

FI Analysis No 36

Has FI's risk weight floor had an impact on banks' CRE lending?



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Summary

In 2020, FI introduced an additional capital requirement on banks in the form of a risk weight floor for loans collateralised by commercial real estate (CRE). The aim of the floor was to increase the amount of capital banks hold for this specific type of exposure and thus their resilience to CRE-related credit losses. However, the risk weight floor could also impact the banks in other ways. For example, the banks could transfer some of the costs for the capital requirement to their customers and take on more risk in their lending. CRE firms could also shift their financing away from bank loans to more market financing.

The risk weight floor appears to have had a small impact, approximately 0.12 percentage points, on the banks' interest margin for lending to CRE firms. This is smaller than FI's assessment prior to the introduction of the floor. The effect is largest for new customers, small firms, loans collateralised by non-residential commercial property, and loans with high risk weights.

When FI introduced the risk weight floor, there was a concern that the banks would increase the risks in their lending to maintain their profitability. We see nothing today to indicate that the banks have pursued this path.

CRE firms' borrowing from both banks and the debt securities market have continued to increase since FI introduced the risk weight floor. Therefore, we are not seeing any indication that the banks' credit supply to CRE firms or these firms' demand for loans has changed to any major extent. However, there are many other factors that affect the banks' lending to CRE firms that make it difficult to quantify the specific impact of FI's measure.

Overall, the risk weight floor appears to have had a limited impact on the banks' lending to CRE firms, although the period that was studied is relatively short and it may take longer to realise the full impact.

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More capital to cover risks associated with loans for CRE

Finansinspektionen (FI) has been warning for several years that there are elevated risks on the CRE market (see, for example, Finansinspektionen, 2019). These risks are related to the current state of the Swedish economy. CRE firms have benefited from a long period of strong economic growth and low interest rates, which has driven real estate prices up at the same time as the number of vacancies has been low and rent growth high. Low interest rates and rising real estate prices have also resulted in CRE firms borrowing more.

Swedish CRE firms receive the majority of their loan-based financing from the Swedish banks, and lending for CRE is a large portion of the banks' lending to non-financial corporates. FI's analyses indicate that the internal credit risk models used by the banks underestimate the risk in the lending to the CRE sector. As a result, the banks have not set aside enough capital for this risk. FI decided therefore at the beginning of 2020 to introduce a capital add-on for the banks' lending to the CRE sector (see Finansinspektionen, 2020a). This additional capital requirement in the form of a risk weight floor corresponds to the difference between a minimum risk weight as determined by FI and a bank's actual average risk weight for exposures to the CRE sector. FI set the minimum risk weights at 35 and 25 per cent for corporate exposures collateralised by commercial real estate and commercial residential real estate, respectively.

For the banks, this means that they need to set aside more capital to cover exposures collateralised by CRE. Overall, this means that the banks need to hold more capital.

Assessed impact and aim of the analysis

When the risk weight floor was introduced, FI made the assessment that the floor would have the following impact (see Finansinspektionen, 2020a):

- The additional capital requirement would primarily impact the major Swedish banks, and FI estimated the impact at around SEK 5 billion per major bank.
- The additional capital requirement could impact the banks' lending rates. If the banks transferred the entire cost of the additional requirements to the CRE firms, FI estimated that the average lending rates could increase by 0.15–0.3 percentage points.¹

¹ FI's calculation is based on the assumptions that the banks' risk weights on average were 10 percentage points lower than the risk weight floor and that the banks aim to generate the same return on equity, for the credits, as before.

- Since it is designed as a floor and thus is not risk sensitive, the additional capital requirement could create incentives for banks to take on more risk. Higher credit risk in lending can result in better payment in the form of higher interest margins and lending rates without capital requirements increasing to the same extent.
- Other financing alternatives, such as bonds, could become more competitive and thus lead to a shift in lending to CRE firms from banks to bond markets.

The first effect – *increased capital requirements* – was intended to increase the banks' resilience to shocks to the CRE sector and therefore was judged to benefit financial stability. The second effect – *higher lending rates* – could also have a positive impact on financial stability by limiting CRE lending, even if this effect was judged to be secondary.

The third effect – that the additional capital requirement could create incentives for the banks to take on more risk – would be negative from a stability perspective. However, the fourth and final effect – *more financing alternatives* – potentially has both positive and negative sides. Since the banks provide several systemically important services in the financial system, a weaker link between the CRE market and the banks would mean less of a risk that other systemically important services would be interrupted. A broader financing base can also help spread risk for the CRE firms. On the other hand, though, too much market financing can lead to new risks for individual firms and financial stability since access to market financing tends to be more likely to dry up following a shock.

How an individual bank chooses to act is expected to depend on what the competition is like, the financing alternatives available to customers, and if the bank is experiencing capital as a scarce resource. It is conceivable, quite simply, for the banks to merely accept a lower return on CRE lending after the introduction of the risk weight floor.

In this FI Analysis, we study how the risk weight floor has impacted the banks' lending to CRE firms using detailed lending data. The aim is to analyse whether the risk weight floor impacted the banks' interest margins and the risk in their lending. We also investigate how the volume of bank loans and bonds to CRE firms has changed before and after the introduction of the risk weight floor.

It will take time before the effects of the risk weight floor have an impact on the entire credit portfolio for the banks in question. This is because the maturities of the loans vary from less than twelve months to several years, and the terms of the loans primarily change when the loan is renegotiated or renewed.

The risk weight floor applies from Q4 2020. In this analysis, we compare the banks' portfolios from December 2019 and December 2020.² It is a short period of time, but since FI announced the measure already at the beginning of 2020, the banks can be expected to have had time to adapt their portfolios. It is also reasonable to believe that it may take longer to realise the full impact. FI will continue to analyse the market for CRE loans and may conduct corresponding analyses in the future.

Banks' risk measurement

The legislation that regulates banks' operations requires banks to maintain certain levels of capital. The aim of the capital requirement is for the banks to be able to absorb losses, maintain the credit supply, and thus prevent and offset the effects of an unfavourable economic development or a financial crisis on an individual bank, the banking system and society at large. One important lesson from the global financial crisis in 2007–2008 was that low levels of capital made the banks unstable, which had a negative impact on the financial system and the economy.

The current capital adequacy regulations are largely risk-based. This means that the higher the risk a bank undertakes in its lending, the more capital the bank will need to hold. Differences in risk are reflected in the different risk weights assigned to different types of lending and counterparties. Greater risk means a higher risk weight, which means a higher capital requirement. There are two methods to measure risk under the capital adequacy regulations: the standardised approach and the internal ratings-based approach.

The standardised approach uses the risk weights specified in the Capital Requirements Regulation.³ The risk weights assigned to exposures collateralised by immovable property are primarily determined by the type of real estate. In simplified terms, exposures collateralised by real estate are broken down into two categories: residential property and commercial property.⁴ According to the standardised approach, residential property is assigned a risk weight of 35 per cent and commercial property 50 per cent.

² We use FI's mapping of the CRE market. It contains data from seven banks that have exposures to the CRE sector. The banks are Danske Bank, Handelsbanken, Länsförsäkringar Bank, Nordea, SBAB, SEB and Swedbank.

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 amending Regulation (EU) No 648/2012.

⁴ According to the Capital Requirements Regulation's definition of residential property and commercial immovable property (see Article 4(1)(75) of the Capital Requirements Regulations and the EBA's Q&A 2014_1214).

Under the internal-ratings based approach (the IRB approach), banks may use their own data and models to estimate certain parameters in the equation to calculate the risk weights for credit risk. To use their own models, a bank must receive permission from FI. The parameter estimates are largely based on the banks' historical data on credit losses. There are two different variations of the IRB approach that the banks apply to estimate the risk weights – the advanced and the foundation approach. Under the advanced approach, the banks estimate themselves both the probability of default (PD) and the loss given default (LGD) for some exposure classes. Under the foundation approach, LGD is determined using statutory values for these exposure classes.⁵ The advanced approach in practice generates significantly lower risk weights than the foundation approach.⁶ The Swedish banks use the advanced approach for most of their lending to CRE firms.

It is reasonable to assume that the banks' IRB approaches result in better quantification and differentiation of risk than the standardised approach. However, there is also some uncertainty associated with the IRB approach since it is based on assumptions that do not necessarily reflect the actual risk. One reason could be because significant economic relationships and correlations change over time, but it could also be a result of banks facing incentives to try to minimise their capital requirements to keep their capital need down and thus increase their return on equity.

FI's risk weight floor for CRE bank loans only applies to banks that received permission to use the IRB approach. Banks using the standardised approach to calculate the capital requirement for credit risk are not affected. All banks in the analysis have permission from FI to use the IRB approach for risk classification.

Banks' capital requirements

The Swedish banks' risk-based capital requirements consist of four primary parts :

- minimum capital requirement :
- additional own funds requirement (Pillar 2 requirements)
- combined buffer requirement
- guidance in Pillar 2 (Pillar 2 guidance).⁷

For the banks that have permission to use an IRB approach, the credit risk-related capital requirements in Pillar 1 are relatively low. This is in part because the requirements in Pillar 1 are determined by the risk weights the bank calculates itself. Under Pillar 2, FI determines a capital requirement for risks that are not

⁵ Banks using the advanced IRB approach may also estimate conversion factors using their own method, and maturity is calculated in a specific way for these banks.

⁶ This is because the banks' estimates of LGD are often lower than the statutory values.

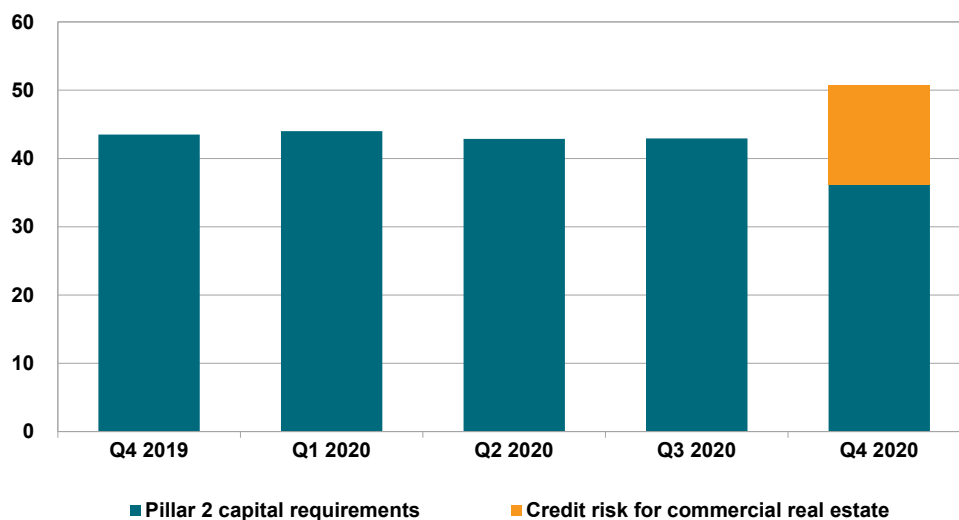
⁷ See Finansinspektionen, 2020b.

covered by Pillar 1. FI's risk weight floor for loans collateralised by CRE falls within the Pillar 2 requirements.

The Pillar 2 requirements include several other capital requirements, for example for interest risk and other market risk and credit risk-related concentration risk. The risk weight floor for CRE exposures ensures that the banks hold enough capital for the loss risk specific to CRE lending. This capital requirement amounted in total to SEK 14.6 billion for the major Swedish banks for Q4 2020 (Diagram 1). The total increase in the Pillar 2 requirement, however, was only SEK 7.2 billion between Q4 2019 and Q4 2020.⁸

1. Major Swedish banks' Pillar 2 capital requirements

SEK billion



Source: FI.

Risk weights for loans to CRE firms have decreased

The CRE market in Sweden has not experienced a major shock since the financial crisis at the beginning of the 1990s. Over the past few decades, only a few CRE firms have become insolvent. The properties the firms pledged as collateral for loans in the banks have had relatively low loan-to-value ratios at the time the loan

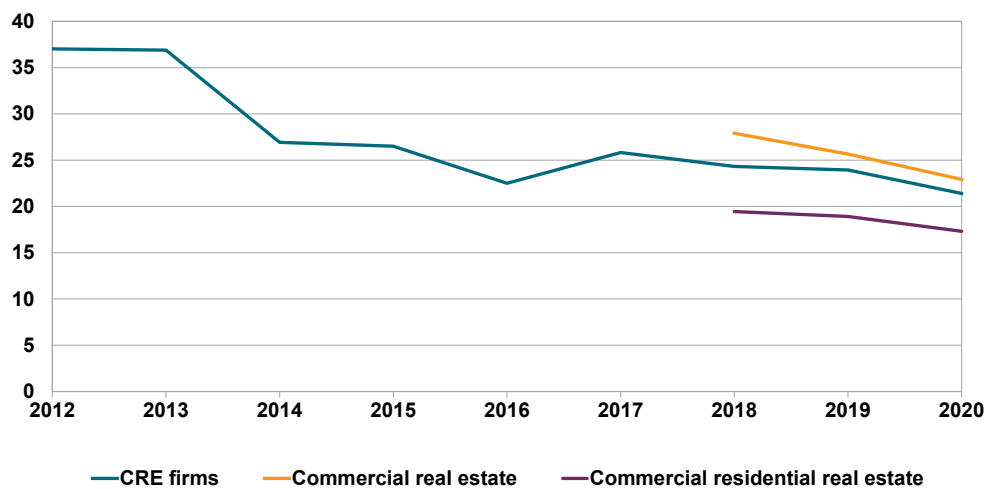
⁸ The difference of SEK 7.4 billion is due to a decrease (of SEK 4.4 billion) in the additional requirements from other assessment methods in Pillar 2 (independent of the risk weight floor), and that the capital requirements for the maturity assumptions and deficiencies in the banks' calculation of risk weights for corporate exposures decreased by the same amount as the share that was linked to CRE exposures in Q4 2020 (SEK 3.0 billion).

was granted.⁹ Loan-to-value ratios have also in many cases later decreased as property values rose. CRE firms, especially in recent years, have increased their borrowings sharply. Today, the banks have large exposures to the CRE sector.

The banks' risk weights for loans to CRE firms are low and have decreased over time (Diagram 2). This is largely because the banks' own estimates are based on actual outcomes in terms of credit losses. As a result of the long period of few and small credit losses in the sector, the credit risk models are showing low risk.

2. Risk weights for lending to CRE firms

Per cent



Source: FI.

Note. The diagram shows the banks' risk weights for CRE firms. The breakdown for 2018 between commercial real estate and commercial residential real estate is based on which of these property types comprises the majority of the firm's property holdings, expressed as market value. For the years 2019 and 2020, the breakdown is based on information about loans and the type of collateral, and not the counterparty.

The banks' estimated credit risks differ depending on the type of property. Residential property is generally judged to have lower risk and thus has lower risk weights than other commercial properties. In 2020, the banks' average risk weights for lending for commercial residential real estate and other commercial real estate were 17 and 23 per cent, respectively. This is significantly lower than the risk weight floor that FI introduced in 2020. The banks must therefore hold more capital for this lending.

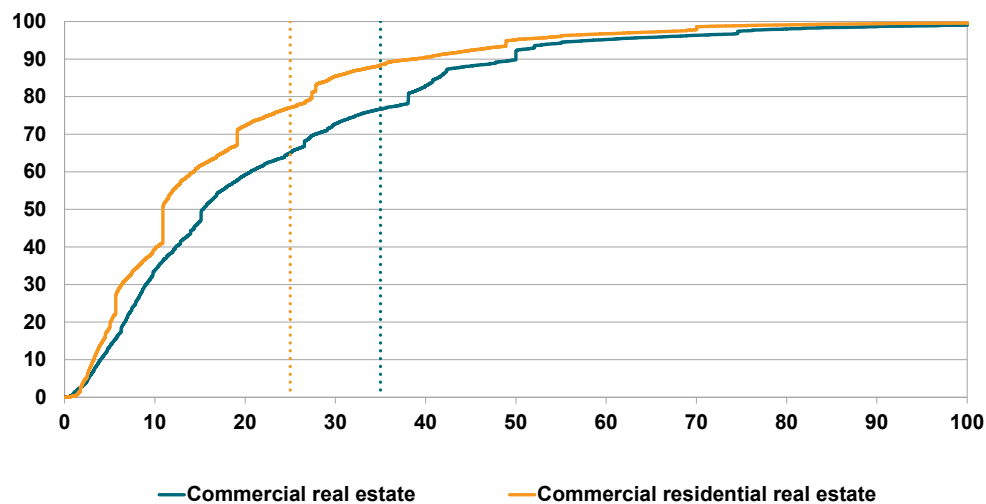
Almost 80 per cent of all loans to CRE firms have a risk weight that falls below FI's risk weight floor (Diagram 3). But FI's risk weight floor applies to the banks' entire loan portfolio collateralised by CRE. This means that the floor does not

⁹ The loan-to-value ratio is defined as total loans in relation to the value of the property.

apply to every individual loan. In practice, it is the average risk weight in the loan portfolios in relation to the risk weight floor that determines the size of the additional capital requirement.

3. Cumulative distribution of risk weights for CRE bank loans in 2020

Per cent



Source: FI.

Note. The diagram shows the share of the loan (Y axis) that falls below each risk weight value (X axis). Dashed vertical lines show the risk weight that FI set as the floor: 35 per cent for corporate exposures collateralised by commercial real estate and 25 per cent for corporate exposures collateralised by commercial residential real estate.

Impact of risk weight floor on interest margin and risk in lending

If the banks choose to transfer the cost of the increased capital requirement from FI's risk weight floor to the borrowers, their borrowing costs (all else equal) will rise. This is done by the banks increasing their interest margins.¹⁰ The risk weight floor can also result in the banks increasing their high-risk lending since the floor means that the marginal capital requirement for each new loan becomes the same regardless of risk. Since loans with higher risk as a rule have a higher interest rate, the return on the capital that an individual loan requires is higher if the capital requirement is the same for a loan with high and low risk.

To investigate the effect the risk weight floor has had on the banks' lending to CRE firms, we need to gain an understanding of what would have happened if FI had not implemented the measure. Since it is not possible to observe this directly, we must

¹⁰ The interest margin can be described as the difference between the interest rate the customer pays and the banks' borrowing cost (or reference rate).

use a method that indirectly measures the effect. *Difference in difference* is a method that compares the development between two groups, where one group has been affected by a measure or reform (treated group) and the other not (control group). By comparing the development between these groups, we can calculate the effect of the measure. The method is based on an assumption that the treated group would have developed in the same manner as the control group if the measure had not been implemented.¹¹ The challenge with this method is to find situations where this assumption is reasonable.

FI's risk weight floor applies to the banks' total corporate exposures collateralised by CRE. Loans collateralised by CRE in the retail exposure class are not subject to the risk weight floor. But basically all loans collateralised by CRE are in the corporate, and not retail, exposure class.¹² Thus, in practice, all bank loans for CRE are affected by the risk weight floor and thus are included in the treated group in our analysis.¹³

Banks are impacted differently by the risk weight floor

One way to analyse the impact of the additional capital requirement is to compare lending at banks that were impacted greatly to those that were barely impacted. The banks can prioritise lending to different customers and segments. In general, the banks' credit portfolios are similar, but the methods and bases that they use to calculate the risk weights differ. Therefore, there may be systematic differences that result in different risk weights for the banks' lending even if the portfolio structure is similar. This means that the banks are impacted to varying extents by the risk weight floor.

Banks that in general had high risk weights for their exposures in 2019 were already close to, or even above, the risk weight floor. These banks therefore were

¹¹ Finansinspektionen has used this method in several previous analyses to evaluate various reforms (see Finansinspektionen, 2017; Andersson et al., 2018; Andersson and Aranki, 2019; Aranki and Larsson, 2019; Andersson et al., 2020; and Andersson and Aranki, 2021).

¹² Approximately 99 per cent of the banks' loans to CRE firms are corporate exposures. Roughly 1 per cent of the loans are classified as retail or institute exposures. The residential properties classified as retail exposures are already subject to the risk weight floor for mortgages, which is also 25 per cent.

¹³ Some of the banks' lending to CRE firms is not collateralised, so-called unsecured loans. These loans are not subject to the additional capital requirement and are therefore a conceivable candidate for the control group. However, the additional capital requirement can be viewed as giving banks incentives to not accept collateral in CRE for some counterparties, particularly if the risk weights fall below FI's risk weight floor. Thus, this lending could also indirectly be affected by the additional capital requirement. At the same time, in contrast, the non-collateralised lending to CRE firms is limited and in reality decreased in 2020 to 4 per cent of the total lending volume, from 5 per cent in 2019. We have chosen not to use unsecured loans as the control group.

only impacted slightly or not at all by the risk weight floor. In this analysis, we call these banks *weakly impacted*. The opposite applies to banks that in general had low risk weights before the introduction of the floor. The risk weights for these banks are further away from the floor. They therefore need to set aside more additional capital due to FI's measure. We call these banks *greatly impacted*.¹⁴ Any impacts from the risk weight floor should vary between these two groups and be largest for the greatly impacted banks.

Weakly impacted banks on average have higher interest margins and risk weights for new loans to commercial real estate and commercial residential real estate than greatly impacted banks (Table 1).¹⁵ However, the development over time is basically the same. The interest margin has increased equally for both groups. The banks' risk weights for new loans collateralised by commercial real estate and commercial residential real estate have also developed in a similar way. The risk weights fell, but on average the risk weights of the greatly impacted banks fell more than those of the weakly impacted banks. This indicates that the additional capital requirement did not make the banks take on more risk to compensate for the decreased return that could be the result of the higher capital requirement. The results from these calculations point instead to the opposite, but the effect is relatively small.

Tabell 1. Interest margin and risk weight of new loans broken down by type of collateral for greatly and weakly impacted banks

Per cent and percentage points

	Interest margin				Risk weight			
	Greatly impacted		Weakly impacted		Greatly impacted		Weakly impacted	
	CRE	CRRE	CRE	CRRE	CRE	CRRE	CRE	CRRE
2019	1.4	1.1	1.7	1.5	21.4	18.2	49.1	37.0
2020	1.5	1.2	1.8	1.6	17.4	16.2	45.3	36.8
Diff., level	0.1	0.0	0.1	0.1	-4.0	-2.0	-3.8	-0.2
Diff., per cent	7.9	4.5	5.6	4.6	-18.8	-11.2	-7.8	-0.6

Source: FI.

Note. CRE stands for loans collateralised by commercial real estate, and CRRE stands for loans collateralised by commercial residential real estate. Diff. stands for the difference between the development over time in level (i.e., percentage points) and in per cent.

¹⁴ This analysis includes data from seven banks. There are three weakly impacted banks and four greatly impacted banks.

¹⁵ In the analysis, we study the impact of the additional capital requirement on new or renegotiated loans since the banks can adjust the terms on these loans.

Comparison with lending to tenant-owner associations

Another method to roughly illustrate the risk weight floor's impact on the banks' lending to CRE firms is to study lending to tenant-owner associations. This lending is to some extent comparable to loans to CRE firms since the loans are collateralised with similar assets in the form of property. Properties owned by tenant-owner associations and commercial residential real estate are similar since the type of property (private residences) and the underlying need for loan-based financing (housing) are similar. In addition, the monthly fees that members pay to their association can be likened to CRE firms' rental income.

Income from rents and fees is important information in the credit assessment for both CRE firms and tenant-owners associations. However, the banks' lending to tenant-owner associations is not subject to FI's additional capital requirement. By comparing the development in lending collateralised by commercial real estate and lending to tenant-owner associations, we can obtain an additional measure of the impact of the additional capital requirement.¹⁶

The banks assume significantly lower credit risk in their lending to tenant-owner associations than to CRE firms. This is because a tenant-owner association is owned by the households that are members of the association and live in the association's property. The members of the association seldom stop paying the monthly fee to the association due to a loss of income or rising costs because this means they may lose their right of occupancy and be forced to return the apartment to the association. The bankruptcy risk is therefore low, and in any case it is significantly lower than in loans to firms that conduct business as a limited-liability company. The differing credit risks are reflected in the banks' interest margins and interest rates. The banks' interest rates for loans for property owned by tenant-owner associations is on average lower than for loans to commercial residential real estate that in turn are lower than for loans to other commercial real estate (Appendix 1).

In 2020, the banks' interest margins for new loans collateralised by commercial real estate and commercial residential real estate increased by 0.1 percentage point. The interest margin to tenant-owner associations decreased by approximately the same amount (Table 2). At the same time, the banks' lending rates decreased by 0.1 percentage points for new loans to all segments. This points to a decrease in the banks' funding costs and that the banks only have partly passed on this cost decrease to CRE firms, while tenant-owner associations have been able to benefit from the full reduction. The banks' risk weights during the corresponding period

¹⁶ We compare the banks' new or renegotiated loans to CRE firms collateralised by commercial real estate to corresponding loans collateralised by apartment buildings or single-family homes that are owned by a tenant-owner association.

also decreased in all segments. This can be due in part to continued low credit losses and rising property values, but it is also in line with the assumption that the banks' new and renegotiated loans are going to counterparties with slightly higher creditworthiness than before.

Tabell 2. Interest margin and risk weight on new loans broken down by collateral type

Per cent and percentage points

	Interest margin			Risk weight		
	CRE	CRRE	TOA	CRE	CRRE	TOA
2019	1.4	1.1	0.8	23.7	18.9	4.7
2020	1.5	1.2	0.7	20.6	17.0	3.9
Diff., level	0.1	0.1	0.0	-3.1	-1.9	-0.9
Diff., per cent	8.3	4.7	-6.0	-13.1	-9.8	-18.4

Source: FI.

Note. CRE is loans collateralised by commercial real estate, CRRE is loans collateralised by commercial residential real estate, and TOA is loans collateralised by apartment buildings or single-family homes owned by a tenant-owner association. Diff. stands for the difference between the development over time in level (i.e. percentage points) and in per cent.

Risk weight floor has limited impact on interest margins

In order to be able to assign the risk weight floor the observed difference in the above calculations, our treated and control groups, must be relevant and comparable to one another and the only thing that may differ between them is the risk weight floor (i.e., the reform). In addition, there may not be other factors that co-vary with the risk weight floor and at the same time impact the banks' lending. For example, other events in 2020, including the coronavirus pandemic, which had a strong and diverse impact on the economy, may have had an impact on the banks' lending.

Another method for measuring the impact on the risk weight floor is to only study lending to firms that have loans at multiple banks.¹⁷ This means that we compare the outcome for the same firm where the only thing that varies is the bank that has granted the firm the loan. The assumption is thus that a firm's loans from different banks would have been impacted in a similar manner if the risk weight floor's introduction had impacted all banks in the same way.

¹⁷ These firms comprise approximately 5 per cent of all CRE firms in the banks' portfolios and around 15 per cent of the bank loans.

This method potentially provides a better estimate of the impact of the additional capital requirement than the methods used above in the sense that we compare the same firms and the only difference is the bank the firm borrowed from.¹⁸ Since the banks' average risk weights vary, and the impact of FI's risk weight floor on them thus varies, we can create a variable that we call *Distance to the floor*. This variable measures the distance between FI's floors and the banks' actual risk weights.¹⁹ We start with the banks' average risk weights from 2019, i.e., the year before the reform. The variable will differ between banks and the type of collateral for each loan. We are thus able to estimate the marginal effect of a greater distance to the floor.

In the model, we can also control for other observable factors that impact the outcome variables that we are interested in (interest margin, loans to corporates with high risk weight). For more details on the model specification, see Appendix 2.

The results indicate that the risk weight floor has led to a slight increase in the interest margin, but that it has not impacted the risk in lending (Table 3). For the interest margin, the estimate of the distance to the risk weight floor is positive and statistically significant. The results show that a 1 percentage point difference between FI's risk weight floor and the banks' own risk weights increases the interest rate margin, and thus – all else equal – the lending rate, by 0.015 percentage points. Since the average distance to FI's risk weight floors for the banks is 8 percentage points, the total effect on the interest margin is 0.12 percentage points. This estimated effect is relatively limited and is below the interval of 0.15–0.30 percentage points that FI calculated in its impact analysis prior to the introduction of the risk weight floor (see Finansinspektionen, 2020a). However, individual banks have adapted their interest margins to varying extents, which in part is explained by the difference in the bank's own risk weights and FI's risk weight floors.

The risk weight floor so far has not appeared to have resulted in the banks' increasing their lending to corporates with higher risk.²⁰ The estimate is not

¹⁸ Jiménez et al. (2017) uses a similar approach to analysing with detailed data how macroprudential measures (dynamic provisioning) in Spain influences banks' credit supply and the real economic impact.

¹⁹ We calculate the distance as the difference between FI's risk weight floors and the banks' average risk weights in 2019. The difference is set to zero in cases where the average risk weight exceeds the floor.

²⁰ In the model, we estimate the loan amount for firms with high risk at the firm level since an estimate of the average loan amount at the loan level can be impacted by the number of loans. As a sensitivity test, we also estimated the model at the loan level. This does not change the results of the study. We have classified firms that have loans with high risk as loans where the risk weight exceeds the median broken down by year, collateral, and bank for each firm. We use the banks' own estimates of risk weights as a measure of risk for each individual loan and weight them up to the firm level.

statistically different than zero. Since the estimate only refers to firms that have loans with several banks, there is a risk that the sample primarily consists of large firms. And large firms often have lower risk than small firms. But the estimate should still capture differences between the banks with regard to change in risk-taking.

Tabell 3. Model estimate for the risk weight floor's effect on the interest margin and loan amount for firms with high risk weight

Percentage points

	Interest margin	Loan amount for firms with high risk
Distance to the floor	0.015** (0.007)	0.002 (0.021)
Adjusted R-squared (per cent)	48.1	67.5
Observations (number)	6138	1645

Source: FI.

Note. ** indicates that the estimate is statistically different than zero at a five-percent level. Robust standard of error in parentheses is adjusted for clusters by firm, bank and type of collateral. The table shows only the coefficient for how the interest margin (for each loan) and loan amount for firms with high risk weights (at the firm level) change for each percentage point the banks' risk weights fell below the floor. The regression refers only to firms that have loans at several banks. The coefficient for *Distance to the floor* refers to β_1 and β_2 in each model (see Appendix B for a description of the models).

Interest margin primarily increased for loans to small firms

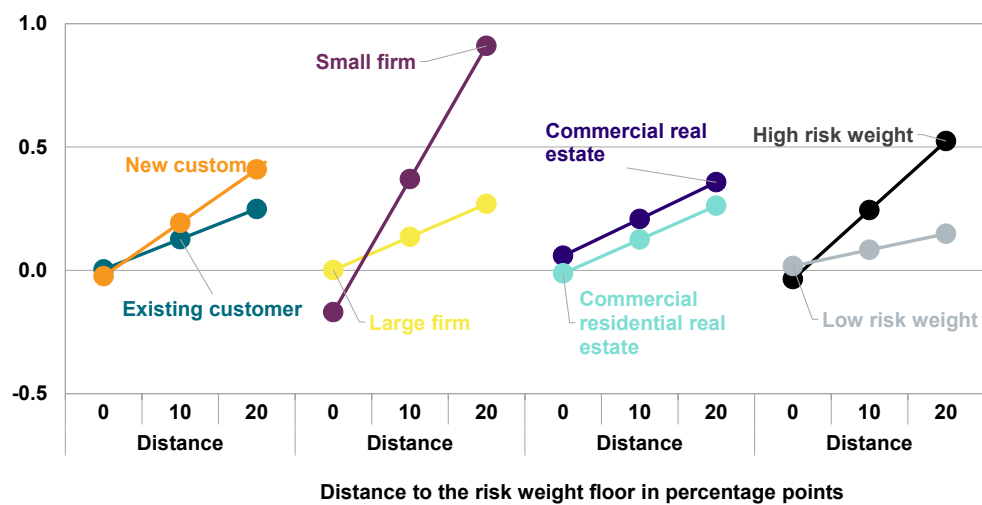
The reported results imply that the risk weight floor overall has had a limited impact on the banks' interest margins and no impact at all on the risk in the lending. We can use a similar model to estimate to what extent the impact on the interest margin varies between different types of borrowers. In general, the differences proved to be small, but the greatest impact was on new customers, small firms, loans collateralised by commercial real estate and loans with high risk (Diagram 4).

For loans in banks with the greatest distance to the floor, the interest margin for small firms increased the most. This may be because the banks want to keep their large customers, which are often customers at several different banks and even have access to the debt securities market. The banks therefore may be more willing to try to pass on the effect of the risk weight floor to smaller firms that have fewer financing options. Along the same lines, the ability of firms with higher risk to negotiate may be more limited than that of firms with low risk.

The estimates are based only to firms that have loans at several banks. The fact that the impact of the risk weight floor is larger for small firms than large firms indicates that the overall impact of the interest margin can be larger than the 0.12 percentage points we calculated above. This is because the firms that have loans at several banks are often large. And in the banks' portfolios there is a significantly larger share of small firms compared to the share included in these estimates (firms with loans at several banks).

4. Impact of the risk weight floor in 2020 on the interest margin for different types of firms, broken down by distance to the floor

Percentage points



Source: FI.

Note. The diagram shows the estimated impact of FI's risk weight floor on the interest margin for different types of firms. The model for calculating the impact of the interest margin on different types of firms is estimated simultaneously. In the model, we also control for the logarithm of the exposure amount, reference rates, business day, indicator for which IFRS stage the loan is in, the counterparty's share of non-secured loans (from banks), an indicator for whether the counterparty belongs to the public sector, the bank's estimated risk weight, the change in the banks' credit losses over time, bank-specific effects and group-specific effects.

No clear impact on the firms' financing

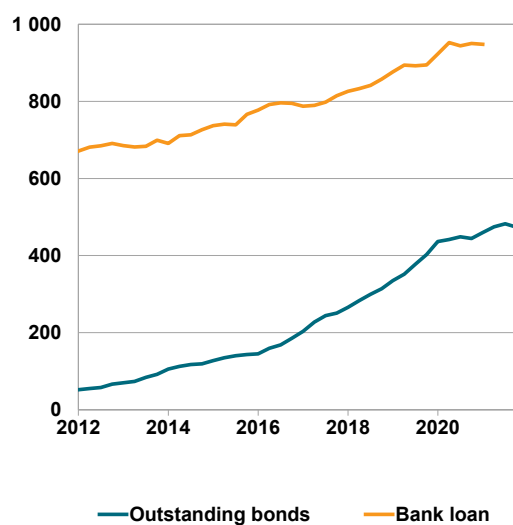
The above results indicate that the risk weight floor has had some of an impact on the CRE firms' cost for bank loans through higher interest margins. This can lead to other financing alternatives becoming more competitive and thus slowing the banks' lending to CRE firms. We therefore investigate how the volume of bank loans and bond-based financing has changed before and after the introduction of the risk weight floor. At the same time, the investigated period was characterised

by considerable turbulence on the financial markets. Caution should therefore be applied when drawing far-reaching conclusions from any changes.

The development in lending shows that both the bank loans and the capital market financing of CRE firms have continued to increase along approximately the same trend as before FI introduced the risk weight floor (Diagram 5).

5. Bank loans and bonds over time

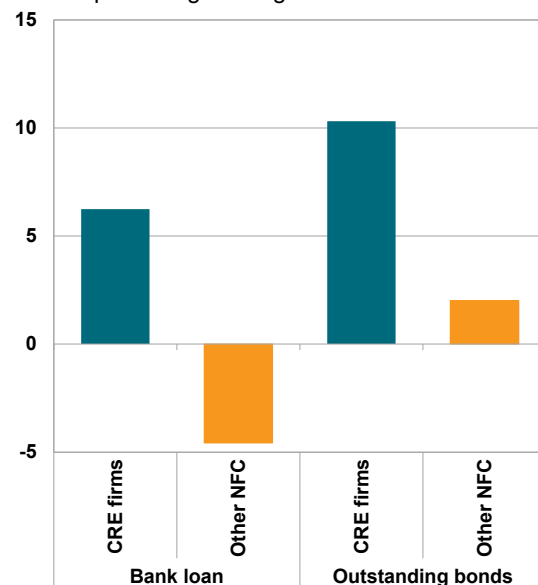
SEK billion



Source: FI and Refinitiv Eikon.
Note. Banks loans to Swedish CRE firms.
Outstanding bonds issued by Swedish CRE firms.

6. Development of bank loans and outstanding bonds in 2020

Annual percentage change



Source: FI and Refinitiv Eikon.
Note. CRE firms and tenant-owner associations are not included in the bars for other non-financial corporations (NFC).

In 2020, CRE firms increased their bank loans by approximately 6 per cent (Diagram 6). This is roughly in line with the average rate of growth in bank loans to the sector since 2010. Over the same period, bank lending to other non-financial corporations fell by almost 5 per cent. Thus, we see no clear signs that the risk weight floor has decreased the supply of bank loans to CRE firms, although it is possible that the bank loans to CRE firms would have increased by even more if FI had not introduced the floor.

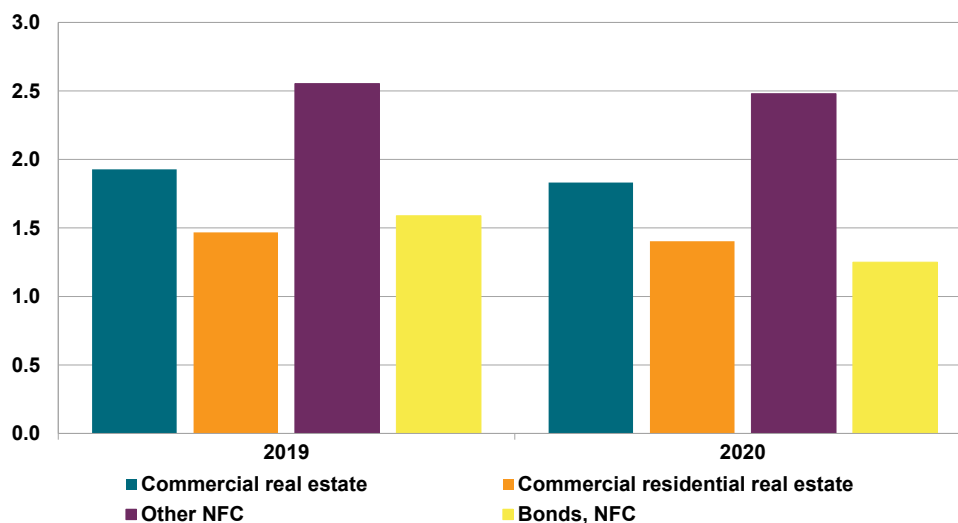
The rapid increased in CRE firms total liabilities is largely explained by the environment, with very low interest rates over a period of several years and historically low financing costs for CRE firms. If anything, the favourable conditions were strengthened in 2020 in conjunction with the Riksbank's very large contribution of liquidity to the economy through bond purchases, including direct purchases of corporate bonds. Interest on bonds issued by non-financial corporations, to which CRE firms belong, is lower than for bank loans for CRE

(including commercial residential real estate). This gap widened in 2020 when the rate on newly issued bonds decreased more than for new bank loans (Diagram 7).

The risk weight floor may have played a part in the interest rate on bank loans for CRE firms decreasing less than the firms' bond rates. But the Riksbank's measures had so much of an impact on both the access to financing and the level of the bank and bond rates that it is difficult to assess the specific impact of the floor.

7. Average interest rates for new bank loans and bonds

Per cent



Source: FI, the Riksbank and SCB.

Note. Refers to interest rates for new bank loans collateralised by commercial real estate and commercial residential real estate and other non-financial corporations (NFC). Interest on bonds refer to twelve months' rolling average for new issues from non-financial corporations.

References

- Andersson, M.K. and T. Aranki (2021). Temporary amortisation exemption led to new mortgagors borrowing, *FI Analysis No 34*, Finansinspektionen.
- Andersson, M.K., T. Aranki and A. Hult (2020). Fewer high-cost short-term credits after new rules, *FI Analysis No 22*, Finansinspektionen.
- Andersson, M.K. and T. Aranki (2019). Fewer Vulnerable Households after Stricter Amortisation Requirement, *FI Analysis No 17*, Finansinspektionen.
- Andersson, M.K., T. Aranki, M. Gjirja and N. Olsén Ingefäldt (2018). The mortgage cap reduced household debt, *FI Analysis No 12*, Finansinspektionen.
- Aranki T. and H. Larsson (2019). Fewer home equity withdrawals after amortisation requirements, *FI Analysis No 20*, Finansinspektionen.
- Finansinspektionen (2021 Capital requirements of Swedish banks as of Q4 2020, *Memorandum*, 2021-02-25, FI Ref. 20-11344.
- Finansinspektionen (2020a). Ökade kapitalkrav för banklån till kommersiella fastigheter, *Promemoria*, 2020-01-28, FI Ref. 19-14171.
- Finansinspektionen (2020b). New Capital Requirements for Swedish Banks, *Memorandum*, 2020-11-20, FI Ref. 20-20990.
- Finansinspektionen (2019). The Commercial Real Estate Market and Financial Stability, May 2019, *Reports*, FI Ref. 18-20931.
- Finansinspektionen (2017). Amortisation requirement reduced household debt, *FI Analysis No 10*, Finansinspektionen.
- Gabriel Jiménez G., S. Ongena, J.-L. Peydró and J. Saurina (2017). Macroprudential policy, countercyclical bank capital buffers, and credit supply: Evidence from the spanish dynamic provisioning experiments, *Journal of Political Economy* 125, 2126–2177.

Appendix 1

Tabell 4. Summary statistics of the banks' loans broken down by type of collateral

Per cent and SEK billion, where specified

	Commercial real estate		Commercial residential real estate		Tenant-owner association	
	2019	2020	2019	2020	2019	2020
Interest margin	1.55	1.68	1.18	1.27	0.82	0.82
Interest	2.05	2.16	1.63	1.65	1.42	1.34
Probability of Default (PD)	1.64	1.56	0.97	0.84	0.22	0.18
Loss Given Default (LGD)	18.6	17.9	17.5	16.9	9.1	7.8
Risk weight	25.7	22.9	19.1	17.3	4.5	3.6
Share of loans in IFRS Step 1	95.1	94.0	96.5	96.0	97.2	97.9
Share of loans in IFRS Step 2	4.7	5.9	3.4	4.0	2.7	2.1
Share of loans in IFRS Step 3	0.2	0.1	0.0	0.0	0.0	0.0
Collateralised lending, SEK billion	245	334	286	332	418	437
Total lending, SEK billion	357	446	412	454	423	443
Loan-to-value ratio	53.5	52.5	51.2	50.3	30.8	29.0

Source: FI.

Note. Collateralised lending refers to the banks' total lending collateralised by commercial real estate, commercial residential real estate or tenant-owner associations. Total lending refers to the banks' total lending to firms within the segments commercial real estate, commercial residential real estate or tenant-owner associations. The firms are classified based on the type of property that serves as the majority of their property holdings (in terms of market value). The loan-to-value ratio is also calculated at the firm level. This means that all of a firms' bank loans are included in the calculation, and not only those that are collateralised.

Appendix 2

We use the following models to estimate how FI's risk weight floor for CRE loans have impacted the banks' interest margins:

$$Y_{1bcfit} = \alpha_{1bc} + \delta_{1f} + \lambda_{1t} + \beta_1 AG_{bc} * D_{2020} + \theta' X_{bcfit} + \varepsilon_{bcfit} \quad (1)$$

The model is estimated only for firms that have loans at several banks. Y_l is the interest margin on the firms' loans (loan level). Index b stands for bank, c stands for the type of collateral, f stands for firm, i stands for loan and t stands for time. α_{1bc} represents bank- and collateral-specific effects, δ_{1f} firm-specific effects and λ_{1t} time effects. It is the coefficient β_1 that we are interested in and that measures the impact of the effect on the interest margin after the risk weight floor was introduced. AG_{bc} is the variable *Distance to floor* and measures the difference between FI's floor levels and the banks' actual average risk weight in 2019, i.e., the year before the reform. This variable will differ between the banks and the type of collateral for each loan. AG_{bc} is multiplied by D_{2020} , a dummy-variable for 2020, since what we want to investigate is the effect on the interest margin after the measure has been implemented. X_{bcfit} refers to other explanatory variables that could impact the interest margin. They are the reference rate, business day, indicator for which type of collateral issued for the loan (commercial real estate or commercial residential real estate), indicator for the IFRS stage to which the loan belongs, indicator for whether the loan has a high risk weight, indicator for if the counterparty is a new customer in the bank, indicator for the counterparty's size (based on the market value of the total property portfolio), the counterparty's share of unsecured loans (from banks), indicators for whether the counterparty belongs to the public sector, and change in the banks' credit losses over time. We also tested the inclusion of a measure of the banks' funding cost calculated as the difference between the bank's collateralised borrowing rate and the swap rate. This does not change the results of the study. ε is an error term.

To analyse whether FI's risk weight floors for CRE loans has impacted the banks' lending to firms with high risk, we estimate the following model:

$$Y_{2bcft} = \alpha_{2bc} + \delta_{2f} + \lambda_{2t} + \beta_2 AG_{bc} * D_{2020} * D_{risk} + \rho' Z_{bcft} + e_{bcfit} \quad (2)$$

Since the number of loans can impact the average loan amount, we have summed all of the firms' loans and estimate the model at the firm level. Y_{2bcft} , in other words, is the logarithm of the firms' total loans. In this model, it is the coefficient β_2 that measures the effect of the risk weight floor on the banks' lending to firms with high risk. D_{risk} is multiplied by $AG_{bc} * D_{2020}$ since we want to analyse whether the amount of the loan to firms with high risk differs in 2020 compared to 2019 in banks that have a relatively larger distance to the floor. The model includes

the same explanatory variables as in equation (1) with the exception of the variables that differ for each individual loan.