

## ARTICLE – The Riksbank’s stress test of banks’ capital – an update

The Riksbank uses stress tests of banks’ capital to estimate how a bank’s financial situation is affected under stressed conditions. It is important to assess banks’ capacity to provide the economy with credit if economic developments deteriorate. On the basis of two different scenarios, the Riksbank’s stress test shows that credit losses could increase substantially for the four major banks<sup>55</sup> in Sweden if production and house prices fell significantly and unemployment increased. In the more serious scenario, credit losses could increase the risk that credit supply in the economy is being negatively impacted. If this were to happen, both banks and public authorities might need to take measures to support the supply of credit.

### The Riksbank’s stress tests are based on several assumptions

The Riksbank’s stress test of the capital in the banking sector is a so-called top-down stress test, which involves all calculations being made by the Riksbank.<sup>56</sup>

In the stress test a number of models form the basis of the calculations.<sup>57</sup> These models describe how different items in the banks’ profit and loss accounts and balance sheets can be affected by economic and financial stress. The models show how capital ratios in the banking sector can develop in different scenarios. The model for credit losses is based first and foremost on historical correlations between the banking system’s credit losses and, for instance, developments in housing prices, unemployment, interest rates and corporate and household sector debts as a percentage of GDP.

In the Riksbank’s stress tests, there are also separate models for net interest income and net commission income. The models explain the banks’ net interest income and net commission income using various macroeconomic and bank-specific variables. In addition, there are two mechanisms that take into account contagion effects that can arise in the financial system.

### The stress test is not a forecast

The Riksbank’s stress test does not take into account the fact that banks can make changes in their business models in the scenario or in other ways act to reduce their credit losses. Nor does the stress test assume that any measures are taken by the authorities.<sup>58</sup> The results of the stress

test should therefore not be regarded as a forecast of future credit losses or capital ratios. Instead, the stress test is an analysis of the banks’ capital strength on the basis of today’s balance sheets and under the specific conditions assumed in the different scenarios. Although one should exercise caution in drawing any strong conclusions from individual analyses, they may nevertheless guide both banks and authorities on how they may need to act under different stressed circumstances.

### Different models give different results

The model used in the Riksbank’s stress test to estimate credit losses is sensitive to which variables are included and which history is taken into account. In the model, developments in housing prices have a considerable impact on how the banks’ credit losses develop. However, this does not mean that credit losses largely stem from mortgages, rather that housing prices function as an indicator of the general developments in the economy, and particularly property prices. The Riksbank’s data on the banks’ credit losses stretches back to the end of the 1980s and thus includes the banking crisis at the start of the 1990s. This was a period in which the banks made significant credit losses and the Swedish economy experienced major and protracted problems. Methods where housing prices are given less weight and where the 1990s are not taken into account to the same extent typically result in much lower credit losses for the banks.

<sup>55</sup> The four major banks refer in this article to Handelsbanken, Nordea, SEB and Swedbank. The stress test includes the four banks at group level.

<sup>56</sup> This differs from so-called bottom-up stress tests in which the banks themselves make the calculations. This means that bottom-up stress tests are based on more granular data and can take into account more institution-specific qualities than a top-down stress test.

<sup>57</sup> See Buncic, D., Li, J., van Santen, P., Wallin, P. and Winstrand, J. The Riksbank’s method for stress tests of banks’ capital, *Staff Memo*, May 2019. Sveriges Riksbank.

<sup>58</sup> It is a question of measures to both avoid resolution and make resolution easier to manage if it nevertheless became unavoidable. Under the European Bank Recovery and Resolution Directive (BRRD) and as part of any resolution, authorities can, for instance, allow parts of banks’ liabilities to bear the losses by using the so-called bail-in tool. This involves some of the banks’ lenders having their claims written down or converted into shares in the bank.

### Two economic scenarios form the basis for the stress tests

In addition to the models described above, economic scenarios are used as a basis for the calculations. Given the considerable uncertainty about developments going forward, the Riksbank's April Monetary Policy Report published two possible future macroeconomic scenarios (A and B) stretching until the end of 2022.<sup>59</sup> This article estimates how the credit losses for the four major banks in Sweden might develop in these two scenarios and how this would affect the banks' capital ratios. In addition to the assumptions regarding the scenarios described in the Monetary Policy Report, further assumptions are made in the stress tests, for instance with regard to how housing prices and the equity market will develop (see table 3 and table 4). This means that the scenarios on which the stress test is based cannot be compared in full with those in the Monetary Policy Report.

### Substantial stress in the scenarios

The two scenarios, Scenario A (see table 3) and Scenario B (see table 4), contain different degrees of macroeconomic stress<sup>60</sup>. In Scenario A, GDP declines substantially during 2020, and then recovers rapidly during the two following years. Unemployment will be higher during 2020-2021 and then decline somewhat in 2022. In addition, it is assumed in the stress test that asset prices, that is, housing prices and equity, will fall during 2020, after which housing prices will recover slowly while equity prices recover at a faster pace.

**Table 3. Scenario A**

	2020	2021	2022
GDP	-6.9	4.6	5.0
House prices*	-9.5	0.5	4.2
Inflation	0.6	1.5	1.6
Unemployment	8.8	9.0	8.2
Equity prices*	-20	18.8	5.3

Note. GDP, house prices and equity prices are given as annual percentage change. Inflation is given as annual percentage change in price index. Unemployment is given in per cent. The variables marked with an asterisk in the tables are ones not included in the scenarios in the Monetary Policy Report. It is assumed in the model for the stress tests that the banks distribute profits to shareholders as long as they are making a profit and are not in breach of the capital adequacy buffers (see Buncic, D., Li, J., van Santen, P., Wallin, P. and Winstrand, J. The Riksbank's method for stress tests of banks' capital, *Staff Memo*, May 2019. Sveriges Riksbank). This also applies to profits from 2019.

Source: The Riksbank

In the second scenario, Scenario B, the sequence of events is more protracted and GDP falls further during 2020, and the recovery is slower. Unemployment rises more the first two years, but then declines in 2022, just as in Scenario A. In the stress test, housing prices and equity prices fall more in Scenario B than in Scenario A and the recovery is slower. All in all, Scenario B describes a more protracted sequence of events, with a larger economic downturn than Scenario A. It is assumed in the stress test that risk premia will increase and that growth in lending is 0.

**Table 4. Scenario B**

	2020	2021	2022
GDP	-9.7	1.7	5.4
House prices*	-14.8	-13.4	7.2
Inflation	0.6	1.3	1.4
Unemployment	10.1	10.4	9.3
Equity prices*	-30	14.3	18.8

Note. See note in table 3.

Source: The Riksbank

### Credit losses affect the results to a considerable extent

In both scenarios the banks make substantial credit losses, although in Scenario B they are more than twice as large in absolute values (see table 5). In Scenario B house prices (approximating property prices in general) fall more than in Scenario A, which to a large extent explains why the credit losses are greater. The banks' earnings fall somewhat relative to their starting point in 2019<sup>61</sup>. The fact that earnings are slightly lower in Scenario B than A is partly due to worse macroeconomic developments and larger stock market falls. In Scenario A, the banks' leverage ratios are unchanged relative to 2019. On the other hand, their Common Equity Tier 1 (CET 1) ratios fall somewhat, as the banks' risk-weighted assets increase because the lending stock is assessed as more risky.<sup>62</sup> In Scenario B, the banks' leverage ratio falls to 3.4 per cent and the CET 1 ratio to 11.1 per cent.

The stress test indicates that the banks have good capacity to manage a macroeconomic development similar to Scenario A, where the economic recovery is relatively rapid and the fall in housing prices is moderate. In Scenario B, where the economic recovery is protracted and house prices fall more, the impact on the banks' capital ratios is much greater. But in this scenario, too, the banks' capital is above the regulatory minimum requirement.<sup>63</sup>

<sup>59</sup> See *Monetary Policy Report*, April 2020. Sveriges Riksbank.

<sup>60</sup> The scenarios are contingent on certain general economic policy measures taken by authorities, see *Monetary Policy Report*, April 2020. Sveriges Riksbank.

<sup>61</sup> The calculations in the stress test are based on the fourth quarter of 2019 as this is the last period for which there is outcome data for all variables. The calculations thus

do not take into account the results the banks have reported for the first quarter of 2020.

<sup>62</sup> In the first two years, the banks' risk-weighted assets increase as a result of higher credit risk by 7.5 per cent a year.

<sup>63</sup> The stress test describes the banks' aggregate capital situation and different banks are affected to a different extent in the stress test.

**Table 5. Results**

	Scenario A	Scenario B
Earnings before credit losses (SEK billion)	253	231
Total credit losses (SEK billion)	201	476
Leverage ratio, 2019 and final period of scenario (per cent)	5.2 / 5.2	5.2 / 3.4
CET 1 ratio in 2019 and final period in the scenario (per cent)	17.1 / 15.7	17.1 / 11.1

Note. See note in table 3.

Source: The Riksbank

### The assumptions are important for the results

The stress test is based on a few simplified assumptions, for instance, that the banks' lending growth is 0 in the scenarios and that the banks pay dividends if they make a profit. If lending had increased, the banks' capital ratios would have been lower. If the banks had not been assumed to pay dividends, the capital ratios would instead have been higher.

It may also be interesting to compare the results in table 5 with the results from stress tests published by the Riksbank in Financial Stability Report 2019:1. The estimated credit losses become lower in this stress test than that from 2019.<sup>64</sup> The stress test from 2019 is based on scenarios from the European Banking Authority's (EBA) stress tests. The difference in the results can be largely explained by developments in house prices, which showed much weaker development in the EBA's scenario than in the scenarios described in table 3 and table 4.

### Importance of continued good credit supply

There is considerable uncertainty surrounding the results of the stress tests, as regards both the scenarios and the assumptions made in the models.<sup>65</sup> Future macroeconomic outcomes can be either better or worse than assumed in the two scenarios. Moreover, the different scenarios can in reality affect the banking sector more or less than is assumed in the stress test models.

All in all, the banks are more negatively impacted in scenario B than scenario A. If the banks' capital ratios were to decline to an extent corresponding to the description in scenario B, credit supply could be negatively impacted. Although the banks' capital in the scenario is above the minimum requirement, individual banks may nevertheless choose to reduce their lending to compensate for increased credit losses. It is important that banks, in such a situation, do what they can to supply sufficient credit to companies and households. In the Riksbank's view, the buffers built up by the banks in good times can be used if needed (see chapter "Summary of the stability assessment"). The banks can also take other measures to improve their capital situation, for instance, by limiting potential dividend payments to shareholders.

If the economic recovery takes a long time and banks' lending capacity deteriorates, even more measures may, however, be needed. In such a situation, further public-sector measures may be required to provide support to credit supply and to manage problems in the banking sector. The Riksbank is ready to contribute by providing any necessary liquidity both now and if the situation were to deteriorate.

<sup>64</sup> In the stress test in *Financial Stability Report 2019:1*, the banks' total credit losses amounted to SEK 771 billion.

<sup>65</sup> For further information on which assumptions are made in the model, see Stress tests of banks' capital. Article in *Financial Stability Report 2019:1*. Sveriges Riksbank.