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STRESS TESTS – A TOOL FOR ANALYSIS AND MANAGEMENT OF BANK RISK

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Abstract: This paper describes stress tests as one of the important tools for analyzing and managing bank risk. Emphasis is placed on stress tests conducted in 2016, as the results are monitored at the level of the banking system and at the level of commercial banks.
Keywords: Stress tests, banking system, commercial banks, risk, bank management

This paper aims to analyze the role of stress tests as an important tool in the process of analyzing and managing bank risk, similarly to track the main results of Bulgaria's stress testing of the banking system in 2016.

1. STRESS TESTS AS WAYS AND MEANS FOR ANALYZING AND MANAGING BANK RISK

Stress tests are a relatively new and innovative approach in the bank system and more precisely to the bank risk management. These are a kind of analysis that is done to determine if the bank has enough capital to withstand the effects of unfavorable events. Stress tests can be seen as a useful addition to the Basel measures as they offer flexibility in terms of time frame and in the same time - scenarios and enable simulation of economic and financial crises.

According to the Bank for International Settlements (BIS), "stress test" is a general term that describes different techniques used by financial firms to gauge their potential vulnerability to exceptional, but plausible events (Bank for International Settlements, 2000, p. 2). That is to say, the focus of the stress tests is on events unlikely to occur, but at the same time poses a great potential loss. The International Monetary Fund defines stress testing as a technique that measures the vulnerability of the portfolio, an institution, or an entire financial system under different hypothetical events or scenarios. It is a quantitative "what if" exercise, estimating what would happen to capital, profits, cash flows, etc. of individual financial firms or the system as a whole if certain risks were to materialize (Viñals, 2012, p. 8).

Stress tests are intended to detect weaknesses in the banking system at an earlier stage. The aim is to be able to take preventive action by banks or regulators. They allow banks to establish relationships between exposures that occur only under unfavorable conditions. These may be, for example, complex chain reactions from events that involve the occurrence of unforeseen risks (e.g. liquidity risk) as well as events of a second or a farther order (BNB, Ukazania za upravlenieto na riska ot kontsentratsia v ramkite na protsesa za nadzoren pregled (Prerabotena ramka), p.5).

Risk management is one of the most important problems that commercial banks have to solve as it affects their liquidity, profitability, capital adequacy, etc (Baklicharov, 2005, p.294). Stress tests are a tool for risk management and are aimed at identifying different scenarios and those risk factors that can lead to threatening the operation of the Bank's operation. Using this analysis, the bank can value the weaknesses in its business model, business strategy, and capital planning.

Having the results of the stress tests, the bank has the opportunity to take appropriate management actions that it would take in unfavorable events to maintain its capital adequacy. The bank chooses what measures to adopt, as well as when it will be applied. If necessary, some are taken immediately.

2. MAIN RESULTS OF THE STRESS TESTS IN BULGARIA

In the Republic of Bulgaria stress test runs in 2016 as part of the comprehensive assessment of the banking system, taking into account the results of the AQR analysis. The test provides an opportunity to track the development of a bank's capital position under a baseline scenario and in an unfavorable scenario, allowing a "static" balance over a three-year period until 2018. The ultimate aim is to establish the ability of commercial banks to absorb unexpected losses as a result of adverse shocks. The general conditions for conducting the stress test are listed in Table 1.

Table. 1. General considerations for a commercial bank stress test, 2016

<table>
<tr><td>Horizon of simulation</td><td>2016–2018 г.</td></tr>
<tr><td>Scenario</td><td>Baseline scenario and adverse scenario</td></tr>
<tr><td>Approach</td><td>In accordance with EBO's test</td></tr>
<tr><td>Main principle in simulaton</td><td>„Static balance“</td></tr>
<tr><td>Starting point of the simulation</td><td>31.12.2015</td></tr>
<tr><td>Reference value of CET1[1]</td><td>• Under baseline scenario – 8%
• Under adverse scenario – 5,5%</td></tr>
<tr><td>Consolidation level</td><td>On an individual basis</td></tr>
<tr><td>Simulation of hypothetical income levels for 2016-2018</td><td>Recognition methods, applied in accordance with IAS and the FINREP format, are used – effective as of December 31, 2015</td></tr>
<tr><td>Types of risk affected by simulation hypotheses</td><td><table><tr><td>Risk</td><td>Baseline scenario</td><td>Adverse scenario</td></tr><tr><td>Credit</td><td>X</td><td>X</td></tr><tr><td>Market</td><td></td><td>X</td></tr><tr><td>Interest rate</td><td></td><td>X</td></tr></table></td></tr>
<tr><td>Stress test approach</td><td>Bottom-up (with preliminary restrictions)</td></tr>
</table>

Source: Ukazania za provezhdane na stres test na bankite, 2016 (in Bulgarian)

The stress test is carried out in accordance with the approach proposed by the EBA for the EU and the guidelines developed by the BNB. The methodology is focused on the specifics of the Bulgarian economy, but the final results do not lead to an assessment of banks 'passed' / 'failed'. It features more conservative approach compared to the last given by the EBA stress test applied by EU countries.

The incoming data on which the stress test is based are the final results of the AQR analysis that are "simulated" to see how the capital of the bank would react to by 2018. Two stressed macroeconomic scenarios with a horizon of three years 2016 to 2018) – a baseline scenario and an aggravated (unfavorable) scenario. Two microeconomic scenarios with horizon of three years (from 2016 to 2018) are placed for stress testing – a basic (baseline) scenario and an aggravated (adverse) scenario. In order for the test to be considered successful, the indicators must meet the minimum required by Basel, i.e. in the baseline scenario, the bank remained at least 8% CET1 and 5,5% in the case of the underlying scenario.

After the stress tests, the BNB publishes the results at the level of the banking system and at the individual level for each commercial bank. The results for the *banking system* of the two scenarios for the three-year simulated period can be seen in Figure 1.

Simulation in a **baseline scenario** shows that the CET1 size of the banking system could improve by 3,3% by 2018 compared to its size after AQR adjustments. The overall effect of the complex valuation is an increase of CET1% by 2,2% from 20% to 22,2% at 31.12.2018. Under the **aggravated scenario**, in the hypothesis of worsening the macroeconomic environment, CET1% would have fallen to 14,4%, taking into account the additional impact of a reduction in risk-weighted assets, but bring forward the resilience of the banking system. The main reason for the decrease is primarily related to losses on credit portfolios.

[1] CET1 = Common Equity Tier 1

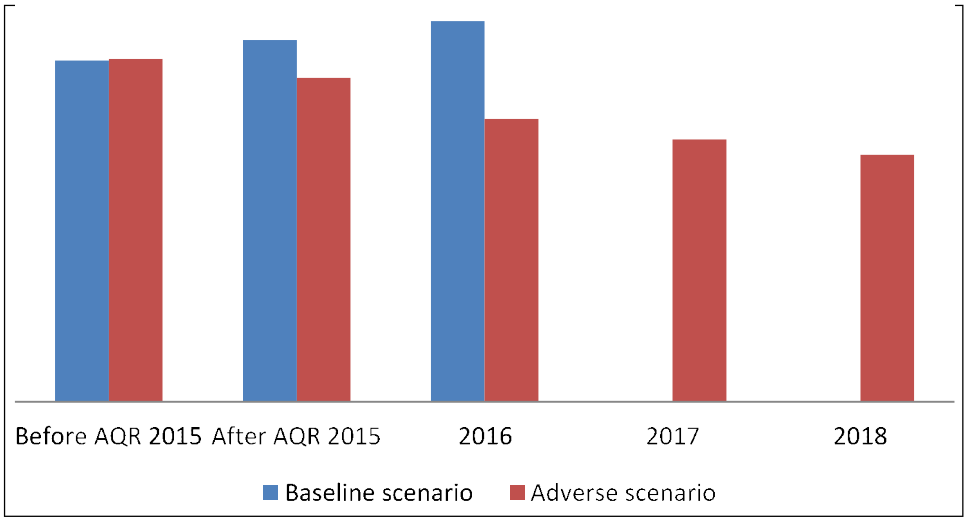

Fig. 1. CET1% at the banking system level in a baseline and adverse scenario

In terms of *individual results* (Table 2), banks with CET1 values above 8% under the baseline scenario and above 5,5% under aggravated scenario are considered to be sufficiently capitalized. Others have capital scarcity.

Table. 2. CET1% in a baseline and adversescenario for commercial banks

Commercial bank	Baseline scenario, %			Adverse scenario, %		
	2016	2017	2018	2016	2017	2018
Allianz Bank Bulgaria AD	16,4	17	16,1	15,7	15,5	15,2
DSK Bank EAD	16,5	16,5	16,7	15,5	15,5	15,4
Piraeus Bank Bulgaria EAD	21,5	20,4	19,2	19,5	16	12,8
Bulgarian American Credit BankAD	21,5	20,6	19,5	17,9	14,7	12
Bulgarian Development Bank AD	54,6	55,4	56	52,6	53,2	53,2
Investbank AD	3,8	1,1	-1,6	1,4	-3,5	-7,7
International Asset Bank AD	13,2	11,1	9	11	7,1	3,7
United Bulgarian Bank AD	26,7	30,4	34	25,5	25,7	25,8
Municipal Bank AD	17,2	17	17	12,4	9,2	6,5
ProCredit Bank Bulgaria EAD	20,2	20,1	19,9	16,8	16,6	16,4
First Investment Bank AD	6,7	8,3	9,9	0,9	-3,1	-6,9
Raiffeisenbank (Bulgaria) EAD	26,9	26,1	25,1	23,1	22,3	22,4
CiBank EAD	18,6	19,4	20,2	15,8	15,1	14,9
SocieteGeneraleExpressbank AD	16,1	18	19,8	14	14,2	14,3
TeximBankAD	18,1	16,6	15,1	14,3	10,5	6,8
TBI Bank AD	29,2	36,3	43,6	21,3	21,8	22,1
Tokuda Bank AD	19,1	18,9	18,8	12,1	6,2	0,9
Victoria Commercial Bank AD	18,6	12,6	6,5	17,7	11,1	4,6
D Bank AD	19,3	19,4	20,4	16	14,9	13,7
UniCreditBulbank AD	26,2	28,8	31,6	18,9	18,1	18,3
Central Cooperative Bank AD	13,1	13,5	13,9	10,4	8,3	6,5
EurobankBulgaria AD	22,8	24,7	27,1	20,5	20,2	19,7

Source: BNB, Doklad za pregleda na kachestvoto na aktivite i stres testovete na balgarskata bankova sistema, 2016 (in Bulgarian)

The detailed results at an individual level show that almost all commercial banks operating on the territory of Bulgaria are **well capitalized** and they have the potential to incur losses under the aggravated macroeconomic and financial scenarios.An exception is the results for Investbank, First Investment Bank, International Asset Bank and Tokuda Bank. In order to improve their performance, these banks implement measures coordinated with the BNB.

CONCLUSION

In **conclusion**, stress tests can be said to be a useful tool at local level, as banks improve their capital. Those who fail to pass the test have plans to restructure and raise capital.

The stress tests show that the banking system in the Republic of Bulgaria is successfully managed under conditions of a simulated crisis situation. The main benchmark of banks for financial stability – **CET1**, following the stress test, **is above the required minimum**. It has a value of 18,9% after the AQR analysis at the regulatory minimum required by the Basel Accords of 4,5%. The stress test demonstrates an improvement in the indicator to 22,2% in 2018 if macroeconomic forecasts materialize and drops to 14,4% in the event of a deep economic crisis. The results of individual banks also give reason to assert that **their capital position is stable with the ability to absorb shocks under unfavorable market conditions.**

The results of the stress test lead to the conclusion that the general level of capital requirements in the system is not expected to increase. Based on the results of the stress test, it is expected that the definition of supervisory measures will be modified and this may have an effect on the requirements of the second pillar of the Basel Accord. In this sense, a possible decrease of CET1 in certain banks (especially in the adverse scenario) could also be a factor in defining the second pillar guidelines.

The actions of the Central Bank in Bulgaria with a view to publishing the results not only at the level of the banking system but also on the individual results for each commercial bank are also positively evaluated. The author shares the view that with this action, the BNB contributes to **greater transparency** and **confidence** in the banking system.

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