Results of the 2019 LSI stress test

Press conference on 23 September 2019
Agenda

I. Background

II. Survey

III. 2019 LSI stress test

IV. Real estate financing

V. Credit underwriting standards
Background to the 2019 LSI stress test

- **Fourth survey** since 2013 – focus of the survey: German “Less Significant Institutions” – LSIs

- This year, the Bundesbank and BaFin surveyed **1,412 banks and savings banks** regarding their current and future earnings and resilience

- Covers almost all **small and medium-sized institutions**; significant institutions under the European Central Bank (ECB)’s direct supervision are not included

- **89 % of credit institutions** and **38 % of the total assets** represented in the survey

- Survey filled out between **the start of April and the start of June 2019**, followed by quality checks until the start of September 2019

- The stress effect is used to determine the future **Pillar 2 Guidance**
Results of the 2019 LSI stress test

Agenda

I. Background

II. Survey

III. 2019 LSI stress test

IV. Real estate financing

V. Credit underwriting standards
## Overview of the survey results

### Institutions’ five-year planning data

<table>
<thead>
<tr>
<th><strong>Quality of planning</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximately half of the institutions had expected an upturn in interest rates and were therefore too optimistic in their plannings</td>
</tr>
<tr>
<td>Overall, plans have historically been rather conservative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Profitability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutions planning for increase from 0.42% to 0.46%</td>
</tr>
<tr>
<td>Figures too optimistic if upturn in interest rates does not occur</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Risk exposure</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk-weighted assets (RWA) increasing more quickly than total assets</td>
</tr>
<tr>
<td>Institutions agreeing longer-term fixed interest rates</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Solvency</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital ratios good overall in comparison with previous years</td>
</tr>
<tr>
<td>Just under 1/3 of the institutions planned for a reduction in Common Equity Tier 1 (CET1) ratios</td>
</tr>
<tr>
<td>Planned CET1 ratios increasing from 16.5% to 16.8% by 2023</td>
</tr>
</tbody>
</table>

### Rating

- Conservative planning provides buffer for downward revisions
- Return on assets at historically low level
- Consistent trend towards increased risk exposure can lead to considerable strain in the future
- CET1 ratios increasing but with higher risk exposure
Plans for increased return on assets too optimistic

Planned return on assets for 2023 compared with 2018
Return on assets in % / proportion of total revenue contribution as percentage points (p.p.) of total assets

- Clear differences between the forecasts of institutions planning for upturn in interest rates and those that are not
  - with upturn in interest rates: 18 %
  - without upturn in interest rates: -2 %.
- Due to the reduction in interest rates that has occurred in the meantime, it appears that even the plans without an upturn in interest rates are too optimistic.

Note: Impairments disclosed without reserves in accordance with section 340f of the German Commercial Code (Handelsgesetzbuch – HGB). Δ (Delta): Difference
Low liability-side margin contributions and declining structural contributions exert pressure

Contributions to net interest income in planning scenario

Margin contributions and structural contributions

Results of the 2019 LSI stress test
Institutions reported on their own planning data and on five interest rate scenarios defined by supervisors

Return on assets
Net profit for the year before tax to total assets

Note: “Static balance sheet” means that existing business that matures is replaced by equivalent new business with current conditions. “Dynamic balance sheet” means that there are no supervisory restrictions with regard to the balance sheet structure. bps: basis points

Results of the 2019 LSI stress test
Willingness to pass on negative interest rates has increased

Were negative interest rates on deposits passed on in the respective scenarios?

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Planning data (2017 survey on low interest rate environment)</th>
<th>-100 bps scenario</th>
<th>Planning data</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes, only in commercial business</td>
<td>8%</td>
<td>19%</td>
<td>33%</td>
</tr>
<tr>
<td>yes, in both retail and commercial business</td>
<td>9%</td>
<td>8%</td>
<td>49%</td>
</tr>
<tr>
<td>no</td>
<td>77%</td>
<td>31%</td>
<td>58%</td>
</tr>
</tbody>
</table>

Results of the 2019 LSI stress test
Management of climate risks still in early stages

To what extent do you currently take into account ecological and climate-related risks in your risk management?

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
<th>Risk Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>fairly comprehensively (1 %)</td>
<td>1 %</td>
<td>0.3 %</td>
</tr>
<tr>
<td>to some extent (33 %)</td>
<td>1 %</td>
<td>24 %</td>
</tr>
<tr>
<td>not at all, but planning to take these risks into account (22 %)</td>
<td>3 %</td>
<td>15 %</td>
</tr>
<tr>
<td>not at all (44 %)</td>
<td>9 %</td>
<td>33 %</td>
</tr>
</tbody>
</table>

What is your assessment of the risk to your institution with regard to ecological and climate-related risks?

- no answer given
- low
- moderate
- high

Results of the 2019 LSI stress test
Agenda

I. Background
II. Survey
III. 2019 LSI stress test
IV. Real estate financing
V. Credit underwriting standards
# Stress testing: Method and results

Simulation of the **full profit and loss statement (P&L)** over a **three-year stress horizon**

The simulation assumes a **severe economic downturn**

All **material risks** considered

<table>
<thead>
<tr>
<th>Interest rate risk</th>
<th>Market risk</th>
<th>Counterparty risk</th>
<th>Other P&amp;L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase of the yield curve by 45 to 173 basis points</td>
<td>Rise in interest rates (analogous to interest rate risk) and increase in credit spread between 71 and 1,446 basis points</td>
<td>Automatic calculation of the valuation reserves based on the probability of default (PD) and loss given default (LGD)</td>
<td>Forward projection on the basis of historical data, in case of some positions with haircuts</td>
</tr>
<tr>
<td>Net interest income on the basis of a simplified interest rate gap analysis</td>
<td>Haircuts on other positions of between 5.8% and 30.7%</td>
<td>PD and LGD paths dependent on starting parameters</td>
<td>Consideration of one-off effects on an individual basis</td>
</tr>
</tbody>
</table>

The German **institutions** proved to be resilient even **under stress**

On average, the **stress effect** was approximately **3.5 percentage points**

The stress effect is used to determine the future **Pillar 2 Guidance**

---

**Results of the 2019 LSI stress test**
Stress effect is mitigated significantly by net interest income

Cumulative impact of stress effects
Evolution of CET1 ratios between 2018 and 2021 by risk area

- The greatest stress impact occurs in the first year. The cause for this is the sudden shock to market risk.

- The worst CET1 ratio is obtained in the third year, at 13%. Without considering the rise in interest rates in the scenario an increase of 1 p.p. in CET1 ratio in 2021 would materialize.

- The net interest income continues to yield the best returns, even in a stress scenario.

- Credit risk and market risk together contribute 6.2 p.p. of the stress result.

- Other P&L items are dominated by administrative expenses.
Reduction in capital of just under four percentage points compared with the planning scenario

Comparison of change in capital

CET1 ratios between 2018 and 2021

- In the planning scenario, capital ratios rise marginally.
- In the stress scenario, the CET1 capital resources fall by 3.7 p.p. in comparison with the planning scenario.
- The stress effect is reflected in all significant revenue items. Effect mainly a result of credit and market risk.
- Other items are driven primarily by higher tax payments in the planning scenario.
- Dynamic effects such as an increase in the balance sheet total are not included in the stress scenario.

Results of the 2019 LSI stress test
Credit risk driven by exposures in default

Stress effect and share of risk volume by exposure class

Cumulative CET1 effect over three years

The stress scenario causes the exposures in default to more than double (increase by just under 150%).

The main driver for the stress effect in the credit risk is the default class.

The stress effect on the exposure classes sovereigns and institutions is, as is to be expected, marginal.

The stress effect on the exposure class residential real estate is also only minimal, despite the high exposure.
Clear stress effect from interest-bearing items

<table>
<thead>
<tr>
<th>Proportion in overall portfolio and proportion of stress effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct investment</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Proportion in portfolio</td>
</tr>
<tr>
<td>Proportion in stress effect</td>
</tr>
<tr>
<td>Direct investment</td>
</tr>
<tr>
<td>Funds</td>
</tr>
</tbody>
</table>

Interest-bearing items (incl. interest rate swaps) account for more than **90% of the portfolio dominating the stress effect** in the market risk.

**Non-interest-bearing items** (direct investments and held via funds incl. respective derivatives) have a disproportionately high contribution to the stress effect, in particular shares and real estate funds.

The stress effect is shown after **offsetting** the hedging-effects and price reserves.

On average, **derivatives** led to a **reduction** in the stress effect.

**There is no significant change in the risk taking** in comparison with the 2017 survey on the low interest rate environment.

---

**Proportion in portfolio (by rating class and risk category)**

<table>
<thead>
<tr>
<th>AAA</th>
<th>AA</th>
<th>A</th>
<th>BBB</th>
<th>BB and lower</th>
<th>Funds</th>
<th>Shares</th>
<th>Real estate funds</th>
<th>Other</th>
<th>Derivatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.8%</td>
<td>19.4%</td>
<td>18.5%</td>
<td>9.1%</td>
<td>1.7%</td>
<td>17.2%</td>
<td>3.0%</td>
<td>4.9%</td>
<td>0.6%</td>
<td>-0.1%</td>
</tr>
</tbody>
</table>

**Proportion in CET1 effect (by rating class and risk category)**

<table>
<thead>
<tr>
<th>AAA</th>
<th>AA</th>
<th>A</th>
<th>BBB</th>
<th>BB and lower</th>
<th>Funds</th>
<th>Shares</th>
<th>Real estate funds</th>
<th>Other</th>
<th>Derivatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.6%</td>
<td>10.0%</td>
<td>8.0%</td>
<td>8.2%</td>
<td>4.5%</td>
<td>1.6%</td>
<td>9.6%</td>
<td>10.6%</td>
<td>12.7%</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

- Credit-spread driven | Interest driven
Interest income still has compensating effect in stress test

Effect of interest rates on individual portfolios
Cumulative CET1 effect over three years

- Despite the assumption of a rise in interest rates, there is a fall in net interest income in the stress test.
- This is caused by the shorter interest rate fixation period on the liabilities side and assets with higher interest rates maturing.
- The majority of the interest income is earned through business with retail and commercial clients.
- Refinancing is primarily through retail deposits.
- Credit risk defaults lower interest income.
Agenda

I. Background

II. Survey

III. 2019 LSI stress test

IV. Real estate financing

V. Credit underwriting standards
Banks continuing to expand their real estate business

Retail residential real estate financing

Price (left axis, index 2010=100) vs. Expansion of credit portfolio (right axis, in %)

- Portfolio expansion at **highest level** since the financial crisis.
- The majority of the banks surveyed plan for further expansion.

Source: Bundesbank calculations based on price data from bulwiengesa AG; banking statistics, data for Monetary Financial Institutions (MFIs) adjusted for statistical changes.
Credit standards for residential real estate financing less conservative, but not critical

New business lending: retail residential real estate financing

Credit characteristics (volume-weighted)

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2018</th>
<th>Avg. loan-to-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. total loan amount</td>
<td>€134,360</td>
<td>€148,010</td>
<td></td>
</tr>
<tr>
<td>Avg. annuity</td>
<td>€7,061</td>
<td>€7,510</td>
<td></td>
</tr>
<tr>
<td>Avg. repayment rate p.a.</td>
<td>3.48%</td>
<td>3.25%</td>
<td>83.8%, 84.8%, 86.5%</td>
</tr>
<tr>
<td>Avg. interest rate p.a.</td>
<td>1.77%</td>
<td>1.83%</td>
<td></td>
</tr>
</tbody>
</table>

Source: 2019 survey on real estate financing, based on data from 1088 banks and savings banks with large residential mortgage portfolios. p.a. (per annum); per year

Results of the 2019 LSI stress test
Expansion of commercial real estate financing volume; no clear indication of credit standards loosening

Commercial real estate financing
Price commercial real estate
(Index 2010=100)

Lending volumes for existing and new business
(average share of total assets among surveyed banks)

Source: Based on data from 383 institutions with large commercial mortgage portfolios.

Source: vdpResearch GmbH.
Agenda

I. Background
II. Survey
III. 2019 LSI stress test
IV. Real estate financing
V. Credit underwriting standards
Indications for loosening of credit underwriting standards

Assessment of market competition in corporate financing since 2015

<table>
<thead>
<tr>
<th>Large increase</th>
<th>Increase</th>
<th>Reduction</th>
<th>Unchanged</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.3%</td>
<td>64.1%</td>
<td>1.0%</td>
<td>13.6%</td>
</tr>
</tbody>
</table>

Volume of stock and new business in sampled portfolios
(average share of total assets in %)

<table>
<thead>
<tr>
<th>2015 Stock</th>
<th>2018 New business</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.9%</td>
<td>4.1%</td>
</tr>
<tr>
<td>4.1%</td>
<td>13.1%</td>
</tr>
<tr>
<td>4.8%</td>
<td></td>
</tr>
</tbody>
</table>

Purpose of survey
- To investigate the trends in credit underwriting standards in corporate financing
- 105 banks were included in the survey
- Two portfolios were sampled: borrowers that are corporates with an annual turnover of between EUR 50 million and EUR 500 million (portfolio A) and corporates with an annual turnover of over EUR 500 million (portfolio B)

Results of the survey – on the basis of term loan structures
- Individual indicators for loosening of credit underwriting standards
- Share of new business with good credit ratings increased; meanwhile margins declined
- Approx. 85% of banks have seen an increase in domestic competition since 2015
- The particularities of contract terms and conditions of the portfolios are often becoming more similar

Results of the 2019 LSI stress test
Increase of unsecured shares and bullet loans

Uncollateralised proportion of new business

<table>
<thead>
<tr>
<th>Portfolio A</th>
<th>2015</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncollateralised share of partly collateralised loans</td>
<td>54.9%</td>
<td>78.5%</td>
</tr>
<tr>
<td>Proportion that is 100% uncollateralised</td>
<td>47.8%</td>
<td>72.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Portfolio B</th>
<th>2015</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncollateralised share of partly collateralised loans</td>
<td>85.8%</td>
<td>87.8%</td>
</tr>
<tr>
<td>Proportion that is 100% uncollateralised</td>
<td>73.4%</td>
<td>77.7%</td>
</tr>
</tbody>
</table>

Collateralisation

- The proportion of uncollateralised business has risen in both portfolios; the proportion that is “100% uncollateralised” has expanded; Meanwhile, no changes seen in banks’ internal policies for collateral allocation.
- Real estate collateral does not play a significant role; key risk indicator loan-to-value is therefore of little significance.

Repayment schedule

- The proportion of bullet loans has increased in portfolio A (slightly decreased in portfolio B). Meanwhile, the fixed interest rate periods have remained steady (portfolio A) or reduced (portfolio B).
Increasing importance of short maturities and good credit ratings

Trends in contract maturity

- **Very high proportion** of term lengths of *less than 10 years*; volume of contracts with terms between 10 and 20 years is falling
- **Reduction in average contract term** by around a year in each of the two portfolios with a slight increase in the average loan size

Credit ratings and margins

- **Increase in share of new business** contracts with *good credit ratings* in both portfolios; meanwhile decline of margins
- Heterogeneous development of interest rate spreads in portfolio B caused mainly by *one-off effects*

Types of contracts

- **Clear trend towards standard contracts**; doubling of share of new business contracts to 48% in portfolio A and 25% in portfolio B
Results of the 2019 LSI stress test

Press conference on 23 September 2019