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Looking for the macroprudential policy stance

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The opinions expressed in this paper/presentation are those of the authors and do not necessarily reflect the views of the National Bank of Romania.

Presentation outline

- Motivation
- Current environment
- A structural approach for the macropru' policy stance
- An *at stress* based approach for the macropru' policy stance
- Conclusions

Motivation

Job description of the macroprudential policy in **three core directions**:

- *When to act?*
- *How to act?*
- *How much to act?*

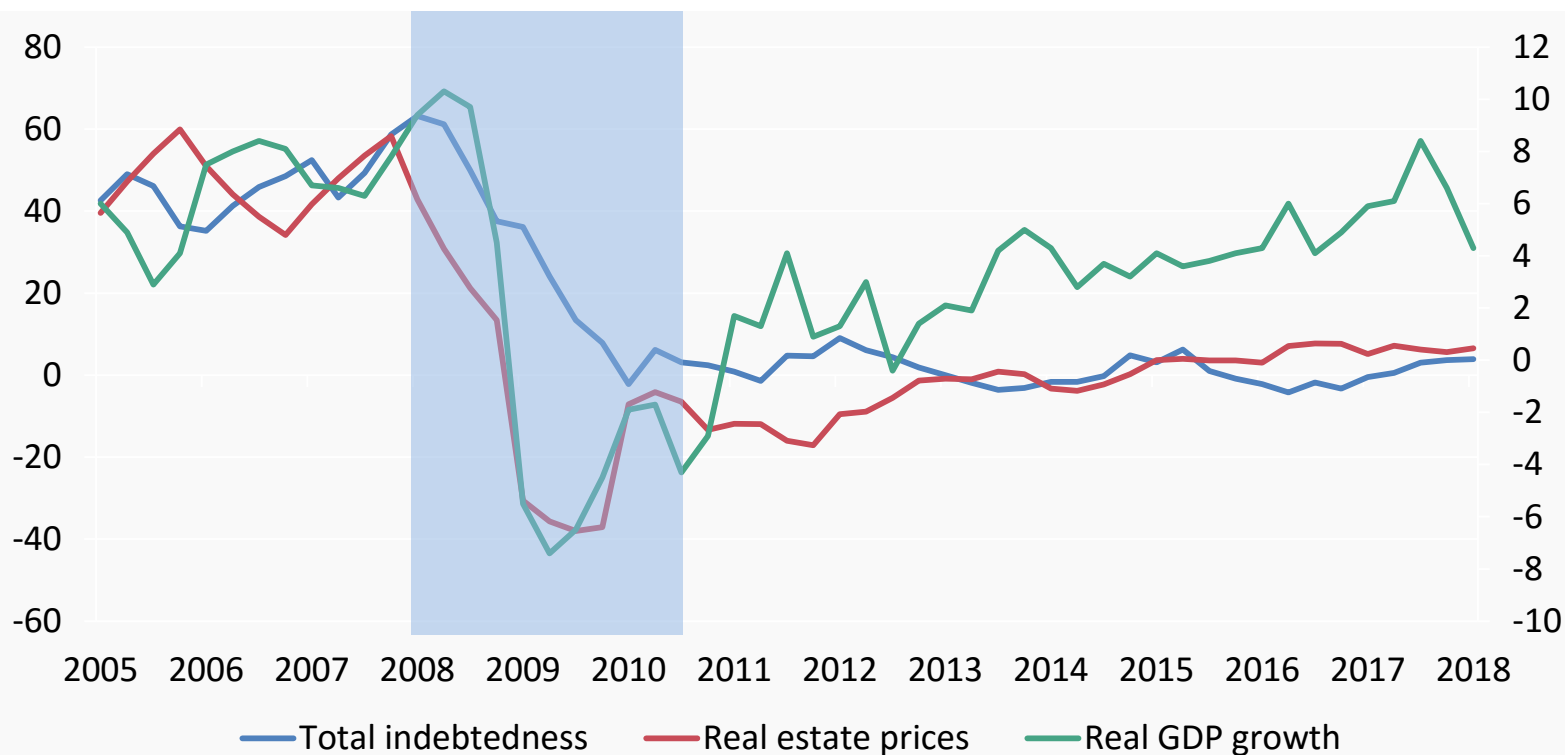
➔ Need for **simple implementable optimal rules** for instruments setting

➔ Need for a proper understanding of the **interaction between macroprudential instruments and financial stability** related objectives

Current environment

Current environment

- Romanian macro-financial environment shows a **strong procyclical pattern**: **high increases** followed by **contractions** of similar or even larger magnitudes = “*Boom & Bust*” behavior

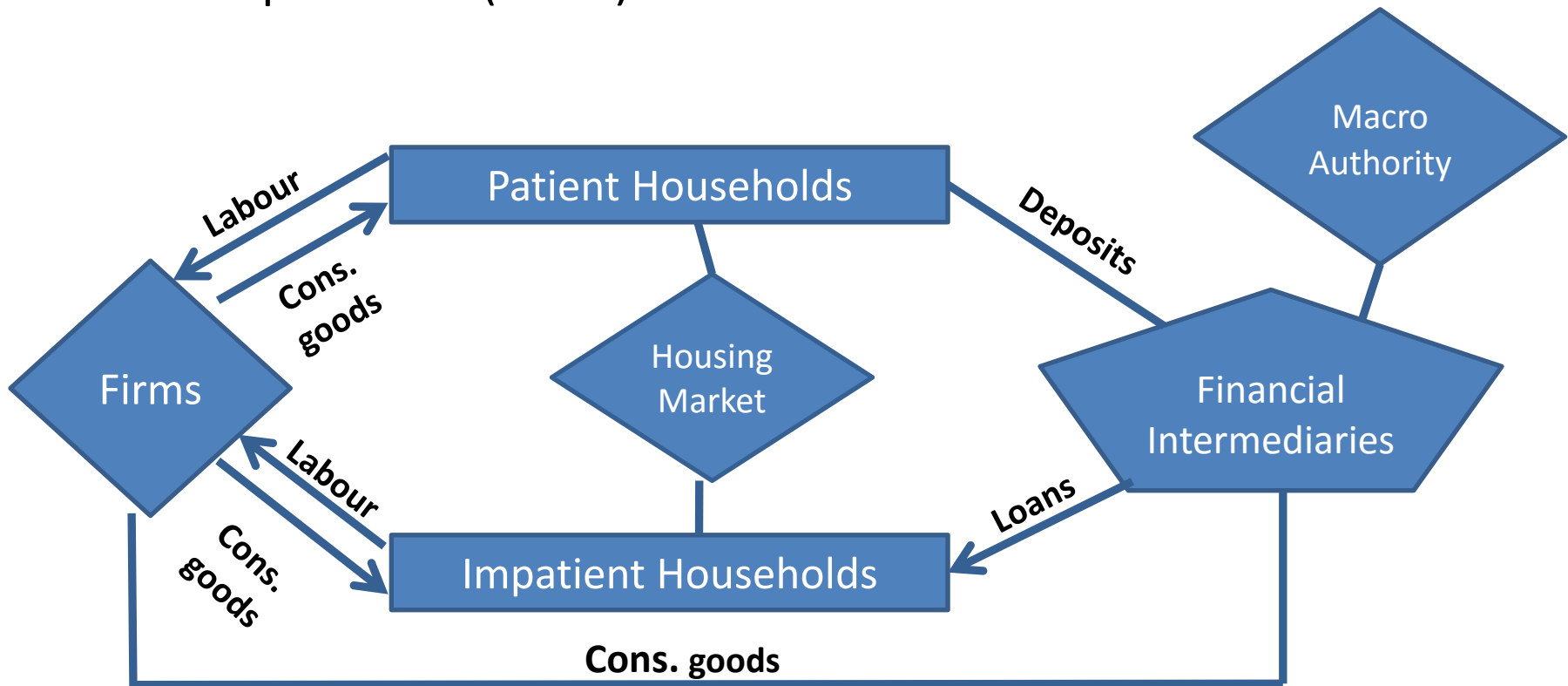


Source: NBR, NIS

A structural approach for the macroprudential policy stance

A structural approach for the macroprudential policy stance: framework

- Financial-business cycle facts as in Iacoviello (2013) and Rubio and Carrasco-Gallego (2014) are analysed by using a Dynamic Stochastic General Equilibrium (DSGE) model



A structural approach for the macroprudential policy stance: implementation (I)

- **Method:** Calibration at quarterly frequency for Romanian economy
- **Exogenous disturbance:** technology shock
- **Solving:** Second order approximation for the welfare based optimal policy adopted by the macroprudential authority
- **Instruments:** Loan-to-Value (LTV) and Countercyclical Capital Buffer (CCyB)
- **Macroprudential decisions:**
 - i) static exogenous rules
 - ii) dynamic hybrid (endogenous and exogenous elements) rules

A structural approach for the macroprudential policy stance: implementation (II)

Welfare definition

$$W_0 = E_0 \sum_{t=0}^{\infty} \beta^t U(\Omega_t)$$

W_0 – unconditional welfare

E_0 – expectation operation

β – subjective discount factor

U – utility (felicity) function

Ω_t – a vector of contingent plans (e. g. consumption, work, housing acquisitions)

A structural approach for the macroprudential policy stance: implementation (III)

Second order approximation for welfare

$$W = \mathcal{G}(s_0, \sigma) + \mathcal{G}_\sigma(s_0, \sigma)\sigma + \frac{1}{2}\mathcal{G}_{\sigma\sigma}(s_0, \sigma)\sigma^2$$

\mathcal{G} – a function of the initial state vector s_0 and the σ parameter used to scale the standard deviation of exogenous disturbances

Macroprudential policy objective

$$\Phi = \operatorname{argmax} (W)$$

Φ – a vector of parameters for defined rules

A structural approach for the macroprudential policy stance: implementation (IV)

Static rules

$$CAR_t = CAR^{SS} \quad LTV_t = LTV^{SS}$$

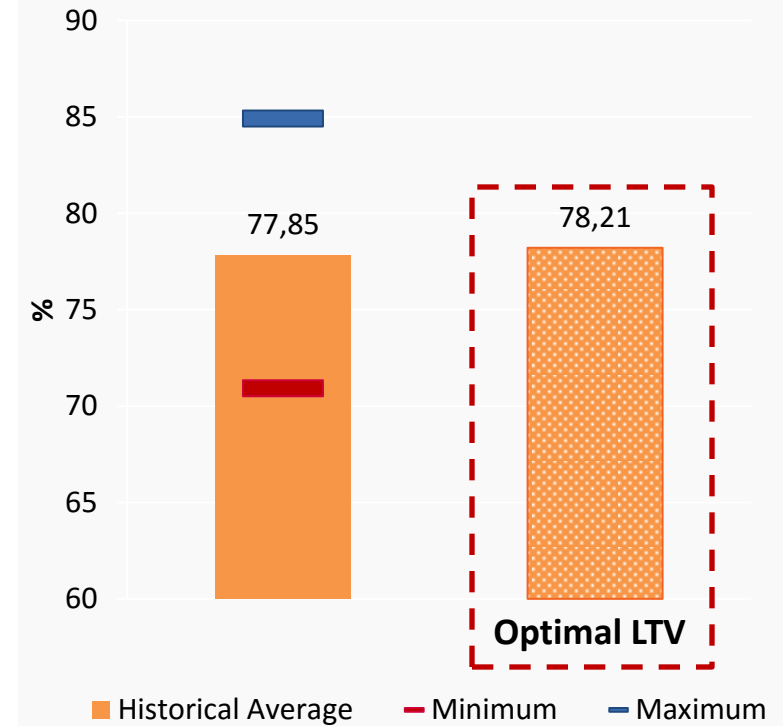
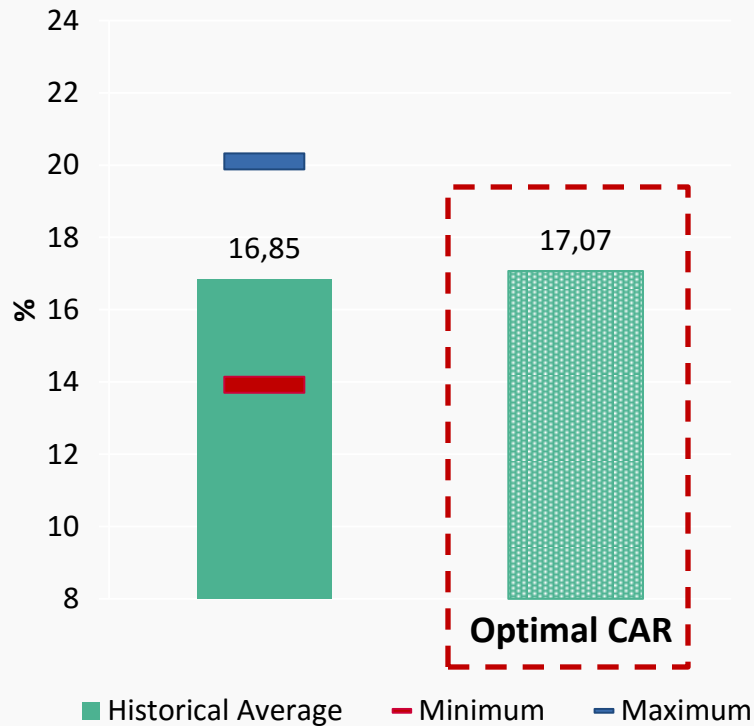
Dynamic rules

$$\ln \left(\frac{CAR_t}{CAR^{SS}} \right) = \rho_r \ln \left(\frac{CAR_{t-1}}{CAR^{SS}} \right) + (1 - \rho_r) \varphi_l \ln \left(\frac{Lend_t}{Output_t} \frac{Output^{SS}}{Lend^{SS}} \right)$$

$$\ln \left(\frac{LTV_t}{LTV^{SS}} \right) = \rho_r \ln \left(\frac{LTV_{t-1}}{LTV^{SS}} \right) + (1 - \rho_r) \varphi_h \ln \left(\frac{House_t}{House^{SS}} \right)$$

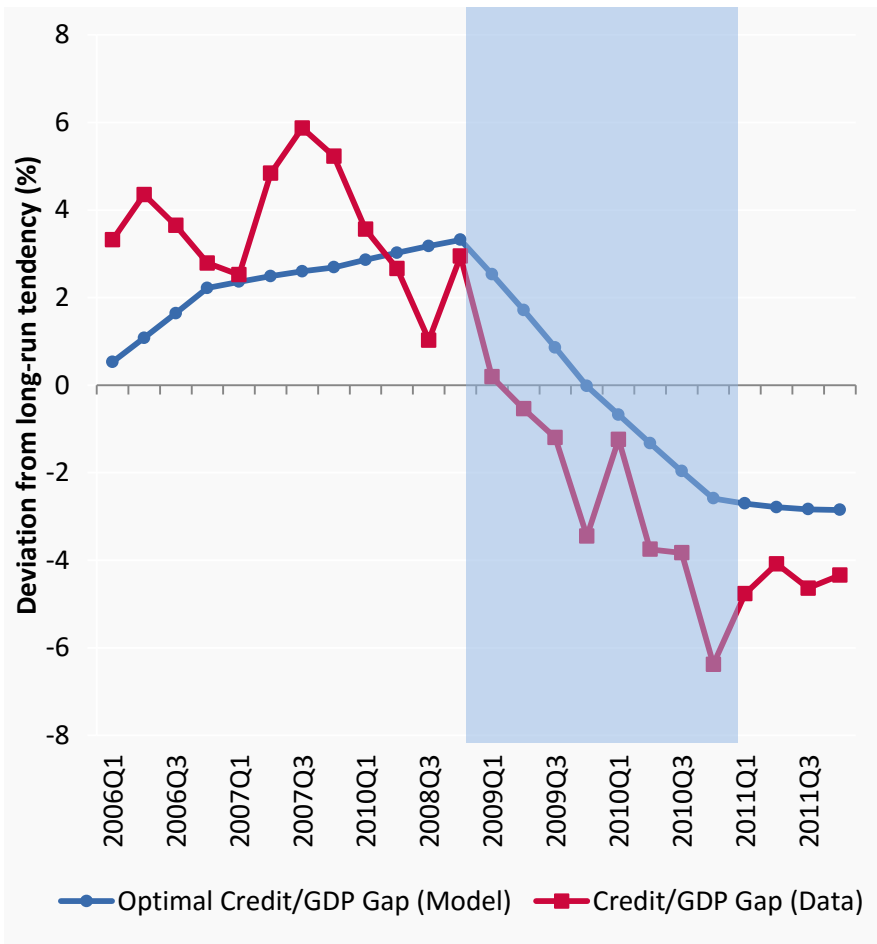
A structural approach for the macroprudential policy stance: results (I)

- For the **optimal static rules**, obtained parameters for CAR and LTV (dotted bars) are close to the related empirical averages



Source: own calculations

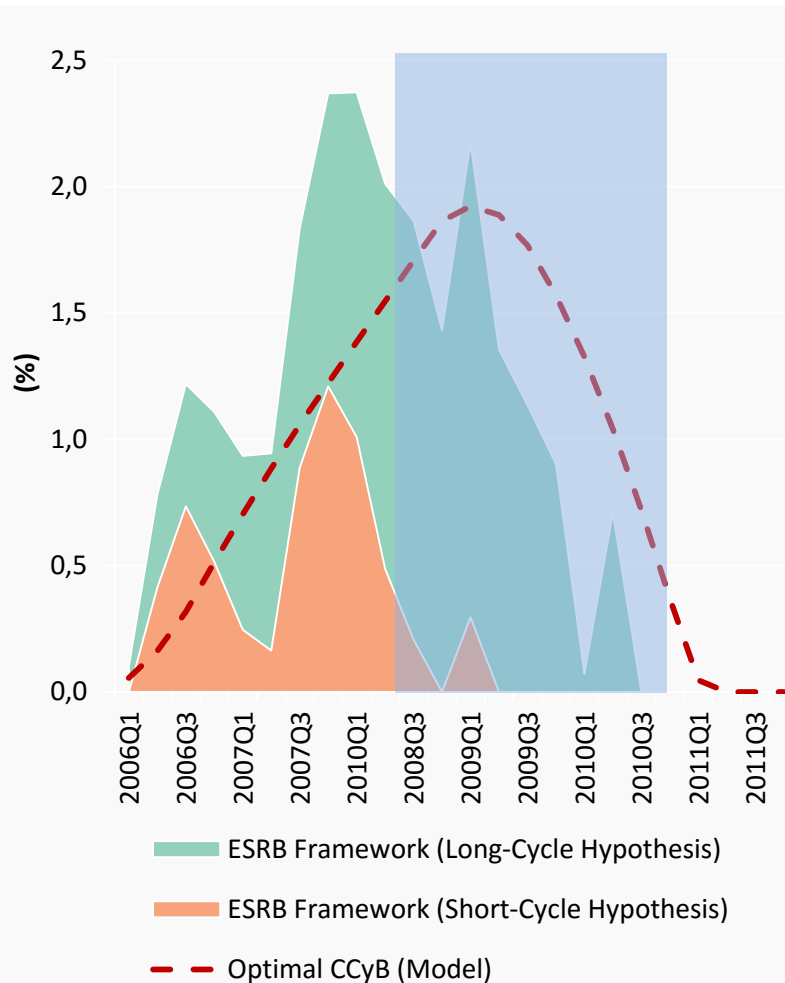
A structural approach for the macroprudential policy stance: results (II)



- For the **optimal dynamic rules**, we elaborated a counterfactual analysis to investigate dynamics of the key variables
- ...by feeding a series of technology shocks to match the empirical evolution of TFP during 2006Q1-2011Q4, we implemented a **dynamic simulation approach** for model with optimal dynamic rules

Source: own calculations

A structural approach for the macroprudential policy stance: results (III)



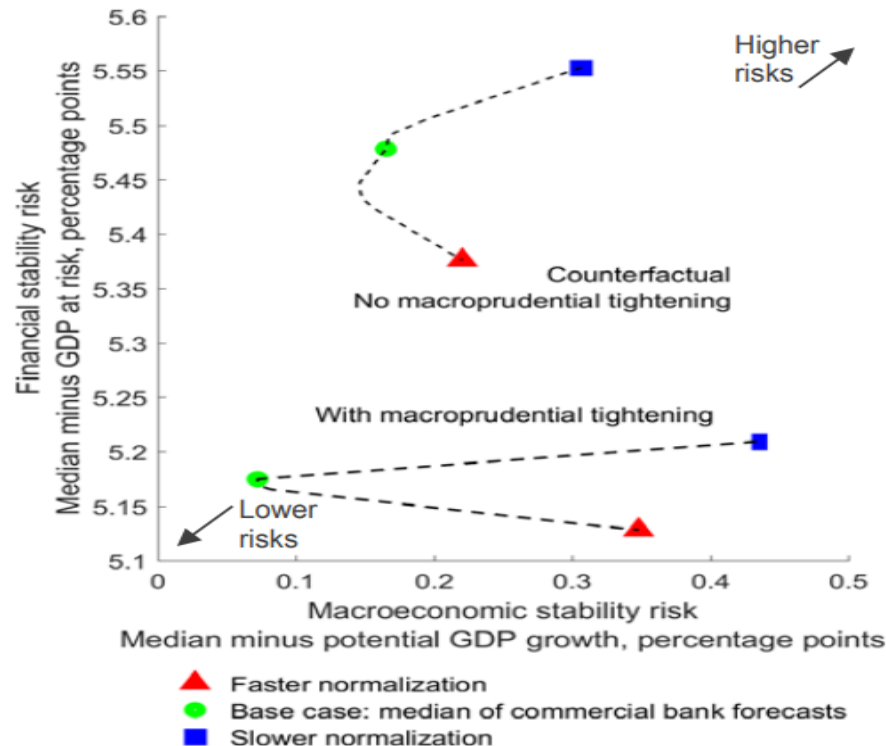
- When **optimal rules** for two core macroprudential instruments are implemented, volatility of the financial-business cycle gap is smoother than the case with no optimality
- ...the optimal rule for CCyB is **smoother** as compared with the ESRB frameworks for the long- and short-cycle before
- ...and could provide **different information** on the policy stance

Source: own calculations

An *at stress* based approach for the
macroprudential policy stance

An *at stress* approach for the macroprudential policy stance: framework

Macroprudential policy has a **higher capacity** to reduce the downside risk related to real economic activity than other macroeconomic policies



Source: Duprey and Ueberfeldt (2018)

An *at stress* approach for the macroprudential policy stance:

A financial stability barometer (I)

EWS Framework → multiple indicators with potential to signal the **build-up of vulnerabilities** in the financial sector (building on Duprey and Robers, 2017 – Bank of Canada Paper)

Variables included (22) – sectoral basis

- **Household sector:** total indebtedness, mortgage and consumer indebtedness (growth rate and dev. from trend)
- **NFC sector:** total indebtedness, external indebtedness (growth rate and dev. from trend)
- **Government sector:** public debt to GDP ratio (growth rate and deviation from trend)
- **Banking sector:** leverage ratio, liquidity ratio, profitability (ROE)
- **Real estate sector:** housing price index (growth rate and deviation from trend)
- **Macroeconomic stance:** output gap, structural public deficit, current account deficit

Aggregate index - Barometer $t = \sum_{s=1}^S \max \left\{ \sum_{i=1}^{I_s} \max \left\{ \frac{v_{s,i,t} - \tau_{s,i}}{\sigma_{s,i}} ; -1 \right\} * \omega_{s,i} ; 0 \right\}$

With weights computed as $\omega_{m,i} = \frac{\max\{AUROC_{m,i} - 0.5; 0\}}{\sum_{i=1}^{I_m} \max\{AUROC_{m,i} - 0.5; 0\}}$ → **EWS framework**

An *at stress* approach for the macroprudential policy stance: A financial stability barometer (II)

Threshold selection → limited length of historical data

Solution = historical averages, pre-crisis values, expert judgement, reference values (e.g. Maastricht Treaty)

Crisis signal → dummy variable identifying the crisis episode from **Q3 2005 until Q4 2008** ↔ main interest = indicators with high predictive power in capturing the vulnerabilities in the build-up phase

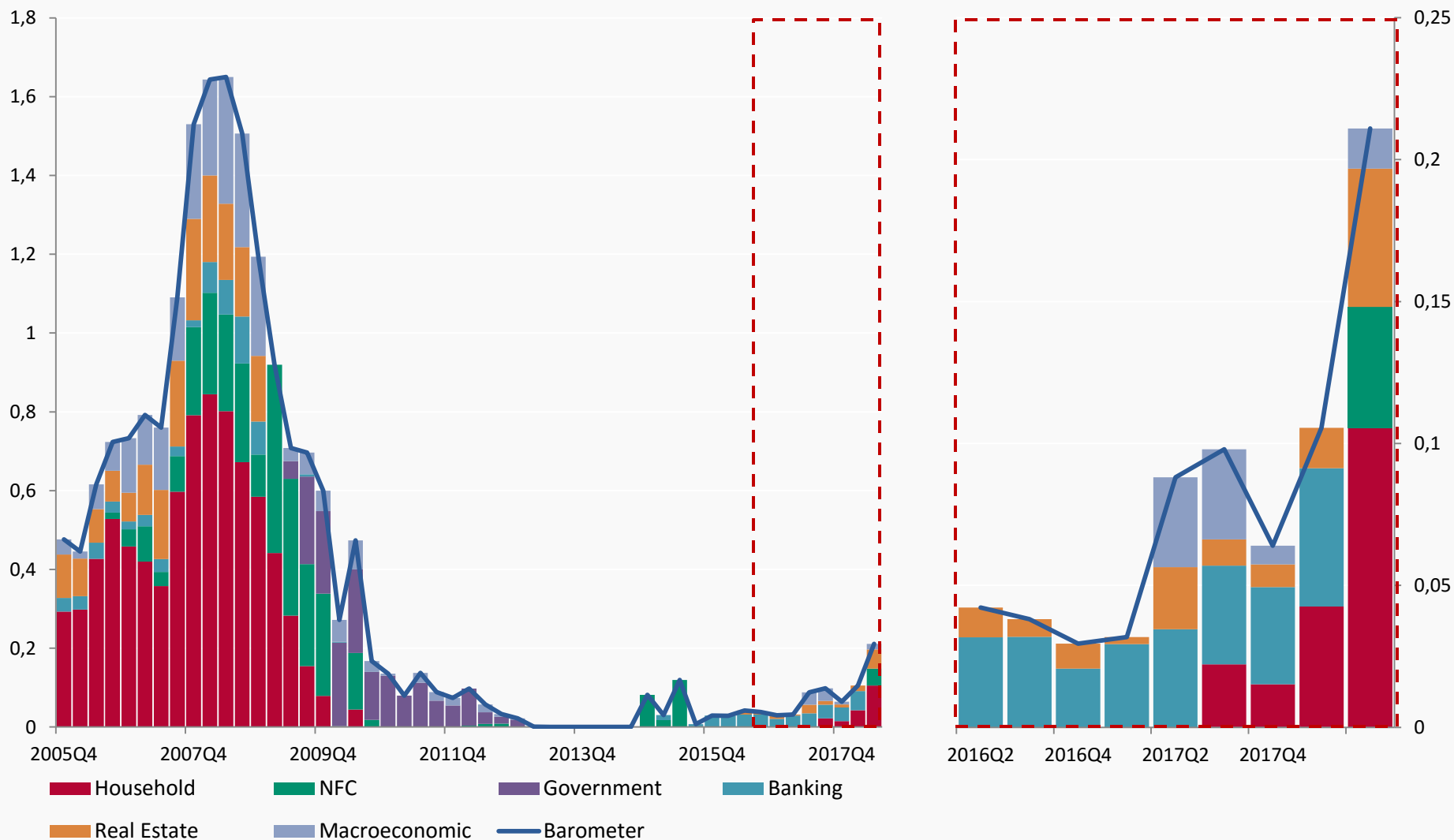
Weights → derived from **EWS models** and aggregated taking into account each series volatility

Table 1. Indicators and thresholds used in the Barometer

| Indicator | Threshold | Indicator | Threshold |
|--------------------------------------|-----------|---------------------------------|-----------|
| (1) Household indebtedness | | (6) Public debt | |
| growth rate | 10% | growth rate | 10% |
| dev. from trend | 1% | dev. from trend | 2% |
| (2) Mortgage indebtedness | | (7) Banking sector | |
| growth rate | 10% | Bank leverage | 12% |
| dev. from trend | 1% | Bank liquidity | 65% |
| (3) Consumer indebtedness | | ROE | 3% |
| growth rate | 10% | (8) House price index | |
| dev. from trend | 1% | growth rate | 5% |
| (4) NFC indebtedness | | dev. from trend | 2% |
| growth rate | 10% | (8) Macroeconomic stance | |
| dev. from trend | 1% | Output gap | 2% |
| (5) NFC external indebtedness | | Structural deficit | 1% |
| growth rate | 10% | Current account def. | 2% |
| dev. from trend | 1% | | |

Source: NBR

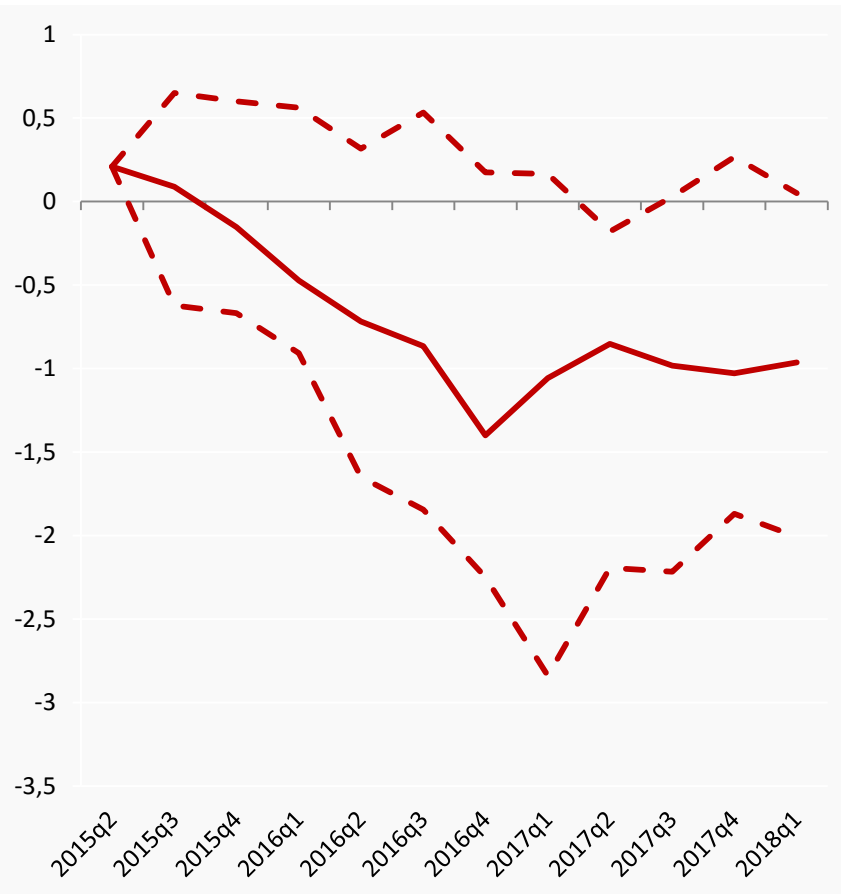
An *at stress* approach for the macroprudential policy stance: A financial stability barometer (III)



Source: own calculations

An *at stress* approach for the macroprudential policy stance: GDP at stress (I)

Difference between conditional and unconditional forecast for GDP



Source: own calculations

Structural BVAR with sign restrictions

→ GDP growth, inflation, interest rate, loan growth (HH and NFC), capital ratio and spreads (HH and NFC) – identification of demand and bank capital shocks

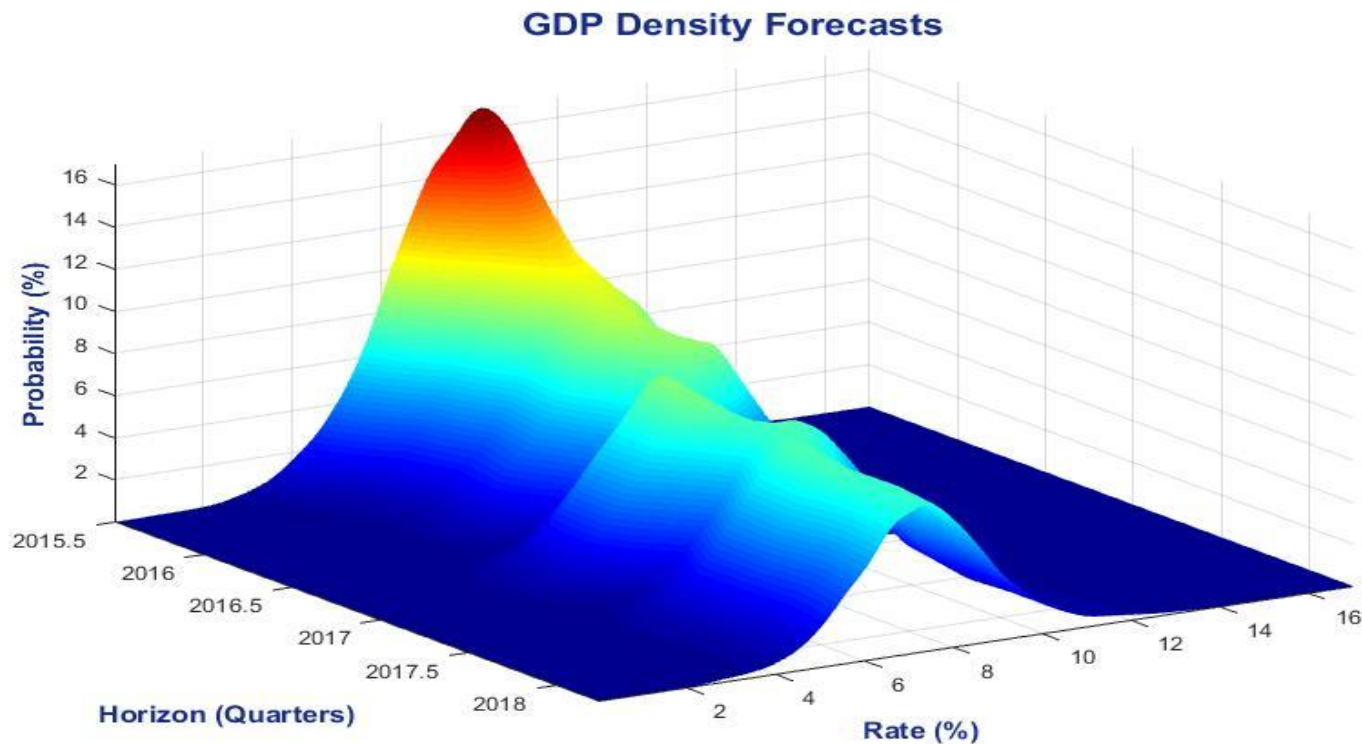
Counterfactual scenario →

conditional forecast with a stress scenario - drop in HH (-15%) and NFC (-9%) lending over 12 quarters

Compute a “GDP at stress” = difference between unconditional and conditional forecasts

An *at stress* approach for the macroprudential policy stance: GDP at stress (II)

- Density forecasts of the GDP are produced by using a Bayesian VAR model (Minnesota Prior approach) with business and financial variables



Source: own calculations

Conclusions

Conclusions

- The macroprudential policy stance is **difficult to be properly identified** because it is not directly observable - sustained research efforts need to be conducted further forward
- **Hybrid approaches** to assess the macroprudential policy stance could provide a (con)quest of the robust financial stability conditions
- Need for a **mix of macroprudential policies**, properly designated, to be able to reduce the probability of strong financial imbalances



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Thank you for
your attention!