

**BCB - FINANCIAL SYSTEM
MONITORING
DEPARTMENT**

**SYSTEMIC RISK
DIVISION**

SCENARIO DESIGN

IMF-Bank of Russia Workshop

**Recent Developments in
Macroprudential Stress Testing**

Moscow, 4-5 September 2018

CONTENTS

- Scenario Design Approaches – BCB.
- Top Down Stress Test Scenarios.
- Bottom Up Stress Test Scenarios.
- Backtesting Stressed Scenarios.
- Special Scenarios.

APPROACHES TO SCENARIO DESIGN

SCENARIO DESIGN DEPARTS FROM SOME VIEWS

- Adverse domestic economic condition.
- Adverse effects from the global economy.
- Materialization of specific risks.

STRESSED SCENARIOS ARE REQUIRED TO OBSERVE SOME SPECIAL QUALITIES

- Severe: compared to observed or alternative.
- Plausible: believed to be possible.
- Consistent: free of contradictions.

**THREATENING
TO THE
FINANCIAL
SYSTEM**

APPROACHES TO SCENARIO DESIGN

**MARKET
EXPECTATIONS**



Historical



MIX

Statistical



Judgmental



SCENARIOS

TOP DOWN STRESS TEST

SCENARIO VARIABLES

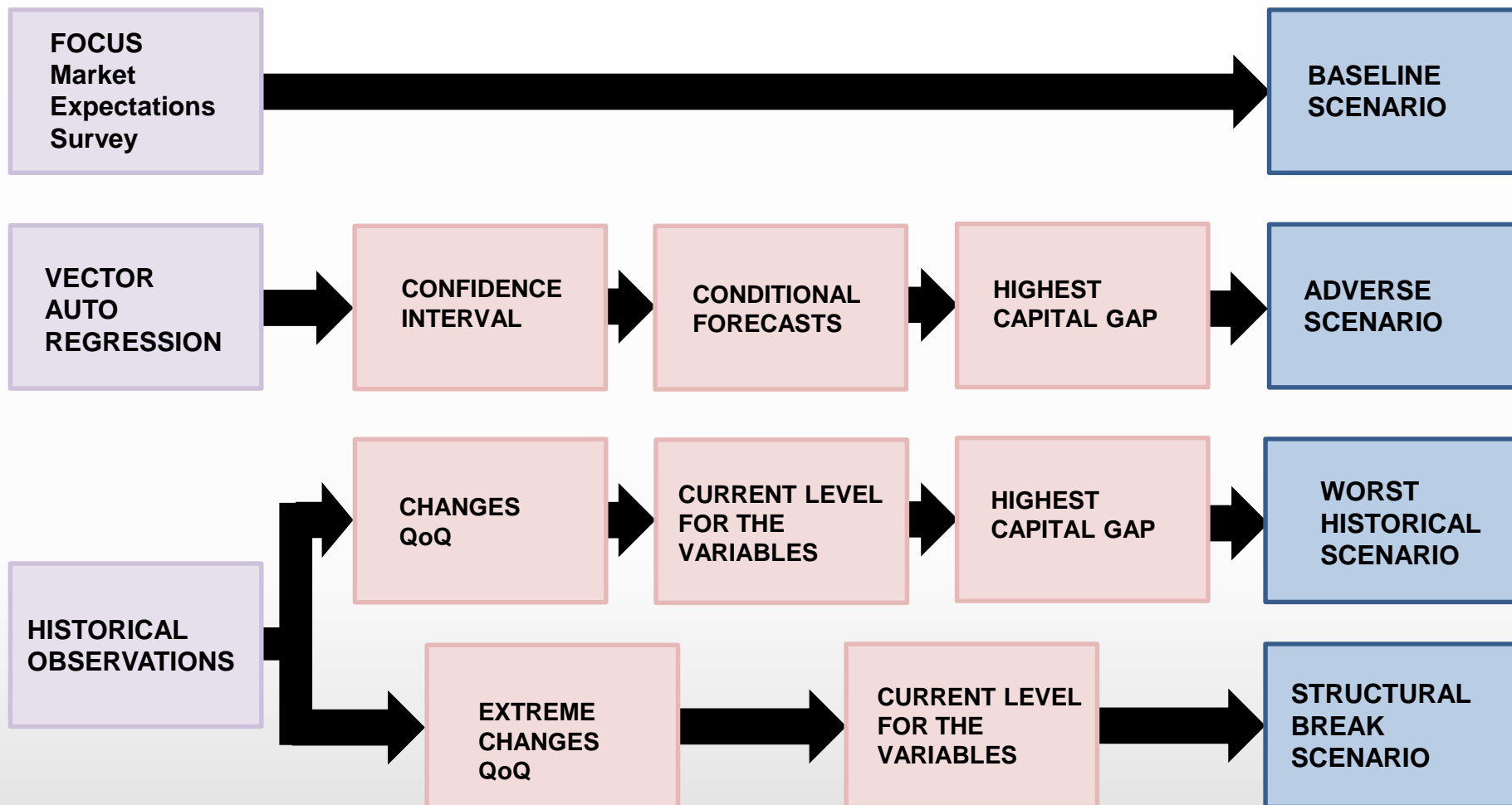
DOMESTIC ECONOMY

- GDP.
- Interest rate.
- Inflation.
- Exchange Rate.
- Unemployment.

INTERNATIONAL ECONOMY

- International Interest Rates.
- Sovereign Risk.
- Commodities Prices.

STANDARD SCENARIOS



MARKET EXPECTATIONS SCENARIO - SURVEY

GDP.
Interest Rate.
Inflation.
Exchange Rate.



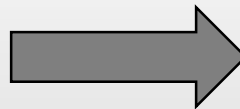
Median from the market survey.

Sovereign Risk.
Commodities Prices.
Unemployment.



Constant at the current level.

International Interest Rate



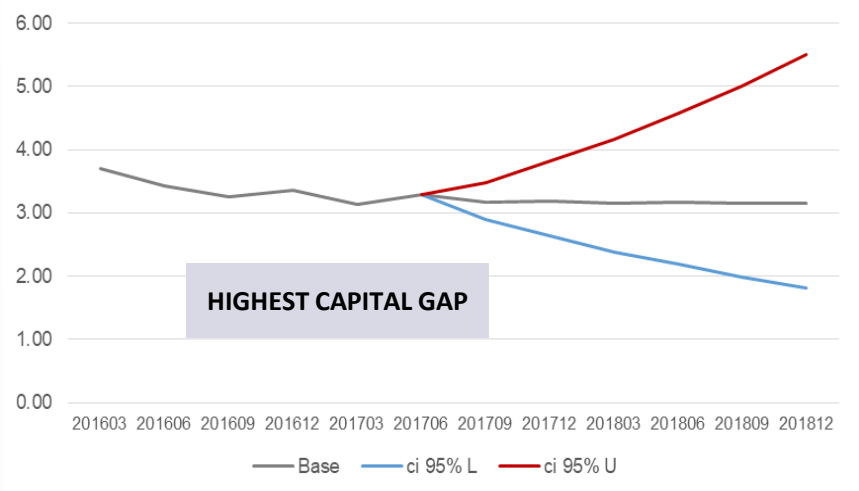
Taken from the FED scenario
(DFAST exercise).

ADVERSE SCENARIO VECTOR AUTOREGRESSION

GDP.
Interest Rate.
Inflation.
Exchange Rate.



One variable at the border of the unfavorable 95% confidence interval.
Conditional forecast of the the other variables.

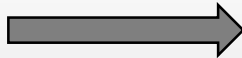


Sovereign Risk.



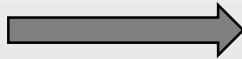
80% increase on the 1st quarter and exponential return (stylized fact).

Commodities Prices.



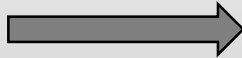
Linear decrease at 5% per year.

International Interest Rate.



Taken from the FED scenario (DFAST exercise).

Unemployment.

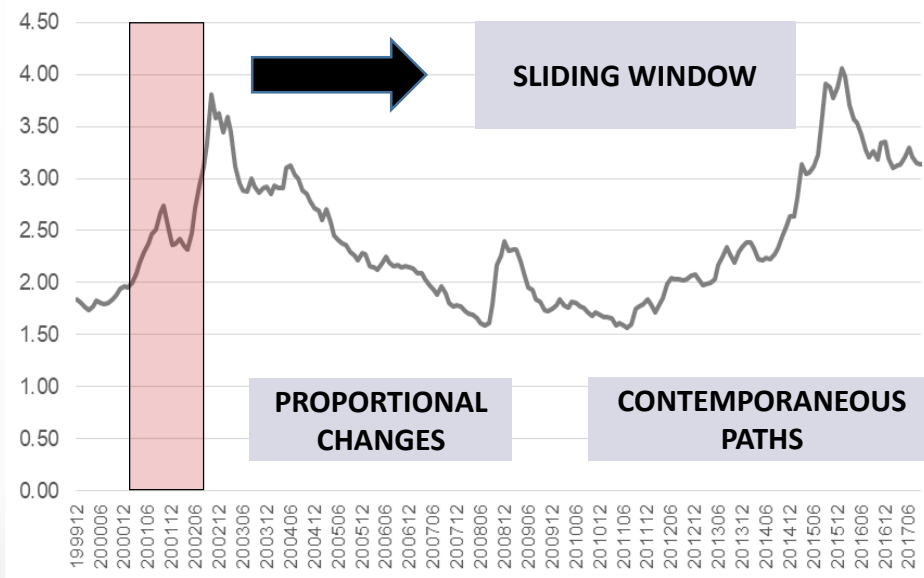
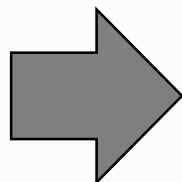


Linear increase up to 80% over 6 quartes (max historical)

WORST HISTORICAL SCENARIO

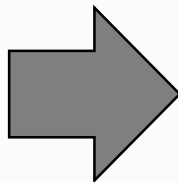
Period which outcome of the stress test results in the highest capital gap for the system.

Production.
Interest Rate.
Inflation.
Exchange Rate.
Sovereign Risk.
Commodities Prices.
Unemployment.
International Interest Rate.



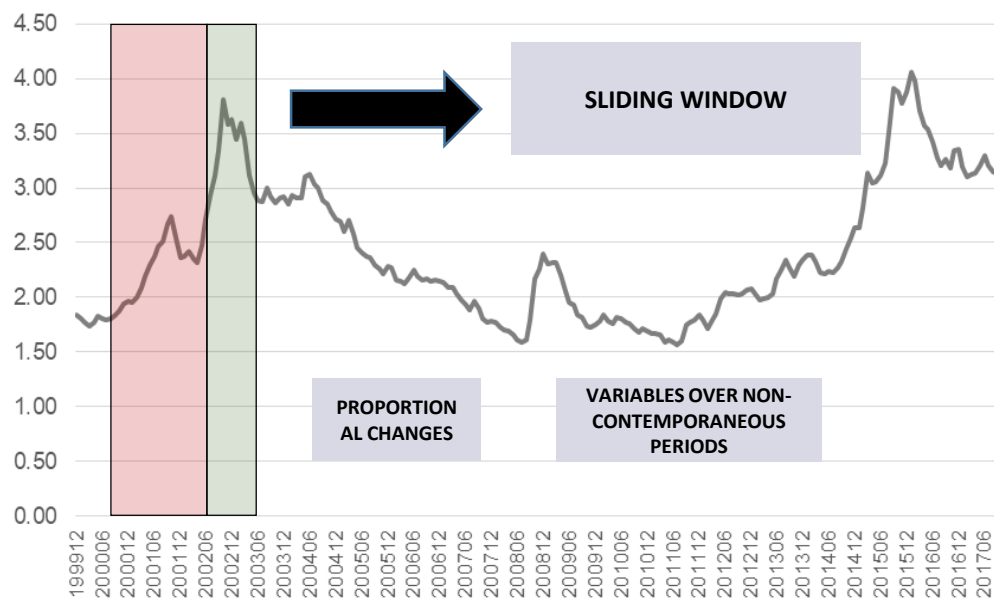
STRUCTURAL BREAK SCENARIO

Production.
Interest Rate.
Inflation.
Exchange Rate.
Sovereign Risk.
Commodities Prices.
Unemployment.
International Interest Rate.



Captures a stress period followed by a stabilization period.

2 years window for searching the period + 1 year window to complete the stress test horizon.



Period Selection:

- Largest combination of the changes end-begin and peak-begin.
- Unfavorable direction (+/-).

ADDITIONAL SCENARIO FOR MARKET RISK

INTEREST RATE TERM STRUCTURES 12 YIELD CURVES – 12 VERTICES

- Fixed interest rates.
- Inflation linked interest rates.
- Foreign Currency linked interest rates.
- Earmarked interest rates.
- Floating interest rates.

Fixed Interest Rate

SCENARIO

Change in the
monetary
policy rate



PCA model
Change to
the level
component

Foreign Currencies & CPI Linked Interest Rates

SCENARIO

Trend for
futures
+
Change in
fixed rate



Non-arbitrage
relationship
future – spot
↓
linked – fixed

Earmarked Interest Rates

SCENARIO

Change in
fixed rate



Keep the
spread

Floating Interest Rate

HISTORICAL
HAIRCUT

SCENARIOS

BOTTOM UP STRESS TEST

SCENARIO VARIABLES

DOMESTIC ECONOMY

- GDP.
- Interest rate.
- Inflation.
- Exchange Rate.
- Unemployment.
- Capital Market.

INTERNATIONAL ECONOMY

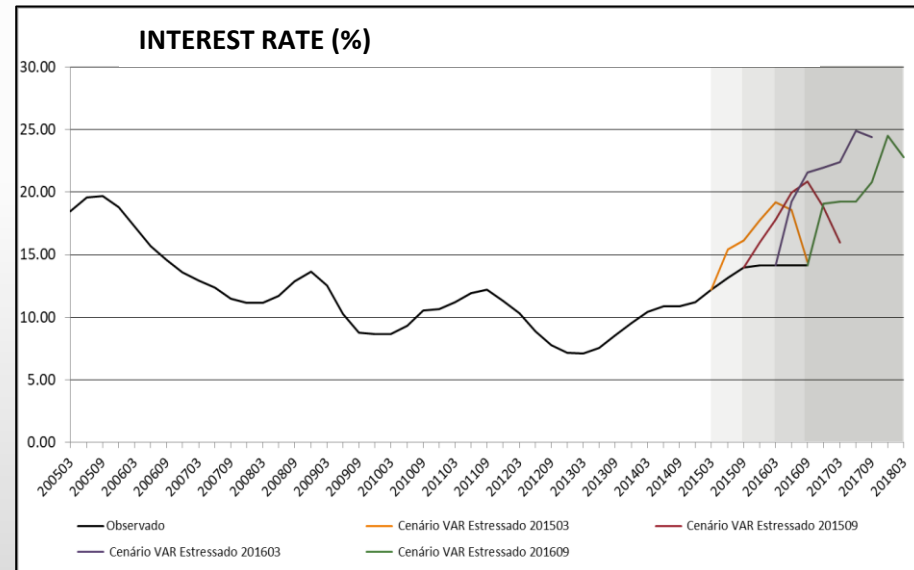
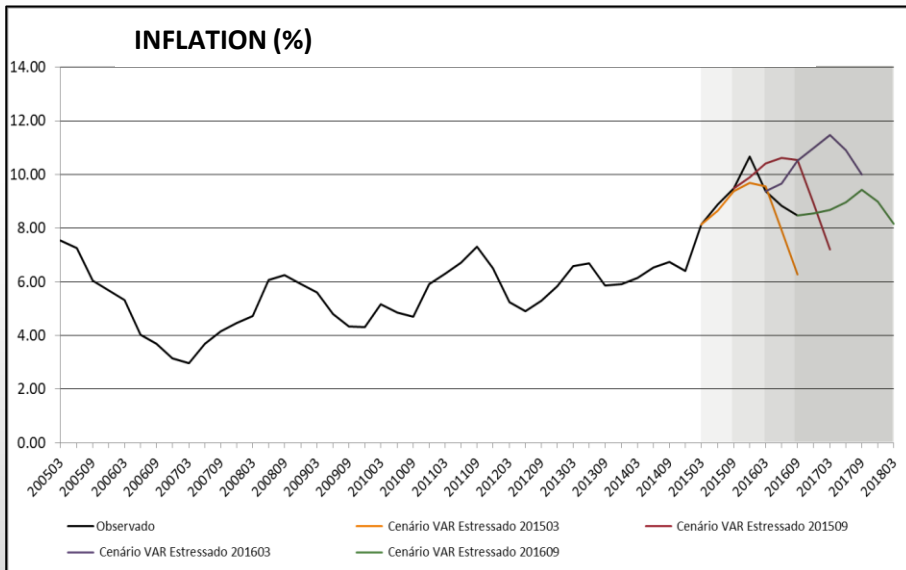
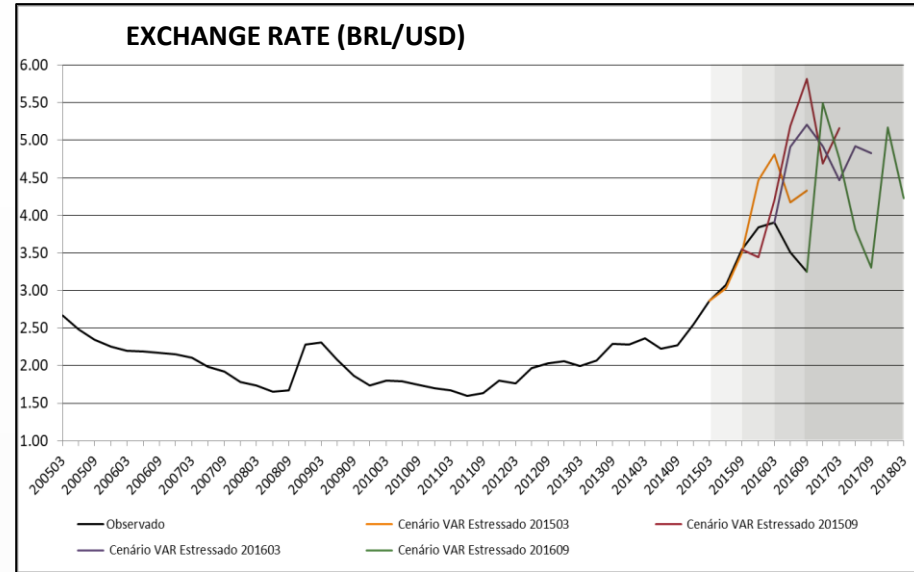
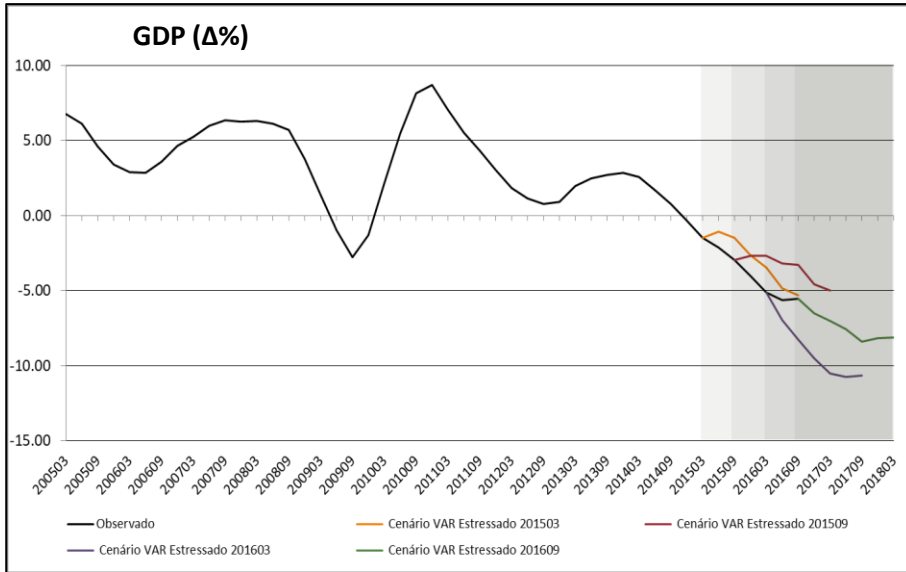
- International Interest Rates.
- Sovereign Risk.
- Commodities Prices.
- International GDP.
- VIX.

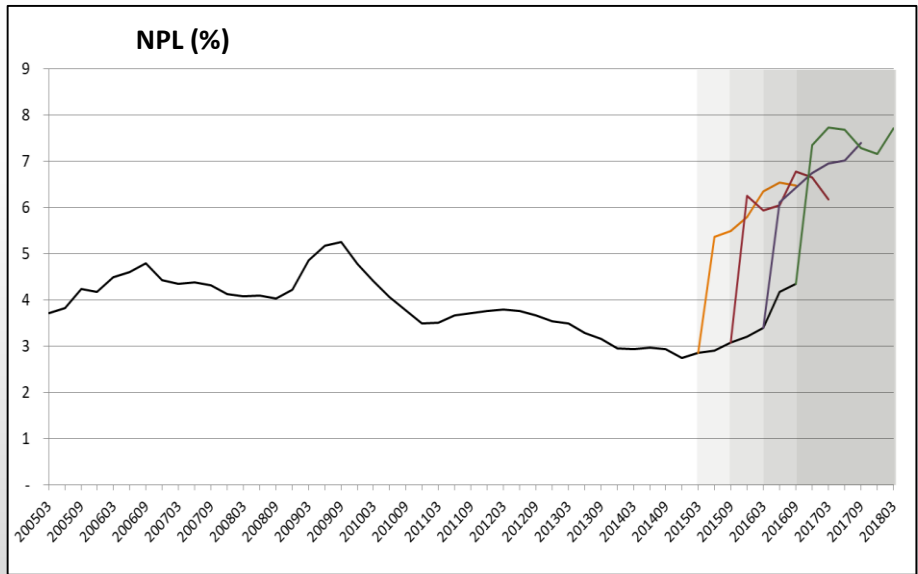
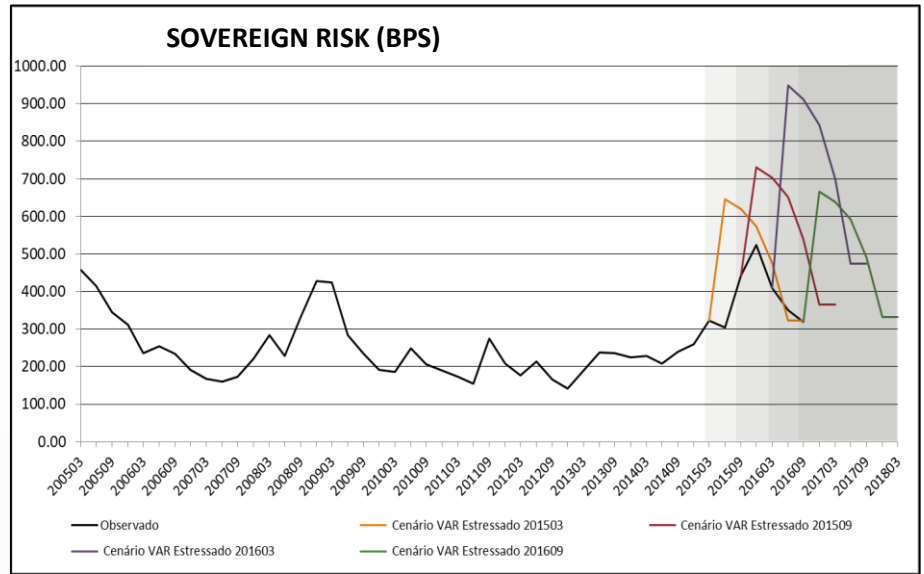
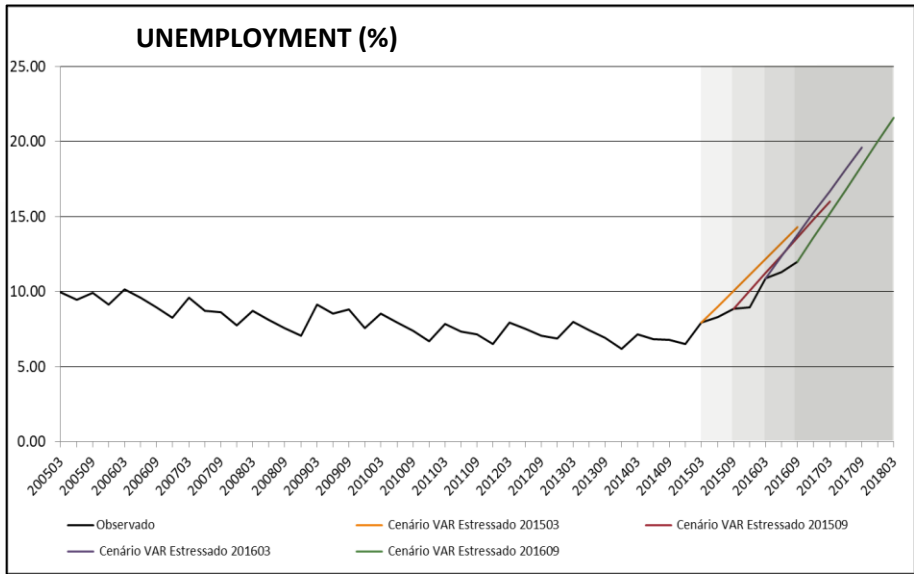
BOTTOM UP STRESS TEST

- Supervisory scenarios were included in the ICAAP to be run additionally to the bank's scenarios.
- DSIBs only.
- The capital plan must cover any capital gap pointed by the stress tests.

- **Baseline Scenario:** Market Expectations.
- **Adverse Scenario:** Structural Break.

BACKTESTING STRESSED SCENARIOS





CASES OF DESIGNING SPECIAL SCENARIOS

- Loss of investment grade.
- Low interest rates.

LOSS OF INVESTMENT GRADE

Fitch Ratings	Standard & Poor's	Moody's
AAA	AAA	Aaa
AA+	AA+	Aa1
AA	AA	Aa2
AA-	AA-	Aa3
A+	A+	A1
A	A	A2
A-	A-	A3
BBB+	BBB+	Baa1
BBB	BBB	Baa2
BBB-	BBB-	Baa3
BB+	BB+	Ba1
BB	BB	Ba2
BB-	BB-	Ba3
B+	B+	B1
B	B	B2
B-	B-	B3
CCC	CCC+	Caa1
CC	CCC	Caa2
C	CCC-	Caa3
D	CC	Ca
	C	C
	D	

Fitch Ratings; Standard & Poor's; Moody's

LOSS OF INVESTMENT GRADE

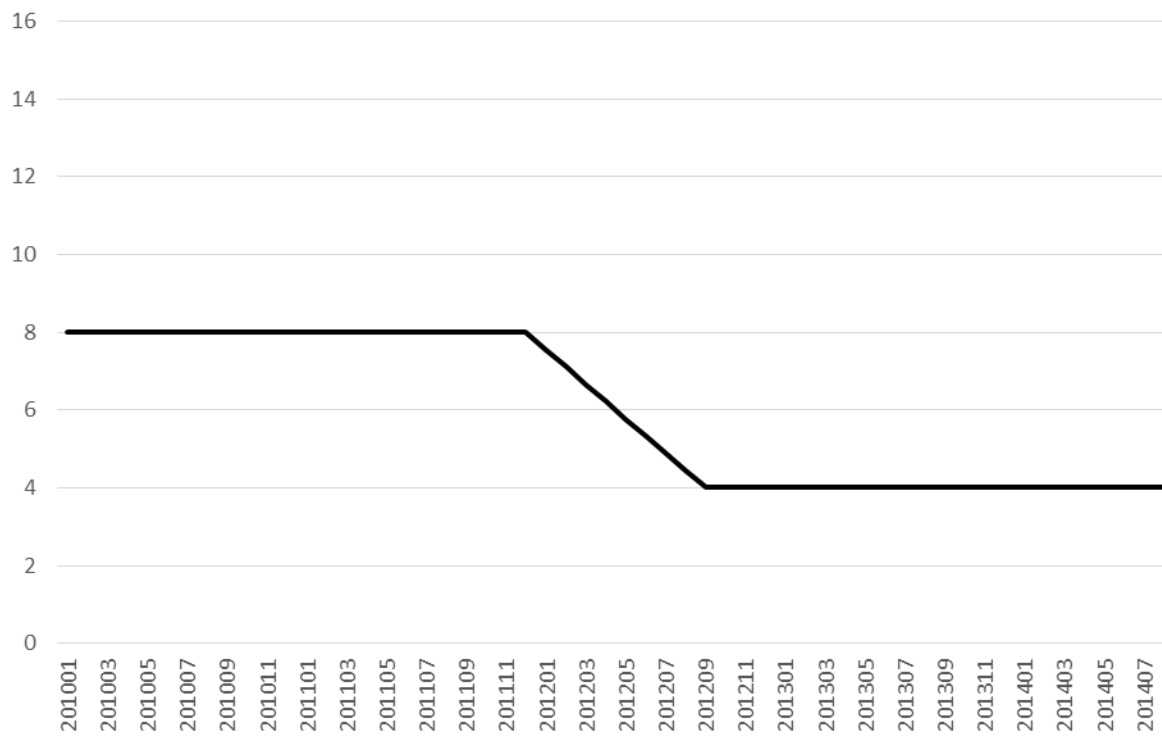
January 2015 – Russia

September 2015 – Brazil

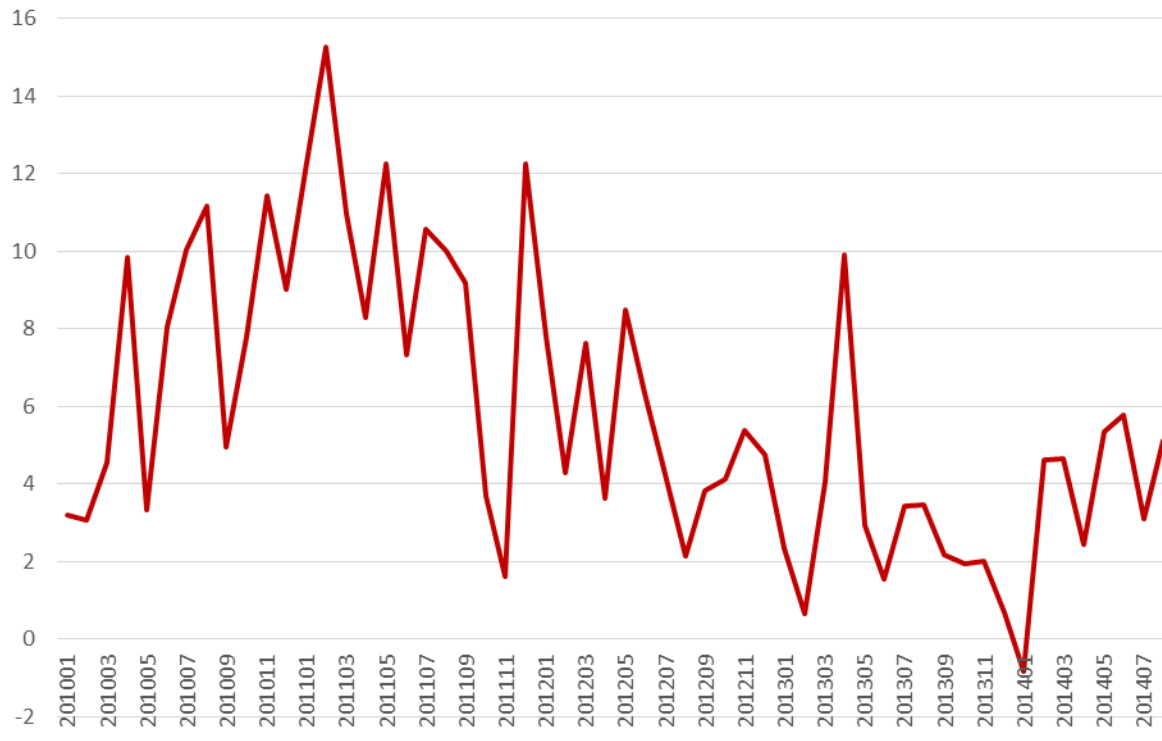
April 2015

A scenario was built using changes in observed variables from the Russian economy surrounding the cut in the rating.

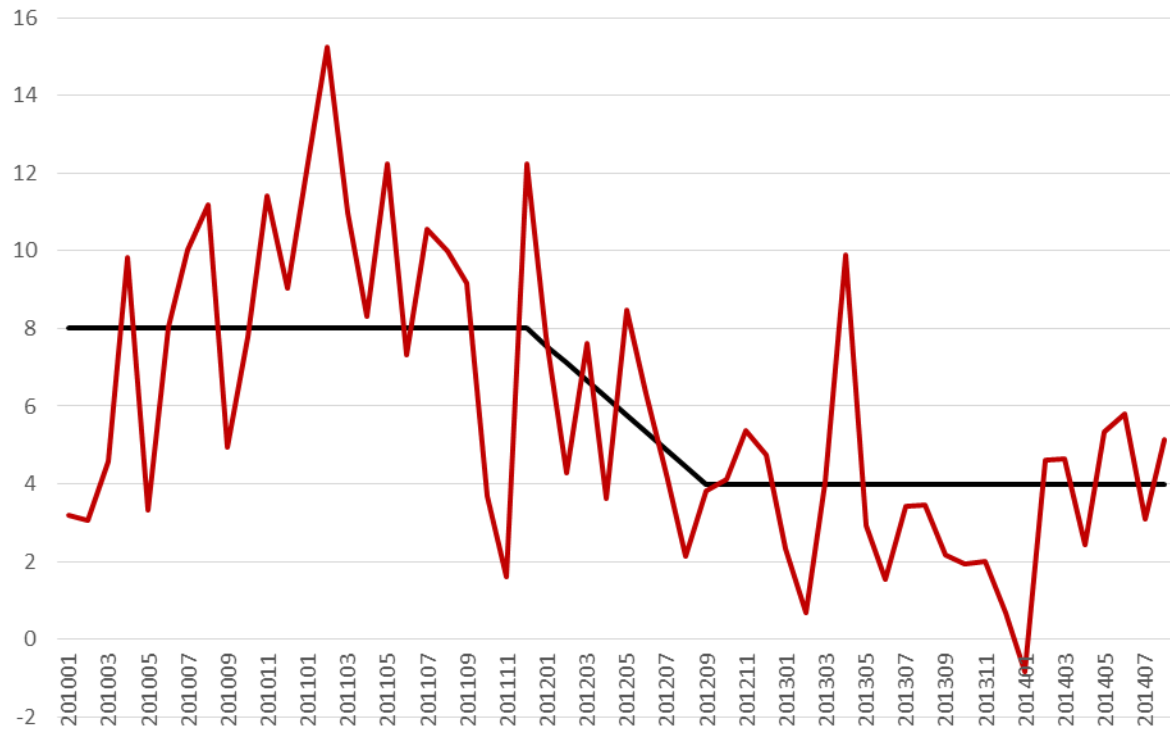
LOW INTEREST RATES



LOW INTEREST RATES



LOW INTEREST RATES



THE END!

Thanks

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