

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

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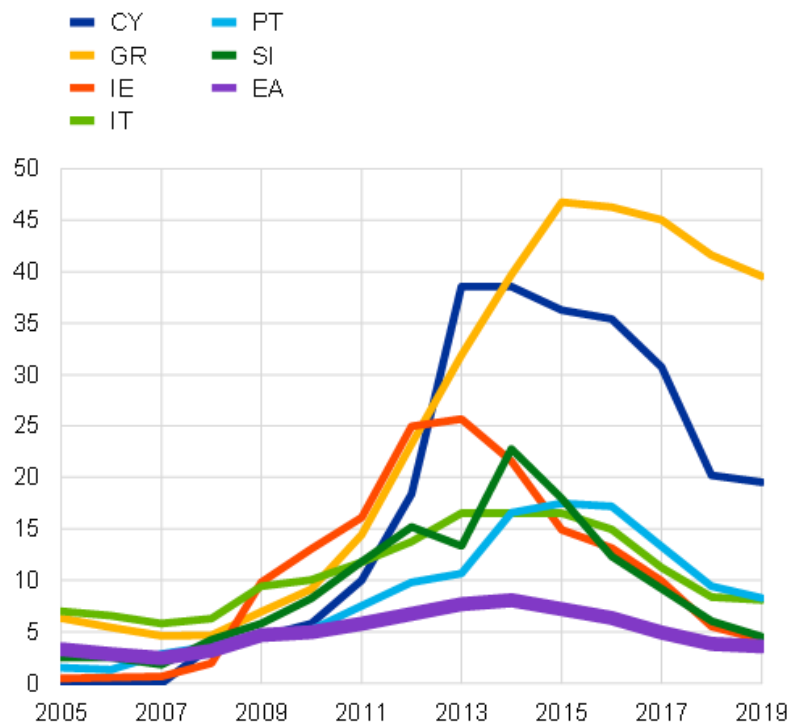
Outline

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- 2. Methodology and Data**
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1. MOTIVATION AND LITERATURE OVERVIEW

Motivation and Literature Overview

NPL ratios in the euro area 2005-2019

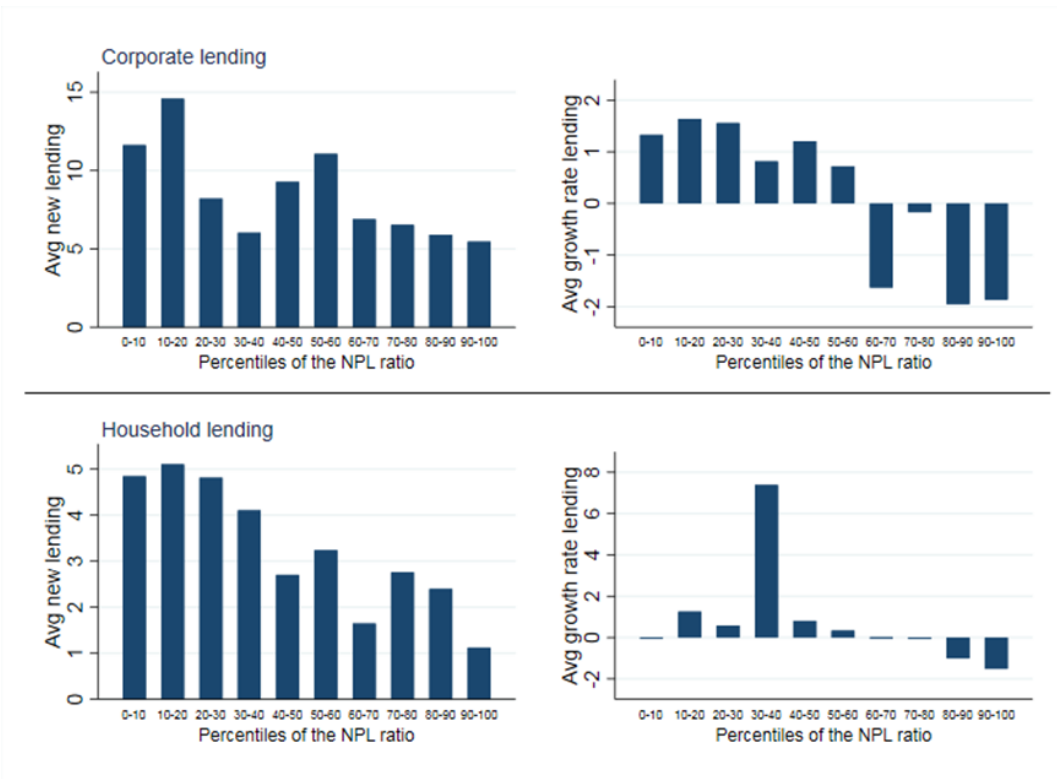


	Average NPL ratio (2007)	Average NPL ratio (mid-2019)
6 EA countries	4.8	11.0
EA	2.4	3.6
UK	0.9	1.0
US	1.4	0.9

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.



Source: ECB Consolidated Banking Data

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.

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

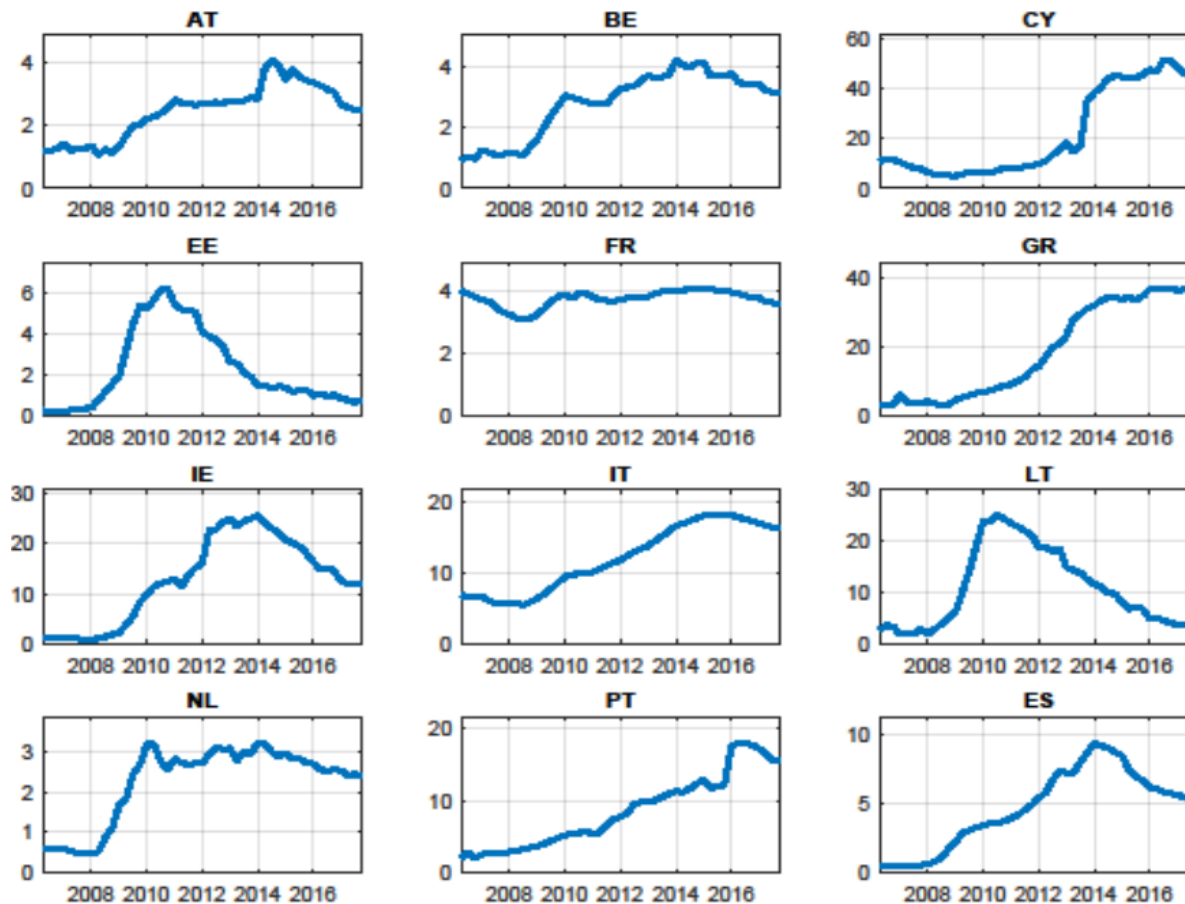
Methodology and Data

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

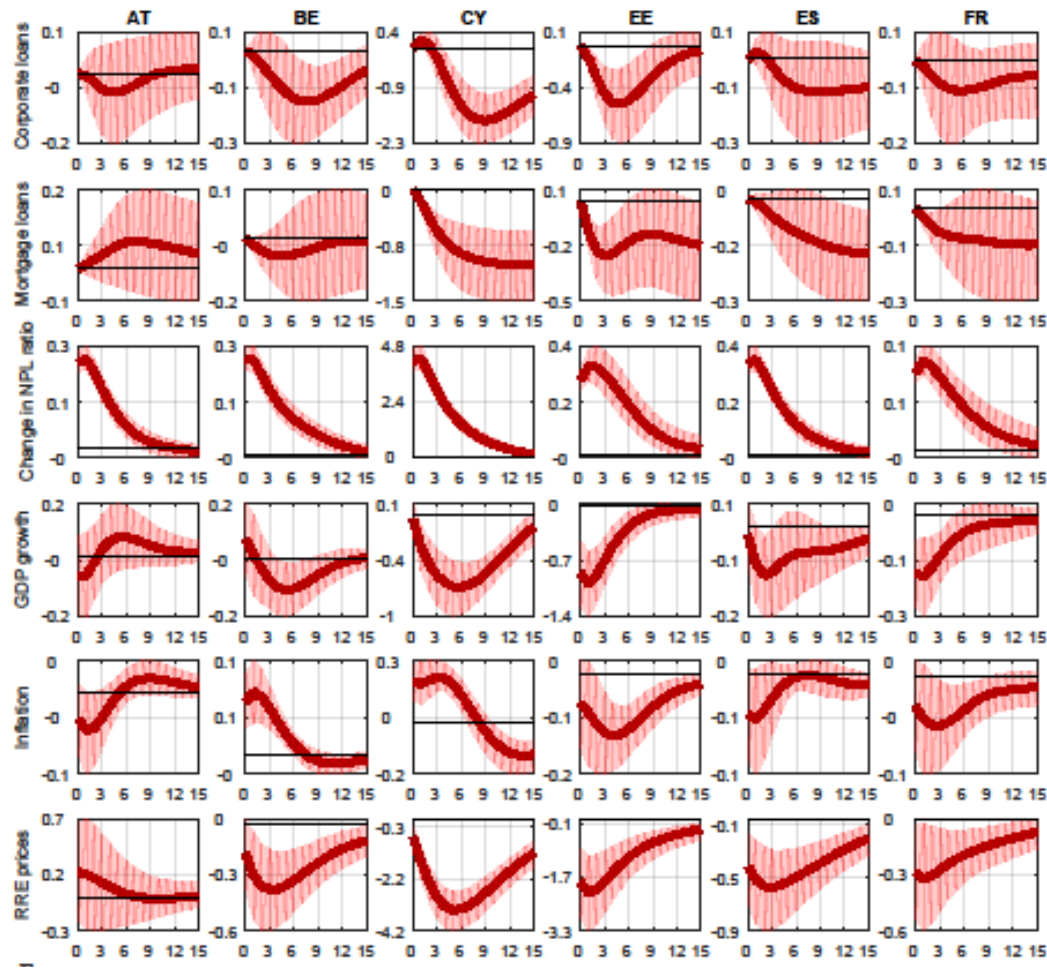
Results

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

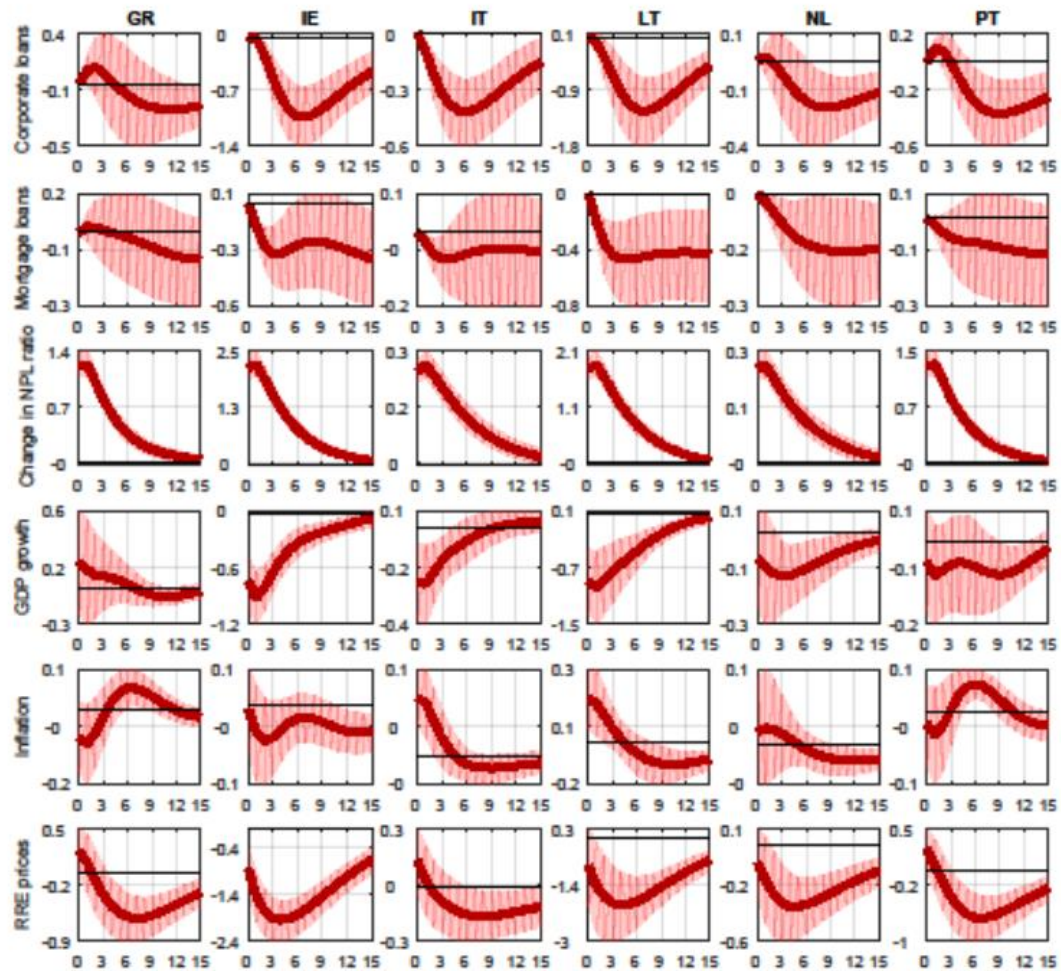
Results

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*

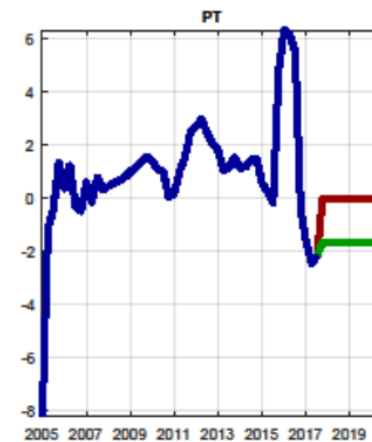
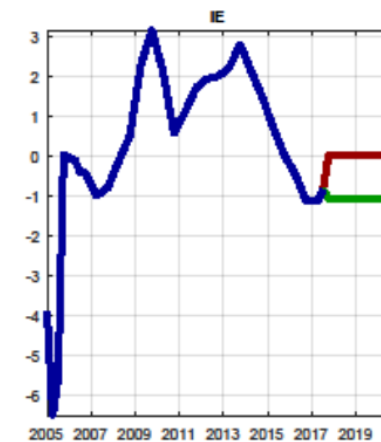
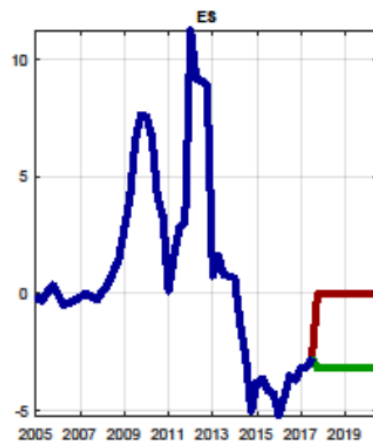
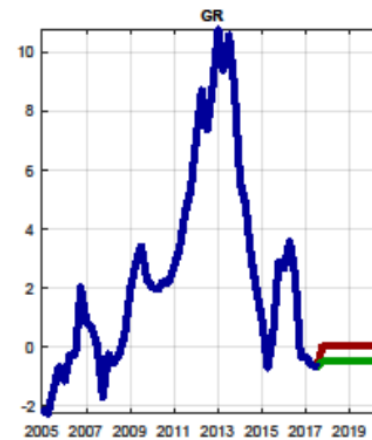
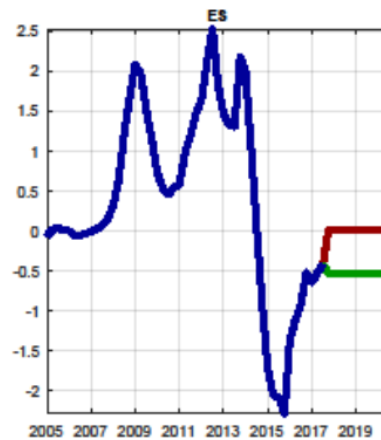
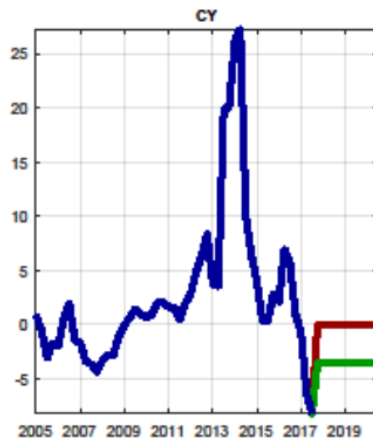
Results

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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