

# Do NPLs Matter for Bank Lending and the Business Cycle in Euro Area countries

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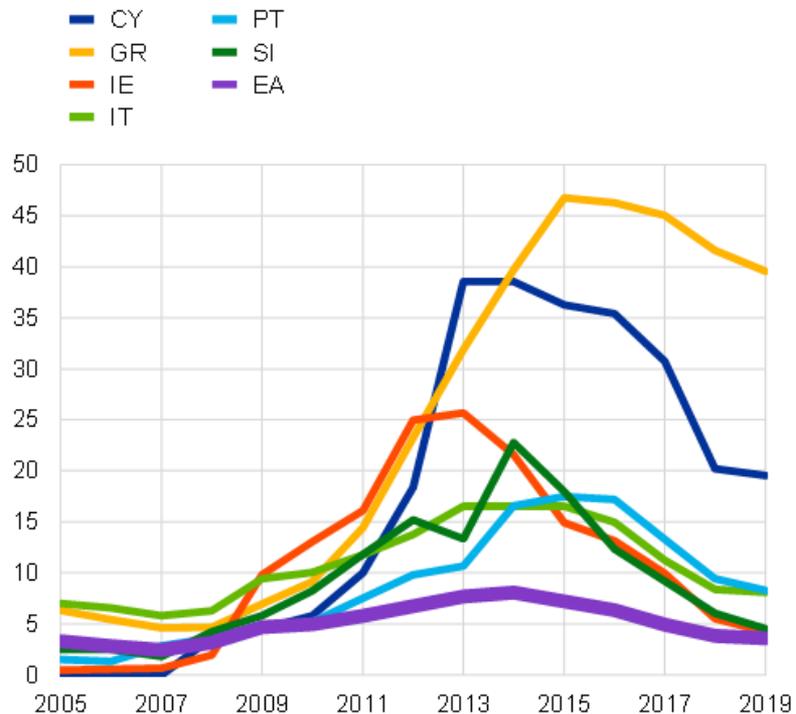
## Outline

- 1. Motivation and Literature Overview**
- 2. Methodology and Data**
- 3. Results**
- 4. Conclusions**

# 1. MOTIVATION AND LITERATURE OVERVIEW

# Motivation and Literature Overview

## NPL ratios in the euro area 2005-2019

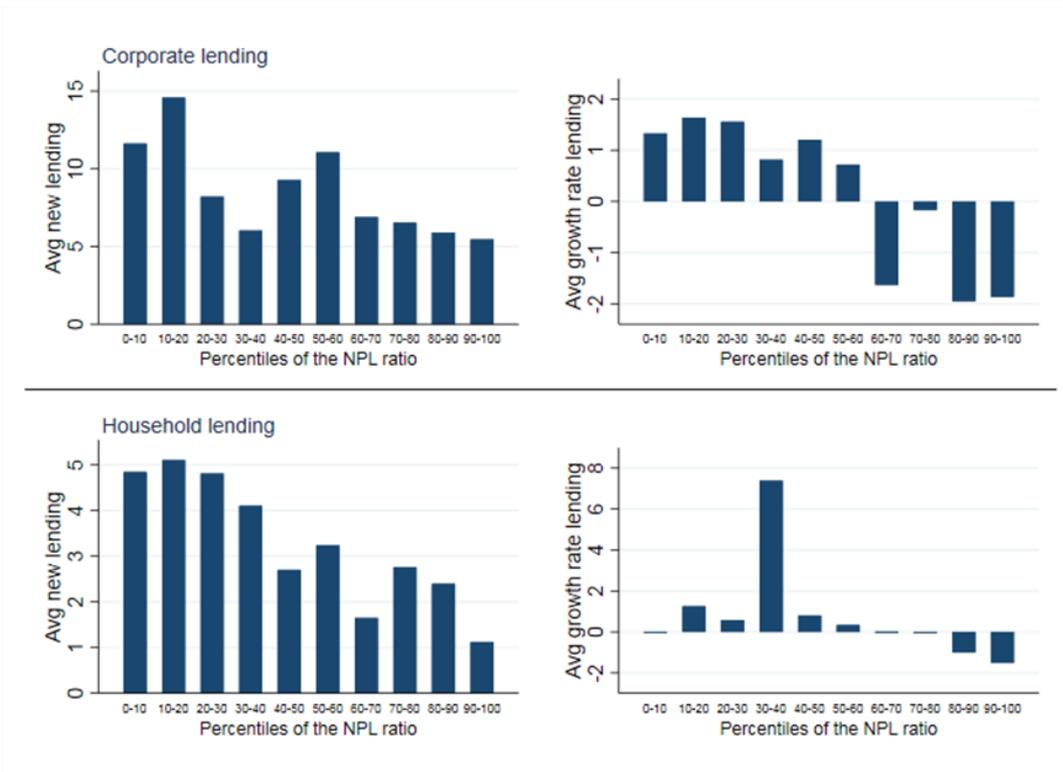


	Average NPL ratio (2007)	Average NPL ratio (mid-2019)
6 EA countries	4.8	11.0
EA	2.4	3.6
UK	0.9	1.0
US	1.4	0.9

Source: World Bank, IMF Financial Soundness Indicators (until 2013), ECB Consolidated Banking Data (2014-Q2 2019).

## Motivation and Literature Overview

Anecdotal evidence: High NPL banks in the euro area lent less during 2014-2018.



But does the anecdotal evidence 'survive' a thorough empirical assessment?

Paper aims to estimate the impact of exogenous shocks to changes in NPL ratios on bank lending and the macroeconomy.

Source: ECB Consolidated Banking Data

## Motivation and Literature Overview

### Three strands of empirical literature on NPLs (1)

#### 1) Determinants of NPLs

- Bank level drivers
  - *Exogenous factors (sudden economic stop)*
  - *Poor management (seen as most prominent driver)*
  - *Low capitalisation and more risk taking*
  - *Scarcity of resources to underwrite / monitor loans*
- Industry-level drivers
  - *Impact of competition on risk-taking; no consensus in the literature*
- Macroeconomic drivers (e.g. Anastasiou / Tsionas 2016)
  - *Improved economic conditions, higher inflation and lower IR positive*
  - *ER depreciations negative for FX loans*

## Motivation and Literature Overview

### Three strands of empirical literature on NPLs (2)

#### 2) Impact of NPLs on the real economy (mainly bank lending and economic activity)

- Balgova, Nies, Plekhanov (2016)
  - Global sample of 100 countries. Reduced NPL ratios result in faster credit and GDP growth.
  - “Active” countries do significantly better than “procrastinating” ones.
- Accornero et al. (2017), based on Italian data
  - Level of NPL ratios does not per se influence bank lending but bank lending impaired by exogenous accumulation of new NPLs.

## Motivation and Literature Overview

### Three strands of empirical literature on NPLs (3)

#### 3) Feedback loops between NPLs and the real economy

- Tries to capture dynamic interaction and feedback between changes in NPLs, banking and macroeconomic variables.
- Klein (2010), Nkusu (2011) and Espinoza, Prasad (2010), De Bock and Demyanets (2012) construct VAR models for country groups
- All these studies find that an increase in NPLs leads to a reduction in credit and has a negative impact on the macroeconomy.

#### 4) New contributions of our paper

- Bayesian panel VAR approach with country-specific dynamics
- Inclusion of larger set of variables including e.g. distinction between NFC and household lending and spreads
- Large quarterly panel over 13 years for 11 countries

## 2. METHODOLOGY AND DATA

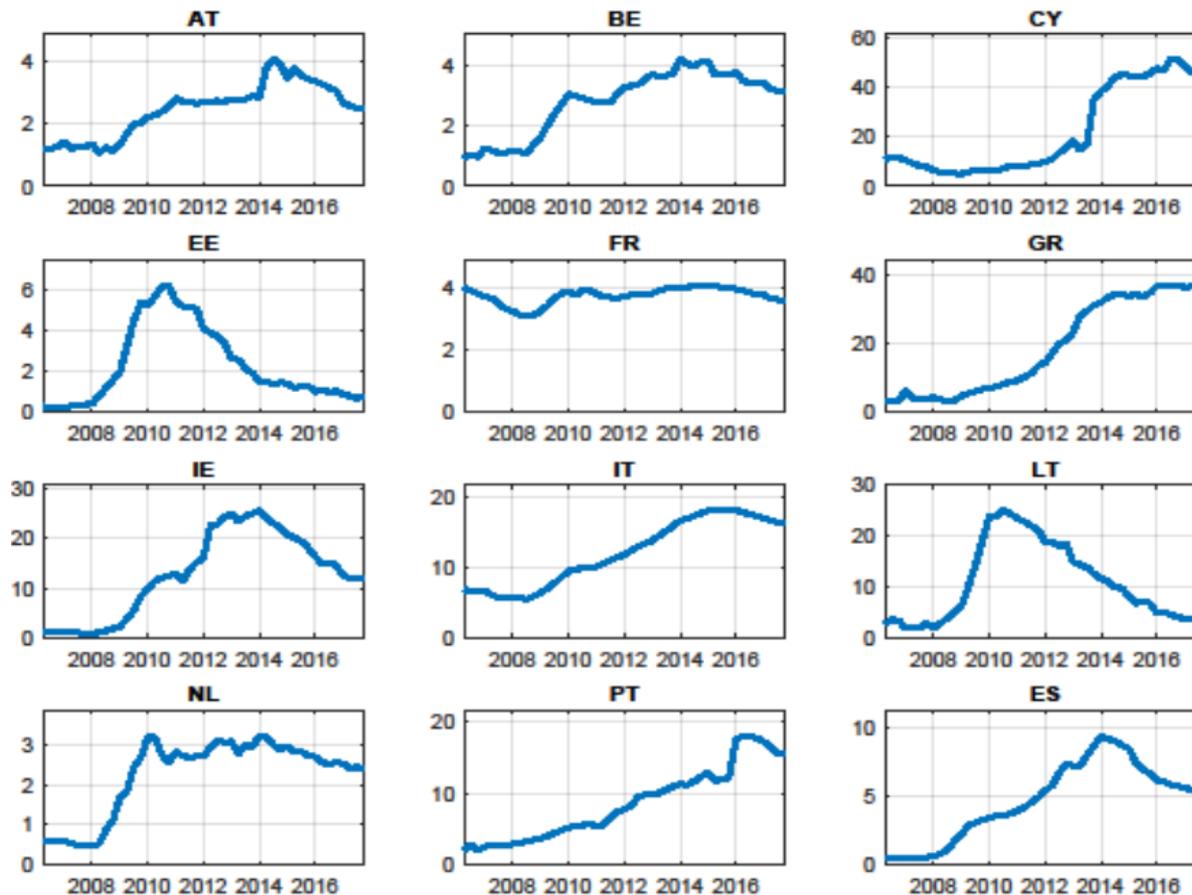
## Methodology and Data

### General methodological approach

- Estimation of Panel Bayesian VAR with hierarchical priors (Jarocinski, 2010)
- Use of Bayesian model due to (1) the relatively short data series for NPL and (2) the relatively large number of parameters included
- Model captures a common component across countries while allowing for cross-country heterogeneity in response to shocks – appropriate set up for analyzing deeply integrated (euro area) economies
- Sample of 12 euro area countries - based on data availability (AT, BE, CY, EE, FR, GR, IE, IT, LT, NL, PT, ES).
- Sample of countries is very heterogeneous regarding the evolution of NPLs over time
- Estimation sample: 2006Q1 – 2017Q3; quarterly data

## Methodology and Data

Figure 1: Non-Performing Loan Ratios



## Methodology and Data

### List of included variables:

- Annual change in NPL ratio, p.p. (IMF FSI, national sources, bank level data).
- Policy interest rate: Eonia (ECB).
- Economic activity: Y-o-Y growth rate of real GDP (Eurostat).
- Inflation: Y-o-Y growth rate core HICP (Eurostat).
- Residential real estate prices (Eurostat)
- Bank lending volumes: Y-o-Y growth rate in lending to *non-financial corporations* and *households for house purchases* (BSI).
- Bank lending spreads: difference between bank lending rates and Euribor (to NFCs and for mortgages (MIR)).
- Capital ratio: capital and reserves to asset ratio (BSI).

## Methodology and Data

### The identification scheme (1)

- Choleski decomposition (e.g. De Bock / Demyanets 2012) to estimate the impact of changes in NPL ratios
- Variables earlier in the ordering considered relatively more exogenous than variables appearing later
- Main assumptions:
  - Monetary policy reacts to a large set of info (Cicarelli et al., 2009)
  - Banking variables (lending and spreads) affect the capital and reserves-to-asset ratio within the same quarter
  - Lending spreads move faster than macro variables (GDP and inflation)
  - NPLs move slowly (accounting rules allow a loan to be classified as NPL after one quarter even if the customer defaults within the same quarter)

## Methodology and Data

### The identification scheme (2)

- Ordering used in the estimation:
  - Rate of change of bank lending (NFC and mortgages)
  - Change in NPL ratio
  - Macroeconomic variables (GDP growth and inflation)
  - Real estate prices
  - Bank lending spreads (for NFC and mortgages)
  - Bank capital and reserves
  - Monetary policy rate
- Similar ordering as in Hancock et al. (1995), Klein (2013) and De Bock and Demyanets (2012)

## Methodology and Data

### Exogenous changes in NPL ratios

- Sources of exogenous variations in NPL ratios, i.e. changes in NPL ratios unrelated to changes in borrowers' repayment capacity
  - *Application of new definition of NPLs (e.g. EBA definition for EU countries in 2013)*
  - *Supervisory action (e.g. NPL guidance by ECB / SSM and related follow-up activities)*
  - *Strategic defaults; able but unwilling borrowers (relatively well documented e.g. in Greece and Cyprus)*
  - *Transfer of NPLs to an Asset Management Company (AMC)*

## 3. RESULTS

## Results

### Four sets of results presented in the paper

- Impulse response functions to a shock in NPL ratios
- Share of forecast error variance, i.e. to what extent is the variable driven by the NPL shock
- Robustness checks
- Out-of-sample structural conditional forecast

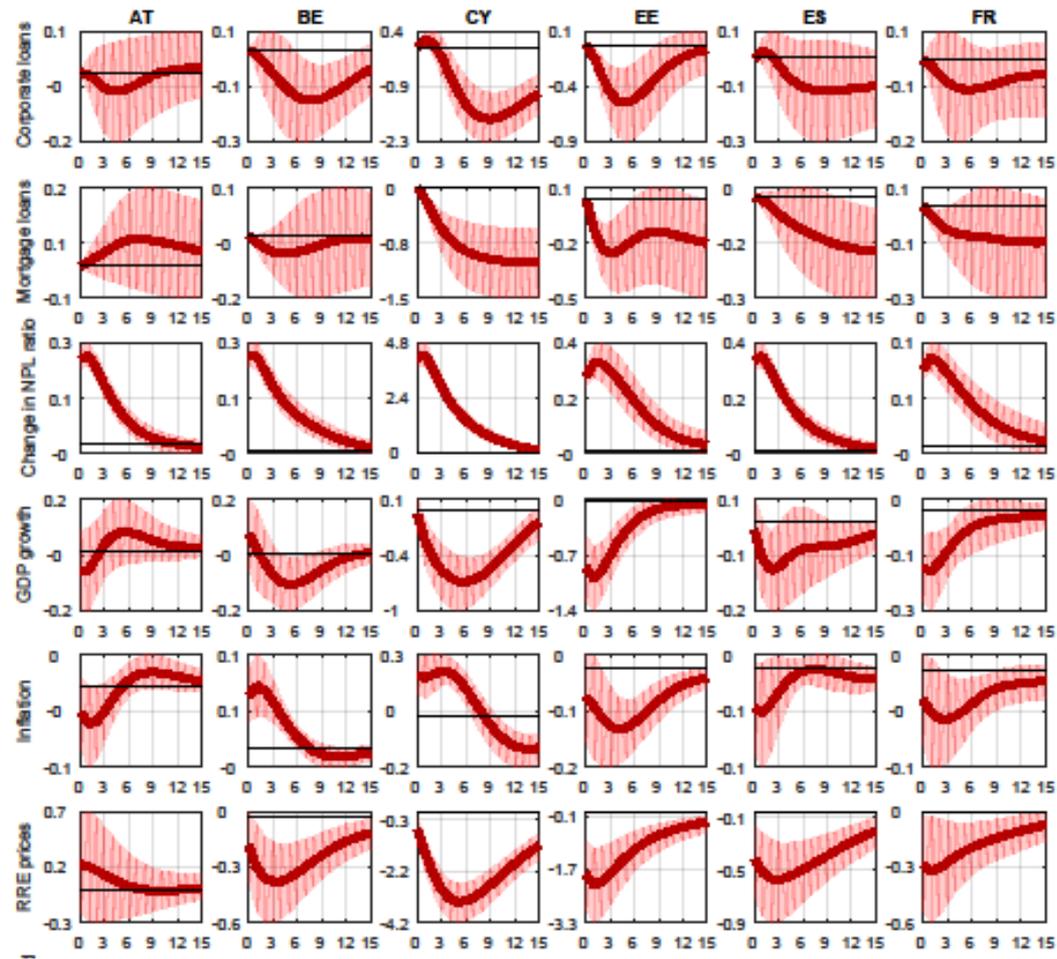
## Results

### Impulse response analysis (1)

- One standard deviation shock to the change in the NPL ratio
- Main impacts:
  - *Decline in bank lending – stronger for NFC lending (up to 1.7 pp) than for mortgages (up to 1 PP)*
  - *Widening in bank lending spreads*
  - *Decline in residential property prices (up to -3.4 pp)*
  - *Decline in GDP growth in most countries (up to 1 pp)*
- Significant heterogeneity across countries, with high NPL countries being (not surprisingly) being more strongly affected

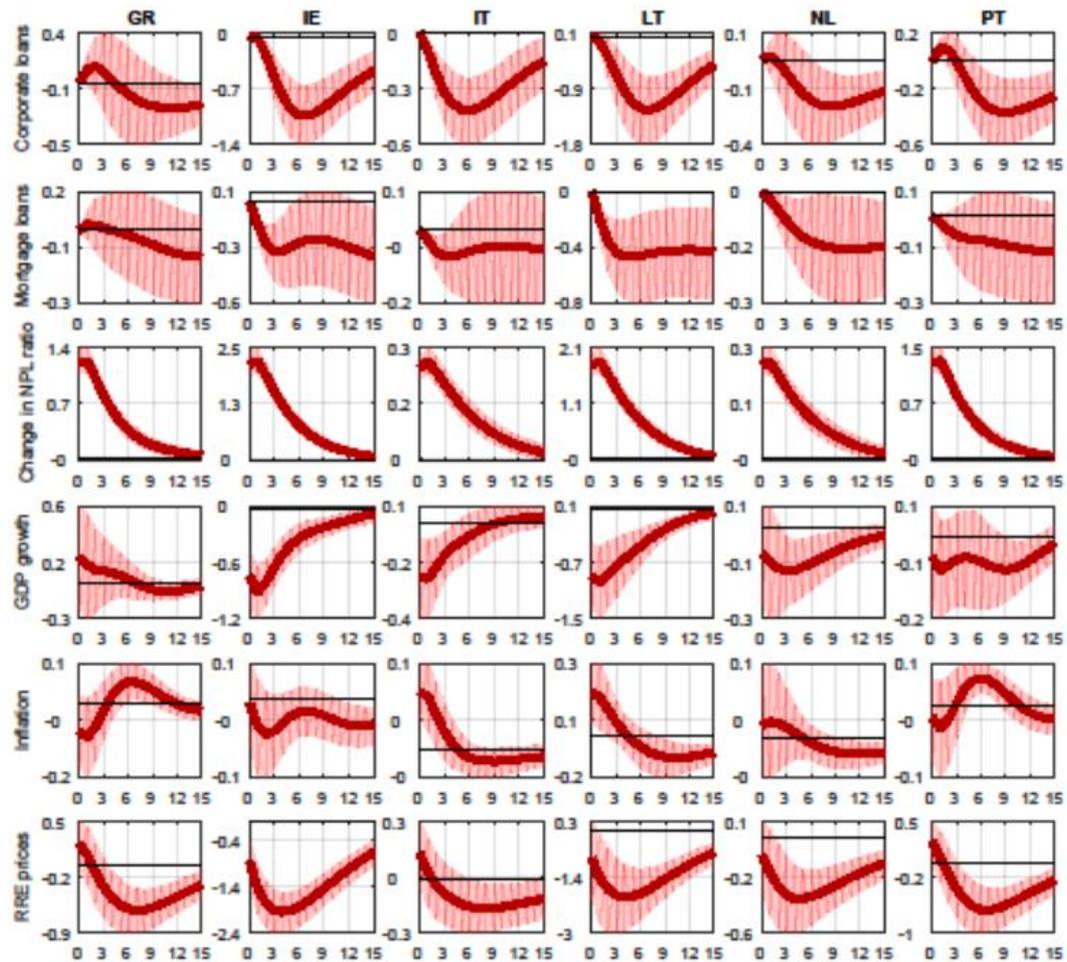
# Results

## Impulse response analysis (2)



# Results

## Impulse response analysis (3)



## Results

### Forecast error variance decomposition

- Analysis shows share of forecast error variance explained by exogenous shocks to other variables
- Shock to the change in the NPL ratio explains non-negligible share of most variance included in the VAR:
  - *Sizeable drivers of real GDP growth, although with significant cross-country heterogeneity*
  - *Explained share of variance larger for NFC lending than for mortgages*
  - *In some countries significant shares of variance in residential real estate prices*
- Again, there is significant heterogeneity across countries, with high NPL countries being (not surprisingly) being more strongly affected

## Results

### Robustness analysis

- Two robustness checks conducted
  - *Change of the ordering of the variables in the Choleski factorization (loans and NPL ratios included after the macroeconomic variables)*
  - *Replace NPL ratios with NPL volumes and order them first in the VAR*
- Results broadly in line with the baseline specification of the model and the results using NPL ratios
  - *Material banking sector deleveraging following an NPL shock; NFC financing more negatively affected than households*
  - *Negative impact on GDP growth and residential real estate prices*

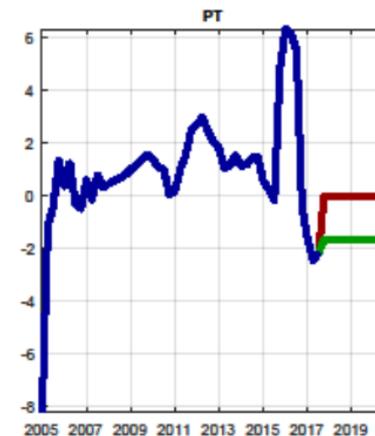
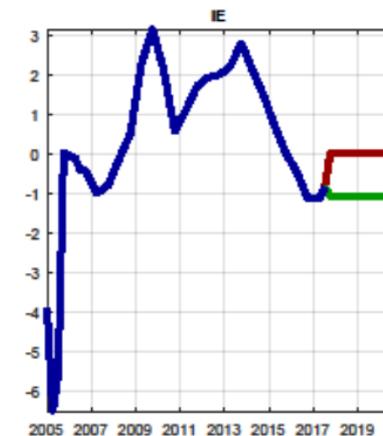
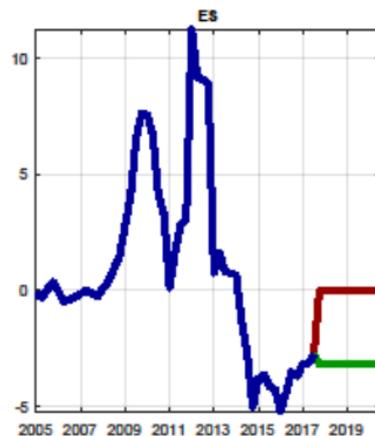
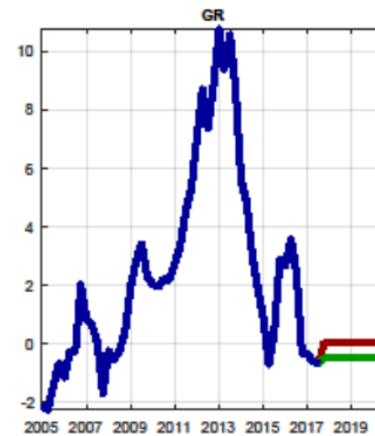
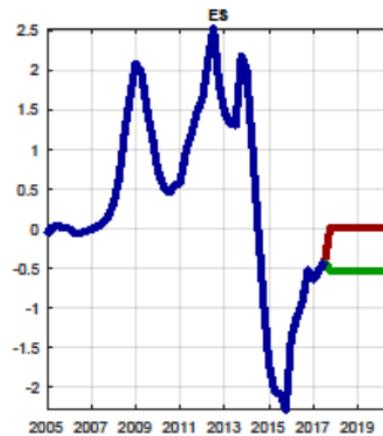
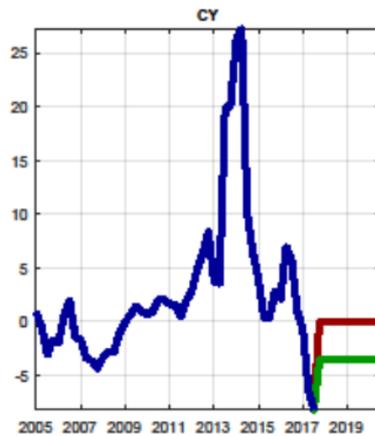
## Results

### Structural out-of-sample analysis (1)

- Focus of the analysis is on the six most relevant variables and the six 'high NPL' countries; 'forecast' covers eight quarters
- Two scenarios:
  - *Baseline: Change in NPL ratio assumed to be in line with last four quarters*
  - *Adverse: Change in NPL ratio assumed to be zero*
- Results show – as expected – positive effects of a further reduction of NPL ratios on macroeconomic and banking variables
  - *Higher growth of mortgage lending (+1.4 to 2.9 pp)*
  - *Higher growth of NFC lending (+0.9 to 4.4 pp)*
  - *Higher residential real estate prices (+1.6 to 6.7 pp)*
  - *Higher GDP growth (+0.5 to 1.6 pp)*

# Results

## Structural out-of-sample analysis (2)



## 4. CONCLUSIONS

## Conclusions

### **The main findings of the paper are as follows:**

- Impulse response analysis shows that an exogenous increase in the change in NPL ratios depresses bank lending volumes, widens bank lending spreads and leads to a fall in real GDP growth and residential real estate prices;
- Forecast error variance decomposition shows that shocks to the change in NPL ratios explain a relatively large share of the variance of the variables in the VAR;
- A structural out-of-sample scenario analysis suggests that reducing banks' NPL ratios can produce significant benefits in terms of improved macroeconomic and financial conditions.

**Thank you for your attention!**

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