.2.2.4 FX swaps

The nominal amounts for 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 in each sheet depending on currency.

1.2.2.5 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.

1.2.2.6 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 with a negative nominal amount and coupon payments.

1.2.3 Supplementary information

1.2.3.1 Maturity-matched currency hedging

FI requires access to information relating to currency hedging in respect of specific assets and liabilities, and which matches these with regard to maturity, in order to get a true and fair view of the period during which the firm's capital is tied up.

Specify a nominal amount in the time horizon corresponding to the derivative's maturity, with a positive amount where the firm has a fixed interest rate.

1.3 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_Cash Flows_XXX], where XXX represents a three-digit currency code. The requirements here are lower to differentiate the sources for the cashflows. Instead the focus is placed on specifying in detail when they occur in terms of time.

1.3.1 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 reference date corresponds with an integer.

1.3.2 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 NMDs** – correspond to nominal amounts for interest-bearing liabilities with a contracted repricing date.

- **Liabilities with modelled duration** – correspond to nominal amounts in accordance with the possible modelled fixed interest structure for equity and/or NMDs.

- **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.

1.4 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.

1.5 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 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 interbank rates as an underlying variable are reported separately, and in this case the calculation period is to be decisive for the cell in 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), the firm should create new tables where this information can be entered.