



OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

Has private sector credit in CESEE approached levels justified by fundamentals? A post-crisis assessment

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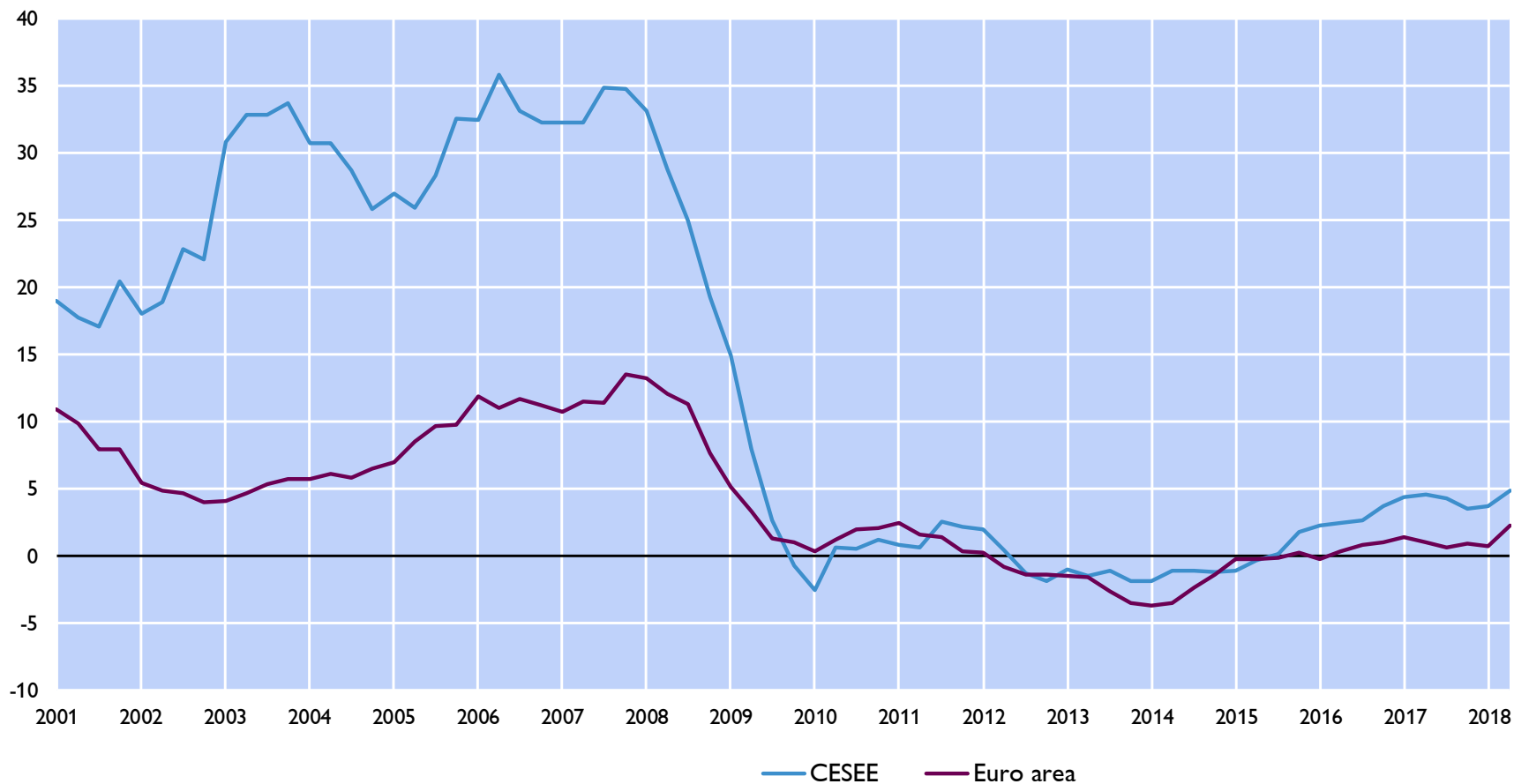
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Have credit levels eventually approached levels justified by macroeconomic and financial fundamentals?

Domestic credit to the nonbank private sector in the CESEE countries and the euro area

Year-on-year changes in %



Source: ECB, national central banks (aggregated balance sheets of other MFIs).

Note: Domestic banks' claims on resident nonbank private sector. CESEE reflects unweighted averages across the 11 CESEE EU member states.

The literature so far

- Before the GFC: rapidly rising credit levels in most CESEE countries
 → credit bubbles or convergence-related financial deepening?
 - e.g. Boissay et al., 2005; Duenwald et al., 2005; Égert et al., 2006; Kiss et al., 2006

- Post-GFC work has continued to study the deviation of observed credit levels from long-run equilibrium levels
 - e.g. Zumer et al., 2009; Eller et al., 2010; Geršl & Seidler, 2015; IMF REI, 2015; Stojanović & Stojanović, 2015; Jovanovic et al., 2017
 - Focus on domestic bank credit to the private sector
 - Linking countercyclical capital buffers (CCyBs) to credit gaps
 - Foreign credit determinants largely disregarded
 - Switch from out-of-sample to in-sample approaches
 - Static and dynamic panel data models (addressing either credit *levels* or credit *growth*)

Our contribution

- **Cross-border credit** as important source of corporate financing in CESEE → added to the domestic private sector credit stock

- **Foreign credit determinants** added
 - Strong openness of the region in terms of trade and banking ([Fadejeva et al., 2017](#)) & potential role of global “supply push” factors in determining credit ([Bruno & Shin, 2015](#))
 - Pay attention to global GDP developments and spillovers from global/European credit cycles

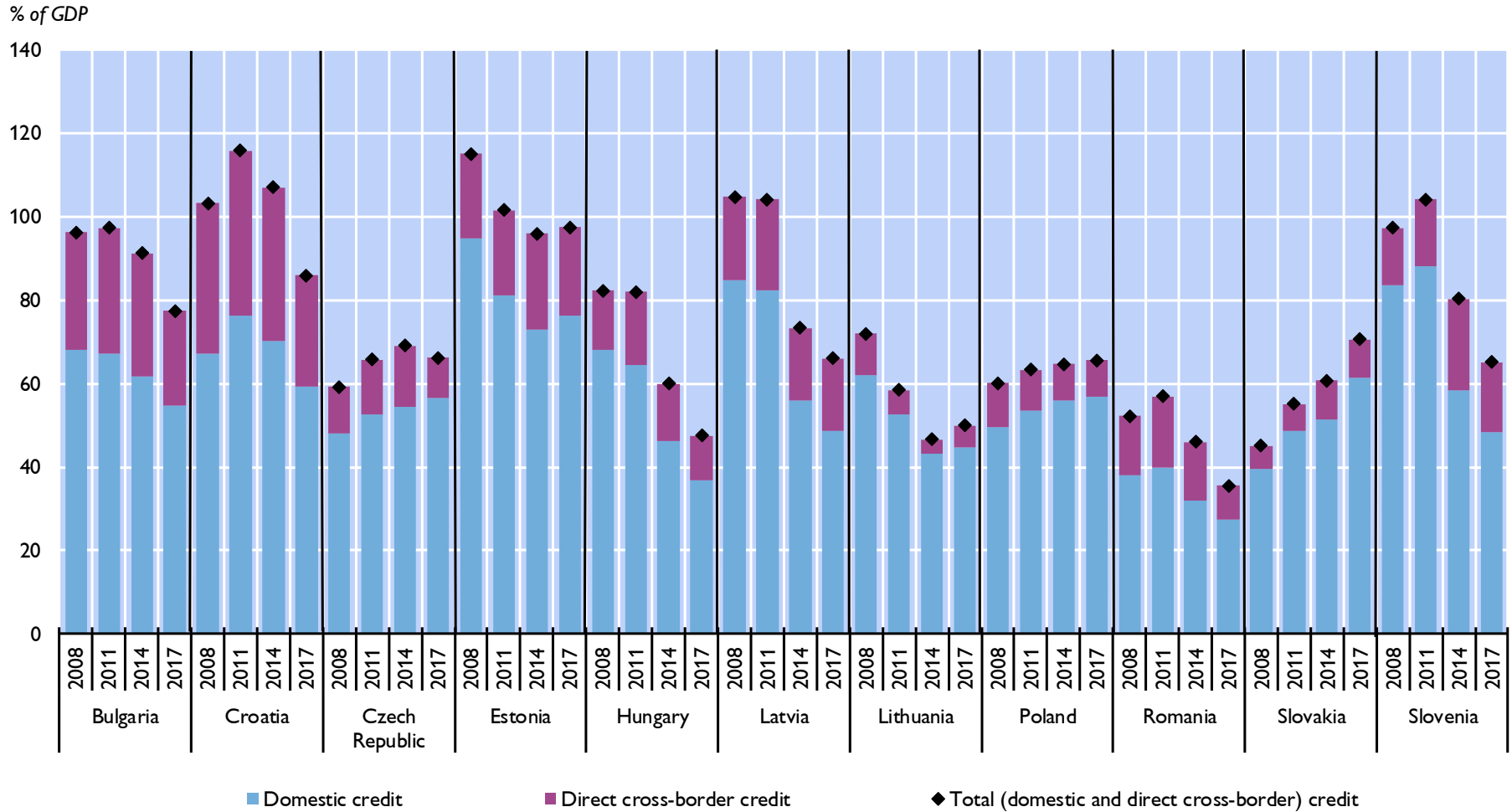
- **Different candidate models** for estimating fundamental credit levels
 - Static panel model accounting for heterogeneous coefficients, cross-sectional dependence, nonstationarity and cointegration
 - Comparison of different estimators, static vs. dynamic:
[companion working paper](#)

Sample

- 11 CESEE EU member states:
BG, CZ, EE, HR, HU, LV, LT, PL, RO, SI, SK
- For the estimations: quarterly data from mid-1990s until end-2016
- **Main variable of interest:** total private sector credit-to-GDP ratio
 - a) Domestic banks' credit to resident nonbank private sector
 - b) Direct cross-border credit, i.e. external debt of the nonbank private sector (IIP), excl. intercompany loans and trade credits (liabilities)
 - In a robustness check: wider definition, including ICLs and trade credit

Considerable decline in total private sector credit-to-GDP ratio; increase in CZ, PL and SK

Domestic and direct cross-border credit to the nonbank private sector

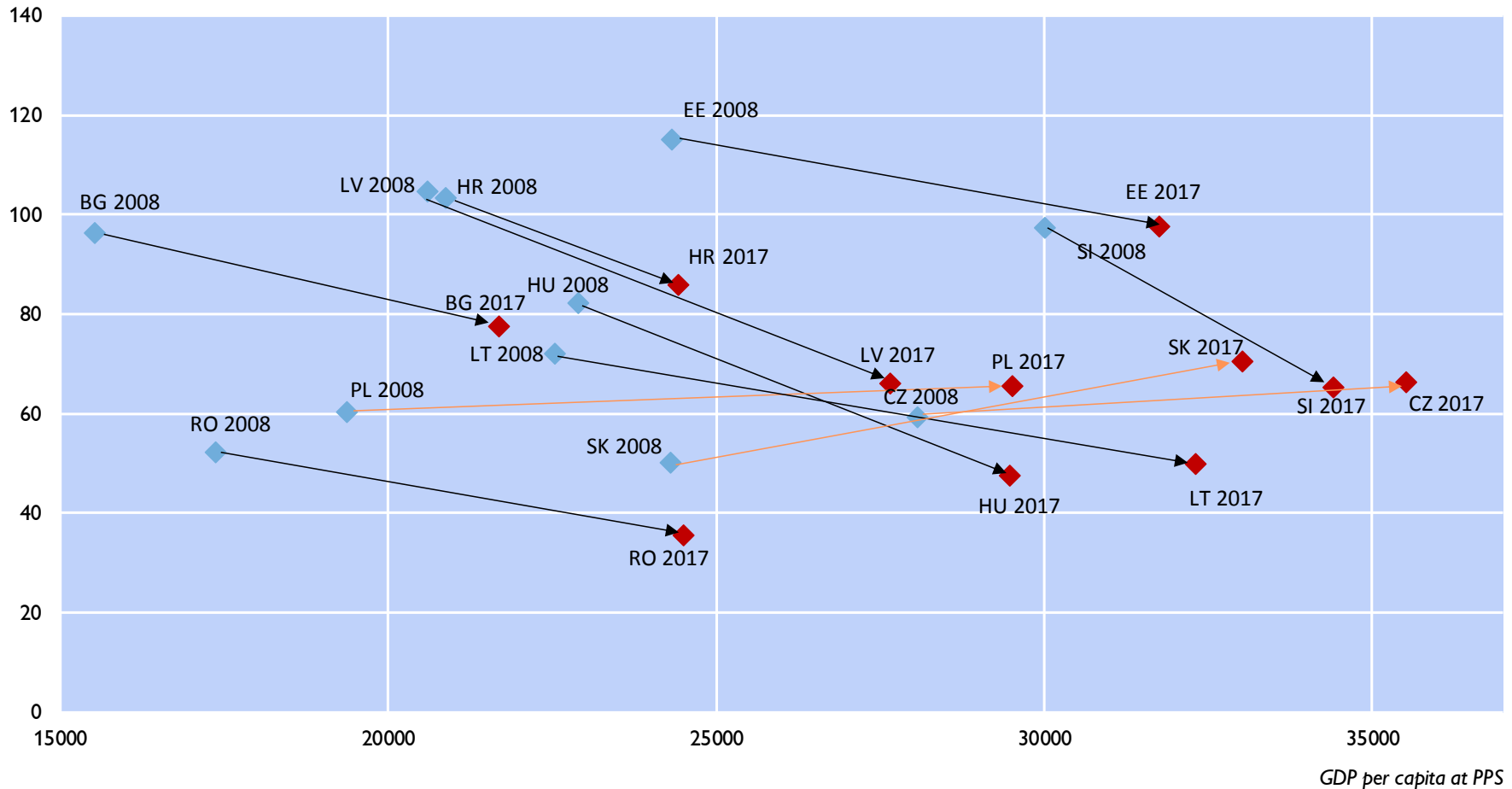


Sources: National central banks, Eurostat.

Credit vs. income: has the downward adjustment removed possible overshooting tendencies?

Total credit-to-GDP ratios in relation to GDP per capita at PPS

Total credit in % of GDP



Source: National central banks, Eurostat, IMF.

Econometric framework in a nutshell

$$\left(\frac{\textit{credit}}{\textit{GDP}}\right)_{i,t} = \beta_{1i}X_{i,t-1} + \beta_{2i}G_{t-1} + \beta_{3i}S_{i,t-1} + \mu_i + \varepsilon_{i,t}$$

$$\left(\frac{\textit{credit}}{\textit{GDP}}\right)_{i,t}^{\textit{fund.}} = \hat{\beta}_i' X_{i,t}^{\textit{HP}}$$

- X are the **domestic (CESEE countries') fundamentals**:
 - GDP per capita, bank credit to the general government, inflation rate, lending rate and the spread of lending rates over deposit rates
- G is the **common global factor** taken as global GDP
- S is a country-specific, time-varying variable for **cross-country spillovers in credit** (trade-weighted measure of partners' credit)
- *Preferred estimator*: Group Mean-Fully Modified OLS (as in [Pedroni, 2000](#))
- *HP-filtered fundamentals* to avoid that credit gaps are driven by short-run shocks in fundamentals (as in [Jovanovic et al., 2017](#))

Static panel results for total private sector credit

Dependent variable:
total credit/GDP

Explanatory variables

GDP per capita

Domestic general government credit/GDP

PPI inflation rate

Lending rate

Interest rate spread

Global GDP

Total credit spillovers

Constant

Observations

Number of countries

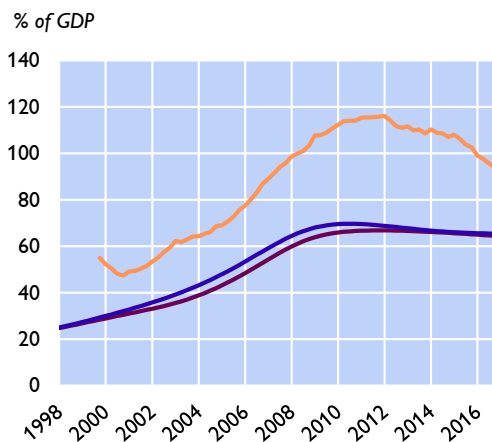
	1.383*** [0.036]	0.918*** [0.084]
	0.028* [0.020]	-0.041 [0.020]
	-0.244 [0.140]	-0.022 [0.130]
	0.023*** [0.040]	0.064*** [0.030]
	-0.204*** [0.020]	-0.172*** [0.010]
		0.313*** [0.080]
		0.842*** [0.110]
	-13.810*** [0.040]	-14.790*** [0.740]
	811	811
	11	11

Source: Authors' calculations.

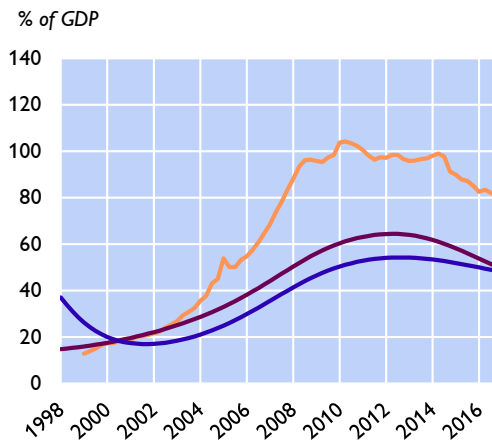
Note: Standard errors in brackets, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. GM-FMOLS estimator; all values in logs except for the PPI inflation rate.

Evolution of TOTAL credit in comparison to fundamentals-based levels (SEE and Baltics):

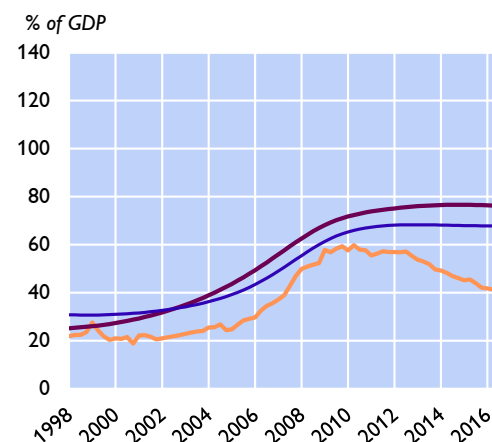
Croatia



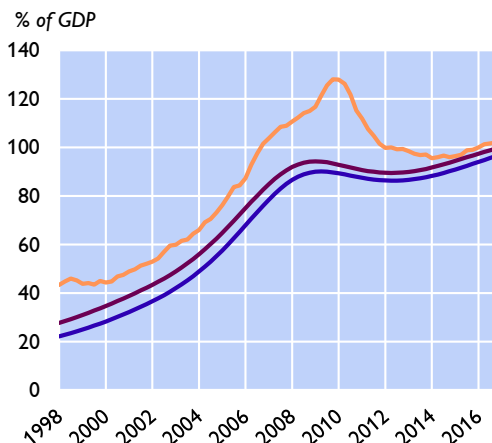
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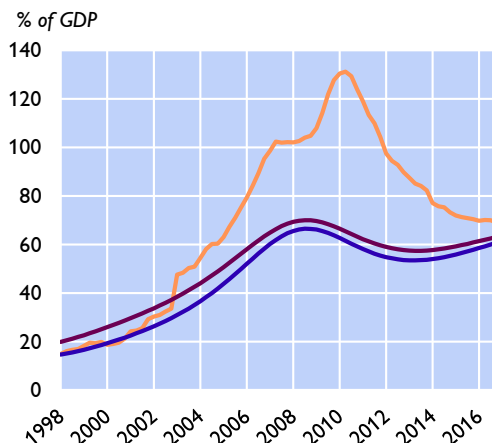
Romania



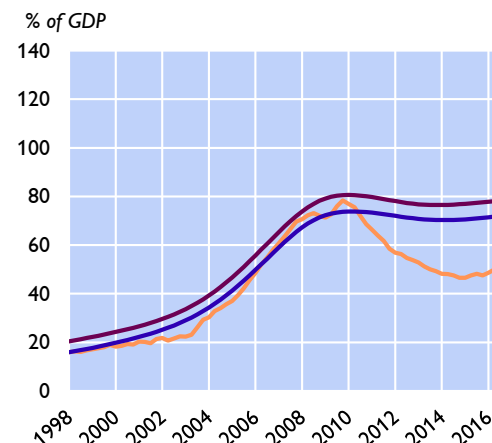
Estonia



Latvia



Lithuania

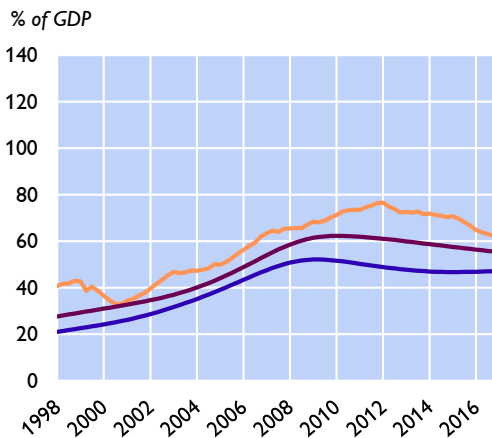


- Total private sector credit
- Fundamental level (based on GM-FMOLS)
- Fundamental level (based on FE)

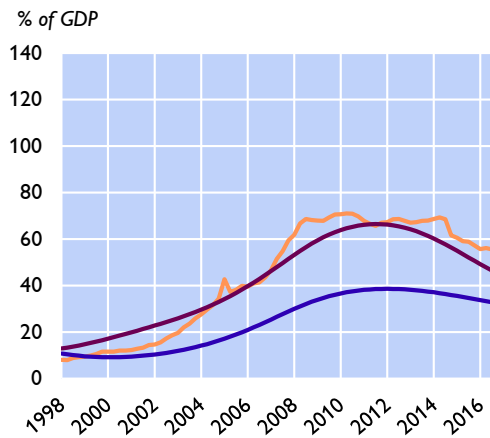
Source: National central banks, IMF, authors' calculations.

Evolution of DOMESTIC credit in comparison to fundamentals-based levels (SEE and Baltics):

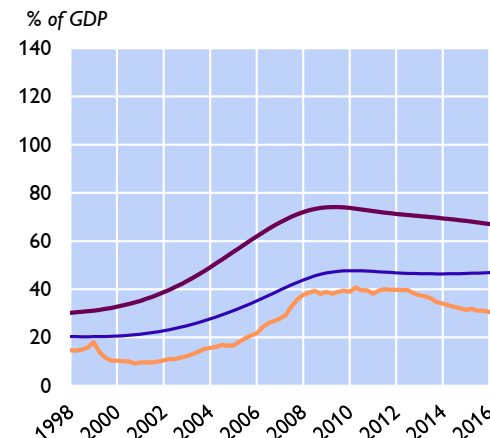
Croatia



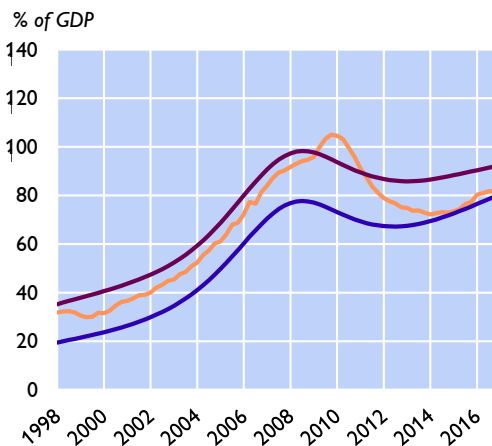
Bulgaria



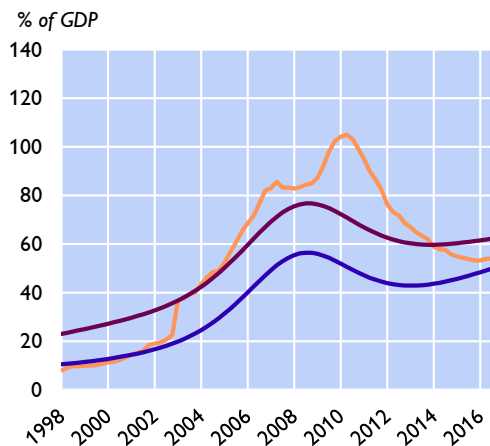
Romania



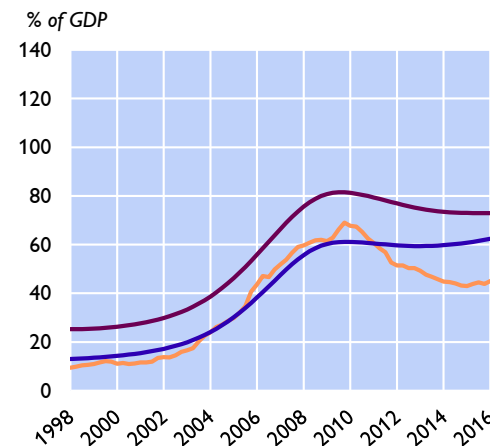
Estonia



Latvia



Lithuania

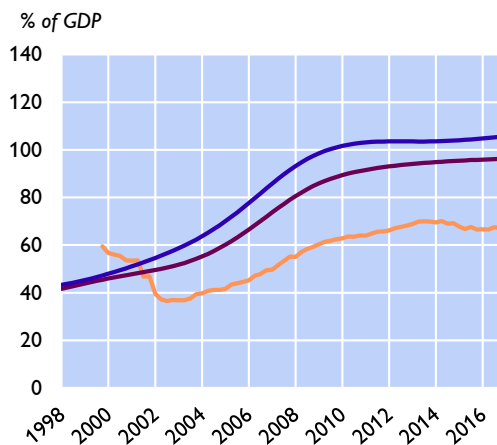


— Domestic private sector credit
 — Fundamental level (based on GM-FMOLS)
 — Fundamental level (based on FE)

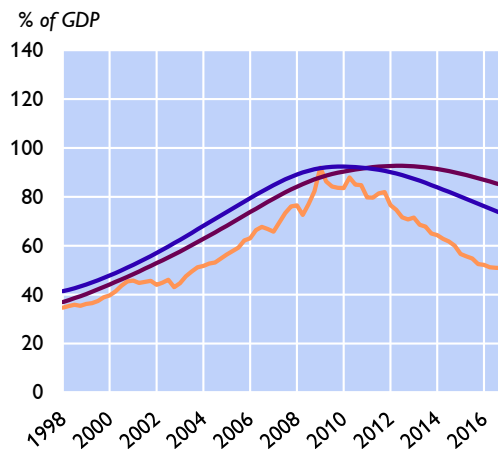
Source: National central banks, IMF, authors' calculations.

Evolution of TOTAL credit in comparison to fundamentals-based levels (CEE):

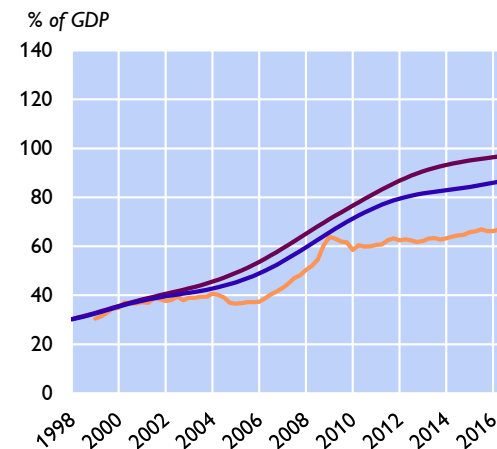
Czech Republic



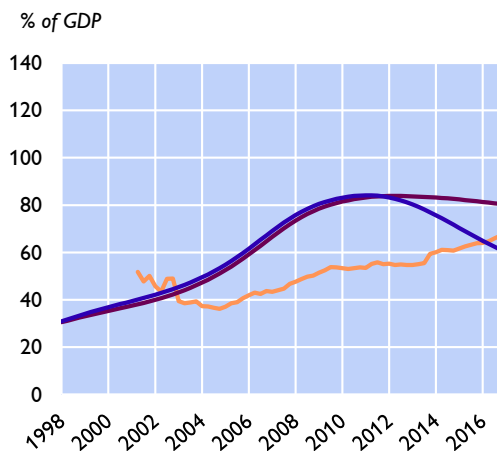
Hungary



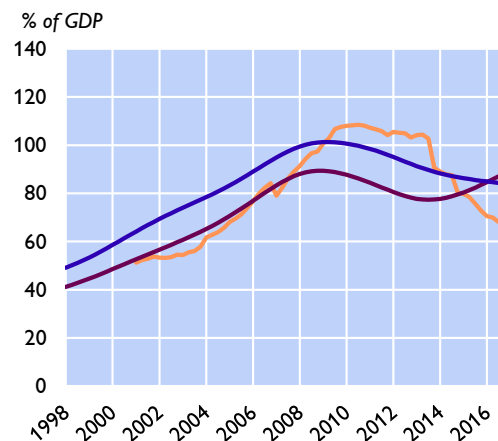
Poland



Slovakia



Slovenia

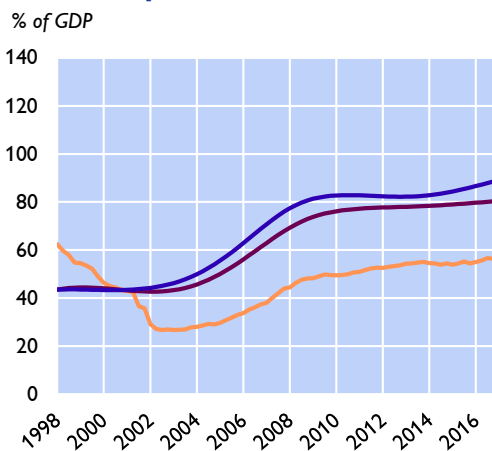


- Total private sector credit
- Fundamental level (based on GM-FMOLS)
- Fundamental level (based on FE)

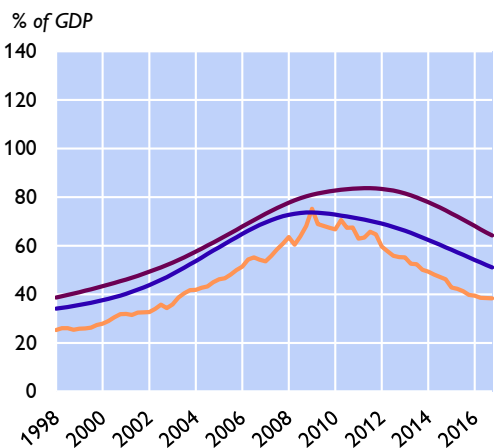
Source: National central banks, IMF, authors' calculations.

Evolution of DOMESTIC credit in comparison to fundamentals-based levels (CEE):

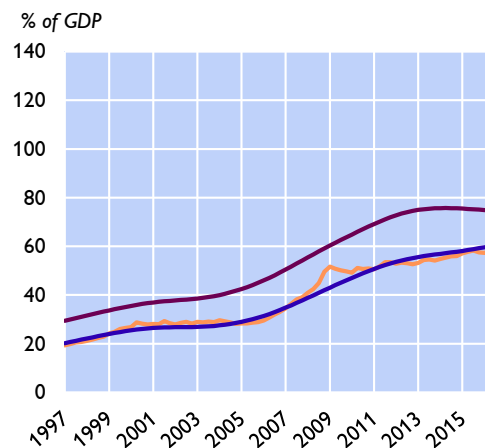
Czech Republic



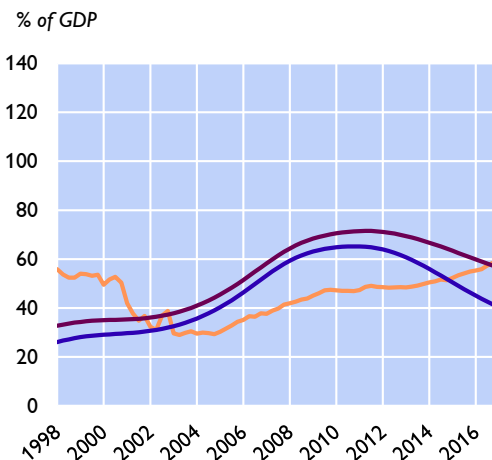
Hungary



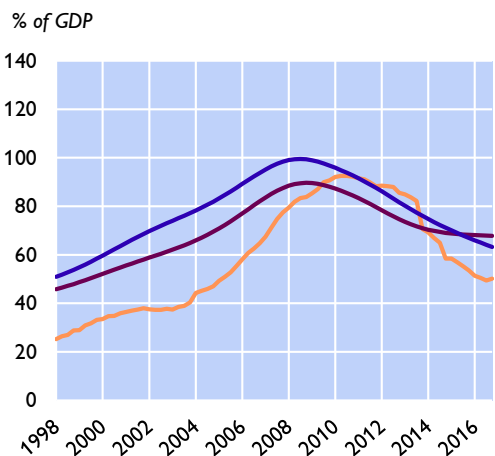
Poland



Slovakia



Slovenia



- Domestic private sector credit
- Fundamental level (based on GM-FMOLS)
- Fundamental level (based on FE)

Source: National central banks, IMF, authors' calculations.

Summary of results

1. Countries featuring positive credit gaps at the start of the GFC **have managed to adjust their credit ratios downward** toward levels justified by fundamentals
 - In a few countries, though, adjustment is not yet accomplished (BG, HR)

2. In most countries characterized by credit levels close to or below the “fundamental” levels of credit at the start of the GFC, **negative credit gaps have emerged or widened**
 - Post-GFC deleveraging often driven by the specific composition of credit (e.g. high shares of FX-denominated loans)

3. The **inclusion of cross-border credit matters considerably** for credit gap assessments as it results in larger gaps in most cases

Policy implications (1)

- **Fundamentals-based approach vs. filtering approach** (e.g. when setting CCyBs): use them **complementarily** (as recommended by [Geršl & Seidler, 2015](#))
 - Case 1: BG and HR
 - Positive credit gap based on fundamentals but no positive gap based on filtering b/c of recently moderate credit growth rates
 - Policymakers may nevertheless want to consider policy measures to steer credit ratios towards the level justified by fundamentals
 - Case 2: CZ
 - Negative credit gap based on fundamentals but an expansionary financial cycle stage
 - Regulatory measures to smoothen the financial cycle may well make sense to boost the banking sector's resilience
 - Important that the regulatory framework taken as a whole contributes to / does not hinder the credit-to-GDP ratio moving towards the level justified by fundamentals in the longer term!

Policy implications (2)

- Gear policy measures not only to the size of the gap, but also to the **adjustment path**
 - Put restrictions on credit growth in order to contribute to shrinking positive credit gaps *if and only if* macrofinancial conditions are favorable

- **Role of direct cross-border lending**
 - One position: cross-border credit does not constitute credit risk from a domestic point of view
 - However: impact on domestic banking sector via other (indebted) sectors, sluggish adjustment during macrofinancial stress episodes
 - Cross-border lending & **reciprocity of macroprudential measures** activated in another EU country ([ESRB, 2018](#))