

## 4 STRESS TESTS

*The resilience of selected sectors was tested in macro stress tests using a Baseline Scenario and an Adverse Scenario as usual (see section 2.1). In some cases, the Adverse Scenario is complemented by sensitivity analyses specific to a given sector.*

*The stress tests of the banking sector confirmed its capital and liquidity resilience to the Adverse Scenario. The capital surplus held voluntarily by banks contributed significantly to keeping the sector's overall capital ratio above the 8% regulatory threshold over the stress test horizon. The currently solid capitalisation coupled with a strong client deposit base and a high proportion of liquid assets also ensured banks' resilience to liquidity shocks. The results of the insurance sector stress tests confirmed that, despite a decline in the ratio of eligible capital to the solvency capital requirement to less than 100% for three insurance companies in the Adverse Scenario, this sector was not a source of systemic risk. The stress test of pension management companies pointed to a reduction in the intensity of the market risks faced by transformed funds. The resilience of transformed funds fell in 2018 owing to a decline in their excess of assets over liabilities. In the future, this may force pension management companies to cover transformed funds' investment losses even in the event of only slightly unfavourable developments. The household stress test confirmed that households with a debt service-to-income ratio of over 45% are the most vulnerable group. Furthermore, the test demonstrated households' high sensitivity to a fall in real wages and a rise in client interest rates. The CNB continues to regard credit institutions' sovereign exposures to the Czech government as systemically important. Given the favourable results of the Czech public finance stress test, however, the CNB will not require credit institutions to meet an additional capital requirement to cover the risk of concentration of these exposures over a three-year horizon.*

### 4.1 SOLVENCY STRESS TESTS OF BANKS, INSURANCE COMPANIES AND PENSION MANAGEMENT COMPANIES

#### 4.1.1 Solvency Macro Stress Tests of Banks

Solvency stress tests are one of the most important tools for assessing the resilience of the banking sector to potential risks to the stability of the Czech financial sector. Particular attention is paid to credit risk, which has long been the most important risk in the Czech banking sector. The evolution of credit risk is closely linked with developments in the non-financial corporations and household sectors.

#### **The stress test methodology has been refined in the area of the response of credit risk to economic developments**

The sensitivity of the satellite model for calculating the default rate to economic developments has been increased and the model provides more robust estimates for both scenarios thanks to the use of Bayesian modelling techniques. In addition, the models for estimating credit losses and provisions in connection with the IFRS 9 accounting standard have been revised and adjusted thanks to information from new statements and from the 2018 supervisory stress test.<sup>57</sup>

#### **In the *Baseline Scenario* credit risks stagnate and the sector's profitability rises**

The continuing economic growth is reflected in the *Baseline Scenario* in a greater ability of corporations and households to repay their debts, i.e. a lower level of credit risk (see section 2.2). The default rate – a key indicator of credit risk materialisation – remains very low in both the non-financial corporations and household sectors (see Table IV.1). Banks' interest income and profitability are being boosted by rising interest rates and the banking sector's significant exposure to the central bank.<sup>58</sup>

<sup>57</sup> <https://www.cnb.cz/en/financial-stability/stress-testing/supervisory-stress-test/>.

<sup>58</sup> See section 3.2.3 for details on profitability.

**Table IV.1**  
Key variables in the individual scenarios  
(averages for given years)

	Actual value	Baseline Scenario			Adverse Scenario		
	2018	2019	2020	2021	2019	2020	2021
<b>Macroeconomic variables</b>							
GDP (y-o-y %)	2.8	2.9	3.0	3.0	-0.7	-4.9	-1.4
Inflation (y-o-y %)	2.1	2.2	2.0	2.0	1.9	1.6	-0.3
Unemployment (%)	2.3	1.9	1.8	1.8	2.4	4.0	5.9
Nominal wage growth (y-o-y %)	7.8	6.9	5.6	5.0	2.2	-1.2	2.6
Effective GDP growth in the euro area (y-o-y %)	2.1	1.6	1.7	1.6	-0.9	-3.6	-0.9
<b>Credit growth (%)</b>							
Non-financial corporations	4.4	3.2	4.2	3.9	1.5	-2.7	-0.8
Loans for house purchase	8.4	5.0	5.4	5.3	2.8	-2.2	-1.1
Consumer credit	5.6	5.8	6.6	7.0	4.0	-0.5	-1.8
<b>Default rate (PD, %)</b>							
Non-financial corporations	1.3	1.4	1.3	1.2	3.2	4.7	4.8
Loans for house purchase	0.9	0.8	0.7	0.7	2.7	4.1	4.2
Consumer credit	4.2	4.2	4.3	4.6	8.2	9.1	8.2
<b>Loss given default (LGD, %)</b>							
Non-financial corporations	32	32	32	32	45	56	51
Loans for house purchase	15	15	15	15	26	37	42
Consumer credit	42	41	41	41	48	59	64
<b>Asset markets (%)</b>							
3M PRIBOR	1.3	2.1	2.1	2.6	0.8	0.3	0.3
5Y GB yield	1.5	1.8	2.0	2.6	1.2	1.0	1.2
3M EURIBOR	-0.3	-0.3	-0.1	0.1	-0.3	-0.3	-0.3
5Y EUR	-0.2	0.2	0.5	0.9	0.0	0.3	0.5
GB yield							
Change in residential property prices	8.2	6.8	4.6	3.8	-2.1	-15.0	-13.0
Change in share prices	-8.5		5.0			-35.0	

Source: CNB, BRČI

**Table IV.2**  
Impact of the alternative scenarios on the banking sector

	Baseline Scenario			Adverse Scenario		
	2019	2020	2021	2019	2020	2021
<b>Provisions for non-performing loans (credit losses)</b>						
CZK billions	-17.0	-17.8	-18.6	-29.4	-74.9	-93.7
% of assets	-0.2	-0.2	-0.2	-0.4	-1.0	-1.3
<b>Provisions for performing loans</b>						
CZK billions	-0.9	-0.5	-0.6	-69.2	-20.1	9.3
% of assets	0.0	0.0	0.0	-0.9	-0.3	0.1
<b>Profit/loss from market risks</b>						
CZK billions	-1.3	-1.5	-2.7	3.9	-0.7	-2.0
% of assets	0.0	0.0	0.0	0.1	0.0	0.0
<b>Earnings for covering losses (adjusted operating profit)</b>						
CZK billions	102.9	105.7	117.0	74.5	55.4	47.8
% of assets	1.4	1.4	1.5	1.0	0.8	0.7
<b>Pre-tax profit/loss</b>						
CZK billions	83.7	85.9	95.0	-20.2	-41.5	-38.6
% of assets	1.1	1.1	1.2	-0.3	-0.6	-0.5
<b>Capital ratio at end of period in %</b>						
<b>Total</b>	<b>19.4</b>	<b>19.3</b>	<b>19.1</b>	<b>16.8</b>	<b>12.4</b>	<b>10.7</b>
<b>Tier 1</b>	<b>18.9</b>	<b>18.8</b>	<b>18.6</b>	<b>16.4</b>	<b>12.0</b>	<b>10.4</b>
<b>Capital injections</b>						
CZK billions		0.0			30.4	
% of GDP		0.0			0.6	
<b>Number of banks below 8% capital ratio</b>		0			9	

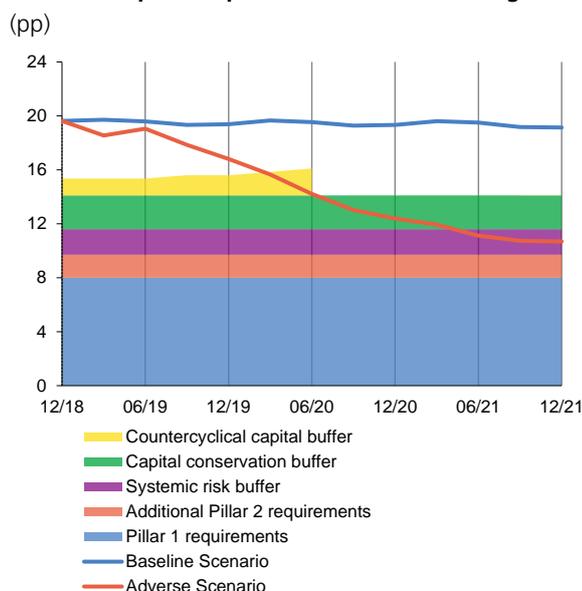
Source: CNB

Note: Losses and provisions are presented with a minus sign.

### The banking sector remains very well capitalised in the *Baseline Scenario*

The banking sector remains resilient and has sufficient capital reserves (see Table IV.2). The sector's aggregate capital ratio remains almost constantly above 19% over the three-year test horizon. The Tier 1 capital ratio is only about 0.5 pp below the total capital ratio. Thanks to high profitability, no bank gets into a situation of an insufficient capital ratio in the *Baseline Scenario*, which assumes growth in credit portfolios of between 3% and 7%.

**Chart IV.1**  
Impact of the alternative scenarios and interactions with the capital requirements of the banking sector



Source: CNB

Note: Illustration depicts the reaction of macroprudential policy represented by the lowering or dissolving of the countercyclical capital buffer in the *Adverse scenario*.

### The *Adverse Scenario* assumes a fall into a V-shaped recession

The *Adverse Scenario* assumes that materialisation of global risks (see section 2.1.3) leads to a sizeable drop in economic activity abroad, which in turn causes the domestic economy to contract. The domestic economy gets into a deep and long-lasting recession resulting in the exhaustion of the financial reserves of some households and non-financial corporations and debt repayment problems. This is reflected in a substantial rise in the default rate and loss given default (see Table IV.1).

### The *Adverse Scenario* implies significant losses for the banking sector

The *Adverse Scenario* assumes growth in credit losses given the rising default rate and also assumes high provisioning for performing loans owing to its assumption of exact knowledge of future economic developments.<sup>59</sup> Credit losses start to rise in the first year of the test period from relatively low initial loss given default and default rate levels. Market risks have no significant effect on the overall result.<sup>60</sup> In response to economic developments, the scenario assumes a decline in monetary policy rates and a drop in lending. This leads to a decrease in yields and a gradual slide of the banking sector into loss (Table IV.2).

### A falling capital ratio will be reflected in the countercyclical capital buffer rate

The model impact of the *Adverse Scenario* shows that the capital ratio of the banking sector as a whole gradually decreases, converging to the level of the capital requirements including the CCyB in the fifth quarter following the start of the test

59 The "perfect foresight" assumption Box 3.2 discusses the effect of banks' alternative economic expectations that would lead to different provisioning profiles.

60 The decline in long-term interest rates assumed in the scenario has a positive effect on banks in the first year, generating profit on market risks.

**Table IV.3**  
Results of the stress tests for different minimum capital settings

Minimum settings	Baseline Scenario		Adverse Scenario	
	Capital injections in CZK billions	Banks below minimum	Capital injections CZK billions	Banks below minimum
Pillar 1 (8%)	0.0	0	30.4	9
TSCR (Pillar 1 + additional Pillar 2 requirements)	0.0	0	48.6	11
TSCR + systemic risk buffer	0.0	0	83.7	14

Source: CNB

Note: Constant requirements in Pillar 2 and the systemic risk buffer over the entire test period are assumed for the calculation of capital injections.

(see Chart IV.1).<sup>61</sup> It subsequently falls to the level of the capital requirement excluding the CCyB at the end of the sixth quarter (see Chart IV.1).<sup>62</sup> Under the model assumptions of the *Adverse Scenario*, it can be assumed that by this period at the latest, the CNB would make one-off or stepwise changes to the CCyB rate allowing it to be used effectively to absorb the adverse economic shock.

### **Some banks would need capital injections to meet the minimum capital requirement**

Although the aggregate capital ratio stays sufficiently above 8% in the *Adverse Scenario* (see Chart IV.1), nine banks – representing about 13% of the sector’s assets – record a fall in the capital ratio below the regulatory minimum of 8%. These banks would have to top up their capital, with the necessary capital injections totalling CZK 30.4 billion, i.e. 0.6% of GDP (see Table IV.2, second column). Relative to the size of the banking sector, this figure is not large enough to jeopardise its stability. The banking sector’s stability is based on its aggregate capital ratio and on its ability to generate income to cover losses even in the event of highly adverse developments.

### **A rise in the minimum capital requirement increases the need for capital injections...**

Taking into account the additional Pillar 2 requirements and some of the capital buffers (in this case the SRB; see FSR 2015/2016, section 4.2.4) in the assessment of compliance with the minimum capital requirement increases the thresholds for passing the stress tests. Increasing the threshold for passing the stress tests to the level of the total capital requirement (TSCR, the sum of the Pillar 1 requirements and the additional Pillar 2 requirements) does not cause a need for capital injections in the *Baseline Scenario*. In the *Adverse Scenario*, the necessary capital injections rise to CZK 48.6 billion and 11 banks would not comply with the threshold (see Table IV.3). If the threshold is raised to the sum of the total capital requirement (TSCR) and the systemic risk buffer maintained by systemically important institutions, i.e. to the level of the “other relevant capital ratio”, again no need for capital injections arises in the *Baseline Scenario*. In the *Adverse Scenario*, however, the necessary capital injections increase to CZK 83.7 billion and 14 banks would not comply with the threshold (see Table IV.3).

### **...and significantly affects profit distribution and dividend payments**

This result reflects not only the very strong shock assumed in the *Adverse Scenario*, but also the assumption of perfect foresight, as reflected in a sharp jump in provisioning for performing loans. Such a situation is very unlikely to occur. However, should a situation arise in which banks are unable to cover the applicable combined capital buffer requirement, as signalled in aggregate terms by the impact of the *Adverse Scenario* (see Chart IV.1),<sup>63</sup> they would be required to prepare capital restoration plans (Article 12m(4) of the Act on Banks) and submit them to the CNB. In this situation, profit distribution and dividend payments would be governed by the rules restricting the distribution of income related to Common Equity Tier 1 (CET1).<sup>64</sup>

### **The capital ratio falls in the *Adverse Scenario* mainly because of high losses and a sharp rise in risk weights**

A decomposition of the change in the capital ratio clearly illustrates the impacts of the main factors. In the *Baseline Scenario* (see Chart IV.2), income increases the capital ratio by as much as 12.3 pp over the test horizon. Most of this income is used to pay dividends and taxes (-9.1 pp). It is also used to cover expected credit and market losses (-2.3 pp) and to partly cover growth in credit exposures (-2.0 pp). The capital ratio moves to a final level of 19.1% through a decrease in risk weights

61 The point of intersection of the upper bound of the yellow band denoting the CCyB and the red line describing the path of the capital ratio in the period 03/20.

62 The point of intersection of the lower bound of the yellow band denoting the CCyB and the red line describing the path of the capital ratio in the period 06/20.

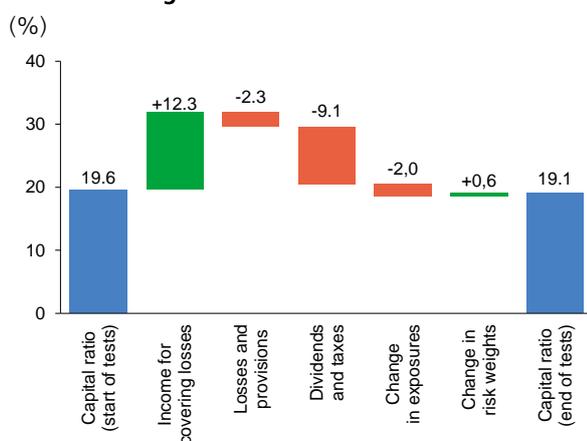
63 This situation arises at the point where the red line describing the path of the capital ratio crosses the upper bound of the green band denoting the CCoB.

64 The maximum distributable amount (MDA) is derived from the coverage of the combined capital buffer requirements with CET1 capital – see Article 141 of the CRD.

(+0.6 pp). In the *Adverse Scenario*, banks are also able to generate income to cover losses (an increase in the capital ratio of 10.6 pp). This is sufficient to cover all expected losses (-10.5 pp). Dividends and taxes paid from profits for 2018 and 2019 make a negative contribution to the capital ratio of 2.0 pp. Banks react to the worse situation by lowering the amount of loans; the change in exposures thus increases the capital ratio by 0.3 pp. The deterioration of the economic environment and the materialisation of credit risk increases the risk weights, fostering a marked drop in the banking sector's capital ratio of 7.3 pp to 10.7% at the end of the test (see Chart IV.3).

Chart IV.2

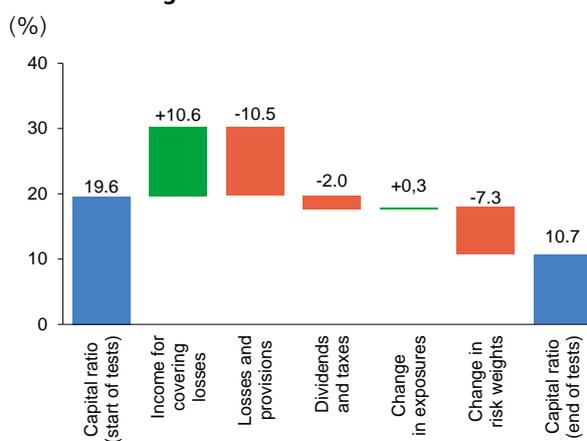
### Decomposition of the change in the capital ratio of the banking sector in the *Baseline Scenario*



Source: CNB

Chart IV.3

### Decomposition of the change in the capital ratio of the banking sector in the *Adverse Scenario*



Source: CNB

### Without a capital surplus, the banking sector would fall below the regulatory minimum in the *Adverse Scenario*

At the end of the test, the aggregate capital ratio is above the regulatory minimum of 8%. However, if banks had no capital surpluses at the start of the test (at the end of 2018 they had a surplus of 4.1 pp), the capital ratio would fall below the regulatory minimum (see Chart IV.4). The stress test results thus show that a voluntary capital surplus plays an important role in ensuring banking sector stability. Its potential use to cover the minimum requirement for own funds and eligible liabilities (MREL; see section 3.2.1 and the relevant thematic article<sup>65</sup>) may have a significant effect on the assessment of the resilience of systemically important banks in the future.

### A supplementary sensitivity analysis shows the impacts of losses arising from debtor concentration...

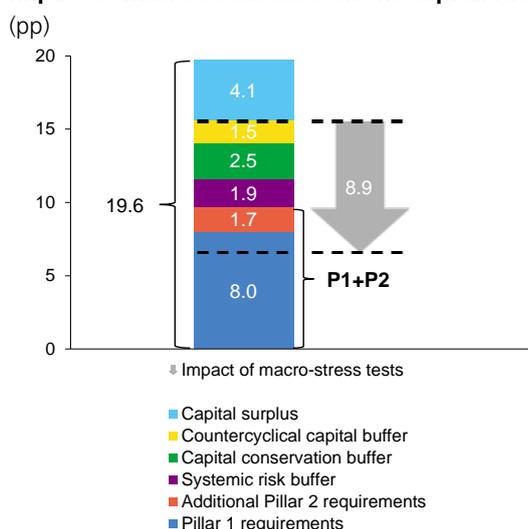
A sensitivity analysis conducted in the *Adverse Scenario*, where the default rate generally rises, tests concentration risk by assuming the additional default of the largest debtors of each bank. Although the concentration of client loan exposures (as measured by the share of the three largest exposures in the portfolio of loans to legal entities) has long been relatively constant at around 16%, the largest loans may not be sufficiently collateralised in some cases. This is evidenced by the fact that the share of uncollateralised loans in loans to the top three debtors was 74% at the end of 2018.<sup>66</sup> If these debtors were to default, banks' credit losses could reach high levels.

65 Kahoun, T. (2019): *Minimum Requirement for Own Funds and Eligible Liabilities (MREL): General Approach of the Czech National Bank.*

66 At the end of 2016 it stood at 50%, so it has risen markedly in the meantime.

Chart IV.4

Structure of bank capital requirements and the impact of macro stress tests on the capital ratio

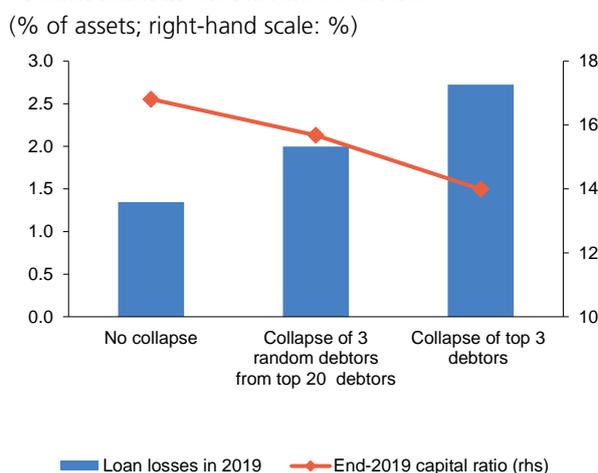


Source: CNB

Note: The illustration assumes a countercyclical capital buffer rate of 1.5%, even though it does not take effect until mid-2019. From 2020 the buffer rate will be 1.75%. From mid-2020 it will be 2.0 %.

Chart IV.5

Impact of the collapse of the top three debtors of each bank in the *Adverse Scenario*



Source: CNB

### ...but the banking sector is resilient to this major shock, too

The concentration test is performed in two variants.<sup>67</sup> The first assumes the default of three random debtors from the top 20 debtors of each bank. The other, more conservative one assumes the collapse of the top three debtors of each bank. Given the high share of uncollateralised loans in loans to the largest clients, a 50% haircut on these exposures is considered in both cases. This additional shock on top of the *Adverse Scenario* has a big effect on credit losses and the capital ratio. The capital ratio declines by 1.1 pp to 15.7% in the case of the collapse of three random large debtors, and by 2.8 pp to 14.0% in the case of the collapse of the top three debtors of each bank, at the end of 2019 (see Chart IV.5). The concentration test represents a very strong stress scenario, and the resulting banking sector capital ratio can therefore be assessed as positive in this sensitivity analysis.

## 4.1.2 Macro Stress Tests of Insurance Companies

### The CNB newly assesses potential risks in the insurance sector using a macro stress test

The CNB has created a framework for macro stress testing the domestic insurance sector.<sup>68</sup> The resilience of insurance companies is tested by assessing the ratio of eligible capital to the solvency capital requirement. Insurance companies are required to maintain this ratio above 100%. The macro stress tests of insurance companies complement the supervisory stress tests of insurance companies.<sup>69</sup> While the supervisory tests contribute to the supervisory assessment of the risk profiles of individual insurance companies, the macro stress tests aim to assess the resilience of the sector as a whole. The macro stress tests of insurance companies follow similar principles as the supervisory tests and are based on insurance companies' balance sheets under the Solvency II legislative framework. Unlike the supervisory tests, the macro stress tests of insurance

67 Both variants involve a one-off shock to the banking sector at the end of 2019.

68 A detailed methodology for the macro stress test of insurance companies is under preparation. It is planned to be published on the CNB website at the end of 2019.

69 <https://www.cnb.cz/en/financial-stability/stress-testing/insurance-sector-and-pension-management-companies-sector/>.

companies evaluate the dynamic evolution of balance sheets at quarterly frequency over three years,<sup>70</sup> i.e. they evaluate the gradual maturing of insurance policies, the creation of new policies, repayment of debt securities held by the insurance company,<sup>71</sup> profitability and profit distribution under the scenarios considered. The dynamic approach enables these tests to be used to assess the potential build-up of adverse shocks over several years.

### **The resilience of the insurance sector is assessed under both the *Baseline Scenario* and the *Adverse Scenario***

Both the *Baseline Scenario* and the *Adverse Scenario* are fundamental to the macro stress test of insurance companies (see section 2.1.3 and Table IV.1), specifically in three areas – interest rates,<sup>72</sup> asset prices on financial markets and specific insurance risks. In the *Baseline Scenario*, the risk-free rates increase owing to a rise in the CNB's monetary policy rate (see Chart II.17F). Interest rates are followed by yields on corporate and government bonds, leading to a fall in their prices. In the *Adverse Scenario*, by contrast, a decline in monetary policy rates and risk-free yields and a rise in the risk spread are considered. The final impact of the *Adverse Scenario* on prices of government and corporate bonds depends on their rating. The *Baseline Scenario* does not consider any change in share prices or dividend income, while the *Adverse Scenario* expects a decline in share prices (most significantly in the first year of the test, when they drop by 31%) and dividend income. The scenarios also make assumptions about the amount of premiums, claim settlement costs and other costs, the volume of new policies and the lapse rate for life insurance policies. The scenarios for the volumes of premiums, new policies and costs in non-life insurance were set in relation to the cyclical nature of each segment.<sup>73</sup> The additional annual lapse rate in life insurance beyond lapses expected by the insurance company was set at 10% in the *Adverse Scenario*.<sup>74</sup> This reflects financial stress causing some households to cancel their life insurance policies to raise additional funds. Both scenarios assume that dividend policy will remain similar to 2016–2018. The test does not consider any change in the solvency capital requirement relative to the level at the start of the test. The requirement would tend to fall with decreasing balance-sheet size, leading to slightly better test results. However, the risk factors identified would remain unchanged. For simplicity, the test abstracts from change in the exchange rate this year, as the results of the supervisory stress tests and the size of the capital requirement for exchange rate risk suggest that insurance companies are hedged against exchange rate movements to a large extent.

### **According to the test results, the insurance sector as a whole should be resilient over the three-year horizon...**

The stress test covers domestic insurance companies active as of 31 December 2018, representing 88% of the life insurance market and 95% of the non-life insurance market.<sup>75</sup> After the application of the *Baseline Scenario*, the ratio of eligible capital

70 For simplicity, the test assumes that the nature of activity remains unchanged over the test period. Likewise, it abstracts from any future mergers and acquisitions in the insurance sector.

71 For simplicity, the test does not assume reinvestment of excess liquidity. If reinvestment was considered, some insurers' liquidity positions could worsen slightly depending on the manner of reinvestment, in particular the maturity and liquidity of the financial instruments purchased.

72 Insurance companies use risk-free yield curves to discount future cash flows arising from insurance policies and determine the market value of their liabilities. An upward shift of the yield curve increases the discount factor, reducing the value of positive liabilities and hence favourably affecting the capital position of insurance companies. Insurance companies' technical provisions may even be negative, in which case a rise in yields would worsen their capital position. An upward shift of the yield curve also pushes down prices of bonds held by insurance companies. The final impact of interest rate movements on the capital position of insurance companies thus depends on the matching of future cash flows from assets and liabilities. When discounting future cash flows, insurance companies may apply volatility adjustment, which is designed to reduce the impact of financial market volatility on their capital position. The potential application of volatility adjustment was taken into account in the test.

73 The evolution of claim settlement costs in non-life insurance was in line with that of premiums received. In the *Adverse Scenario*, claim settlement costs in non-life insurance were subject to an additional upward expert adjustment of 2%–8% a year. This increase represented a general shock to the claim rate considered in the *Adverse Scenario*. A higher rate of growth of claim settlement costs was assigned to segments where growth in claim settlement costs is associated with an economic deterioration (e.g. income protection insurance, credit and guarantee insurance, legal protection insurance and financial loss insurance). The test does not assume any increased incidence of natural disasters.

74 In non-life insurance, the impact of lapses was not considered, as policies are usually concluded on an annual basis. In this case, the lapses were replaced by lower demand for insurance in procyclical insurance segments in the *Adverse Scenario*.

75 As measured by the share in net premiums written in 2018 (26 domestic insurance companies excluding branches of foreign insurance companies).

to the solvency capital requirement rose by 3 pp to 230% at the end of the third year of the test. In the *Adverse Scenario*, the ratio fell by 18 pp to 209%. Even in this case, the ratio remained sufficiently high above the regulatory threshold of 100% (see Table IV.4 and Chart IV.6).<sup>76</sup> Asset repricing during the first year was the main reason for the decline in eligible capital in the *Adverse Scenario*. Technical provisions in life insurance decreased gradually over the course of both scenarios. This reflected a continued fall in demand for life insurance with a saving component considered in both scenarios, with maturing or prematurely terminated policies not fully being replaced by new ones. In the *Adverse Scenario*, however, the fall in total technical provisions was slowed by a downward shift of the risk-free yield curves. This led to upward repricing of the aggregate value of unexpired liabilities and fostered a worse aggregate solvency position of insurance companies.

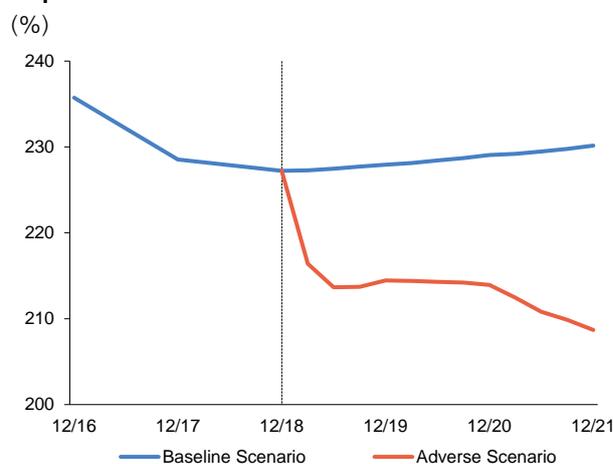
**Table IV.4**  
**Results of the stress test of insurance companies**  
(CZK billions; year-end values, profit for whole year)

	Actual value			Baseline Scenario			Adverse Scenario			
	2018	2019	2020	2021	2019	2020	2021	2019	2020	2021
<b>Total assets</b>	451	420	407	397	394	365	341			
Investment except ULI	296	270	258	250	256	232	214			
ULI assets	71	65	64	62	54	48	43			
<b>Total liabilities</b>	319	294	282	271	283	252	233			
Non-life insurance TPs	44	46	49	52	43	42	41			
LI TPs except ULI	116	96	86	77	100	84	75			
ULI TPs	55	48	43	38	36	22	13			
<b>Total profit</b>	13	11	9	9	-5	3	0			
Investments except ULI		5	3	1	-3	1	-3			
LI TPs except ULI		2	1	2	-5	-2	0			
ULI (assets and TPs)		1	1	1	1	4	4			
Non-life insurance		5	6	7	3	1	-1			
Tax on profit		-3	-2	-2	-1	-1	-1			
<b>Excess of assets over liabilities</b>	132	126	125	126	111	112	109			
<b>SCR</b>	51	51	51	51	51	51	51			
<b>Eligible capital</b>	116	117	117	118	110	110	107			
<b>Ratio of eligible capital to SCR (%)</b>	227	228	229	230	214	214	209			

Source: CNB

Note: LI = life insurance, ULI = index-linked and unit-linked life insurance. TPs = technical provisions. SCR = solvency capital requirement. Profit on ULI investments and assets includes repricing effects and dividends received.

**Chart IV.6**  
**Ratio of eligible capital to the solvency capital requirement**  
(%)



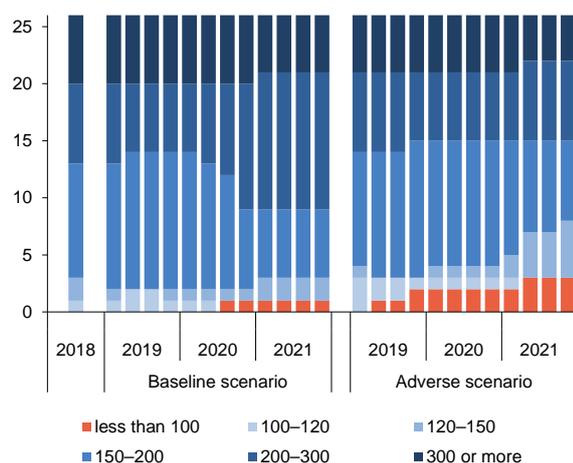
Source: CNB

### ... but eligible capital fell below the capital requirement in three insurance companies

The impact of the shocks considered in the *Adverse Scenario* on the capitalisation of individual insurance companies reflected differences in the composition of their investment portfolios and in their focus on individual insurance segments. In three of the insurance companies tested, the ratio of eligible capital to the solvency capital requirement fell below 100% (see Chart IV.7). However, the capital shortfall would be relatively small (CZK 614 million at the end of 2021). One of these insurance companies would not have sufficient eligible capital even in the *Baseline Scenario* (a capital shortfall of CZK 44 million).

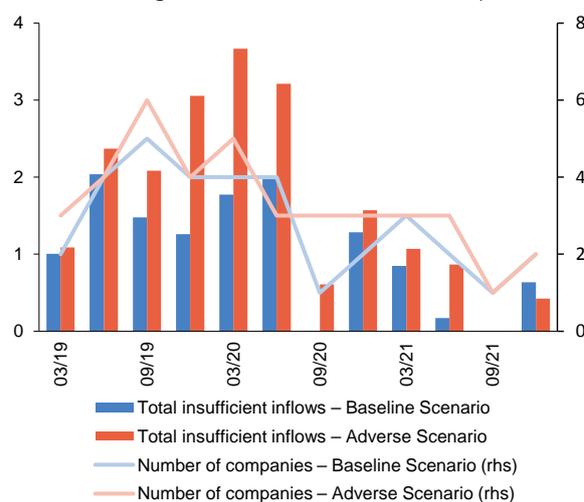
<sup>76</sup> The macro stress test results are more favourable than the 2018 supervisory stress test results for insurance companies. This partly reflects the different scope of the risks tested and the different size of the shocks. Another reason is a different time frame. The supervisory stress test considers a one-off marked repricing of insurance companies' balance sheets. The macro stress test considers a dynamic balance sheet, so profit generated during the test on some policies or portfolios counteracts the adverse impact of the shocks even in the *Adverse Scenario*.

**Chart IV.7**  
**Insurance companies by ratio of eligible capital to the solvency capital requirement**  
 (numbers)



Source: CNB

**Chart IV.8**  
**Matching of insurance companies' cash inflows and outflows**  
 (CZK billions; right-hand scale: number of companies)



Source: CNB

Note: The volume of insufficient inflows is the total difference between cash inflows and cash outflows for insurance companies whose outflows outweighed inflows in the given quarter.

### Potential sell-offs of domestic financial assets by insurance companies could adversely affect other institutional investors...

A continued decline in returns on insurance products with a saving component (see section 3.3) and the gradual maturing of policies for these products could result in a gradual decrease in the amount of assets covering life insurance technical provisions. If cash flows from assets and liabilities are matched, insurance companies can use the money generated by their investments to cover life insurance claims. If households started terminating policies prematurely, the natural cash flows from the investment portfolio might not be sufficient and insurance companies would be forced to sell their investment assets. On a less liquid market, sell-offs of domestic assets (especially domestic government bonds) could cause their prices to fall and exacerbate the adverse financial conditions (see section 3.4).

### ...but the liquidity position of insurance companies remained good even in the *Adverse Scenario* and does not give rise to a need for significant asset sell-offs

Using the macro stress test, the CNB tests whether cash inflows (bond repayments, dividends received and other investment income, and premiums received) and cash outflows (claim settlement costs and other costs, dividends and taxes) are matched, as an excess of outflows over inflows requires insurance companies to draw on their liquidity buffers and potentially sell off their assets. The test results showed that in the domestic insurance sector as a whole, insurance companies would be able to cover cash outflows even in the case of the 10% annual lapse rate in life insurance considered in the *Adverse Scenario*. At the level of individual insurance companies, however, six insurance companies would have insufficient natural flows from investments for a part of the test period in both the *Baseline Scenario* and the *Adverse Scenario*. The total amount of assets sold off to raise additional funds would fluctuate from quarter to quarter, peaking at CZK 2 billion in the *Baseline Scenario* and CZK 3.7 billion in the *Adverse Scenario* (see Chart IV.8). The total volume of assets sold would be CZK 12.5 billion and CZK 20.0 billion respectively. This would not be a source of stress on domestic financial markets. However, asset sell-offs by insurance companies at a time of market uncertainty could contribute, in a way, to amplifying an adverse shock.

### 4.1.3 Stress tests of pension management companies

#### The stress tests of pension management companies assess the sector's resilience at the one-year horizon

The stress tests of pension management companies (PMCs) focus on assessing the risks to transformed funds (TFs) managed by PMCs at the one-year horizon.<sup>77</sup> Besides the *Baseline Scenario*, the sector's resilience to the *Adverse Scenario* was also tested; this variant captures adverse economic developments coupled with a drop in asset prices in financial markets (see section 2.1.3 and Table IV.1).

#### The PMC stress-testing methodology underwent further changes...

In this year's round, the stress test methodology saw a number of changes reflecting, among other things, comments made by the PMCs tested.<sup>78</sup> First, the look-through approach is now applied partially to TFs' investments in mutual funds. This means that a smaller haircut is applied to units of funds investing in safer assets than to units of funds investing primarily in equity. In last year's test, all units were subject to the same haircut as that for equity. However, this change has a relatively small impact, because, as regards mutual funds, TFs invest mostly in equity funds. Second, the shock to corporate bonds is no longer the sum of the shock to corporate bonds and the shock to government bonds of the issuer's country but is modelled independently of government securities. Third, the shock to government securities is applied to corporate securities underwritten by the government (typically issued by the CEB and the EIB) in order to take into account actual credit risk. Fee for the management of transformed and participation funds was credited to PMCs in an additional sensitivity analysis.<sup>79</sup>

#### Transformed funds are mainly sensitive to interest rate risk...

The effect of the risks considered on TFs' results is summarised in Table IV.5, Chart IV.9 and Chart IV.10. As TFs mostly invest in high-quality government bonds, general interest rate risk and credit spread risk for government bonds have the most significant effect. A rise in swap curves leads to a decline in total assets of 0.3% in the *Baseline Scenario*, whereas a movement in swap rates (mainly a decrease at the short end of the koruna curve) in the *Adverse Scenario* causes the value of assets to increase by 0.9% (see Chart II. 17F). The credit spread remained broadly unchanged in the *Baseline Scenario*. A widening of the credit spread for government and corporate bonds in the *Adverse Scenario* reduced the value of total assets (by 1.3% and 0.8% respectively). TFs holding a large proportion of their assets in fixed-rate koruna bonds with longer durations are again hit hardest by the materialisation of credit spread risk. TFs reduce the impact of a potential interest rate shock by holding bonds to maturity<sup>80</sup> (38% of the bond portfolio is valued at amortised cost)<sup>81</sup> and investing in floating-rate bonds (a further 24% of the bond portfolio).<sup>82</sup> By contrast, the impact of the interest rate shock is reduced only slightly by derivative hedging, especially in the case of koruna assets.

#### In the *Adverse Scenario*, the capital adequacy of some PMCs would fall below the required minimum

PMCs guarantee non-negative returns for the clients of their TFs by law. If a TF's assets decline below its liabilities, the relevant PMC is obliged to top up the TF's assets. This is the case for five PMCs in the *Baseline Scenario*. As a result of topping up TFs' assets by a total of CZK 0.8 billion, the capital adequacy of no PMC would fall below the required

77 Participation funds were not tested, as their market losses affect the funds' clients and not PMCs. Moreover, they account for 9.5% of the sector's total assets.

78 The current version of the methodology is available at [https://www.cnb.cz/export/sites/cnb/en/financial-stability/galleries/stress\\_testing/download/stress\\_testing\\_FPS\\_methodology.pdf](https://www.cnb.cz/export/sites/cnb/en/financial-stability/galleries/stress_testing/download/stress_testing_FPS_methodology.pdf)

79 Adding PMCs' remuneration for the management of assets in the transformed fund and participation funds in the maximum amount allowed by law reduced the number of PMCs needing capital injections in the *Adverse Scenario* to one and the size of the capital injection to CZK 0.3 billion.

80 In the case of market repricing of all bonds regardless of their accounting classification, in the *Adverse Scenario* total assets would fall by a further 0.8% and the size of the capital injection by PMC owners would rise by CZK 2.0 billion. Market repricing of the portfolio held to maturity would also lead to a need for a capital injection totalling CZK 0.1 billion in two PMCs even in the *Baseline Scenario*.

81 The law allows TFs to include high-quality government bonds of up to 35% of total assets in the portfolio classified as held to maturity, which is valued at amortised cost. This portfolio accounted for 30.4% of TFs' total assets in December 2018.

82 Floating-rate bonds held to maturity are not included in this 24%.

statutory level. Seven of the eight PMCs had to top up TFs' assets by a total of CZK 3.4 billion in the *Adverse Scenario*. This top-up caused the capital adequacy of three PMCs to fall below the required level, leading to negative capital in one of them. The PMC owners would have to inject capital of CZK 0.9 billion in order for their PMCs to satisfy the capital adequacy requirement.

### The impacts of the scenarios on PMCs decreased year on year...

The impacts of the *Baseline Scenario* and the *Adverse Scenario* on PMCs were lower in this year's test than in last year's. This was due mainly to smaller shocks to Czech government securities, which resulted from the fact that monetary policy rate increases and changes on international markets last year led to growth in government bond yields (see section 2.1) and hence to a partial correction in their prices. The room for further potential growth in government bond yields, or a decline in government bond prices, therefore decreased. A revision of market expectations regarding future increases in the monetary policy rates of the CNB and foreign central banks (see section 2.1) also indicates a lower probability of sharp growth in yield curves, especially at their long end. In addition, TFs are able to achieve higher returns on newly purchased bonds in an environment of higher yields. Both scenarios are thus less severe for TFs, so the value of their assets declined by 2.3 pp less in this year's stress scenario than in last year's (see Table IV.6). This difference can be broken down into the effect of the scenario (1.4 pp), the effect of the change in portfolio composition (0.7 pp) and the effect of methodological changes in stress testing (0.2 pp).

**Table IV.5**  
Results of the stress tests of PMCs

		<i>Baseline Scenario</i>	<i>Adverse Scenario</i>
PMC equity (start of test)	CZK billions	9.3	9.3
Capital ratio (start of test)	%	153.8	153.8
Change in TF asset value - general interest rate risk	CZK billions % of TF assets	-1.2 -0.3	3.7 0.9
Change in TF asset value - credit spread risk for corporate securities	CZK billions % of TF assets	-0.5 -0.1	-3.2 -0.8
Change in TF asset value - credit spread risk for government securities	CZK billions % of TF assets	-0.1 0.0	-5.7 -1.3
Change in TF asset value - exchange rate risk	CZK billions % of TF assets	-0.1 0.0	-0.2 0.0
Change in TF asset value - equity risk	CZK billions % of TF assets	0.2 0.0	-1.8 -0.4
Change in TF asset value - property risk	CZK billions % of TF assets	0.1 0.0	-0.2 -0.1
Total impact of risks on TF assets	CZK billions % of TF assets	-1.6 -0.4	-7.5 -1.8
TF asset top-up need	CZK billions	0.8	3.4
PMC equity (end of test)	CZK billions	9.2	6.4
Capital ratio (end of test)	%	152.7	105.3
Capital injection into PMCs	CZK billions	0.0	0.9

Source: CNB

Note: Start of test: end of 2018; end of test: end of 2019. TF stands for transformed funds. PMC stands for pension management company.

**Table IV.6**  
Year-on-year comparison of PMC stress test results in the *Adverse Scenario*

Test methodology	Last year's (FSR 2017/2018)	This year's	This year's	<b>This year's</b>
Scenario	Last year's (FSR 2017/2018)	Last year's (FSR 2017/2018)	This year's	<b>This year's</b>
Data on capital and exposures as of	31 Dec 2017	31 Dec 2017	31 Dec 2017	<b>31 Dec 2018</b>
Fall in TF asset value due to shocks considered (%)	4.1	3.9	2.5	<b>1.8</b>
TF top-up need (CZK billions)	6.5	5.3	2.7	<b>3.4</b>
Number of TFs needing top-ups	7	7	6	<b>7</b>
Injections by owners to meet capital requirements (CZK billions)	4.2	3.5	2.0	<b>0.9</b>
Number of PMCs needing capital injections to meet capital requirements	5	5	3	<b>3</b>

Source: CNB

Note: Remuneration for asset management is not included. This year's methodology includes assessment of corporate bonds underwritten by the government as government bonds and other technical changes. This year's scenario also includes a change in the method for calculating the shock to corporate bonds. PMC stands for pension management company.

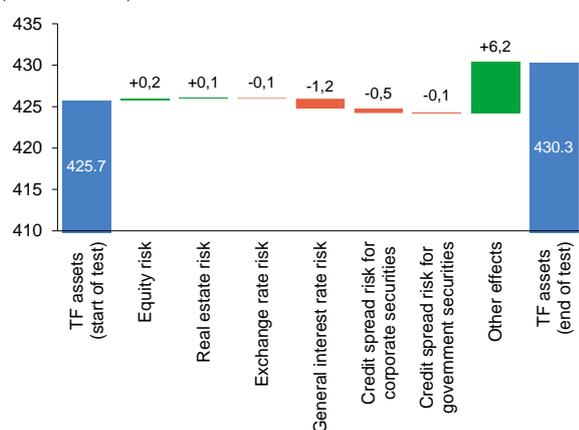
### ...but the PMC sector remains vulnerable to market developments

The lower capitalisation (see the combined capital surplus described in section 3.3.2) than last year means that a smaller shock in year-on-year terms may lead to a large proportion of PMCs needing to top up their TFs' assets and potentially also their own capital. In the *Baseline Scenario*, the number of companies needing to top up TFs' assets rose from three to five, but unlike last year all the PMCs should be able to withstand this scenario without topping up their capital. In the *Adverse Scenario*, seven companies top up TFs' assets again, while the number of PMCs needing capital injections decreased from five to three (see Table IV.6).

**Chart IV.9**

**Change in the value of assets of transformed funds due to the individual types of risks in the *Baseline Scenario***

(CZK billions)



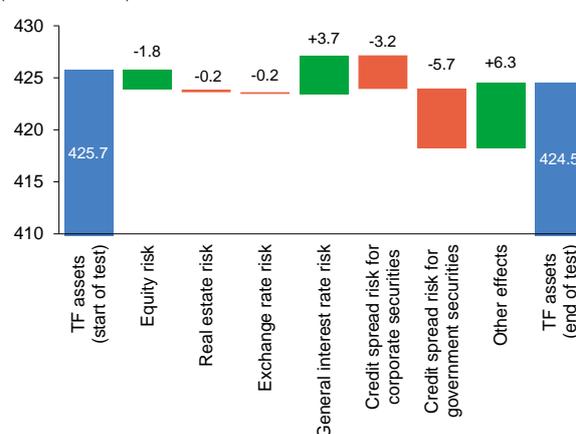
Source: CNB

Note: Other effects represent dividend income, bond coupons received, the return on the HTM portfolio and PMC's TF profit share. Change in the value of foreign-currency liabilities (cross-currency repos) is accounted for when considering exchange rate risk.

**Chart IV.10**

**Change in the value of assets of transformed funds due to the individual types of risks in the *Adverse Scenario***

(CZK billions)



Source: CNB

Note: Other effects represent dividend income, bond coupons received, the return on the HTM portfolio and PMC's TF profit share. Change in the value of foreign-currency liabilities (cross-currency repos) is accounted for when considering exchange rate risk.

## 4.2 BANK LIQUIDITY STRESS TESTS AND LIQUIDITY REGULATION

### The liquidity ratios confirmed the domestic banking sector's high resilience to liquidity risk

The banking sector's resilience to a short-term liquidity shock is tested using the liquidity coverage ratio (LCR). Sufficient available stable funding is monitored using the net stable funding ratio (NSFR). The aggregate LCR for the banking sector as a whole was 189% at the end of 2018<sup>83</sup> and all credit institutions were compliant with the regulatory limit of 100% required as from 2018 (see Chart IV.11). The NSFR was also at a sufficient aggregate level of 135% for the sector (see Chart IV.11).<sup>84</sup> The aggregate LCR and NSFR both rose compared with the end of 2017 and were sufficiently high during the year as well (the LCR averaging 174% and the NSFR 135%).<sup>85</sup> The high levels of both indicators were due to

83 The LCR in euros and dollars is below 100%. The euro- and dollar-denominated liquidity buffers were 37% and 92% respectively at the end of 2018. The euro/dollar liquidity buffer thus did not cover net expected euro/dollar outflows at the 30-day horizon at the end of 2018. No regulatory limit on the LCR in foreign currencies is set for banks.

84 A minimum standard specifying the calculation of the NSFR in the EU will be introduced by an amendment to the CRR (CRR II) expected to take effect during 2021.

85 The end-of-year LCR levels are slightly higher due to changes in banks' balance sheets relating to the optimisation of contributions to the Resolution Fund.

the composition of credit institutions' assets. The liquid assets in the LCR liquidity buffer accounted for 30% of banks' total assets at the end of 2018. The LCR liquidity buffer was composed entirely of liquid assets, to which no haircuts are applied in the case of the LCR (see Table IV.7) and which require no or very low coverage by stable funds in the case of the NSFR. The high ratios were also due to a strong base of retail deposits, which are considered stable funds subject to low expected outflows in crises (see Chart IV.12). For this reason in particular, building societies had the highest aggregate LCR. Unlike other bank groups, they traditionally have a high share of stable funds with a contractual maturity of over 3 months. On the other hand, their assets requiring coverage by stable funds in the NSFR account for almost 68% of total assets, with loans to natural persons and non-financial corporations dominating (see Chart IV.13).

**Table IV.7****The LCR for groups of banks**

(% of total assets of individual bank groups;  
as of 31 December 2018)

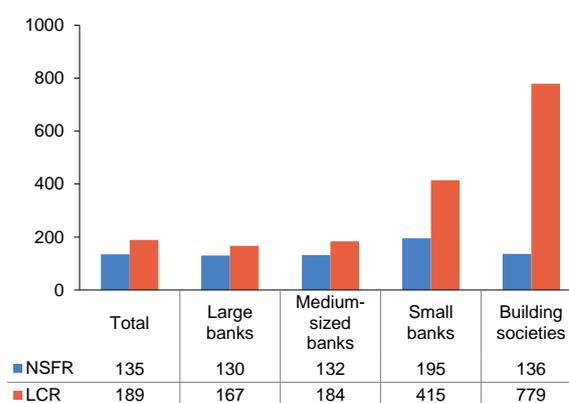
	Large	Banks Medium- sized	Small	Building societies	Total
Liquid assets	30	26	47	22	30
Liquidity buffer in liquid assets	30	26	47	22	30
Weighted average rate of eligibility after application of haircuts*	100	100	100	99	100
Expected outflows	21	17	13	3	19
Balances of outflows	91	75	95	26	85
Weighted average rate of outflow*	24	23	14	13	22
Expected inflows	4	3	2	0	3
Balances of inflows	31	23	38	4	28
Weighted average rate of inflow*	12	11	6	12	22
LCR	167	184	415	779	189

Source: CNB

Note: \*The extent to which items subject to haircuts, outflows or inflows in the stress period are represented in balance sheets. The results take liquidity subgroups into account and exclude state-owned banks.

**Chart IV.11****Comparison of selected indicators of bank balance-sheet liquidity**

(%; as of 31 December 2018)



Source: CNB

Note: The LCR is the ratio of the liquidity buffer to the net liquidity outflow of banks over a 30-day stress horizon as defined by EC Regulation 2015/61. The NSFR is the ratio of available stable funding to required stable funding as defined by Basel III. The results take liquidity subgroups into account and exclude state-owned banks.

**The CNB also assesses the banking sector's liquidity using its own macro stress test...**

Besides assessing short-term balance-sheet liquidity, the CNB conducts its own macro stress test.<sup>86</sup> The sufficiency of a bank's liquid buffer relative to the net liquidity outflow, i.e. the difference between expected outflows and inflows of liquidity, is tested over a one-year horizon (four maturity bands).<sup>87</sup> The model is a two-round one and takes into account the links between balance-sheet and market liquidity and the feedback reaction of the banking sector. The banking system is first hit by scenario-defined exogenous shocks, which banks react to under certain assumptions. Those reactions then change the reputation of each reacting bank and the systemic risk in the banking sector as a whole (endogenous shocks). The reactions are expressed through additional losses arising from the sale of assets from the buffer. Banks have a limited ability to increase their balance-sheet totals over the entire test period. Compared with the LCR or NSFR, the liquidity macro stress test allows for better testing of the impact of scenarios with lagged pass-through of the adverse economic situation to the quality of banks' loan portfolios and to the financial markets.

86 For details see the thematic article in FSR 2015/2016 The Relationship between Liquidity Risk and Credit Risk in the CNB's Liquidity Stress Tests.

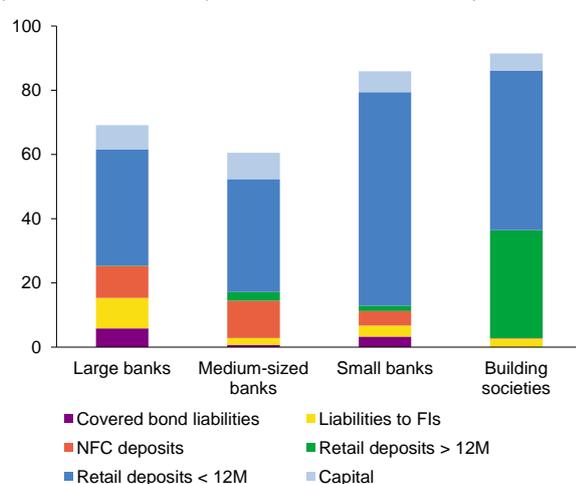
87 The expected inflows of liquidity are limited from above so that the minimum net outflow is 30% of the expected outflow.

The stress test was applied to 20 banks having their registered offices in the Czech Republic using the *Adverse Scenario* (see section 4.1 and Table IV.8) and the end-2018 data.<sup>88</sup> In the first round of stress, a liquidity outflow was generated for each maturity band by increasing the asset funding requirement (see Table IV.8, lines 3.1 and 3.6) amid lower sources (lines 3.2–3.5). At the same time, the inflow of expected liquidity (lines 2.1 and 2.2) for the relevant maturity band was lowered and some assets in the liquidity buffer<sup>89</sup> (lines 1.1 and 1.2) were revalued.

**Chart IV.12**

**Structure and amount of items ensuring stable funding**

(% of balance sheet; as of 31 December 2018)



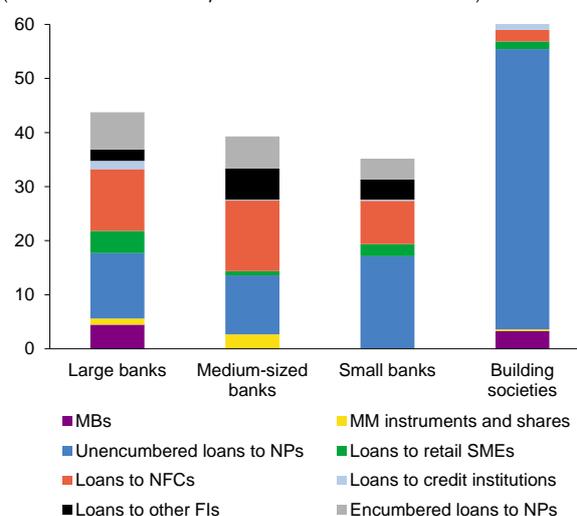
Source: CNB

Note: M = month, FIs = financial institutions, NFC = non-financial corporation.

**Chart IV.13**

**Structure and amount of items requiring stable funding**

(% of balance sheet; as of 31 December 2018)



Source: CNB

Note: MBs = mortgage bonds, NPs = natural persons, NFCs = non-financial corporations, MM = money market, FIs = financial institutions, SMEs = small and medium-sized enterprises.

**...which confirmed their high resilience even over a longer stress period**

The test results reveal that the banking sector as a whole would withstand the simulated stress and would be able to cover a net outflow of liquidity lasting even one year (see Chart IV.14). When the impact was measured using the aggregate decline in the total liquidity buffer, large banks were hit hardest (a decline of 75%), with a higher net outflow relative to their liquidity buffers. This year, building societies also recorded a relatively high impact (a decline of around 65%). The stress in this group of banks manifested itself as higher outflows of liquidity only from the second maturity bucket (3–6 months). However, the composition of building societies' liquidity buffer is riskier and was subject to larger haircuts over the entire stress period. Three banks would exhaust their entire buffer during the test – two in the second quarter and the third in the fourth quarter. This was mainly due to their relatively low or riskier liquidity buffer, which was not sufficient in relation to the maturity mismatch in their balance sheets and their funding stability and consequently was not enough to cover the outflows generated. However, this balance-sheet liquidity risk does not have a systemic dimension, as the assets of the banks that exhausted their liquidity buffers accounted for 4.6% of the total assets of all the banks tested.

88 State-owned banks, which have a specific business model, were not included in the stress test. The test takes liquidity subgroups into account.

89 Two liquidity buffer levels are monitored in the stress test. The level 1 liquidity buffer is defined as the sum of cash, claims on the CNB (excluding minimum reserves) and government bonds. The level 2 liquidity buffer additionally includes unencumbered corporate marketable securities.

### The CNB conducted a new idiosyncratic liquidity stress test

In simple terms, the idiosyncratic testing method extends the LCR calculation method to cover a longer stress horizon. An unlikely scenario with strict parameters, created solely for this test, is applied (see Table IV.1 CB and Table IV.2 CB). In contrast to the LCR, the value of highly liquid assets such as government bonds is subject to stress in the test (see Chart IV.1 CB). The purpose of the idiosyncratic test is to simulate the moment when outflows from a credit institution exceed inflows and the counterbalancing capacity in the form of the liquidity buffer is simultaneously exhausted. In other words, the moment when the liquidity gap turns negative is tracked over the course of the stress. The results of the idiosyncratic test (see Chart IV.15) confirmed the high resilience of domestic credit institutions. Three banks ended the third month with a negative liquidity gap. Overall, this liquidity shortfall amounted to 0.44% of the assets of all the banks tested. In all, 12 of the 17 banks tested would be capable of surviving after 9 months of an extreme liquidity shock. The negative liquidity gap would be 4.2% of the total assets of the banks tested.

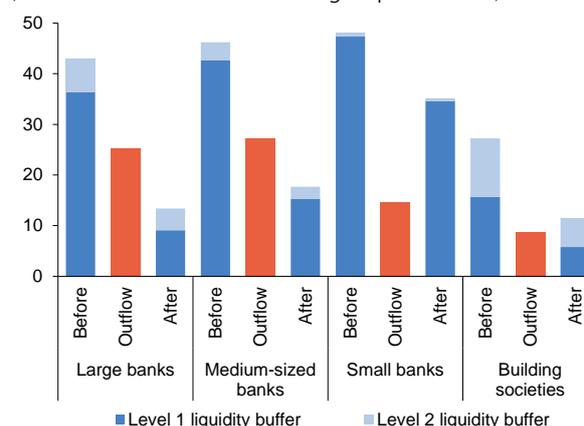
**Table IV.8**  
Scenario type and shock size in the liquidity stress test (%)

Balance sheet item/Maturity bands	< 3M	3M–6M	6M–9M	9M–12M
<b>1. Liquidity buffer</b>				
<b>Interest rate and equity shock</b>				
1.1 Change in yield curve in pp*				
1Y PRIBOR	-0.3	-0.5	-0.4	-0.2
5Y GB yield	-0.4	-0.2	-0.2	-0.1
1Y EURIBOR	0.0	0.0	0.0	0.0
5Y EUR GB yield	0.1	0.1	0.1	0.2
1.2 Haircuts from value of capital instrument	39,0	-	-	-
<b>2. Inflows</b>				
<b>Size of deduction from expected inflow</b>				
2.1 Secured claims	0.0	0.0	0.1	0.1
2.2 Unsecured claims due**				
on NPs	0.4	0.4	0.1	0.5
on NFCs and retail SMEs	0.1	0.2	0.2	0.4
<b>3. Outflows</b>				
<b>Expected outflow rate</b>				
3.1 Drawdown of credit lines	5.0	5.0	5.0	5.0
3.2 Issued debt securities	100.0	100.0	100.0	100.0
3.3 Retail deposits				
insured	3.3	3.1	3.3	3.1
others	6.6	6.3	6.6	6.3
3.4 Liabilities to NFCs				
secured	13.1	12.5	13.1	12.5
others	26.3	25.0	26.3	25.0
3.5 Liabilities to FIs				
secured	13.1	12.5	13.1	12.5
others	32.8	31.3	32.8	31.3
3.6 Growth in new loans, of which***				
Secured claims	1.2	1.7	1.5	1.0
due to NPs	0.6	1.7	0.8	0.0
due to NFCs and retail SMEs	0.0	4.3	0.5	0.0

Source: CNB

Note: The parameter values are the averages of those applied to individual banks. M = month, Y = year, NPs = natural persons, NFCs = non-financial corporations, FIs = financial institutions, GB = government bonds, SMEs = small and medium-sized enterprises. \* The haircut is determined by multiplying the change in the yield curve by the duration of the bond portfolio. \*\* Due claims on financial institutions were not subject to deductions in this scenario. \*\*\* The credit growth assumption is calculated using satellite models in macro stress tests of bank solvency.

**Chart IV.14**  
Results of the bank liquidity stress test (% of total assets of individual groups of banks)



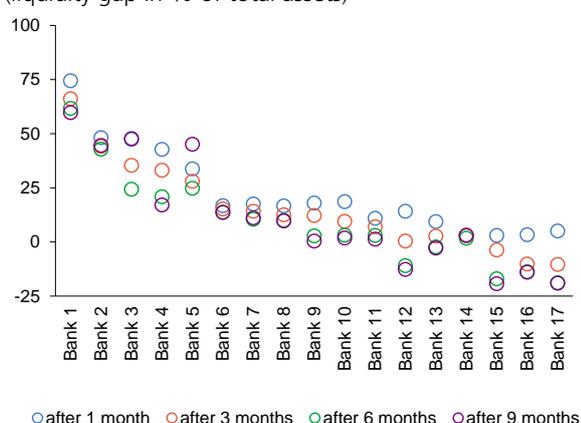
Source: CNB

Note: The column "Before" represents the pre-stress size of the liquidity buffer and the column "After" the post-stress size of the liquidity buffer. The column "Net outflow" represents the outflow of liquidity over the one-year horizon taking the liquidity inflow into account. The inflows are limited from above, i.e. a minimum net outflow of 30% of the expected outflow is assumed.

### Despite a higher share of short-term liabilities to non-resident credit institutions, a strong liquidity position persists in banks

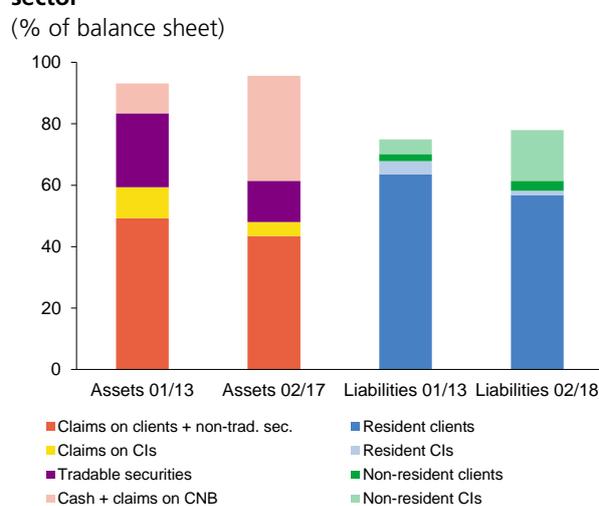
The high resilience of domestic banks to liquidity shocks is due mainly to a high share of liquid assets and a large excess of client deposits over client loans (see Chart IV.16). An elevated share of liabilities to non-resident credit institutions persists in balance sheets. Loans from non-resident credit institutions rose from 5% of total assets (January 2013) to almost 17% (February 2018). However, this type of funding source was deposited by domestic banks with the CNB. Claims on the CNB grew from 10% to around 34% of the total assets of the banking sector in the period under review.

**Chart IV.15**  
Results of the idiosyncratic liquidity test  
(liquidity gap in % of total assets)



Source: CNB  
Note: The results take liquidity subgroups into account and exclude state-owned banks. The liquidity gap is the final net outflow plus the final counterbalancing capacity comprising liquid assets for the month.

**Chart IV.16**  
Selected balance-sheet items of the domestic banking sector  
(% of balance sheet)



Source: CNB  
Note: CIs = credit institutions.

### According to banks' plans, coverage of loans by primary funds will remain high in the future

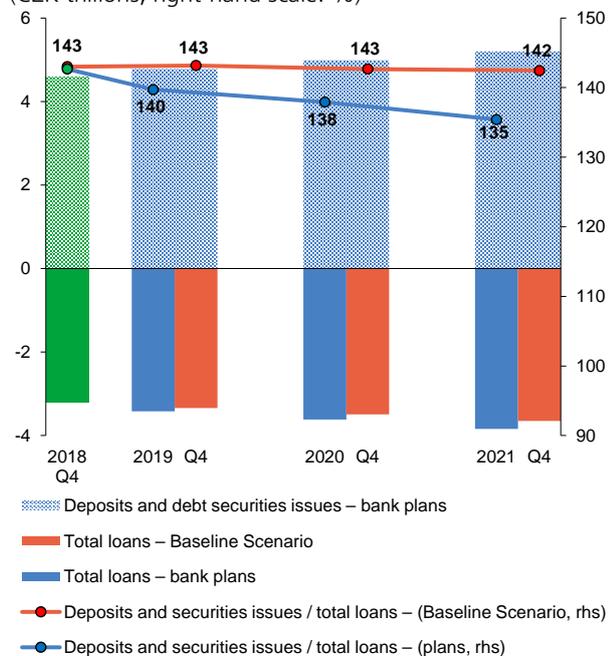
In their end-2018 funding plans, domestic banks expect loans to the private sector to increase on average by 5.6% year on year, from CZK 3.2 trillion to around CZK 3.85 trillion at the three-year horizon (see Chart IV.17). They are planning to increase private sector deposits and issuance of debt securities with maturities of at least three years from CZK 4.54 trillion to CZK 5.2 trillion.<sup>90</sup> The planned funds of banks would sufficiently exceed their planned loans and would even cover credit growth over the entire three-year horizon in the *Baseline Scenario* (see Table IV.1 and Chart IV.17). The three-year outlook for the coverage of loans by primary funds, i.e. the ratio of client deposits to loans, also remains high. Banks are planning to stay at similar levels in the medium term. This ratio would drop below 100% assuming slightly higher-than-planned growth in client loans (10%) and unchanged client deposits (see the simulation in Chart IV.18). These developments would force banks to cover growth in loans using other, potentially less stable, funds.

<sup>90</sup> Banks are planning to reduce the stock of covered bonds in their liabilities by CZK 13 billion by 2021. An amendment to the Act on Bonds (190/2004 Coll.) changing the rules for covered bonds has been in effect since 4 January 2019. The changes include a minimum level of over-collateralisation and bring the rules closer into line with European regulations.

Chart IV.17

### Funding plans of domestic banks

(CZK trillions; right-hand scale: %)



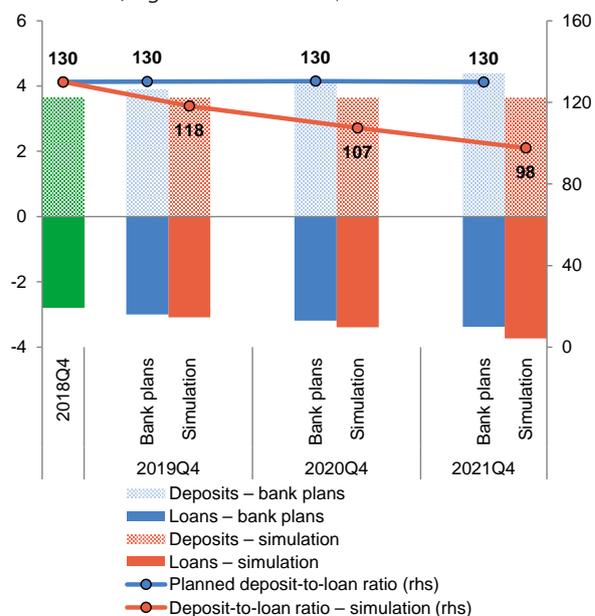
Source: CNB

Note: Includes loans and deposits to the private sector defined as households, non-financial corporations and financial institutions. Also includes debt securities with maturities equal to or more than three years. The green columns denote the position as of the end of 2018; positive values are deposits and securities issues and negative values are loans.

Chart IV.18

### Comparison of planned and encumbered client deposits and loans

(CZK trillions; right-hand scale: %)



Source: CNB

Note: Clients comprise households and non-financial corporations. The simulation involves 10% year-on-year growth in loans and unchanged deposits. The green columns denote the position as of the end of 2018; positive values are deposits and negative values are loans.

### 4.3 THE HOUSEHOLD STRESS TEST

#### The total debt of households with a secured loan is growing faster than their net income

The median net income of households<sup>91</sup> taking out a loan secured by residential property (a mortgage loan) has increased from less than CZK 32,000 to CZK 39,000 over the last four years (see Table IV.9). Median purchase prices of property have grown even more strongly. In 2015, the median price of a mortgaged property was CZK 1,620,000, whereas in 2018 it exceeded CZK 2,381,000, an increase of 47%. This growth is in line with the general trend on the Czech property market (see section 2.1, Chart II.11) and is also largely reflected in the median value of mortgage loans, which has grown rapidly in recent years. However, households' total debt has increased faster than their mortgage loans. This suggests that property purchases may have been part financed by additional unsecured loans or that mortgage loans have been provided to clients with high additional debt (see section 5.3.1, Chart V.17 and Chart V.18).

The available data show that mortgage applicants in the 18–30 age category usually declared lower incomes than applicants in higher age categories (see Table IV.10). Nevertheless, the loan amounts in this age category were the highest. This may reflect the fact that when they purchased property, households in higher age categories had higher savings accumulated in previous years. In the data sample under review, this is particularly apparent in the 51+ age group.

**Table IV.9**  
**Median values of loans to households for house purchase**

	2015	2016	2017	2018
Loan size (CZK thousands)	1,400	1,500	1,562	1,710
Year-on-year change (%)		7.14	4.13	9.48
Property purchase price (CZK thousands)	1,620	1,900	2,190	2,381.6
Year-on-year change (%)		17.28	15.26	8.75
Net monthly income (CZK thousands)	31.9	32.7	36.7	39.1
Year-on-year change (%)		2.43	12.57	6.37
Client's total debt (CZK thousands)	1,740	1,968.3	2,075	2,290.5
Year-on-year change (%)		13.12	5.42	10.38

Source: CNB

**Table IV.10**  
**Median values of loans to households for house purchase by age category in 2018 H2**  
(CZK thousands)

	18–30	31–50	51+
Share in survey (%)	27%	66%	7%
Loan size	1,915	1,800	1,400
One client	1,650	1,650	1,250
More than one client	2,304	2,000	1,500
Property purchase price	2,150	2,550	2,246
One client	1,980	2,359	2,110
More than one client	2,500	2,810	2,400
Net monthly income	32.6	42.7	45.8
One client	26.2	33.9	34.2
More than one client	41.8	49.6	53.7
Total debt	2,211	2,377	1,848
One client	1,900	2,081	1,571
More than one client	2,698	2,668	2,118

Source: CNB

91 This section of the Report analyses households that took out a loan secured by residential property. The data source for the analyses below is anonymised data from the Survey of new loans secured by residential property, conducted by the CNB since 2015.

### The household stress test enables the sector's resilience to be assessed

The household stress test<sup>92</sup> focuses on the risk of overindebtedness of households, whose potential debt service problems could transform into financial sector credit risk. This year's household stress test is based on the concept of borrowers' financial reserve for repaying debt under stress and that of the maximum hypothetically repayable loan.<sup>93</sup> The size of the financial reserve is derived from the borrower's net income minus essential expenditures, property maintenance costs and loan instalments. The financial reserve is deemed risky if it falls below 10% of the borrower's net income.<sup>94</sup> Households with a reserve below this level are considered "overindebted". The maximum hypothetically repayable debt is set on the basis of the maximum possible monthly loan instalment, which is equal to net monthly income minus essential expenditures, property maintenance costs and the minimum reserve (10% of net income). The resulting maximum monthly instalment is then multiplied by the number of repayment periods, where the length of this period is determined by the length of the borrower's economic activity, with the maximum possible maturity set at 30 years (360 months).

**Table IV.11**  
Stress test structure

1st part	Comparison of overindebted households by scenario	Actual value 2018	Baseline Scenario 2019	Adverse Scenario 2019	Chart IV.19
2nd part	Comparison of overindebted households by DSTI	Adverse scenario 2019 + increase in interest rates of:			Chart IV.20
		1 pp	3 pp	5 pp	Chart IV.21
		Adverse scenario 2019 + increase in interest rates of:			Chart IV.22
		3 pp			
3rd part	Ratio of total household debt to maximum hypothetically repayable loan by DTI	Minimum reserve of 10% of net income			Chart IV.23

Source: CNB

**Table IV.12**  
Key variables in the individual stress test scenarios

	Actual value		
	2018	Baseline Scenario 2019	Adverse Scenario 2019
Inflation (y-o-y CPI)	2.07	2.22	1.57
Nominal wage growth (y-o-y)	7.80	6.51	-1.39
Interest rate on consumer credit	8.63	8.84	8.24
Interest rate on mortgage loans	2.92	3.13	2.53

Source: CNB

Note: Interest rates are rates on koruna loans provided by banks to households in the Czech Republic. The rates predicted for 2019 are based on the prediction of government bond yields.

The stress test consists of several parts, each offering an alternative view of households' resilience (see Table IV.11). In the first part of the stress test, the financial situation of households (their financial reserve) in 2018 is compared with the situation in 2019 if the *Baseline Scenario* and the *Adverse Scenario* were to materialise (see Table IV.12). The second part of the stress test involves tracking households' financial situation under the *Adverse Scenario*, for which an additional shock in the form of a rise in interest rates is also simulated. This additional stress enables a potential increase in credit risk in the event of particularly adverse developments to be assessed. The last part of the stress test, based on the concept of the maximum hypothetically repayable loan, compares the size of the hypothetically repayable loan with the size of the actual loan. In this test, households are deemed overindebted if the ratio of the actual loan to the hypothetically repayable loan exceeds 100%.

92 The household stress test is conducted on data for individual households that took out a loan secured by residential property between 2015 H2 and the end of 2018.

93 The methodology is described in more detail in the thematic article The Introduction and Calibration of Macroprudential Tools Targeted at Residential Real Estate Exposures in the Czech Republic in FSR 2017/2018.

94 The figure of 10% of net income reflects the average household saving rate (see the thematic article The Introduction and Calibration of Macroprudential Tools Targeted at Residential Real Estate Exposures in the Czech Republic in FSR 2017/2018).

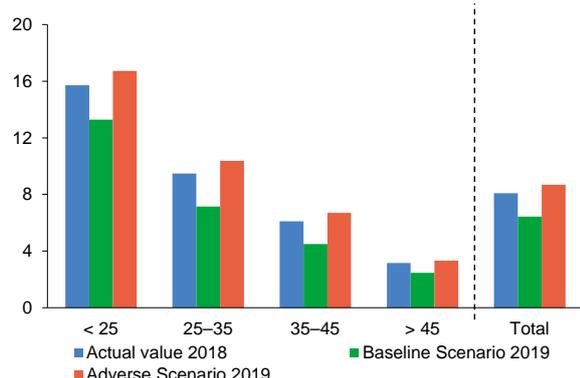
### The share of overindebted households with a mortgage is highest for borrowers with a net monthly income below CZK 25,000 in both scenarios

In 2018, almost one-sixth of households with a net monthly income of less than CZK 25,000 were exposed to increased financial stress as defined by a very low (less than 10% of net income) or even negative financial reserve (see Chart IV.19). If the *Baseline Scenario* were to materialise, the share of overindebted low-income households would fall by about 2.5 pp compared with 2018. The lower risk is due mainly to the strong wage growth forecasted for 2019. Were the *Adverse Scenario* to materialise, the share of overindebted households would conversely rise at the end of 2019. The substantial ratio of overindebted low-income households points to their increased sensitivity to adverse economic developments. The environment of strong consumer optimism and strong demand for debt-financed owner-occupied housing could thus lead to the financial default of large proportion of low-income households in the future. The share of overindebted households in the category of households with a net income of CZK 25,000–CZK 35,000 is almost half that in the low-income group (income below CZK 25,000), and in the income category of CZK 35,000–CZK 45,000 it is only one-third. The risk of default among high-income households with a net monthly income of more than CZK 45,000 is low.

Chart IV.19

#### Shares of overindebted households with a mortgage by income group

(x-axis: borrower's net income in CZK thousands; y-axis: %)



Source: CNB

Note: The calculation of the financial reserve in 2018 is based on data from Survey, with data from 2015, 2016 and 2017 adjusted for an income and price inflation.

### A potential rise in interest rates will mainly hit households with a DSTI of over 45%

The second part of the stress test examined the financial situation of households in the event of a rise in interest rates. The test is based on the assumption that the *Adverse Scenario* for 2019, for which additional increases in rates of 1, 3 and 5 pp were also simulated, materialises. The simulation maintained the contractual mortgage fixation periods, so the growth in interest rates affected less than 10% of loans. Floating rates were assumed in the case of additional debt.

This part of the stress test confirmed the sector's relatively high resilience to potential growth in interest rates when the ratio of debt service to net income is below 40%. However, the risk of default rises when the ratio is above this level and climbs sharply when it exceeds the recommended 45% level.<sup>95</sup> Assuming materialisation of adverse developments, an additional increase in interest rates of 1 pp can thus lead to increased financial stress for more than half of highly indebted households

95 See Official Information of the CNB of 12 June 2018: Recommendation on the Management of Risks Associated with the Provision of Retail Loans Secured by Residential Property. ([https://www.cnb.cz/export/sites/cnb/en/legislation/galleries/official\\_information/vestnik\\_2018\\_08\\_21018180\\_en.pdf](https://www.cnb.cz/export/sites/cnb/en/legislation/galleries/official_information/vestnik_2018_08_21018180_en.pdf)).

with an income of less than CZK 25,000 (see Chart IV.20) and almost one-third of highly indebted households with an income of more than CZK 25,000 (see Chart IV.21). A sharper increase in interest rates coupled with a cooling of the economy and unfavourable income developments would further increase the share of households at risk.

### Almost one-fifth of all mortgage loans were provided to households with a DSTI ratio of over 45%

The results of the second part of the household stress test also indicate that almost one-third of households with a DSTI ratio of over 45% would get into a very unfavourable financial situation characterised by a negative financial reserve if the *Adverse Scenario* supplemented by an additional increase in interest rates of 3 pp were to materialise. Just 3% of households with a DSTI ratio of 40%–45% would face the same situation. This reflects a sharp drop in credit risk. However, almost one-tenth of households with a DSTI ratio in this range would have a financial reserve of less than 10% of their net income (see Chart IV.22). A DSTI ratio of below 40% thus seems sufficiently safe and a DSTI ratio of over 45% insufficiently safe from the financial stability perspective (see section 5.3.1).

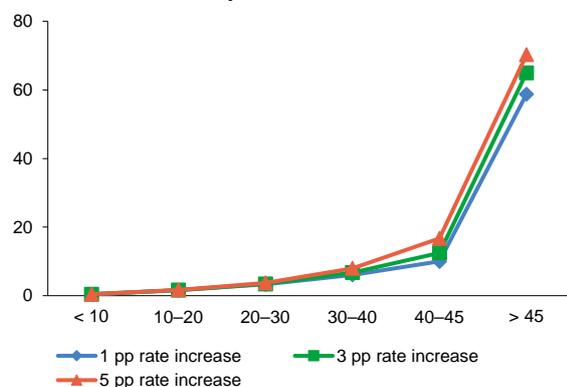
### Households drawing loans with a DTI ratio of over 10 do not usually have a sufficient financial reserve

The results of the third part of the household stress test reveal that the current debt of almost one-fifth of households exceeds the maximum hypothetically repayable loan. These households may thus get into an unfavourable financial situation in the future. Risk is accumulating particularly among households with a DTI ratio of over 10 (see Chart IV.23). In response to this potential risk, the CNB has issued a DTI recommendation according to which the ratio of applicants' total debt to their net income should not exceed 9 (see section 5.3.1).<sup>95</sup>

Chart IV.20

#### Shares of overindebted households with net income below CZK 25,000 by DSTI ratio

(x-axis: DSTI ratio in %; y-axis: %)



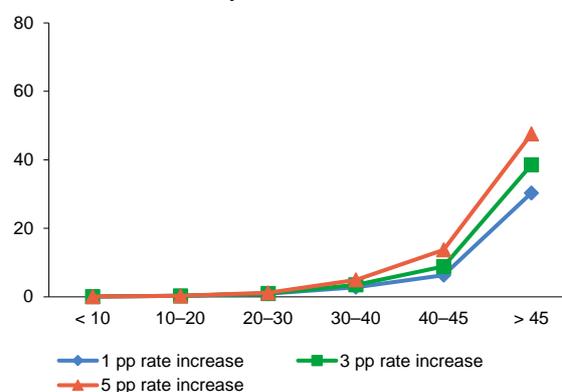
Source: CNB

Note: The simulation of growth in interest rates maintained the contractual fixation periods negotiated when concluding the mortgage agreement. Full refixation based on the chosen scenario is assumed for clients' additional debt. Interval closed from the right.

Chart IV.21

#### Shares of overindebted households with net income over CZK 25,000 by DSTI ratio

(x-axis: DSTI ratio in %; y-axis: %)



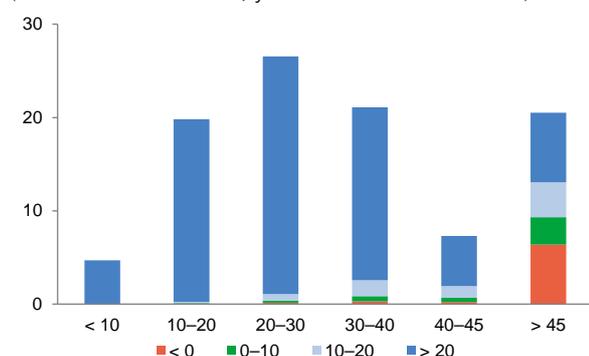
Source: CNB

Note: The simulation of growth in interest rates maintained the contractual fixation periods negotiated when concluding the mortgage agreement. Full refixation based on the chosen scenario is assumed for clients' additional debt. Interval closed from the right.

Chart IV.22

**Classification of loans by DSTI ratio and financial reserve under stress**

(x-axis: DSTI ratio in %; y-axis: share of loans in %)



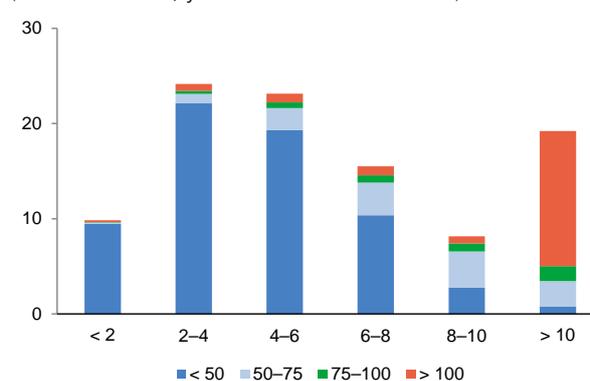
Source: CNB

Note: The shades reflect the size of the financial reserve in per cent of net income (colour scale below the chart). The simulation of growth in interest rates maintained the contractual fixation periods negotiated when concluding the mortgage agreement. Full refixation based on the chosen scenario is assumed for clients' additional debt. Interval closed from the right.

Chart IV.23

**Classification of loans by DTI ratio and ratio of all loans provided to hypothetically repayable loan**

(x-axis: DTI ratio; y-axis: share of loans in %)



Source: CNB

Note: The shades in the chart indicate the ratio of the loan provided to the hypothetically repayable loan (colour scale below the chart). For the maximum hypothetically repayable loan it is assumed that households have a reserve of 10% of their net income. Interval closed from the right.

#### 4.4 THE PUBLIC FINANCE STRESS TEST

##### The CNB reviews and evaluates the risks of concentration of sovereign exposures

Since 2015, based on its internal methodology, the CNB has been annually reviewing and evaluating the risks of concentration of exposures to sovereign issuers in the balance sheets of credit institutions having their registered offices in the Czech Republic.<sup>96</sup> In its *Financial Stability Reports* it informs the market about which sovereign exposures it has identified as systemically important and whether it will require relevant credit institutions to meet an additional capital requirement to cover the risk of concentration of these exposures at a three-year horizon. The methodology defines an important sovereign exposure as an exposure to a sovereign issuer with a minimum ratio of 100% to the credit institution's eligible capital. It becomes systemic if the assets of credit institutions with important sovereign exposures exceed 5% of the total assets of all the credit institutions operating in the Czech Republic, including branches of foreign banks. It is indicated that an additional capital requirement must be met if the three-year outlook for the credit risk indicator of the sovereign issuer (sovereign risk indicator, ISR) exceeds one of its thresholds.<sup>97</sup> The CNB requires additional capital where the credit institution holds exposures in excess of the limit and this above-limit exposure is not already sufficiently covered by capital.<sup>98</sup>

##### Exposures to Czech government debt were assessed as systemically important...

The CNB assessed domestic credit institutions' investments in Czech government bonds as a systemically important sovereign exposure. The value of these exposures rose by CZK 45 billion year on year to CZK 530 billion at the end of 2018, accounting

96 The internal methodology is described in FSR 2014/2015 and at [https://www.cnb.cz/export/sites/cnb/en/financial-stability/galleries/stress\\_testing/download/methodology\\_review\\_evaluation\\_of\\_sovereign\\_exposure\\_concentration\\_risk.pdf](https://www.cnb.cz/export/sites/cnb/en/financial-stability/galleries/stress_testing/download/methodology_review_evaluation_of_sovereign_exposure_concentration_risk.pdf).

97 The CNB primarily monitors two thresholds for the sovereign risk indicator (ISR): a soft threshold of 5% indicating the creation of an additional capital requirement where an additional expert analysis proves this to be necessary, and a hard threshold of 8% indicating unconditional creation of an additional capital requirement.

98 The above-limit part of a sovereign exposure is determined using the ISR where the latter exceeds its thresholds. The ISR provides a simplified assessment of the risk of default on a sovereign exposure. The threshold separating the limit and above-limit parts of a sovereign exposure gradually falls as this indicator increases. As a result, the above-limit part rises. The highest effective limit is 222% and the lowest is 0%.

for 8% of these institutions' total assets and around 106.5% of their total capital. Although the institutions' holdings of government bonds increased overall, the number of institutions with significant sovereign exposures declined. The assets of institutions with significant sovereign exposures accounted for 42.7% of total assets, as against 47% a year earlier. Exposures to other governments, the EU and the EIB were not found to be systemically important.

### ...but their riskiness did not exceed the thresholds

The ISR was estimated for systemically important exposures. Its three-year outlook was 0.66% (see Table IV.13) and did not exceed the supervisory thresholds of 5% and 8%. The CNB will therefore not require credit institutions having their registered offices in the Czech Republic to meet an additional capital requirement to cover the risk of concentration of exposures to the Czech government.

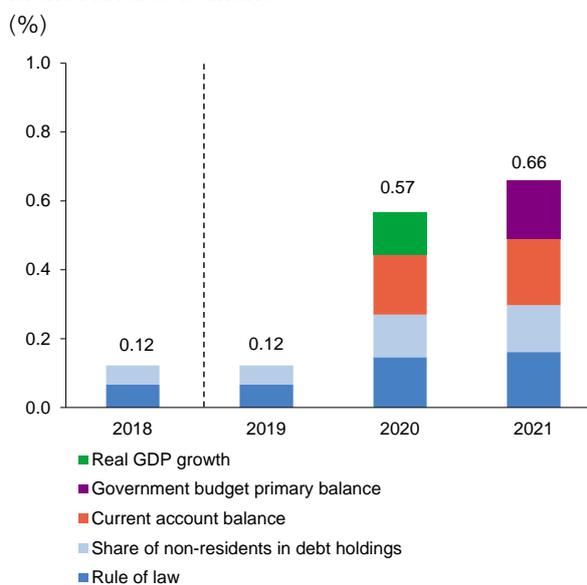
**Table IV.13**  
**Czech public finance stress test**  
(%)

	Actual value*		Adverse Scenario		Critical limit
	2018	2019	2020	2021	
<b>Macroeconomic variables</b>					
Real GDP growth (%)	2.8	-0.7	-4.9	-1.4	< -2.3
Current account balance (% of GDP)	0.5	2.0	-3.9	-4.8	< -1.8
Gross national savings (% of GDP)**	27.1	27.1	27.1	27.1	< 19.3
External debt (% of GDP)**	81.9	81.9	81.9	81.9	> 99.6
Difference between real 10Y GB yield and real GDP growth (pp)	-2.9	0.7	6.1	4.9	> 6.3
<b>Fiscal variables</b>					
Government debt (% of GDP)	32.7	32.0	37.6	42.8	> 64.7
Primary balance (% of GDP)	2.1	1.7	-1.7	-3.6	< -3.2
10Y government bond yield (%)	2.0	1.9	2.8	3.2	> 10.8
Government debt maturing within one year (% of GDP)	5.5	5.2	5.9	6.3	> 19.0
Share of government debt maturing within one year (%)	16.8	16.3	15.7	14.7	> 21.7
Share of foreign currency debt (%)	13.7	16.3	12.6	3.4	> 27.1
Share of non-residents in debt holdings (%)**	40.3	40.3	40.3	40.3	> 34.9
<b>Institutional variables</b>					
Government effectiveness (WGI score)**	1.0	1.0	1.0	1.0	< 1.0
Political stability (WGI score)**	1.0	1.0	1.0	1.0	< 0.8
Rule of law (WGI score)**	1.1	1.1	1.1	1.1	< 1.2
Banking crisis	No	No	No	No	= Yes
Past sovereign defaults	No	No	No	No	= Yes
<b>Sovereign risk indicator (ISR, %)</b>	<b>0.12</b>	<b>0.12</b>	<b>0.57</b>	<b>0.66</b>	

Source: CNB, CZSO, ECB, World Bank

Note: The symbol > (< or =) denotes that a higher (lower or equal) value means breaching of the critical limit and indication of increased risk. The figures are rounded. Indications of breaching of the critical limit are based on unrounded figures. Where the limit is breached, the relevant variables are further indicated in red. \* Values known when Inflation Report I/2019 was being prepared. \*\* Variable not modelled; last known value assumed in projection.

**Chart IV.24**  
**Decomposition of the sovereign risk indicator in the Adverse Scenario**  
(%)



Source: CNB, World Bank

Note: The vertical line divides the actual situation from the scenario horizon. Year-end data.

**Few of the variables under review exceeded the critical limit...**

The onset of the crisis assumed in the *Adverse Scenario* was gradual. With the exception of rule of law and the share of foreign holders of government debt, which are already now regarded as highly risky in terms of the ISR, none of the variables included in the ISR exceeded the critical limit in 2019. The ISR thus stayed at 0.12% (see Table IV.13 and Chart IV.24). In 2020, real GDP growth and the current account deficit also exceeded the critical limit in the *Adverse Scenario*, although the former returned below it the following year. However, the indicator of the general government primary balance newly exceeded the critical limit. As a result, the ISR rose to 0.57% in 2020 and 0.66% in 2021. Total government debt grew to 42.8% of GDP at the three-year test horizon. The deterioration in public finances was due mainly to lower tax revenue during a strong recession (see section 2.1.3 and Table IV.13). On the financial market, nominal Czech government bonds yields increased primarily at the longer end of the koruna yield curve. The ten-year government bond yield rose to 3.2% at the three-year test horizon due to growth in the risk premium. However, debt service costs did not rise significantly as a result, as a large part of interest costs at the test horizon consist of debt instruments issued in the past. Moreover, the growth in nominal Czech government bonds yields is not too high owing to the assumed drop in monetary policy rates.

**...and the low ISR level was also due to more favourable evolution of Czech government finances**

Czech government debt declined again year on year at the end of 2018 – by CZK 9 billion to CZK 1,741 billion. In relative terms, it has been decreasing since 2013, from 44.9% of GDP to 32.7% in 2018, due mainly to renewed economic growth. The favourable trends in these two variables reduced the impacts of the stress scenarios (see Chart IV.25) and were reflected in low levels of the three-year ISR. Government debt stayed well below the “debt brake” of 55% of GDP<sup>99</sup> at the three-year horizon even in an adverse macroeconomic situation. Czech government CDS spreads also remain low, although they have risen since last year as a result of heightened global risk perceptions on financial markets (see section 2.1).

**The external environment remains the main medium-term source of risk for the public sector...**

Viewed through the lenses of the ISR indicator, materialisation of the *Adverse Scenario*, which assumes a marked drop in economic activity abroad, is currently the biggest risk to Czech public finance sustainability. This would mean a drop in GDP, a primary government budget deficit and a current account deficit. The deterioration of macroeconomic fundamentals would probably be amplified by adverse sentiment on the bond market. Sudden shifts by investors into assets of the safest countries could lead to a correction in the prices of Czech government bonds and higher interest costs of new issues. The impact of higher debt service costs is simultaneously mitigated by low government debt and a high proportion of funding in the domestic currency.<sup>100</sup> The share of non-residents in holdings of Czech government debt has decreased since its peak in mid-2017 but is still relatively high, exceeding 34.9%. This level is regarded as risky by the CNB. Foreign investors are more sensitive to market sentiment and more focused on short-term profit and their investment strategies tend to be correlated. Larger-scale sell-offs by non-residents may thus have the potential to destabilise market prices, particularly in an environment of lower market liquidity. The risk of flight by foreign investors is partly mitigated by the higher residual maturity of their bond holdings. The average residual maturity of koruna government bonds, which non-residents hold in much greater quantities than foreign currency bonds, was 4.7 years at the end of 2018, 0.6 of a year more than the average for 2017.

99 Under Article 14 of Act No. 23/2017 Coll., on Budget Responsibility, the government must take steps leading to sustainable public finances if general government debt net of a cash reserve exceeds 55% of GDP. This does not apply if the economy is in a recession or recovering after a crisis.

100 The low share of government debt issued in foreign currencies (13.7%) means that the domestic government sector is facing low exchange rate risk.

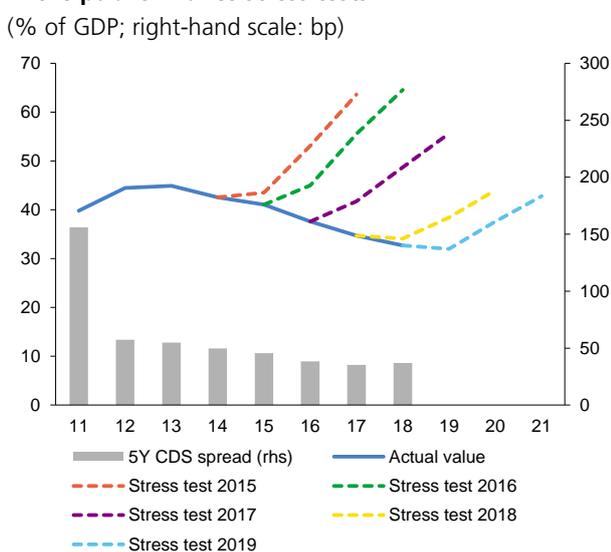
**...together, in the longer run, with the domestic government’s over-expansionary expenditure policy**

Total general government primary expenditure grew by 9.3% in 2018 due to both current and capital expenditure. This represents a sharp rise compared with previous years. The higher growth in current expenditure, due mainly to valorization of pensions and wage growth in the public sector, has a lasting impact on the expenditure side of the budget. The potential onset of a recession or an economic crisis leading to a fall in tax revenue could result in higher primary deficits than in the past and push government debt upwards. Unlike in 2018, the primary deficit thus exceeded the critical limit again at the three-year horizon after the application of this year’s stress scenario (see Table IV.13). While the higher government investment activity may increase the potential output of the economy, a high share of mandatory expenditure in a situation of a worse economic outlook and the presence of macroeconomic risks (see section 2.1) limits the room for fiscal policy to perform its stabilising function and for resolving future structural problems related to population ageing.<sup>101</sup>

**The average residual maturity of government debt increased, leading to a drop in refinancing risk**

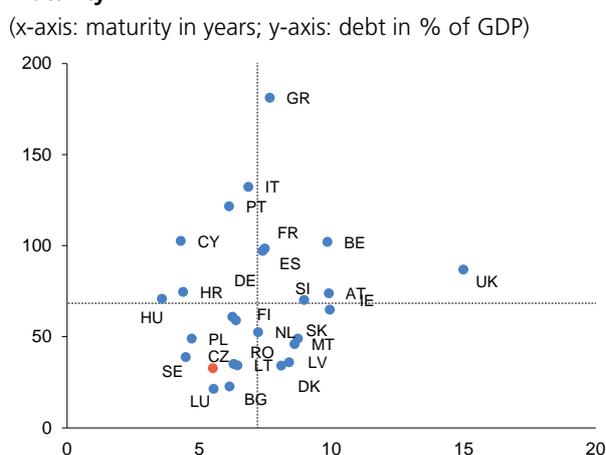
In previous Financial Stability Reports, the CNB noted the relatively short average maturity of Czech government debt. The average maturity of koruna government bonds reached a low of 4.4 years in August 2017. By the end of 2018, it had risen to 5.8 years, entering the tolerance band around the Ministry of Finance’s medium-term objective of six years with a permissible deviation of 0.25 of a year.<sup>102</sup> The average maturity of government debt in the Czech Republic is still short by European standards, as the European average is 1.7 years longer. The United Kingdom had the longest average maturity (15 years, see Chart IV.26).

**Chart IV.25**  
**Comparison of the trajectories of public debt in the public finance stress tests**



Source: Thomson Datastream  
 Note: Year-end data.

**Chart IV.26**  
**Government debt in EU countries and its average maturity**



Source: ECB, Eurostat  
 Note: The Czech Republic is indicated in red. The lines represent the unweighted average for the 27 EU countries. Data are not available for EE.

101 Czech Fiscal Council (2018): Report on the Long-Term Sustainability of Public Finances, and Ambriško et al. (2017): Assessing Fiscal Sustainability in the Czech Republic, CNB RPN 2/2017.  
 102 Ministry of Finance (2018): The Czech Republic’s Funding and Debt Management Strategy for 2019.