

FI Analysis No. 52

Stress test of bank lending to non-financial firms



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Summary

Non-financial firms constitute a significant portion of banks' loan portfolios. Finansinspektionen's (FI) stress test shows that, following a severe macroeconomic shock, vulnerabilities at these firms could lead to significant credit losses at the banks. Even if commercial real estate firms contribute the most to the losses in the stress test, the other industries together account for an almost equally large share. This underlines that the credit risks are not restricted to a single industry.

In this FI Analysis, we describe a stress test method to analyse how vulnerabilities at non-financial firms are linked to banks' credit losses. This method is based on simulations of the firms' income statements, balance sheets, and cash flows.

We estimate the banks' credit losses by first calculating how a change in GDP, inflation, interest rate and asset prices affects the firms' financial position. We then estimate how the change in financial position affects the classification of the firms' bank loans in accordance with the accounting standard IFRS 9. Finally, we calculate how the changed creditworthiness and stage classification affect the size of the banks' credit loss provisions and thus credit losses. We use the results from the stress test to assess the banks' resilience in the event of a macroeconomic shock.

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Firms are important for financial stability

Finansinspektionen (FI) is tasked with promoting a stable financial system. As part of this assignment, FI takes measures to prevent financial imbalances with the aim of safeguarding stability on the credit markets. Finansinspektionen (2019a) describes the work that FI carries out to maintain this stability. This work includes identifying vulnerabilities and assessing the resilience in the financial system in order to assess the need for, and effects of, various measures. Non-financial firms play a key role in financial stability since they represent a significant portion of the banks' lending. Over a period of several years, FI has had an extra focus on and developed its risk and vulnerability analysis of commercial real estate firms.¹ This is because the commercial real estate industry is large and played a central role in previous financial crises. In order to assess the stability risks and their impact, it is important to analyse all non-financial firms, not only commercial real estate firms.

Non-financial firms are inherently different, for example with regards to industry membership. The industries' impact on financial stability differs, in part due their size, indebtedness, cash flow stability, dependence on the business cycle, and degree of interconnection with the financial system.

In this study, we assess the risks in banks' lending to non-financial firms (hereafter referred to as *firms*). In recent years, FI has developed several methods for conducting stress tests (see, for example, Aranki, et al., 2020, and Axelsson et al., 2020). This FI Analysis builds on the micro-based stress test method developed for commercial real estate firms in Aranki et al. (2020), but it expands the scope to include all firms with bank loans, including commercial real estate firms. We also develop the method for calculating firms' financial position during periods of stress. We use the firms' annual reports as a starting point to estimate how vulnerable they are to shocks.² We then calculate potential credit losses for the banks. This analysis is based on detailed information about individual loans in the banks' portfolios and information about each borrower. By combining these sources of information, we can assess the firms' financial position and thus the banks' exposure to vulnerable firms.

¹ See, for example, Finansinspektionen (2019b) for a description of risks and vulnerability on the Swedish commercial real estate market and its link to financial stability.

² The firms' annual reports refer to consolidated financial statements (according to the consolidated accounts). If a firm does not have consolidated accounts and it belongs to a group, we synthetically consolidate the accounts. If the firm does not belong to a group, we used the firm's annual report. Our primary source for this data is Bisnode's database Serrano (see Weidenman, 2016).

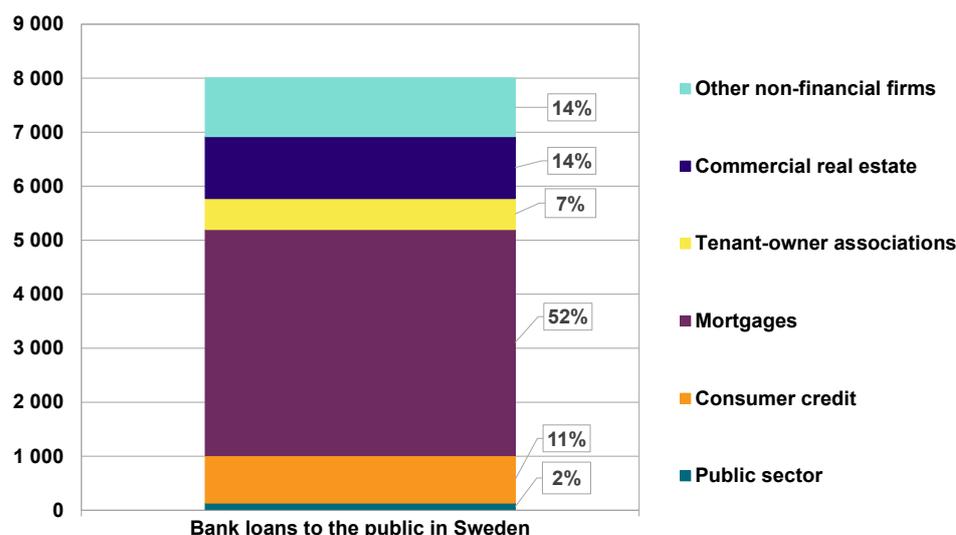
Bank lending to firms is large

FI regularly monitors the loans issued to firms and households as part of its financial stability work.³ Given the banks' concentration in real estate, FI's monitoring has to date focused on the mortgage market and commercial real estate firms.⁴ The Swedish banks lend largely to Swedish households, primarily in the form of mortgages, but their corporate lending is significant (Diagram 1). To this extent, the concentration to commercial real estate firms is high. Around half of the lending to non-financial firms goes to commercial real estate firms.

Although banks' lending to firms is lower than to households, the credit risks in the lending to firms are significantly higher. The household sector has more stable cash flows and a far-reaching payment obligation, which makes debt write-downs unusual. However, firm debt can be written down in the event of bankruptcy, which is more common. Previous crises in Sweden show that the majority of the banks' credit losses have come from their corporate lending.

1. Distribution of Swedish banks' lending

SEK billion



Source: FI and Statistics Sweden.

Note: Swedish banks' lending to the public in Sweden by sector. Total bank lending to the public totalled SEK 8,002 billion in Q2 2025. Consumer credit is calculated as the difference between lending to households and mortgages.

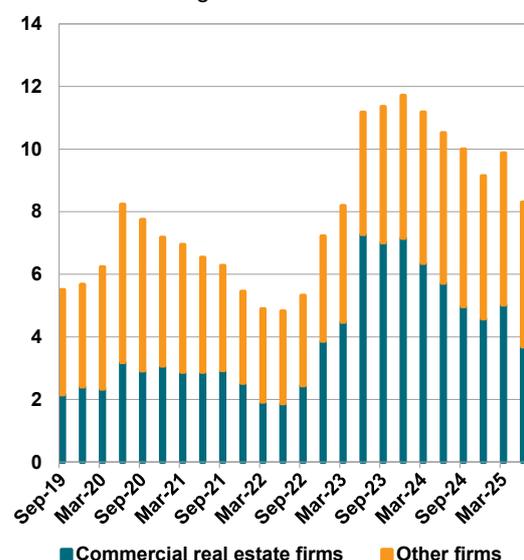
³ FI publishes a stability report twice a year that, among other things, accounts for lending and credit conditions to firms and households (see Finansinspektionen, 2025).

⁴ For example, FI publishes every year a detailed analysis of the development on the Swedish mortgage market (see Finansinspektionen, 2024). FI has also published analyses of the Swedish commercial real estate sector and developed a stress test for banks' lending to commercial real estate firms (see Finansinspektionen, 2019b and Aranki, et al., 2020).

Even if commercial real estate firms constitute the majority of the banks' corporate lending, other firms represent a significant share of the credit risk (Diagram 2). Since 2019, other firms have accounted for the majority of the banks' lending with elevated risk. In addition, they contribute the most to the banks' expected credit losses (Diagram 3). Commercial real estate firms traditionally pledge properties as collateral to the bank for loans, which limits the banks' losses. Bank lending to other firms consists of other, often less value-stable collateral, which means that the losses in the event of default is expected to be higher.⁵

2. Banks' lending with elevated risk

Per cent of lending

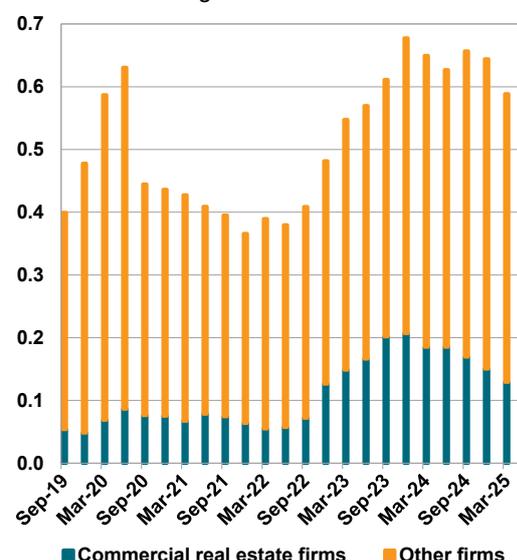


Source: Statistics Sweden.

Note: Refers to the banks' total Swedish exposures to non-financial firms with a significant increase in credit risk (IFRS, stage 2) and in default (IFRS, stage 3), broken down by commercial real estate firms and other firms.

3. Banks' expected credit losses

Per cent of lending



Source: Statistics Sweden.

Note: Refers to the banks' total provisions for expected credit losses for Swedish exposures broken down into commercial real estate firms and other firms.

⁵ The asset pool in the construction, retail, manufacturing and service sectors is in general more specialised and less value-stable than in the commercial real estate sector, where properties constitute the largest assets. Therefore, it is more difficult for the banks to both take suitable collateral when lending to these firms and, in the event of bankruptcy, liquidate the collateral than it is in their lending to commercial real estate firms.

Firms' vulnerability to economic shocks

Macroeconomic shocks have a negative impact on firms. In the event of a shock, the firms' ability to maintain their operations and service their debts deteriorate.⁶ Firms are affected to varying degrees by macroeconomic shocks. Vulnerable firms, for example, could lose their ability to service their debts already after mild shocks, while resilient firms could continue to service their debts even after large shocks. If debt service capacity deteriorates simultaneously for many firms with large bank debt, it may lead to significant credit losses for the banks, which in turn could give rise to financial instability. It is therefore important to analyse the firms' vulnerability (and – the reverse – their resilience) to shocks.

The firms' vulnerability can be analysed based on their operating and financing activities. Operating activities are activities that generate income and costs linked to the business, while financing activities are activities linked to the firms' liabilities and equity. Strong operating profitability usually constitutes the most important source of resilience. However, it is the operating cash flow that determines if the business generates a deficit that needs to be financed through financing activities.

Firms that risk having a large operating deficit could take a number of measures to reduce this deficit. For example, they could improve profitability by cutting operating expenses. They could also negotiate with suppliers for longer payment terms and with customers for shorter payment terms to improve their liquidity. However, during periods of macroeconomic uncertainty, such negotiations can be difficult since both customers and suppliers often face similar challenges. Firms could also defer investments to reduce the deficit in the short term. In addition, they could dispose of assets to strengthen cash, assuming there are buyers. In the longer term, such decisions could decrease revenues and profitability as well as impair competitiveness. Many of these measures therefore generate only temporary resilience – sustainable operating profitability are required in the long run.

Firms must finance their operating deficit to avoid bankruptcy. For indebted firms, it is also important to secure refinancing of existing loans. Firms can primarily cover deficits with liquid assets. They can also strengthen their liquid assets by reducing or deferring dividends paid to shareholders. If liquid assets still are insufficient to cover the deficit, firms need to expand their existing financing through, for example, new bank loans or share issues. However, lenders and investors are only willing to inject money on commercial terms.

⁶ Here, *debt* refers to all payment obligations, including, for example, both accrued wages, accounts payable, and bank loans.

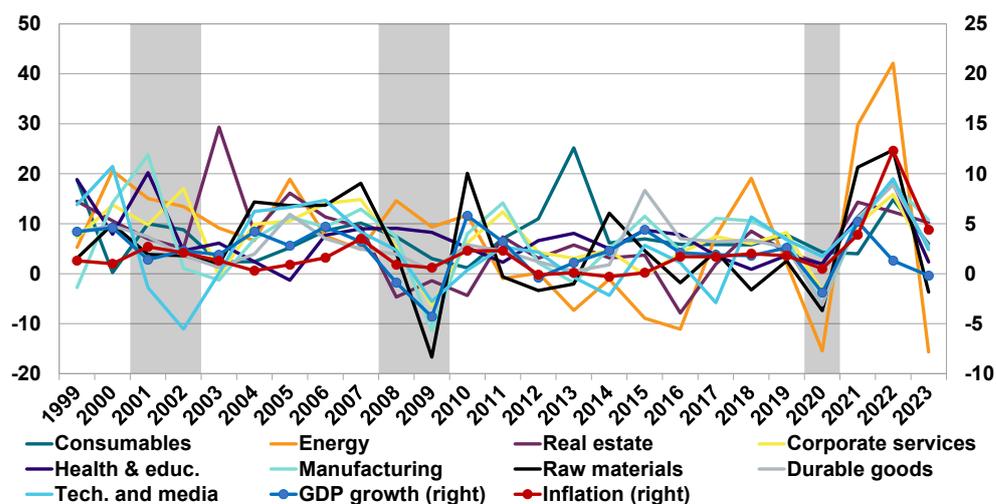
Sensitivity to economic fluctuations and firms' resilience

In general, there is a positive correlation between the economy and firm revenue, but the sensitivity varies, especially between industries. Firms in industries that provide essential goods and services (such as consumables, education and health care) typically face stable demand and are less sensitive to developments in the overall economy. However, industries that export capital-intensive goods and services where prices are set by the global market are more sensitive, for example in the raw materials and manufacturing industries. Macroeconomic shocks are reflected in this relationship, where major economic downturns are mirrored by broad slowdowns in revenue growth across different industries (Diagram 4). For example, the COVID-19 pandemic in 2020 slowed growth in all industries, but the hotel and restaurant industries were hit the hardest. The subsequent period of high inflation is reflected in generally strong growth, but primarily for the energy and raw materials industries. The financial crisis in 2008–2009 caused a decline in global demand reflected in low growth primarily for the export-dependent raw materials and manufacturing industries.

In addition to economic fluctuations, there are industry-specific circumstances that impact industry growth. These can contribute positively through innovations and new trends but also negatively through industry-specific crises. One such crisis that can be mentioned is the IT crisis at the beginning of the 2000s, which caused downturns in the technology and media industries but had a limited impact on the other industries.

4. Economic fluctuations and firms' revenue by industry

Annual growth on comparable basis



Source: Bisnode, FI, Refinitiv and Statistics Sweden.

Note: The diagram shows comparable nominal growth in total revenue per industry together with real GDP and CPI inflation. Industry affiliation is applied primarily using Bisnode's

classification and has been supplemented with information from Refinitiv and Statistics Sweden. Shaded area refers to crisis periods.

Firms with a risk of sharp and unexpected revenue decline constitute a potential vulnerability. The volatility in industry growth, measured as the standard deviation, gives an overall indication of the risk of unexpected fluctuations in revenue in each industry. A high standard deviation reflects a larger deviation from the average growth and thus higher uncertainty. This indicates greater risk of both unexpected upswings and sharp revenue decline. The volatility is in general terms highest in the energy, raw materials, and manufacturing industries. All else equal, firms in these industries thus are subject to a greater risk of revenue decline and weaker profitability following negative shocks.

The effect of declining revenue on operating profit depends on the firm's cost structure. Variable costs decrease as revenue falls, while fixed costs are constant. Firms with a high share of fixed costs are therefore more vulnerable to declining revenues.

Calculation of firms' operating revenue and costs

To analyse the relationship between the firms' operating profit and macroeconomic development, we estimate the following revenue and cost model for each industry:⁷

$$I_{b,t} = \alpha_b^{(1)} gdp_t + \alpha_b^{(2)} inf_t + \varepsilon_{b,t} \quad (1)$$

$$\ln(1 + K_{i,t}) = \beta_b^{(1)} + \beta_b^{(2)} \ln(1 + I_{i,t}) + \beta_b^{(3)} \ln(1 + I_{i,t}) \mathbb{1}[I_{i,t} < 0] + \varepsilon_{i,t} \quad (2)$$

For the revenue model, $I_{b,t}$ is the percentage change in total revenues for industry b and period t . gdp_t is real GDP growth, inf_t is CPI inflation, and $\varepsilon_{b,t}$ is the error term with a constant standard deviation σ_b . For the cost model, $K_{i,t}$ is the percentage change in operating costs (excluding depreciation and amortisation) for firm i and period t .⁸ $I_{i,t}$ is the percentage change in operating revenue, $\mathbb{1}[I_{i,t} < 0]$ is an indicator function that takes the value 1 if $I_{i,t}$ is negative and 0 otherwise, and $\varepsilon_{i,t}$ is the error term.

Based on these two models, we can simulate the effect of economic fluctuations (GDP growth) and inflation on firms' operating profit. We use the revenue model to capture the effect on operating revenues with the estimated coefficients $\hat{\alpha}_b^{(1)}$ and

⁷ In order to exclude the effect of underlying industry growth and only capture the elasticity of the economy under stress, the model has no constant. See Appendix 1 for more details about the estimated models.

⁸ A similar model is found in Calleja et al. (2006).

$\hat{\alpha}_b^{(2)}$. In order to capture negative effects that are not in the revenue model, we use the estimated standard deviation $\hat{\sigma}_b$ when calculating revenue decreases in stress.

With the cost model, we capture the covariation between changes in firms' operating revenues and operating costs. This allows us to simulate firms' ability to reduce their operating costs following a decline in revenues. This cost model captures the share of the firms' variable and fixed costs.

The overall sensitivity of each firm's operating revenues and costs to economic fluctuations and inflation is calculated using the following equations:⁹

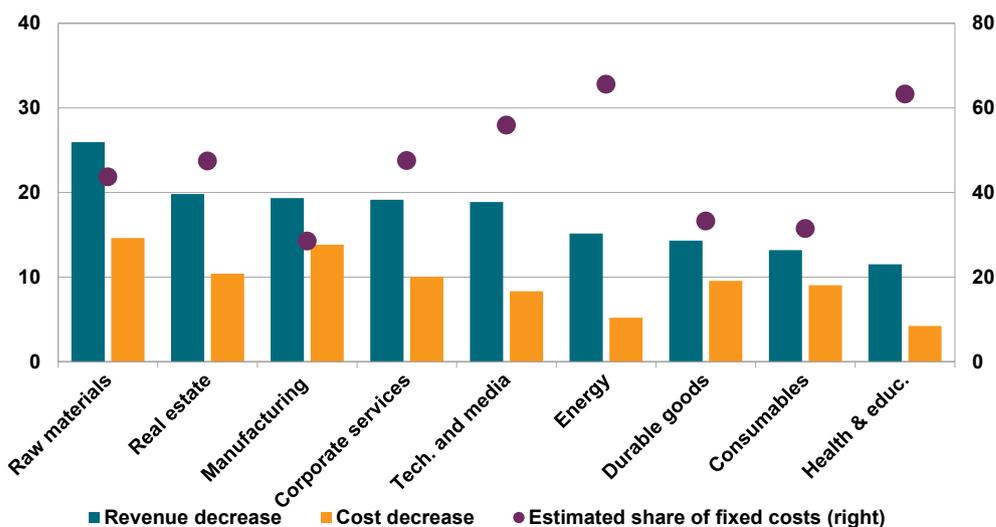
$$\hat{I}_b = \hat{\alpha}_b^{(1)} gdp^{(stress)} + \hat{\alpha}_b^{(2)} inf^{(stress)} - \hat{\sigma}_b \quad (3)$$

$$\hat{K}_b = \exp\left(\hat{\beta}_b^{(1)} + \left(\hat{\beta}_b^{(2)} + \hat{\beta}_b^{(3)}\right) \ln(1 + \hat{I}_b)\right) - 1 \quad (4)$$

Diagram 5 shows an example of how the equations function for firms in different industries given a stress in GDP growth. The raw material industry shows the largest decline in revenues, while the energy, health and education industries are least affected. Firms with the highest share of fixed operating costs are in the energy, health and education industries. This indicates that firms in these industries have more difficulty adapting their costs following a decline in revenues. However, firms in the manufacturing, consumables and durable goods industries have the largest ability to cut back on their costs following a decline in revenues since they have a high share of variable costs.

5. Estimated decline in revenues and costs under stress

Per cent



Source: FI.

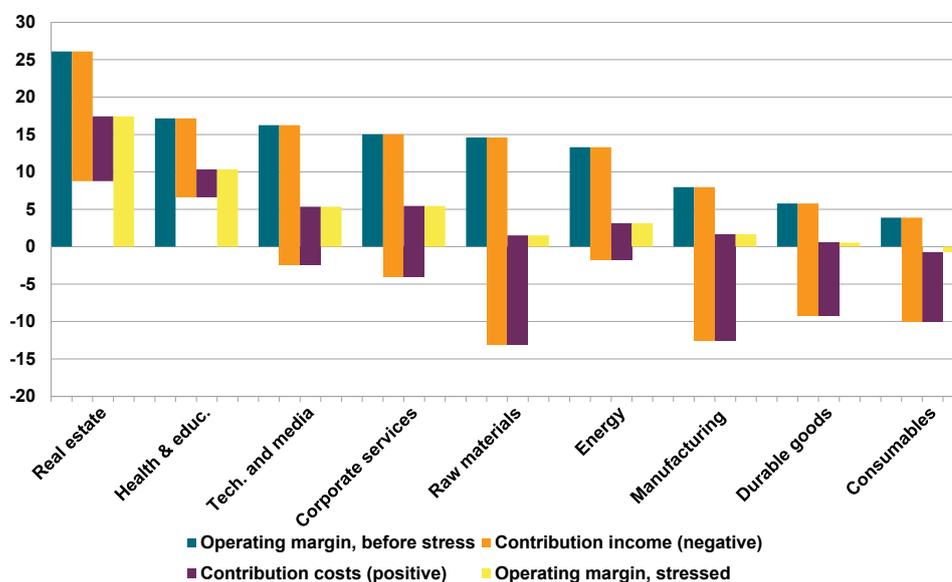
⁹ Equation (4) only applies if \hat{I}_b is negative, which is the case in our stressed scenario.

Note: The diagram shows the estimated reduction in costs and revenues following a 10 per cent decrease in the GDP and inflation of 2 per cent. The estimated share of fixed costs is calculated as the ratio of the cost reduction and the income reduction.

The effect on the firms' profitability is due to the reductions in revenues and costs as well as the operating margin.¹⁰ A reduction in revenues puts pressure on the firms' profitability, while lower costs have the opposite effect (Diagram 6). The operating margin provides a buffer to revenues and cost reductions under stressful conditions. Firms with weak profitability are more vulnerable to shocks and thus run a greater risk of experiencing financial difficulties or failing under stressed conditions. The operating margin gives an indication of the business's resilience.

6. Change in operating margin under stress

Per cent



Source: FI.

Note: The diagram shows an illustration of how the operating margin (before depreciation and amortisation) for the median firm in each industry could be impacted when GDP drops by 10 per cent and inflation is 2 per cent. The operating margin prior to the stress refers to the median for the period 2019–2023.

¹⁰ The operating margin refers to the ratio of operating profit to operating income.

Vulnerable firms and banks' credit losses

The direct link between firms and stability in the banking sector goes via the firms' bank loans.¹¹ Healthy and resilient firms are crucial for financial stability, especially since excessively indebted firms have greater difficulty meeting their debt obligations and thus run a greater risk of default. In addition, large credit losses could impact the banks' possibilities for issuing new loans and therefore in the long term dampen economic growth.

When a borrower defaults on a loan payment, the bank records a loss. The risk for such a default is the credit risk. Banks lend money under the risk that some borrowers cannot fulfil all of their payment obligations. Therefore, some credit losses are expected.¹² The banks compensate for this credit risk through an interest rate margin on lending rates.

Since 1 January 2018, according to the accounting standard IFRS 9, banks must make provisions that correspond to expected credit losses.¹³ In addition, the banks must have enough equity to withstand a major macroeconomic shock (see EU, 2013a, 2013b). This capital should cover unexpected credit losses that could arise under stressed conditions. Through sufficient capitalisation, banks maintain their resilience following a shock.

Expected credit losses reflect credit risk

According to IFRS 9, banks should base their credit loss provisions on forward-looking calculations of expected credit losses (*ECL*).¹⁴ *ECL* can be calculated using the following equation,

$$ECL = EAD \times PD \times LGD \quad (5)$$

where the factors

¹¹ See also Aranki et al. (2021) for a description of non-financial firms and financial stability. Basel Committee on Banking Supervision (2011) reviews the literature on the various channels between the financial sector and the real economy.

¹² In order to limit credit losses, the bank may require collateral when the loan is issued, for example in the form of a property.

¹³ This means that banks already in advance charge their profit with a cost since they assume that a certain percentage of their lending will not be repaid in full (see IASB, 2014 for more information on IFRS 9).

¹⁴ In the previous standard (IAS 39), banks made a provision first when there was clear evidence that losses would arise.

- **EAD (Exposure at Default)** is the sum of outstanding loans and off-balance sheet exposures (such as unutilised credit facilities) to the extent they are considered to be risky.
- **PD (Probability of Default)** is the exposure's probability of default, which is determined by the borrower's ability to pay their debts.
- **LGD (Loss Given Default)** is the share of the exposure that is expected to be lost in the event of a default and is impacted by, among other things, pledged collateral.

Following a macroeconomic shock, both *PD* and *LGD* tend to increase, as deteriorating debt-servicing capacity raises the probability of default, and a strained economy puts pressure on asset values, thereby lowering the recovery rates.

IFRS 9 requires that loans are classified into three stages, for which the main rules are¹⁵

1. **Stage 1:** Bank loans for which the credit risk has not increased significantly since the loans were issued. The provision should be calculated using expected credit losses in the coming 12 months.
2. **Stage 2:** Bank loans for which the credit risk has increased significantly since the loans were issued. The provision should be calculated using expected credit losses over the remaining maturity.
3. **Stage 3:** Bank loans in default.¹⁶ The provision should be calculated using the expected credit loss over the remaining maturity.

This three-stage classification allows credit loss provisions to be broken down and analysed stage by stage. The model creates a threshold effect between Stage 1 and the other two stages since the calculation horizon for expected credit losses is longer and the credit risk as a rule is higher in the later stages. The threshold effect is clearly visible in the provision ratio, which constitutes an overall measure of credit risk and can be expressed as (compare equation 5)

$$\frac{ECL}{EAD} = PD \times LGD. \quad (6)$$

IFRS 9 gives some guidance for how to estimate expected credit losses. These estimates should be probability-weighted, unbiased, and consider the time value of money (the part of the interest rate that only provides compensation for the passing of time). They should also be based on relevant information about historic events, current conditions, and forecasts about future economic conditions. In order to determine if there has been a *significant increase in credit risk*, the banks, as part

¹⁵ These are only the main rules. IFRS 9 specifies a number of exemptions, for example that loans with low *PD* may continue to be classified as Stage 1 even though *PD* has increased significantly and that the 30-day delay for Stage 3 is only a presumption.

¹⁶ Default refers to contractual payments that are more than 30 days late.

of this assessment, should compare the current estimate of *PD* with *PD* at the time the loan was issued. But IFRS 9 still gives the banks considerable manoeuvrability in its assessment of *PD*, *LGD* and the stage classification.

Empirical model of the banks' stage classification

There is extensive academic literature analysing empirical models for credit risk.¹⁷ We use this research as a basis to estimate the probability of how banks classify loans at different stages using a predictive model.

$$p(\text{Stage}_{i,t} = k) = F(X_{i,t}) \text{ for } k = 1, 2, 3 \quad (7)$$

where $p(\text{Stage}_{i,t} = k)$ is the probability that a firm's loans are classified in Stage k , and $F(\dots)$ represents a function that gives a good prediction of the stage classification, particularly for the higher stages.¹⁸ $X_{i,t}$ is a vector of the following explanatory variables (which vary between firm i and year t):

- *Profitability* _{i,t} = profit for the year divided by total assets
- *Leverage* _{i,t} = total liabilities divided by total assets
- *Debt servicing capacity* _{i,t} = operating profit before depreciation and amortisation divided by total liabilities
- *Size* _{i,t} = logarithm of total assets
- *Bankruptcy* _{$i,t-1$} = number of bankruptcies in the group the previous year
- *Stage* _{$i,t-1$} ^(k) = indicator for stage k in the previous year (where $k = 1, 2$ or 3)
- *Industry* _{i} = categorical variable that indicates industry affiliation

Research has shown that these variables are important for empirical estimates of *PD* and *LGD*.

Profitability reflects the firm's ability to cover its costs and how much surplus can be used for reinvestment or dividends. The most critical threshold for this variable is between profit and loss.

¹⁷ A classic model for estimation of *PD* is Altman's Z (see Altman, 1968). Altman's Z was developed for listed manufacturing firms in the USA. Later research has identified models adapted to both private and public firms and in multiple geographies (see Beaver et al., 2005; 2018; and 2023). The research on *LGD* is somewhat younger than the research on *PD*. An important conclusion is that *LGD* tends to go up during economic downturns since the share of bankruptcies is high (see Altman et al., 2004).

¹⁸ Note that the model classifies all of each firm's loans in only one stage. When we estimated the model, we only included firms that have more than 90 per cent of their loans in a specific stage, and these were classified in corresponding stages. See Appendix 2 for more details about the model and the estimation.

Leverage measures the extent to which the firm's assets are financed by liabilities. The leverage ratio increases, for example, when the firm takes new loans, records losses, or pays dividends.

Debt servicing capacity captures the business's ability to pay interest and amortisation. A negative value for this variable indicates that the business is operating at a loss.

Size has empirically proven itself to be strongly correlated with bankruptcy risk. Smaller firms in general have a higher probability of failing than larger firms.

Bankruptcy_{t-1} gives the number of firms in the group that entered into bankruptcy in the previous period.

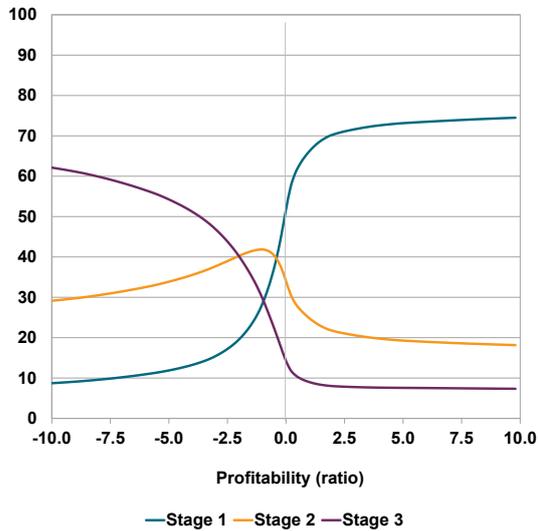
Stage_{t-1} gives the previous year's stage classification. These variables are included to capture firm-specific features that are not captured by the accounting variables.

Industry is an indicator for each industry that is multiplied with the other variables to capture systematic differences between industries that could impact the firms' step classification.

Diagrams 7–10 illustrate how the probability of an average firm being classified as Stage 1, 2 or 3 varies depending on the values of the explanatory variables. Firms with the lowest creditworthiness as a rule have low profitability, high leverage and low debt servicing capacity and are small. The results align qualitatively with previous studies that use linear models (see, for example, Beaver et al., 2005; 2018; and 2023). However, unlike with linear models, we identify specific intervals where small changes in an explanatory variable generate large effects on the classification probabilities. For profitability and debt servicing capacity, these thresholds are close to zero.

7. Profitability

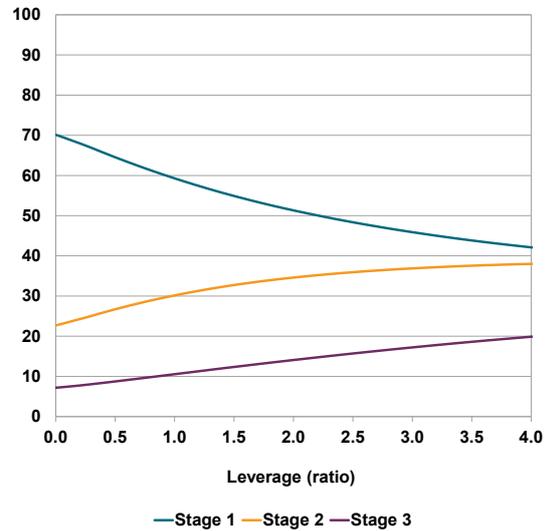
Probability in per cent



Source: FI.
Note: The diagram shows the estimated probabilities for classification to Stages 1, 2 and 3 for given values on the X axis, and other variables are held constant at their average values.

8. Leverage

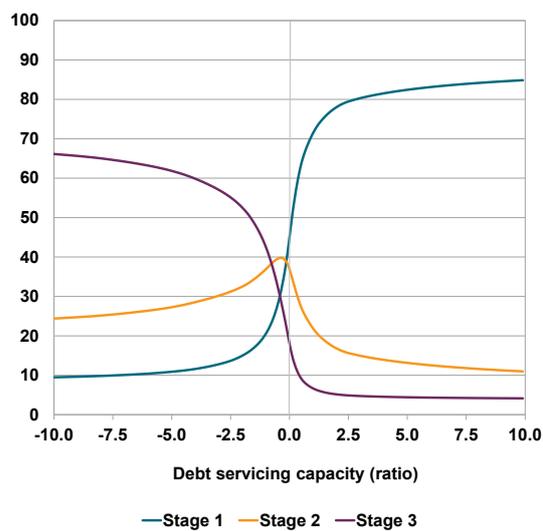
Probability in per cent



Source: FI.
Note: See the note to Diagram 7.

9. Debt servicing capacity

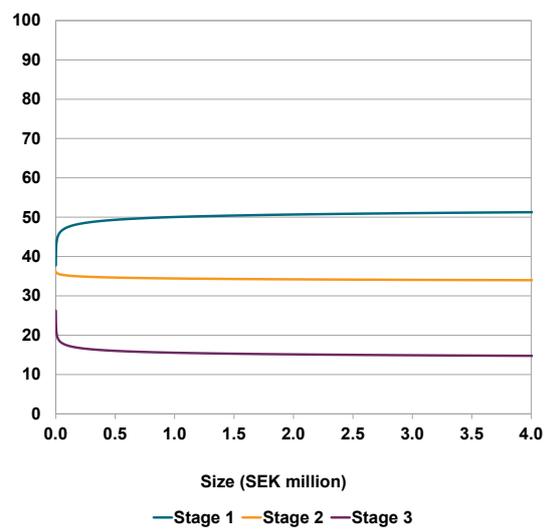
Probability in per cent



Source: FI.
Note: See the note to Diagram 7.

10. Size

Probability in per cent



Source: FI.
Note: See the note to Diagram 7.

Stress tests of firms

In order to estimate the banks' credit losses associated with corporate lending, we conduct a stress test based on a negative macroeconomic scenario. The scenario entails changes to GDP, inflation, interest rates and asset prices. We assume that GDP falls by 10 per cent, inflation is 2 per cent, firms face rising interest costs of 3 percentage points, and asset prices (including property values) fall by 20 per cent. Based on these assumptions, we estimate the firms' financial position.

The calculations are based on firms' income statements, balance sheets, and cash flows. We consider all liabilities; in other words, we consider both interest-bearing liabilities such as bank loans and bonds and non-interest-bearing liabilities such as accounts payable and accrued wages. This approach makes it possible to estimate the firms' financing needs and payment ability under stress as well as their potential impact on the banks' credit risks.

Firms' financial position under stress

To calculate how firms' financial position changes under stress, we start with the estimated revenue and cost sensitivities (described in equations 3 and 4, respectively). Using these sensitivities, we simulate how a macroeconomic shock impacts the firms' operating profit (excluding depreciation and amortisation). We also consider the effects of interest income, interest expenses, and tax expenses, which also impact earnings. In the following section, we account only for the main relationships and assumptions in our calculations.¹⁹

When revenues and profits decline firms' working capital changes. As a rule, firms with positive working capital (net assets) improve their cash flow, while firms with negative working capital (net liability) tend to increase their deficit (negative cash flow). To meet ongoing payments, the firms need liquidity, particularly in stressed situations where the risk of liquidity deficiency increases. We therefore assume that all firms must hold a minimum level of cash to avoid bankruptcy during periods of stress. This minimum level is based on the size of each firm's operating revenues and costs.

A firm's management has a certain degree of flexibility to mitigate the effects of falling revenues and profits. For example, management could decide not to pay dividends, which we assume that all firms do during period of stress. Management could also delay or refrain from making investments. We assume that investments are only made if existing cash covers the payments for investments. Firms might also need to sell assets to free up liquidity. Because such sales require willing

¹⁹ See Appendix 3 for a more detailed description.

buyers, which can be difficult to find during periods of stress, we assume that there are no asset sales.

Firms that run deficits during periods of stress need external financing. We assume that firms primarily utilise existing loan commitments to raise new bank loans. If the need for financing remains, we assume that the owners inject capital into firms with good creditworthiness – although only up to a certain level.²⁰ Firms that the classification model predicts to be in Stage 1 thus receive capital injections if the need is not excessively large. These firms avoid bankruptcy but move to Stage 2 (elevated credit risk). Other firms that continue to have capital needs are assumed to go bankrupt.

Banks' credit losses under stress

Banks' credit losses are determined by changes in borrowers' creditworthiness. During periods of stress, creditworthiness deteriorates, which leads to higher expected credit losses. This is reflected in higher credit loss provisions. Credit losses during periods of stress are thus dependent on the amount by which the banks need to increase their provisions. We analyse this by first classifying all firms' loans into different credit risk stages and then applying the provision ratios for each stage.²¹

We apply the empirical classification model (see equation 7) when assigning the firms' bank loans to a stage classification. Given a negative economic scenario, we update the firms' income statement, balance sheet and cash flows and calculate the following variables: *profitability*, *leverage*, *debt servicing capacity* and *size* (according to the above description). Based on these key ratios and the starting values for *bankruptcy* and *stage*, the model estimates the probability that a firm's loans belong to each respective stage. We assume that all loans for a borrower are assigned to the stage with the highest estimated probability. However, we make special assumptions and deviate from the classification model for firms with a deficit that do not receive external financing.

When we calculate the provisions, we use the banks' initial provision rates broken down by stage and industry (Table 1). Since these rates probably underestimate the levels in a stressed situation, we use the provision rates for the 25 per cent with the highest provisions (75th percentile) as a lower limit.²² Given a bankruptcy, we

²⁰ The banks' loan commitments vary between firms, but on average they are at 0.8–0.11 per cent of the assets among those that have such commitments. We assume that the owners match these levels. If the capital need exceeds these percentages (which vary by industry), we assume that the need is too large for the owners to cover.

²¹ The provision rate measures how large the credit loss provision is in relation to the size of the loan (see also equation 6).

²² In a stressed situation, it is reasonable for the provision rates to increase as a result of higher *PD* and *LGD* (compare equation 6).

assume a provision rate of at least 50 per cent.²³ This means that provisions are made for all firms' bank loans. The banks' total provisions during periods of stress are then calculated by multiplying each provision rate (that varies between step and industry) by each loan (which varies by stage, industry and firm).

Tabell 1. Lowest provision rates for each stage by industry

Per cent

	Stage 1	Stage 2	Stage 3
Consumables	0.3	3.8	34.8
Energy	0.2	2.5	76.8
Real estate	0.1	1.8	30.0
Corporate services & other	0.1	3.2	35.6
Health and education	0.1	4.0	33.9
Manufacturing	0.2	2.6	31.4
Raw materials	0.2	2.4	32.1
Durable goods	0.2	3.9	38.0
Technology and media	0.1	4.0	54.3

Source: FI

Note: The table shows the lowest provision rates that are applied to loans in each stage broken down by industry. They represent the 75th percentiles of the banks' provision rates during the years 2019–2023. For firms that enter into bankruptcy, we assume a provision rate of at least 50 per cent.

Therefore, it is the classification model, together with assumptions on bankruptcy, which determines how the credit risk is distributed in the banks' lending portfolio during periods of stress. This, combined with the provision rates, forms the basis for the estimated credit losses.

There are large differences in the estimated credit losses, in part due to assumptions about bankruptcy (Diagram 11).²⁴ In the stressed scenario, we assume that all firms with capital deficit can use existing loan commitments. This leads to an increase in bank loans of approximately 2.1 per cent. Under the assumption that all firms that then have a remaining capital need receive owner contributions that cover the entire need, the credit losses are 1.3 per cent. This corresponds to SEK 28 billion. This is probably an overestimation of the capital contributions since it is improbable that owners cover the entire capital need for all firms. Under this assumption, owners need to contribute a total of around SEK 173 billion, which corresponds to just over 8 per cent of the banks' corporate lending. The total

²³ Given a bankruptcy, we assume the firms are liquidated. Therefore, the banks' loss share is higher than the corresponding provision rate in Stage 3.

²⁴ In Appendix 4, we show the distribution of bank loans and calculated credit losses during periods of stress broken down by industry given different assumptions about capital contributions and calculations in different scenarios.

contribution from banks and owners thus amounts to around SEK 215 billion or 11 per cent of lending.

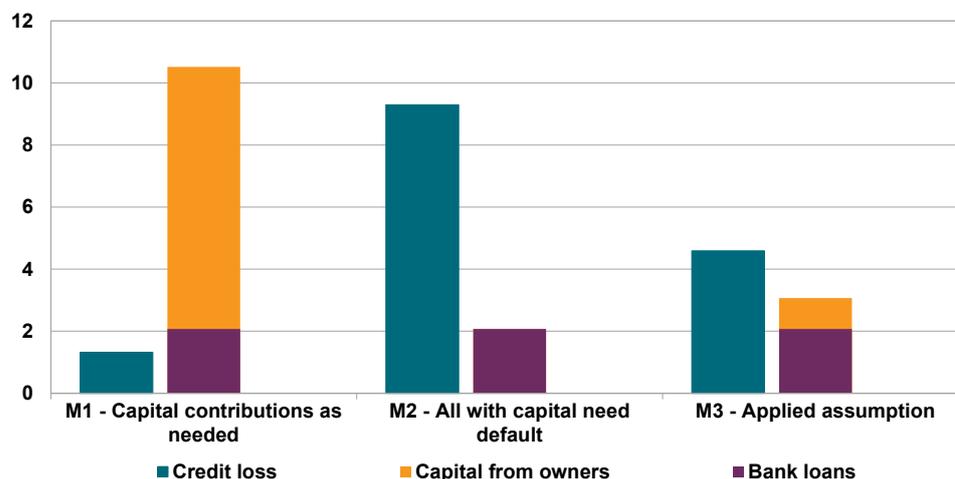
If we instead assume that owners do not contribute any capital and that all firms with a capital need fail after having utilised their credit facilities, credit losses are 9.3 per cent. This is probably an underestimation of the capital contributions since it is reasonable to assume that owners contribute capital to some extent – at least for more solvent firms – and that not all firms with a capital need fail. However, it is difficult to know exactly how owners will act under stress.

Our method to calculate credit losses during periods of stress does not assume that all firms with a capital need enter into bankruptcy. Instead, we assume that firms that have a capital need but have good creditworthiness, i.e., firms that according to the classification model have a high probability of being assigned to Stage 1, receive capital contributions from owners as long as the need is limited in size. These firms thus avoid bankruptcy but are reassigned to Stage 2 (elevated credit risk). Other firms that still have a capital need are entered into bankruptcy.

Under this assumption, the total capital contribution from banks and owners amounts to around SEK 63 billion, of which one-third come from the owners. Despite this, the credit losses are calculated at 4.6 per cent, which corresponds to almost SEK 96 billion.

11. Credit losses and capital contributions in FI's stress test

Per cent of lending



Source: FI.

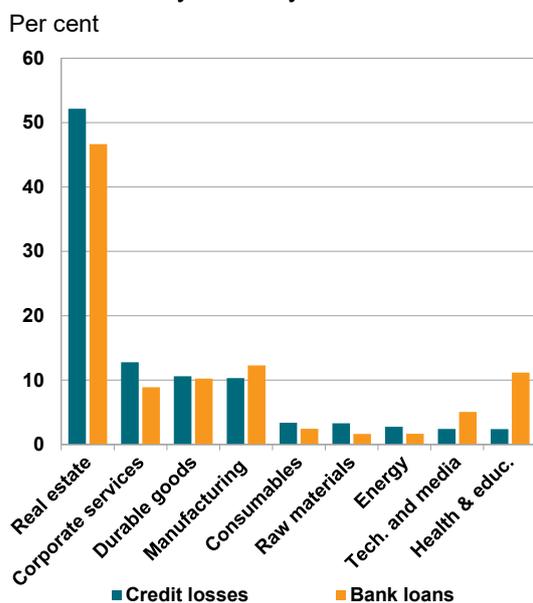
Note: Credit losses as a share of lending calculated using lending after a shock, i.e., we assume that bank loans increase by 2.1 per cent. Capital contributions from owners and increased bank loans are calculated as a share of the original lending. M1 refers to calculations under the assumption that all firms that experience a capital need during periods of stress (operational deficit) receive capital contributions. M2 refers to estimates assuming that all firms that experience a capital need during periods of stress enter into

bankruptcy. M3 refers to FI's applied assumption, where owners contribute capital to solvent firms, but these end up in Stage 2.

Our assumption that solvent firms that have capital needs do not fail but rather are assigned to Stage 2, decrease the estimated credit losses by almost SEK 100 billion. This indicates that owner contributions, which prevent healthy firms from failing due to temporary liquidity problems, could have clearly positive effects on financial stability.

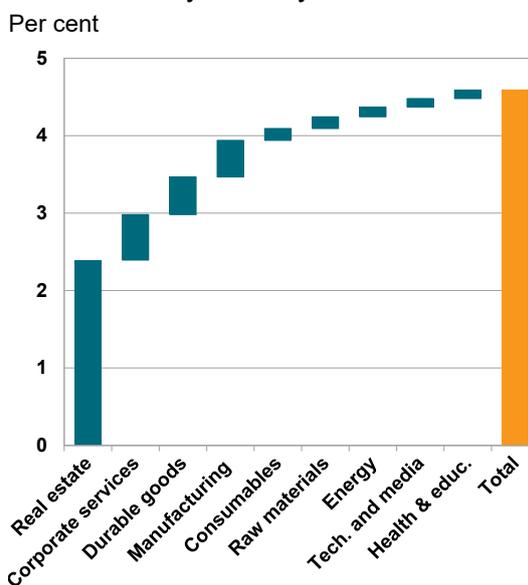
Our calculations show that commercial real estate firms account for more than half of the total credit losses from non-financial firms (Diagrams 12 and 13), which corresponds to almost SEK 50 billion.²⁵ This is also the industry that has the largest share of the banks' lending. The credit losses largely follow the distribution of the lending between industries, which indicates that the risks in general are proportionate to the banks' exposures. The commercial real estate industry and corporate services, however, deviate by contributing a larger share of the losses than what is justified by their share of the loans, which indicates higher sensitivity in these industries during periods of stress. Within health and education, however, the estimated credit losses are small in relation to lending. This reflects that the industry is more resilient.

12. Credit losses in FI's stress test and bank loans by industry



Source: FI.

13. Credit losses in FI's stress test and contribution by industry



Source: FI.

²⁵ This aligns with the credit losses that arise when we perform a similar scenario but apply FI's micro-based stress test method that is described in Aranki et al. 2020. See, for example, Finansinspektionen (2024) for a similar stress test of the banks' lending to commercial real estate firms.

Note: Credit losses refer to each industry's share of the total credit losses, and bank loans refer to each industry's share of the banks' total corporate lending.

Note: The loss contribution refers to losses from each industry in relation to the banks' total lending.

The commercial real estate industry accounts for the individually largest share of the calculated credit losses in the stress test. Other industries contribute together to almost half of the total losses, and their contributions are relatively evenly distributed between industries. This indicates that the credit risks in a stressed scenario, with the exception of the commercial real estate sector, are not concentrated to a single industry but rather are spread across large areas of the business sector. Overall, this shows that the commercial real estate sector constitutes a key driver behind the credit risks in the banks' loan portfolios at the same time as other industries together also make a significant contribution.

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Appendix 1

Operating revenues

Table A1 shows the estimated coefficients and standard deviation for the residuals in the revenue model (equation 1). The residuals are the difference of the observed and the predicted values. The coefficients give an indication of how sensitive revenue growth is to changes in GDP and inflation, while the standard deviation for the residuals measures the part of the volatility in revenue growth that cannot be explained by the model – for example the industry-specific risk.

Table A1. Estimated coefficients income model

	GDP growth	Inflation	Standard deviation residuals (Stddev)
Consumables	0.94*	1.33**	6.5
Energy	0.98	2.82***	11.0
Real estate	1.46**	1.13*	7.4
Corporate services	1.74***	1.29***	4.3
Health and education	0.91**	1.58***	5.6
Manufacturing	1.65***	1.57***	6.0
Raw materials	2.25***	1.21**	5.9
Durable goods	1.32***	1.24***	3.6
Technology and media	1.41**	1.08**	6.9

Source: FI.

Note: *, **, *** indicate that the estimate is statistically different than zero at 10, 5 and 1 per cent. The table shows the coefficients from linear regressions of each industries' (nominal) income growth on real GDP growth and CPI inflation for the period 1999–2023. Standard deviation residuals show the volatility in the industry-specific factors that are not captured by the economic variables in each model.

Operating costs

Table A2 shows the estimated coefficients for the cost model. The coefficients indicate how sensitive cost growth is to changes in revenues. The model is asymmetrical, which means that the effect of an increase in revenues is not necessarily the same as the effect of a corresponding decrease.

Table A2. Estimated coefficients for the cost model

	Constant	Revenue growth	Interaction with loss of revenues
Consumables	0.00	0.80***	-0.14***
Energy	0.03***	0.57***	-0.05***
Real estate	0.01***	0.66***	-0.13***
Corporate services	0.00***	0.76***	-0.25***
Health and education	0.01***	0.70***	-0.23***
Manufacturing	-0.01***	0.86***	-0.22***
Raw materials	0.00	0.69***	-0.16***
Durable goods	-0.01***	0.78***	-0.17***
Technology and media	0.02***	0.72***	-0.22***

Source: FI

Note: *, **, *** indicate that the estimate is statistically different than zero at 10, 5 and 1 per cent. The table shows the coefficients from linear regressions of each industry's (nominal) cost growth on revenue growth and interaction with loss of revenues for the period 2019–2023.

Appendix 2 – Stage classification model

The crucial factor in banks' stage classification according to IFRS 9 is whether the credit risk has increased compared to the risk at the time the loan was issued.

Several studies show that non-linear machine-learning models often give more accurate predictions of credit risk than linear models (see, for example, Altman et al. 2017 and Beaver et al., 2018). Among these, artificial neural networks have shown particularly good ability to capture non-linear correlation (see LeCun et al., 2015).²⁶ Given this background, we use an artificial neural network to estimate an empirical model for the banks' stage classification.

There are several challenges to estimating an empirical model for stage classification that can be used in a stress test. One such problem is that an overwhelming majority of the observations belong to Stage 1, while only a small portion belong to Stage 3.²⁷ In addition, our observations of all Swedish firms with loans in Swedish banks during the period 2019–2023 are based on relatively stable economic times, while the simulated scenario we are analysing refers to significantly more stressed conditions. We use weights when we estimate the stage classification model to manage these challenges. Here, observations for Stages 2 and 3 are allocated a significantly higher weight than observations from Stage 1.

We use the following weights: for Stage 1, the weight is 1; for Stage 2, the weight is 5; and for Stage 3, the weight is 30. As a result, the model estimates higher shares in Stage 2 and Stage 3.

To capture differences in the dynamics between industries, we multiply every explanatory variable by an indicator variable for each industry. Our eight explanatory variables result in a total of 80 input variables in the model.²⁸ In addition, we transform the variables to manage outliers. The artificial neural network that we use consists of a total of five layers (three hidden layers, one input layer, and one output layer). The dimensions of the hidden layers are 40, 20 and 10. We train the model on 50 epochs with a batch size of 1,024 and a learning speed of 0.0001.

Tables A3 and A4 shows a comparative evaluation of the performance of the neural network and a logistic regression. The logistic regression predicts basically all firms to be Stage 1, which means it is not suitable for using in a stressed

²⁶ *Artificial neural network or deep learning.*

²⁷ Within the method literature, this is referred to as the *class imbalance* problem.

²⁸ Our eight explanatory variables are: *profitability, leverage, debt servicing capacity, size, number of bankruptcies in the group the previous year, share in Stage 1 the previous year, share in Stage 2 the previous year, share in Stage 3 the previous year.*

scenario. The neural network predicts higher shares in Stage 2 and Stage 3 than the outcome. In addition, the neural network predicts a higher share correct for Stage 1.

Table A3. Prediction performance of neural networks

Per cent

Number

		Stage			Outcome
		1	2	3	
Stage	1	79.6	7.9	1.3	88.8
	2	5.6	3.4	1.3	10.3
	3	0.2	0.2	0.4	0.8
Prediction		85.4	11.6	3.0	100.0
Percentage correct		93.2	29.8	13.6	

Loan volume

		Stage			Outcome
		1	2	3	
Stage	1	93.9	2.7	0.4	97.1
	2	1.6	0.9	0.2	2.6
	3	0.1	0.1	0.2	0.4
Prediction		95.6	3.7	0.8	100.0
Percentage correct		98.3	23.6	26.0	

Source: FI.

Note: The neural network is estimated using 70 per cent of the entire database, 2019–2023, (randomly) and evaluated using the remaining 30 per cent.

Table A4. Prediction performance of logistic regression

Per cent

Number

		Stage			Outcome
		1	2	3	
Stage	1	88.8	0.0	0.0	88.8
	2	10.3	0.0	0.0	10.3
	3	0.8	0.0	0.0	0.8
Prediction		100.0	0.0	0.0	100.0
Percentage correct		88.8	0.0	0.0	

Loan volume

		Stage			Outcome
		1	2	3	
Stage	1	97.1	0.0	0.0	97.1
	2	2.6	0.0	0.0	2.6
	3	0.4	0.0	0.0	0.4
Prediction		100.0	0.0	0.0	100.0
Percentage correct		97.1	0.0	0.0	

Source: FI.

Note: The logistic regression model is estimated using 70 per cent of the entire database, 2019–2023, (randomly) and evaluated using the remaining 30 per cent. The explanatory variables in the model are the same as for the neural network, but the industry is included as dummy variables instead of interaction variables. The explanatory variables are standardised.

Appendix 3 – Assumption to calculate financial position during periods of stress

Table A5. Income Statement

Row	Variable	Assumption
PL1	Operating revenues	Changes according to estimated sensitivities, from equation 3
PL2	Operating costs	Changes according to estimated sensitivities, from equation 4
PL3	Depreciation and amortisation	Historical rate of depreciation and amortisation multiplied by fixed assets
PL4	Operating profit	$= RR1 + RR2 + RR3$
PL5	Interest income	STIBOR at the end of the period multiplied by cash and financial assets
PL6	Interest expenses	Changes with the scenario
PL7	Profit/loss before tax	$= RR4 + RR5 + RR6$
PL8	Tax expense	22% of the profit before tax ($RR7$) if the profit is positive, otherwise the tax is zero
PL9	Net profit/loss for the year	$= RR7 + RR8$

Note: Income is positive, and costs are negative.

Table A6. Balance Sheet: Assets

Row	Variable	Assumption
BS1	Property values	Changes with scenario. Only applies to commercial real estate firms
BS2	Financial fixed assets	Changes with scenario
BS3	Other fixed assets	Previous periods' value that decreases with depreciation ($RR3$) and increases with investments ($KF2$)
BS4	Current assets	Change in proportion to operating revenues ($RR1$)
BS5	Cash	Previous periods' value that increases or decreases with the period's cash flow ($KF9$). The minimum level is set at 0.5% of the sum of the absolute value of the operating income ($RR1$) and the absolute value of the operating expenses ($RR2$)
BS6	Total assets	$= BR1 + BR2 + BR3 + BR4 + BR5$

Table B7. Balance Sheet: Equity and liabilities

Row	Variable	Assumption
BS7	Equity	Previous periods' value that decreases with dividends (<i>KF4</i>) and increases with shareholder contributions (<i>KF6</i>) and the profit/loss for the year (<i>RR9</i>).
BS8	Financial liability	Previous periods' value that increases with new financial liability (<i>KF5</i>).
BS9	Operating liabilities	Change in proportion to operating expenses (<i>RR2</i>).

Table A8. Cash Flow Statement

Row	Variable	Assumption
CF1	Operating cash flow	Operating profit less depreciation and amortisation (<i>RR4</i> – <i>RR3</i>) minus the change in net current assets (<i>BR4</i> – <i>BR9</i>) minus the tax expense (<i>RR8</i>).
CF2	Investments	Investments are assumed to be as large as amortisation (<i>RR3</i>) given that there is cash (<i>BR5</i>) that exceeds the minimum level. Otherwise, the investments amount to the surplus in cash.
CF3	Operating surplus or operating deficit	= <i>KF1</i> + <i>KF2</i>
CF4	Dividend	Dividend for all firms is set at zero.
CF5	New financial liability	If there is a risk that the firm's cash (<i>BR5</i>) will fall below the minimum level, the firms take new bank loans within the framework of the existing loan commitment.
CF6	Shareholder contributions	If there is a risk that the firm's cash (<i>BR5</i>) will fall below the minimum level despite a new financial liability (<i>KF5</i>), the firm takes in funds from shareholders through new issues up to a certain limit. If the financing need exceeds the limit, the firm is entered into bankruptcy.
CF7	Other financial cash flows	Total of interest income (<i>RR5</i>) and interest expense (<i>RR6</i>).
CF8	Cash flow from financing	= <i>KF4</i> + <i>KF5</i> + <i>KF6</i> + <i>KF7</i>
CF9	Cash flow for the period	= <i>KF3</i> + <i>KF8</i>

Note: Investments and dividends are negative.

Appendix 4

Table A9. Distribution of bank loans and estimated credit losses during periods of stress

		Bank loans	Stage 1	Stage 2	Stage 3	Credit losses		
		(SEK bn)	(%)	(%)	(%)	(SEK bn)	(%)	(Contr., pp)
Baseline	Consumables	49.5	89.4	9.7	0.9	0.1	0.2	0.0
	Energy	34.1	94.4	3.7	2.0	0.1	0.2	0.0
	Real estate	954.3	87.9	11.5	0.6	1.2	0.1	0.1
	Corp. services	181.6	87.5	11.0	1.5	0.5	0.3	0.0
	Health & educ.	228.4	98.2	1.7	0.1	0.0	0.0	0.0
	Manufacturing	251.3	90.7	8.9	0.4	0.0	0.0	0.0
	Raw materials	33.2	93.4	6.2	0.3	0.1	0.2	0.0
	Durable goods	209.0	83.5	12.5	4.0	1.5	0.7	0.1
	Tech. & media	103.2	87.1	11.9	1.0	0.3	0.3	0.0
	Total	2,044.6	89.1	9.9	1.0	3.8	0.2	0.2
M1	Consumables	51.2	85.0	6.0	9.0	1.7	3.4	0.1
	Energy	38.2	84.9	9.4	5.6	1.3	3.3	0.1
	Real estate	971.8	88.5	10.2	1.3	6.5	0.7	0.3
	Corp. services	187.5	83.9	9.0	7.1	5.2	2.8	0.2
	Health & educ.	229.1	98.1	1.4	0.5	0.7	0.3	0.0
	Manufacturing	255.7	87.0	8.5	4.5	4.7	1.8	0.2
	Raw materials	35.1	92.6	2.2	5.2	0.8	2.3	0.0
	Durable goods	212.4	78.8	13.9	7.2	5.8	2.7	0.3
	Tech. & media	106.0	94.9	2.4	2.8	1.0	0.9	0.0
	Total	2,086.9	88.2	8.7	3.1	27.6	1.3	1.3
M2	Consumables	51.2	81.5	1.8	16.8	3.6	7.1	0.2
	Energy	38.2	81.4	4.9	13.7	3.6	9.4	0.2
	Real estate	971.8	71.9	4.9	23.2	111.7	11.5	5.4
	Corp. services	187.5	56.0	4.8	39.2	34.7	18.5	1.7
	Health & educ.	229.1	96.2	1.1	2.8	3.2	1.4	0.2
	Manufacturing	255.7	82.3	4.9	12.8	15.0	5.9	0.7
	Raw materials	35.1	76.8	1.2	21.9	3.7	10.5	0.2
	Durable goods	212.4	76.0	9.6	14.3	12.9	6.1	0.6
	Tech. & media	106.0	87.1	1.9	11.0	5.7	5.3	0.3
	Total	2,086.9	76.1	4.7	19.2	194.0	9.3	9.3
M3	Consumables	51.2	81.5	3.6	15.0	3.2	6.3	0.2
	Energy	38.2	81.4	8.3	10.3	2.6	6.9	0.1
	Real estate	971.8	71.9	18.1	10.0	49.9	5.1	2.4
	Corp. services	187.5	56.0	30.4	13.5	12.2	6.5	0.6
	Health & educ.	229.1	96.2	2.4	1.4	2.3	1.0	0.1
	Manufacturing	255.7	82.3	9.2	8.5	9.9	3.9	0.5
	Raw materials	35.1	76.8	4.8	18.3	3.1	8.9	0.2
	Durable goods	212.4	76.0	12.4	11.5	10.1	4.8	0.5
	Tech. & media	106.0	87.1	8.2	4.7	2.3	2.2	0.1
	Total	2,086.9	76.1	14.6	9.3	95.8	4.6	4.6

Source: FI.

Note: The baseline refers to data for December 2023. M1 refers to an estimate under the assumption of capital contributions when needed (deficit). M2 refers to an estimate under the assumption that firms with a capital need fail (Stage 3). M3 refers to FI's applied assumption, where owners contribute capital to solvent firms, but these end up in Stage 2. The last column (Contr., pp) shows each industry contribution to the total credit losses.

Table A10. The distribution of bank loans and calculated credit losses in stress from FI's applied assumptions given different scenarios

		Stage 1	Stage 2	Stage 3	Credit losses		
		(%)	(%)	(%)	(SEK bn)	(%)	(Contr., pp)
<i>Unchanged Scenario</i>	Consumables	86.8	5.1	8.1	1.6	3.2	0.1
	Energy	93.3	3.6	3.2	0.4	1.2	0.0
	Real estate	86.4	11.9	1.8	9.1	1.0	0.4
	Corp. services	75.7	18.5	5.8	4.5	2.4	0.2
	Health & educ.	97.2	2.2	0.6	0.8	0.4	0.0
	Manufacturing	89.6	6.6	3.9	4.5	1.8	0.2
	Raw materials	83.4	2.7	13.8	2.2	6.7	0.1
	Durable goods	82.9	9.7	7.4	5.2	2.5	0.3
	Tech. & media	96.4	0.8	2.7	0.9	0.9	0.0
Total	87.2	9.5	3.3	29.3	1.4	1.4	
<i>GDP shock -10%</i>	Consumables	82.3	3.2	14.5	3.1	6.1	0.1
	Energy	83.8	5.7	10.5	2.5	6.9	0.1
	Real estate	84.1	13.5	2.4	12.6	1.3	0.6
	Corp. services	66.3	23.5	10.3	8.8	4.7	0.4
	Health & educ.	96.6	2.1	1.3	1.8	0.8	0.1
	Manufacturing	85.1	7.0	7.9	9.0	3.5	0.4
	Raw materials	77.5	4.3	18.2	3.1	8.8	0.1
	Durable goods	78.4	11.4	10.2	8.4	4.0	0.4
	Tech. & media	94.2	1.1	4.7	2.0	1.9	0.1
Total	83.8	10.9	5.3	51.2	2.5	2.5	
<i>Interest rate 3pp</i>	Consumables	86.4	5.3	8.3	1.6	3.2	0.1
	Energy	86.3	8.8	4.9	0.9	2.6	0.0
	Real estate	78.8	17.0	4.1	21.4	2.2	1.0
	Corp. services	68.0	23.4	8.6	7.3	3.9	0.4
	Health & educ.	96.6	2.8	0.6	1.3	0.6	0.1
	Manufacturing	88.9	6.3	4.8	5.3	2.1	0.3
	Raw materials	83.0	3.0	14.0	2.3	6.8	0.1
	Durable goods	82.2	10.1	7.8	5.8	2.7	0.3
	Tech. & media	95.2	2.0	2.8	1.0	1.0	0.0
Total	82.6	12.6	4.8	46.9	2.3	2.3	
<i>Asset prices -20%</i>	Consumables	86.8	5.1	8.1	1.6	3.2	0.1
	Energy	93.3	3.5	3.3	0.4	1.2	0.0
	Real estate	85.0	10.3	4.7	22.8	2.4	1.1
	Corp. services	75.6	18.2	6.2	4.7	2.6	0.2
	Health & educ.	97.2	2.2	0.6	0.8	0.4	0.0
	Manufacturing	89.5	5.8	4.6	5.1	2.0	0.2
	Raw materials	83.4	2.7	13.8	2.2	6.7	0.1
	Durable goods	82.7	9.7	7.5	5.4	2.6	0.3
	Tech. & media	95.1	2.2	2.8	1.0	1.0	0.0
Total	86.5	8.7	4.8	44.0	2.1	2.1	
<i>Stress combined</i>	Consumables	81.5	3.6	15.0	3.2	6.3	0.2
	Energy	81.4	8.3	10.3	2.6	6.9	0.1
	Real estate	71.9	18.1	10.0	49.9	5.1	2.4
	Corp. services	56.0	30.4	13.5	12.2	6.5	0.6
	Health & educ.	96.2	2.4	1.4	2.3	1.0	0.1
	Manufacturing	82.3	9.2	8.5	9.9	3.9	0.5
	Raw materials	76.8	4.8	18.3	3.1	8.9	0.2
	Durable goods	76.0	12.4	11.5	10.1	4.8	0.5
	Tech. & media	87.1	8.2	4.7	2.3	2.2	0.1
Total	76.1	14.6	9.3	95.8	4.6	4.6	

Source: FI.

Note: The table shows calculations for different scenarios