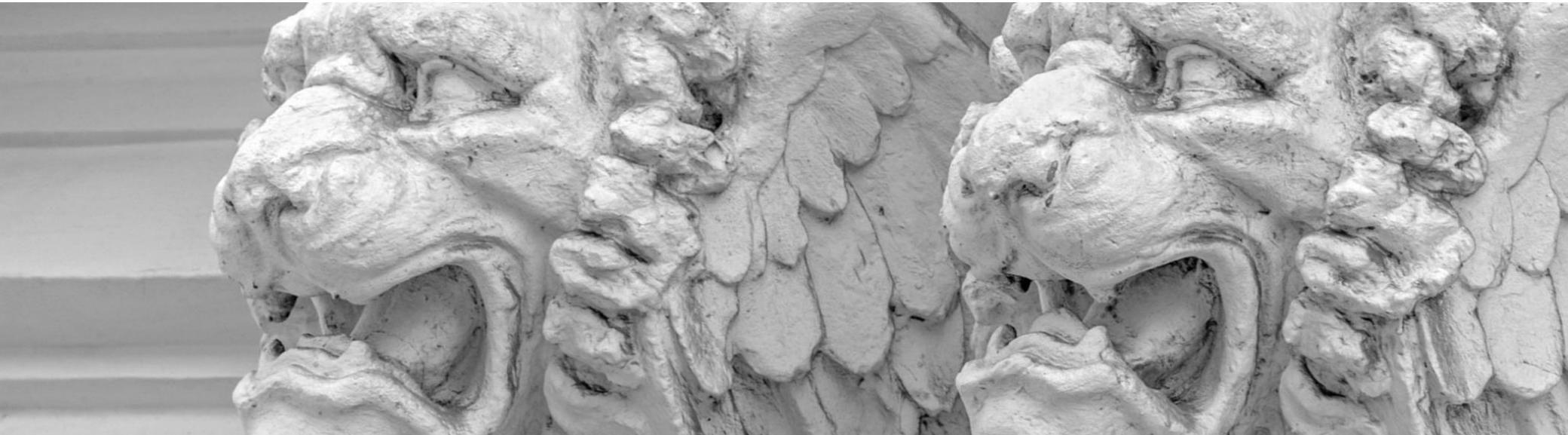




Bank of Russia

The Central Bank of the Russian Federation



# The BoR Approach to Macroprudential Stress Testing

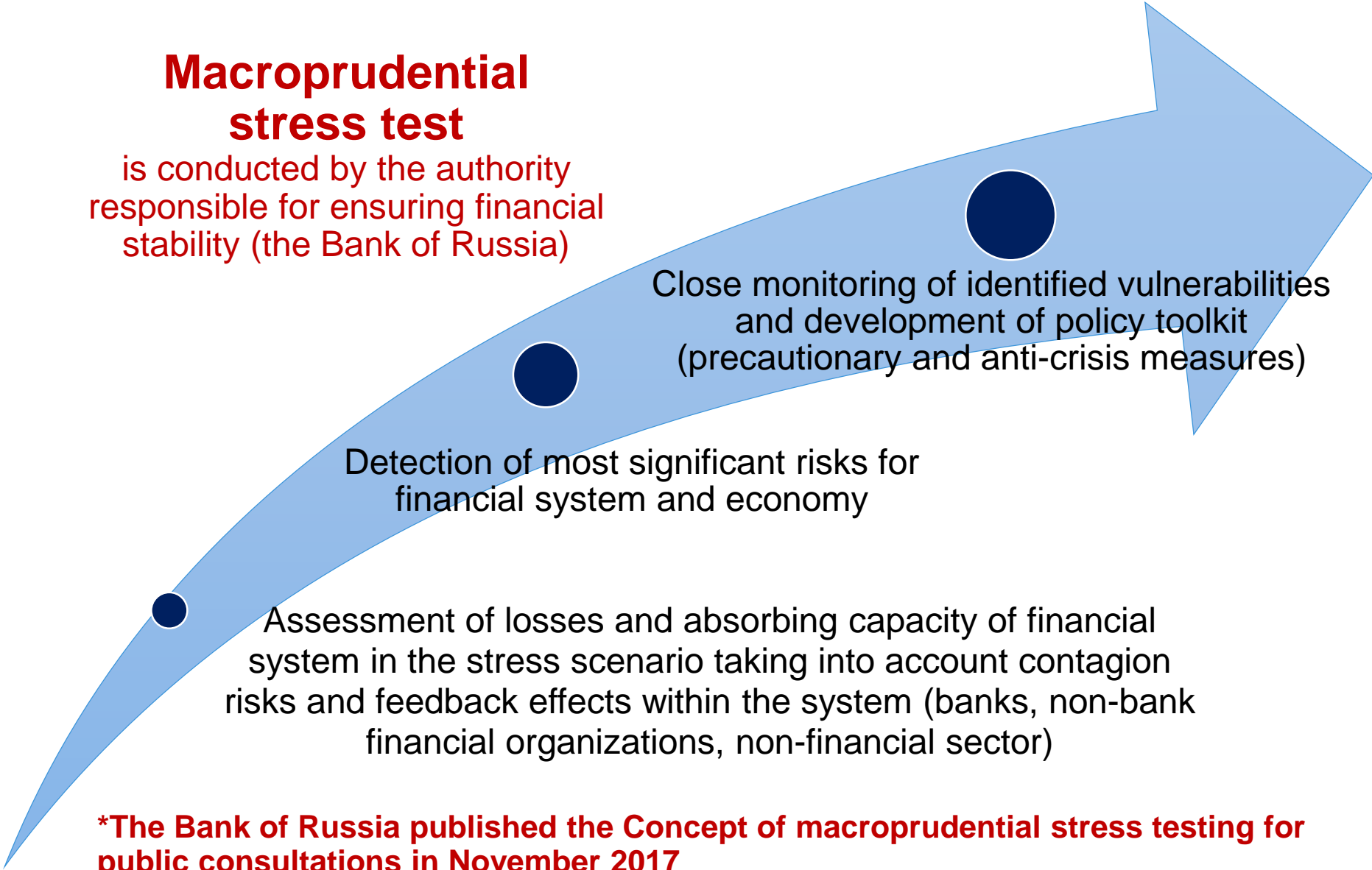
September, 2018

Financial Stability Department



## Macroprudential stress test

is conducted by the authority  
responsible for ensuring financial  
stability (the Bank of Russia)



Close monitoring of identified vulnerabilities  
and development of policy toolkit  
(precautionary and anti-crisis measures)

Detection of most significant risks for  
financial system and economy

Assessment of losses and absorbing capacity of financial  
system in the stress scenario taking into account contagion  
risks and feedback effects within the system (banks, non-bank  
financial organizations, non-financial sector)

**\*The Bank of Russia published the Concept of macroprudential stress testing for public consultations in November 2017**



## Planning anti-crisis measures

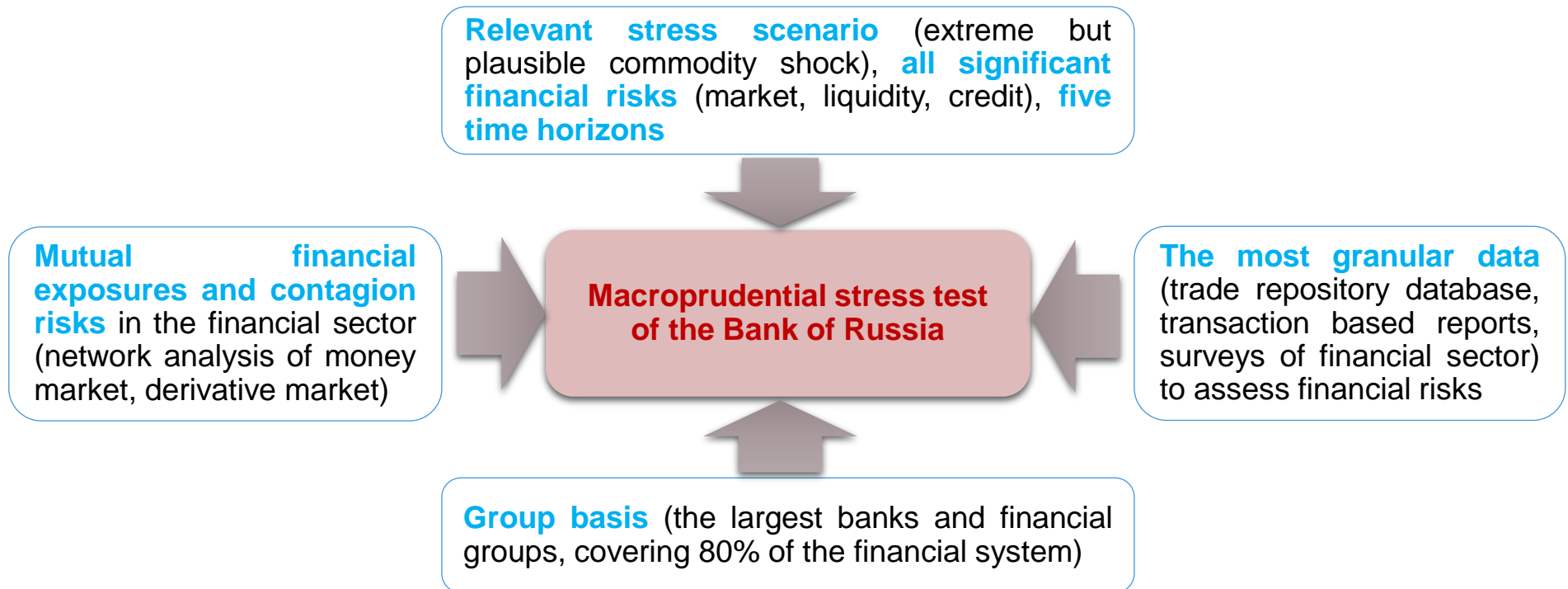


- Assessing amount of funds that may be required for recapitalization of banks
- Planning anti-crisis refinancing policy in ruble and FX
- Timing of regulatory forbearance measures

## Implementing macroprudential policy



Macroprudential stress testing is supposed to provide analytical support for macroprudential policy framework (countercyclical capital buffer and macroprudential add-ons to risk weights)





## **Stress test perimeter (2017) – 39 largest banking and financial groups**

- Banks (73 banks which account for about 85% of the banking sector assets)
- Non-governmental pension funds with an amount of assets under management in each fund exceeding 20 billion rubles (14 NPFs which accumulate almost 90% AUM)
- Systemically important insurance companies (14 insurance companies, which account for more than 60% of assets)

## **Stress test perimeter extension (2018)**

- Broker-dealers
- Development institutions (Vnesheconombank, DOM RF)



## Global risks

- Major central banks policy normalization
- Escalation of trade conflicts
- Political risks

## Decline in oil prices

### Potential shock



On demand side (world economic growth decline)



On supply side (extensive growth of oil production in US and other countries)

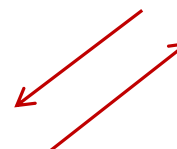
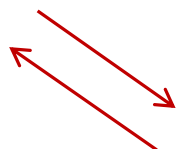
## Spillover effects

**Market risks (volatility, higher rates, capital outflow, FX liquidity shortage)**

Second round effects

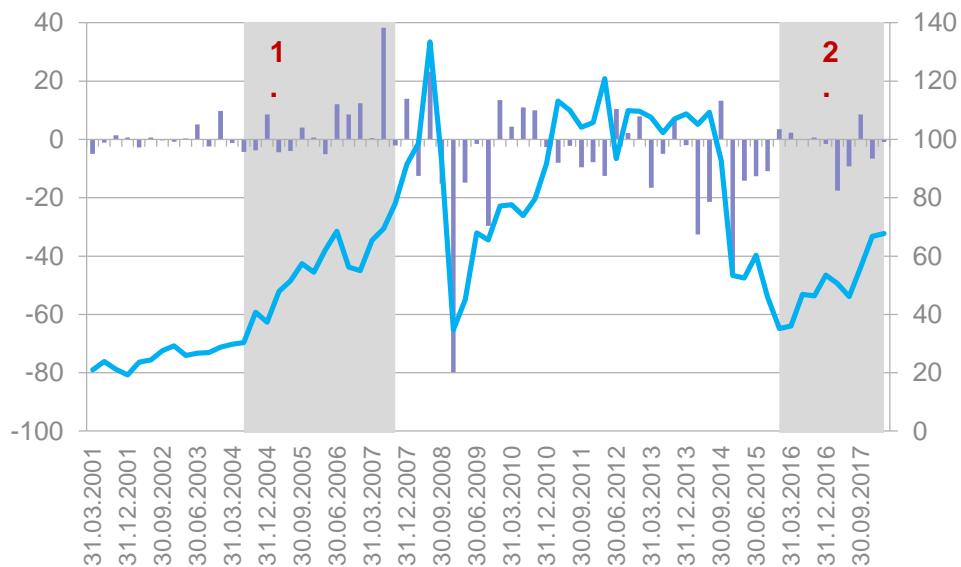
**Macroeconomic effects (GDP growth decline, budget deficit)**

**Negative impact on financial sector**





### Oil price and capital flows



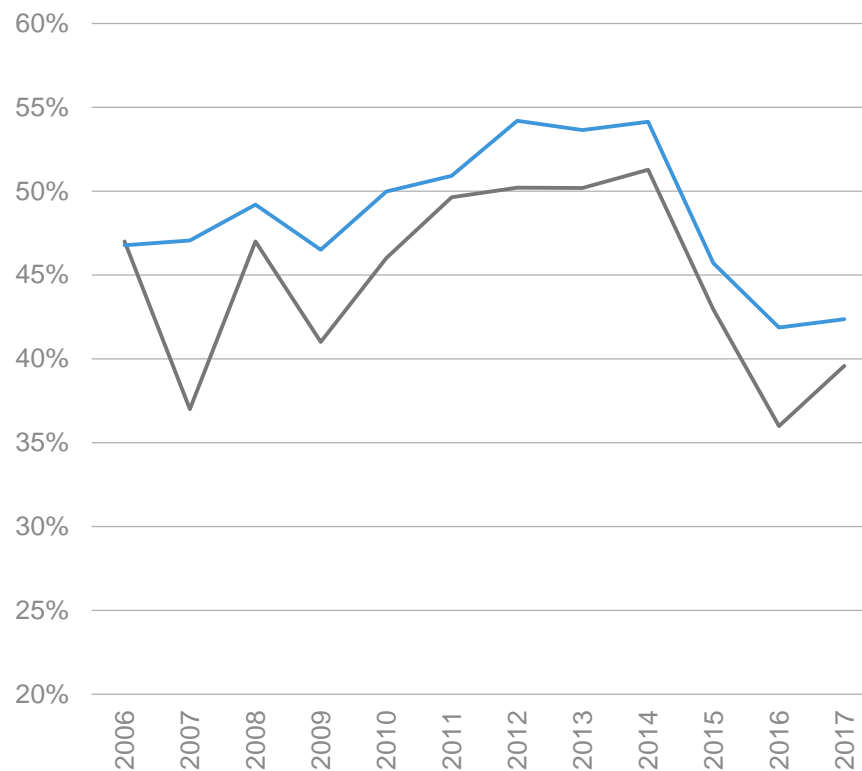
1. From June 2004 to June 2006 Fed funds rate (upper bound) was increased from 1% to 5.25%, till August 2007 the rate remained at 5.25%
2. Since December 2015 Fed funds rate (upper bound) was increased from 0.25% to 1.75%

■ Net private capital inflow in/outflow from Russian banking sector, quarterly balance of payment data (bln USD)

— Urals (USD per barrel), right axis

— Share of oil revenues in total federal budget revenues (%)

— Share of revenues from exports of crude oil and oil products in the total export earnings (%)

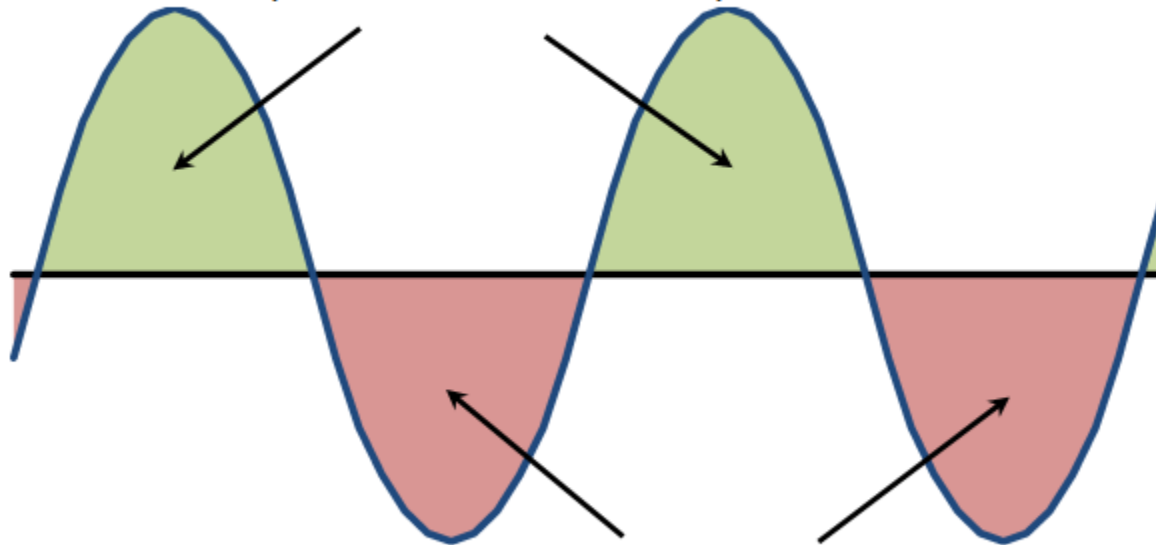


Source: Bloomberg, Thomson Reuters, Bank of Russia.

Source: Ministry of Finance, Bloomberg.

- The base price of oil is supposed to redistribute additional oil and gas revenues between phases of the oil cycles, smoothing fluctuations in the budget expenditures

Accumulation of additional oil and gas revenues in the periods when actual oil price exceeds the base oil price



Spending additional oil and gas revenues in the periods when actual oil price is lower than the base oil price





Stress testing horizon	Type of risk	Perimeter
2 working days	Market risk, liquidity risk	Banks, National Clearing Centre (CCP)
1 month	Market risk, liquidity risk	Banks
1 quarter	Market risk, interest rate risk	Banks, insurance companies, non-governmental pension funds
1 year	Market risk, interest rate risk, credit risk, insurance risk	Banks, insurance companies, non-governmental pension funds
2 years	Market risk, interest rate risk, credit risk	Banks, insurance companies, non-governmental pension funds



Materialization of a stress scenario (approach to each market instrument is defined separately on historical data - 10 years or crisis periods, CVaR 1%)

The need for additional liquidity

- To satisfy margin calls by adding cash or securities to CCP
- To maintain positions on the OTC market

Correction of positions in the money market

- Participants with liquidity shortage decrease amount of lending

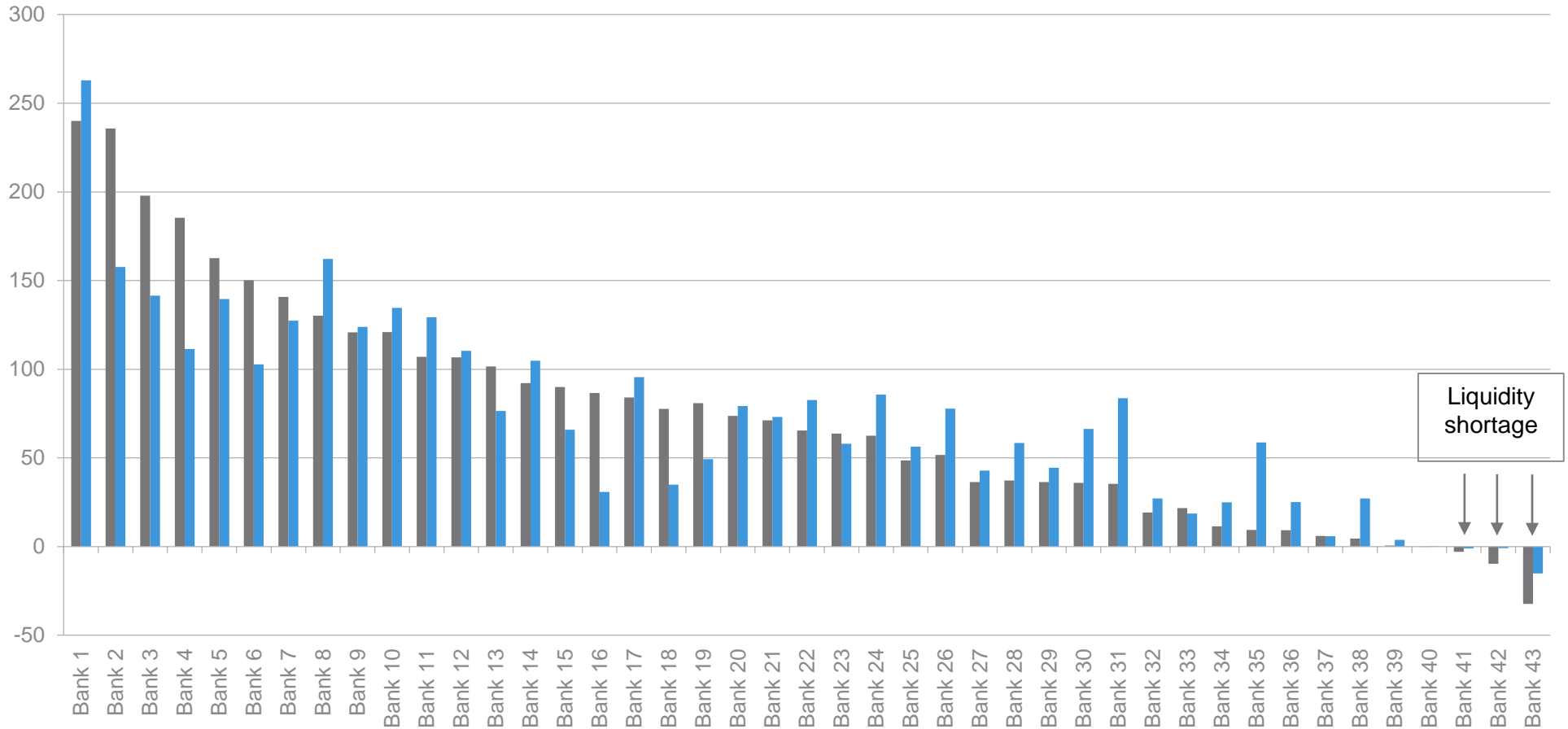
Participants having insufficient amount of liquid assets fail to fulfill obligations to CCP

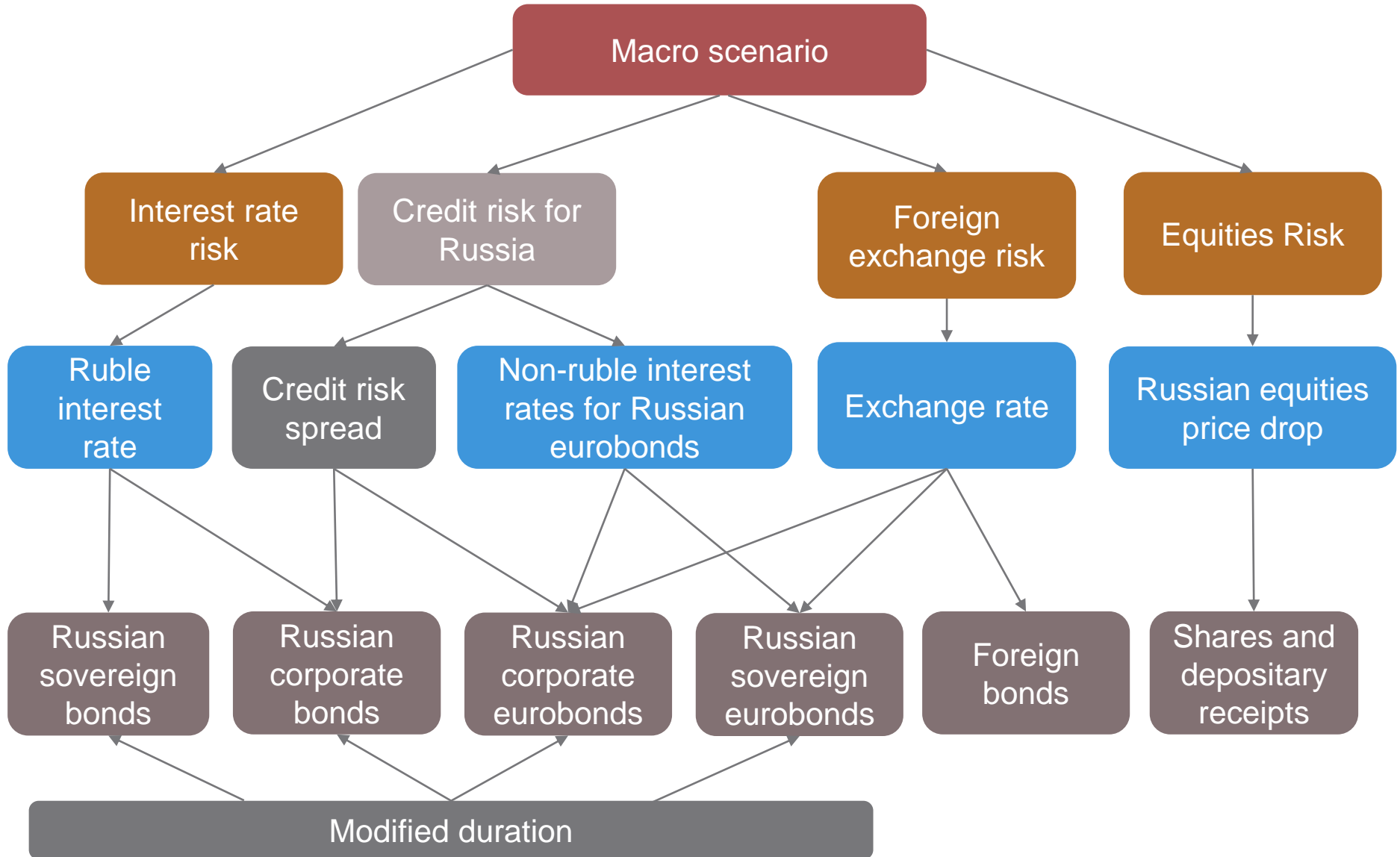
If the lines of defense are insufficient CCP implements loss-allocation procedures



### The ratio of high liquid assets to required amount of liquidity

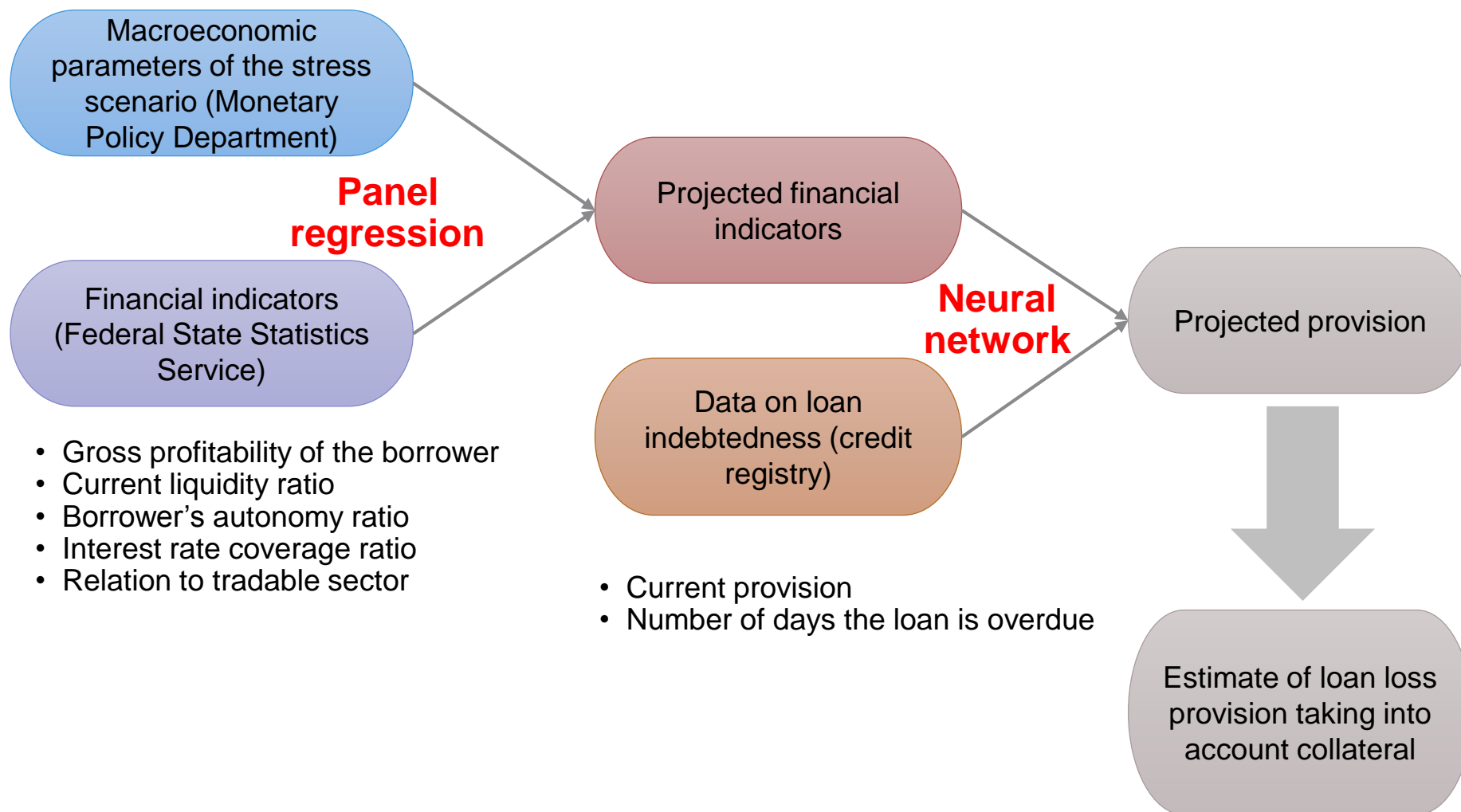
■ Stress scenario ■ Baseline scenario







## Corporate portfolio stress testing





	<b>Baseline scenario</b>	<b>Stress scenario</b>
Number of banks with liquidity shortfall		
Banking groups (of which systemically important credit institutions)		
Liquidity shortfall – difference between deposit outflow and amount of liquid assets (banks with liquidity shortfall)		
Liquidity deficit coverage		
Amount of intragroup liquidity support		
BoR emergency liquidity support measures		
Liquidity deficit after support measures		
Banking groups with liquidity shortage after support measures (of which systemically important credit institutions)		



	<b>Baseline scenario</b>	<b>Stress scenario</b>
Number of banks with capital shortfall		
Banking groups (of which systemically important credit institutions)		
Total losses		
Market risk*		
FX revaluation		
Capital needed to comply with regulatory required level of capital adequacy ratio (at 8%)		
Groups of systemically important credit institutions		
Other groups		

\* Market risk can be partly mitigated by temporary relax measures - the right not to revalue bonds (transfer them to the held to maturity bond portfolio), as in December 2014. These measures can help “to win time” and limit contagion effects.



<b>Cumulative data</b>	<b>Baseline scenario</b>	<b>Stress scenario</b>
Total losses, of which		
Credit risk		
Market risk		
Interest rate risk		
Credit risk of insurance companies and non-governmental pension funds		
Results of insurance companies activities (including insurance risk)		
Positive FX revaluation		
Capital deficit in the financial sector (capital needed to comply with regulatory required level of capital adequacy ratio at 8%)		
Systemically important credit institutions		
Other groups		
Number of groups with capital shortfall		
Systemically important credit institutions		
Other groups		





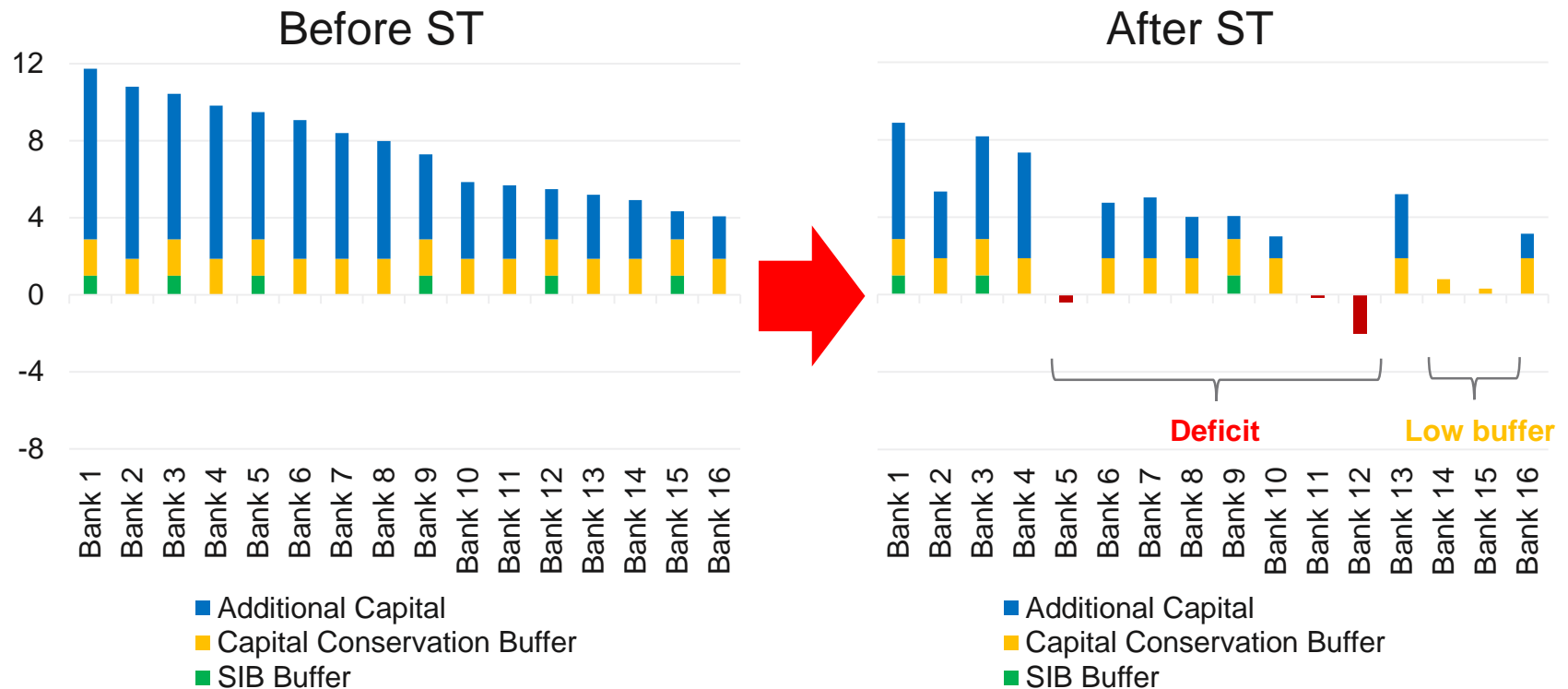
- Contagion effect reflects the amount of losses suffered by the stress test participants due to default of their counterparties in the previous period
- Prevention of the contagion effect at an early stage helps to reduce the capital deficit in the late horizons

		1 Month	1 Quarter	1 Year	2 Years
Stress scenario	Number of groups with capital/liquidity shortfall				
	Total losses				
	Losses from network effect				
	Share of network effect, %	36	59	23	20

Group-defaulters with the ratio of contagion effect to capital deficit  $> 1$  can be attributed to “hidden” systemically important organizations. Elimination of the contagion effect coming from these groups may reduce the capital deficit of other stress test participants



- Capital deficit (identified as a result of macropru stress test) can be covered with countercyclical capital buffer (CCyB)
- Banks with substantial capital buffer can be insensitive to increasing CCyB, but may be vulnerable to particular shocks => potential to use additional Pillar 2 requirements or sectoral macropru add-ons





Comparison and cross-checking the results of the top-down stress test conducted by the Financial Stability Department with the results of the bottom-up stress test

Analysis of the network effect:

- Interconnectedness of the stress test participants
- Results of the macropru stress test taking into account influence of support measures and contagion effects within and between the groups

Attribute analysis of total losses of macropru stress test participants broken down by participants, risks, instruments

Extrapolation of losses (by type of risks) to other organizations beyond the macropru stress test perimeter



## IMF key recommendations

Clearer organization process and internal cooperation between departments



- Development of an annual plan on stress testing for 2019 (including macropru ST, supervisory ST)
- Creation of a Working Group on stress testing at the BoR

Using a set of scenarios



Development of several scenarios for top-down ST (cyclical, structural, alternative, etc.)

Implementation of an expected loss based approach for credit risk, better integration of models



Work on PD model to assess credit risk

Additional data collection for risk analysis



- Improvement of reporting forms on interest rate risk, liquidity risk
- Plan to conduct a survey of expected losses on bank portfolios

Enhancing the use of contagion models



Work in progress



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THANK YOU FOR YOUR ATTENTION!