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Structural breaks in convergence of interest rates in CEE

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Motivation

- globalization and financial integration deepned the international **integration of financial markets** → international spillovers of financial shocks

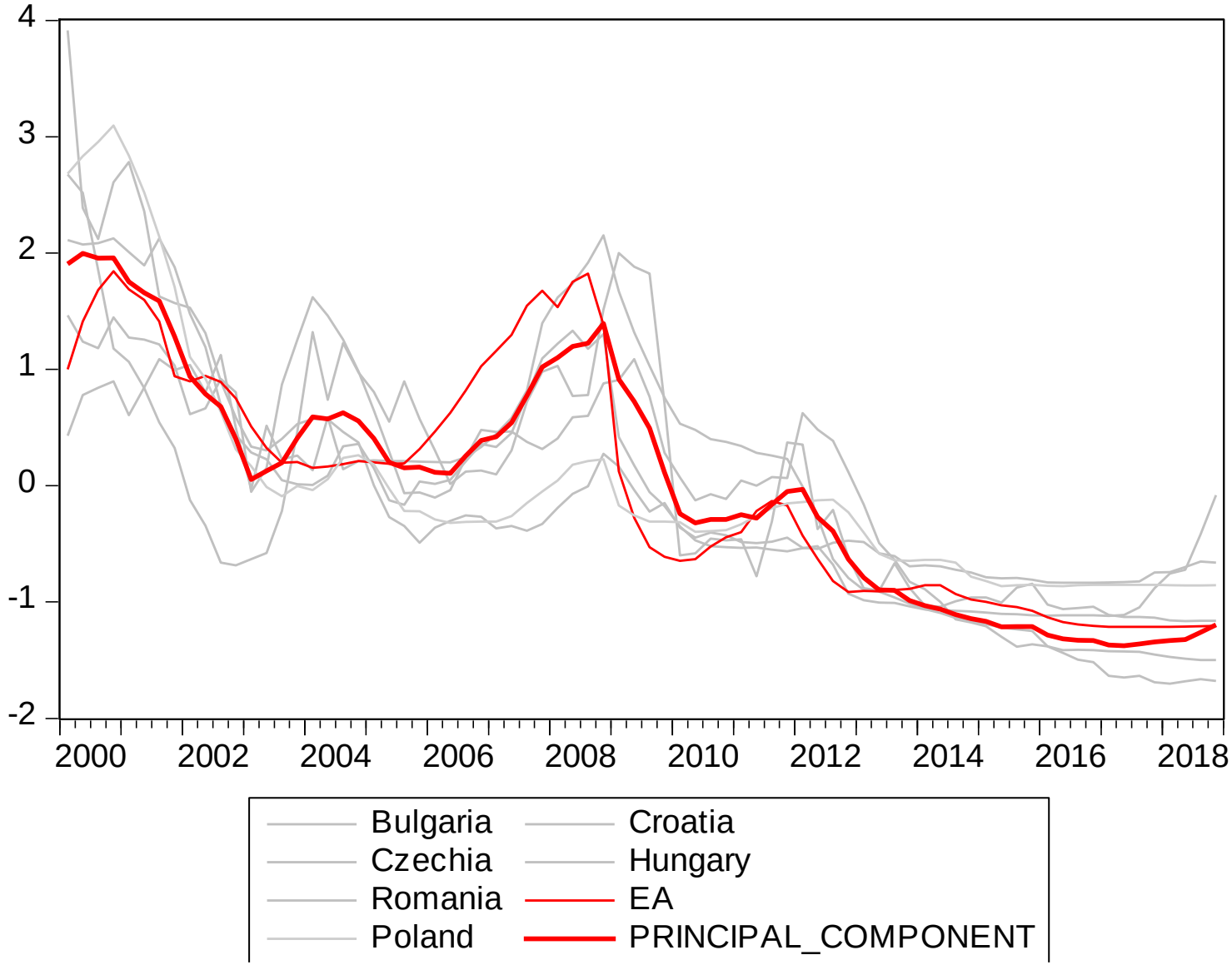
- **challenges for national monetary policy** in small open economies (Rey, 2015)

- convergence of interest rates important for the **effectiveness of common monetary policy** (ECB)

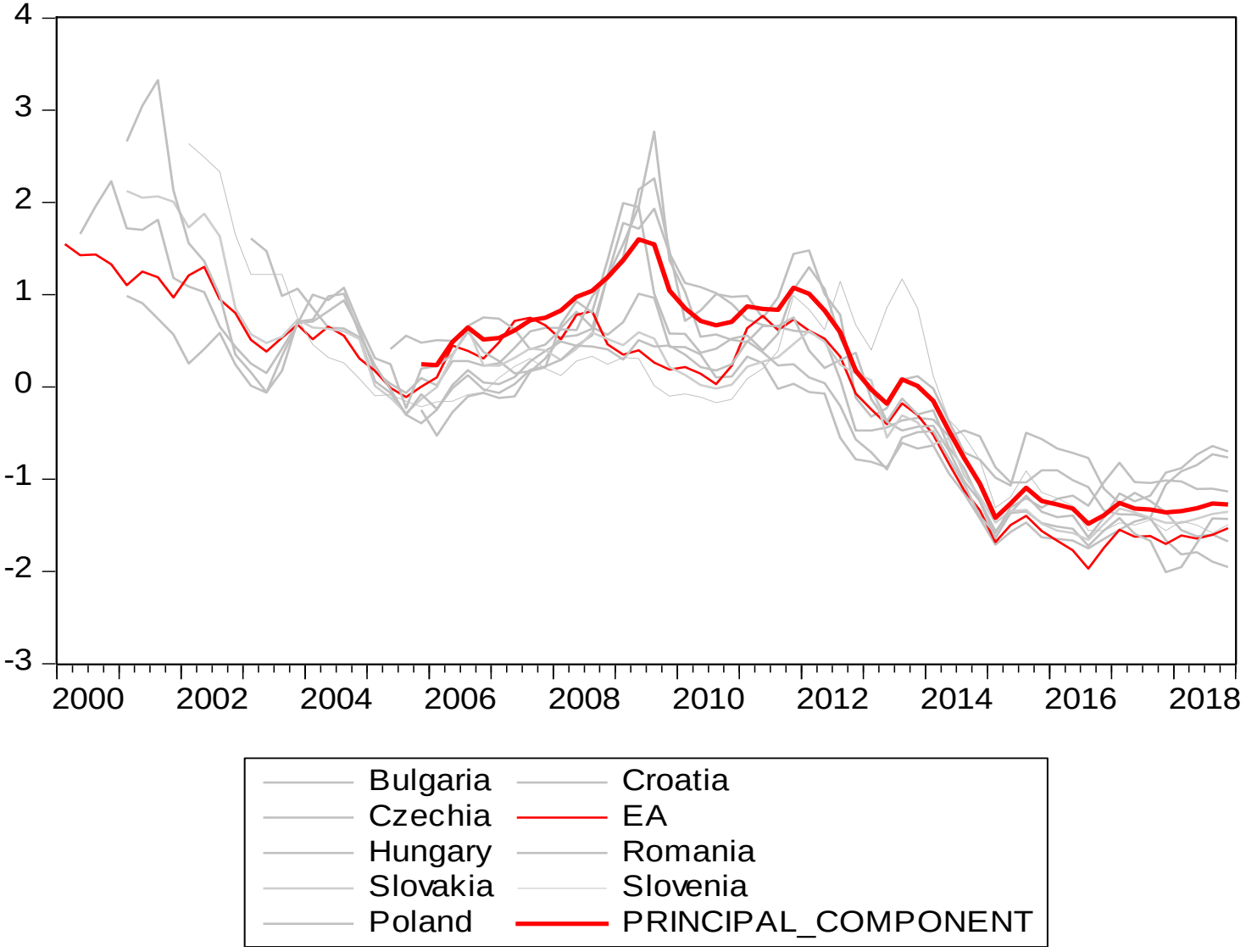
- **CEE countries**
  - Slovakia and Slovenia members of the **euro area**
  - Bulgaria, Croatia and Romania candidates for **ERM II**
  - Czechia, Hungary and Poland – **inflation targeters with floating exchange rate regime**, obliged to introduce euro eventually

- **goal of this paper**: investigate the **convergence** of interest rates in CEE countries and determine important dates of **structural breaks**

Money market interest rates in CEE



10y bond yields in CEE



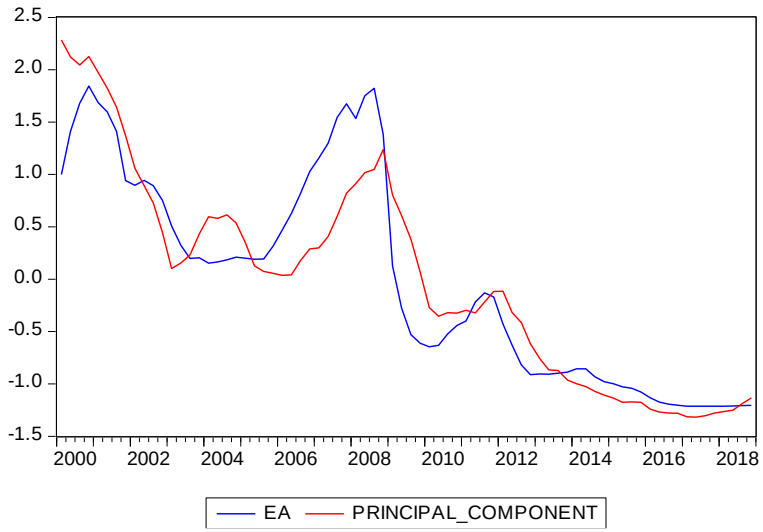
Percentage of variation of interest rates explained by principal component

	3m money market rate	10-year bond yield
Bulgaria	73%	86%
Croatia	72%	83%
Czechia	92%	87%
Hungary	81%	95%
Poland	78%	93%
Romania	75%	88%
Slovenia	EA	69%
Slovakia	EA	57%

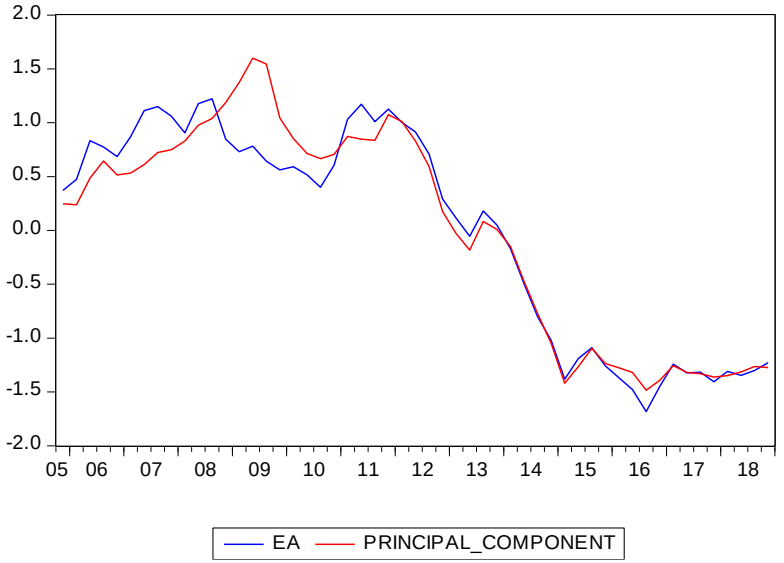
- high degree of variation in interest rates explained by the **common factor**
- as if there is some common factor that keeps interest rates from diverging → **convergence**

Correlation of principal components and EA interest rates

3m money market rate



10y bond yields



- common factors and EA interest rates **highly correlated**
- **euro area interest rates** are thus used as a **bechmark** in the analysis of convergence

Convergence and unit root tests

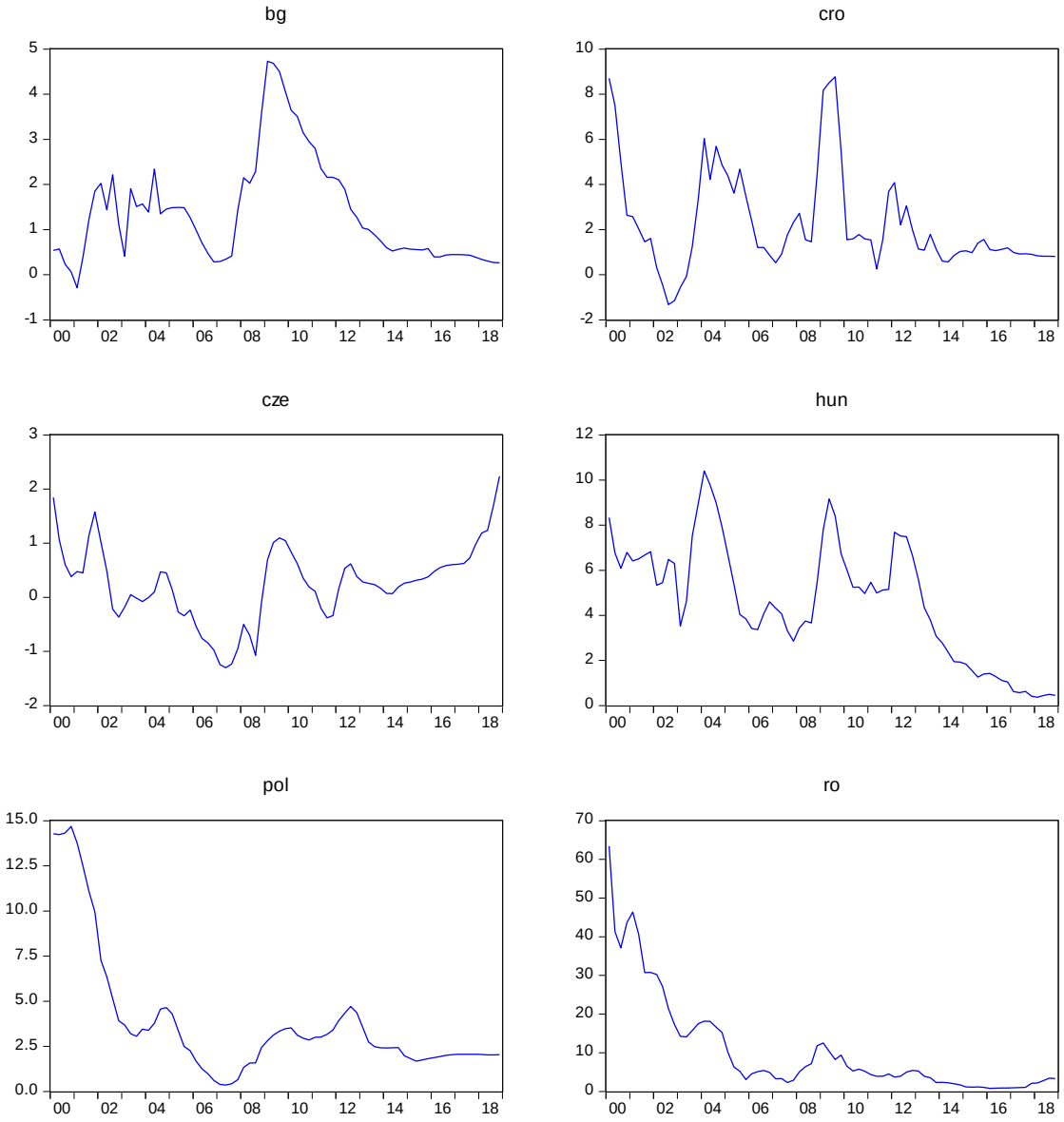
- Bernard and Durlauf (1993) and Pesaran (2007) – analysis of convergence based on **unit root tests**

- Procedure
  - *Step 1 – define the difference between interest rate y in country i and the benchmark $\bar{y}$ in period t*

$$\tilde{y}_{i,t} = y_{i,t} - \bar{y}_{i,t}$$

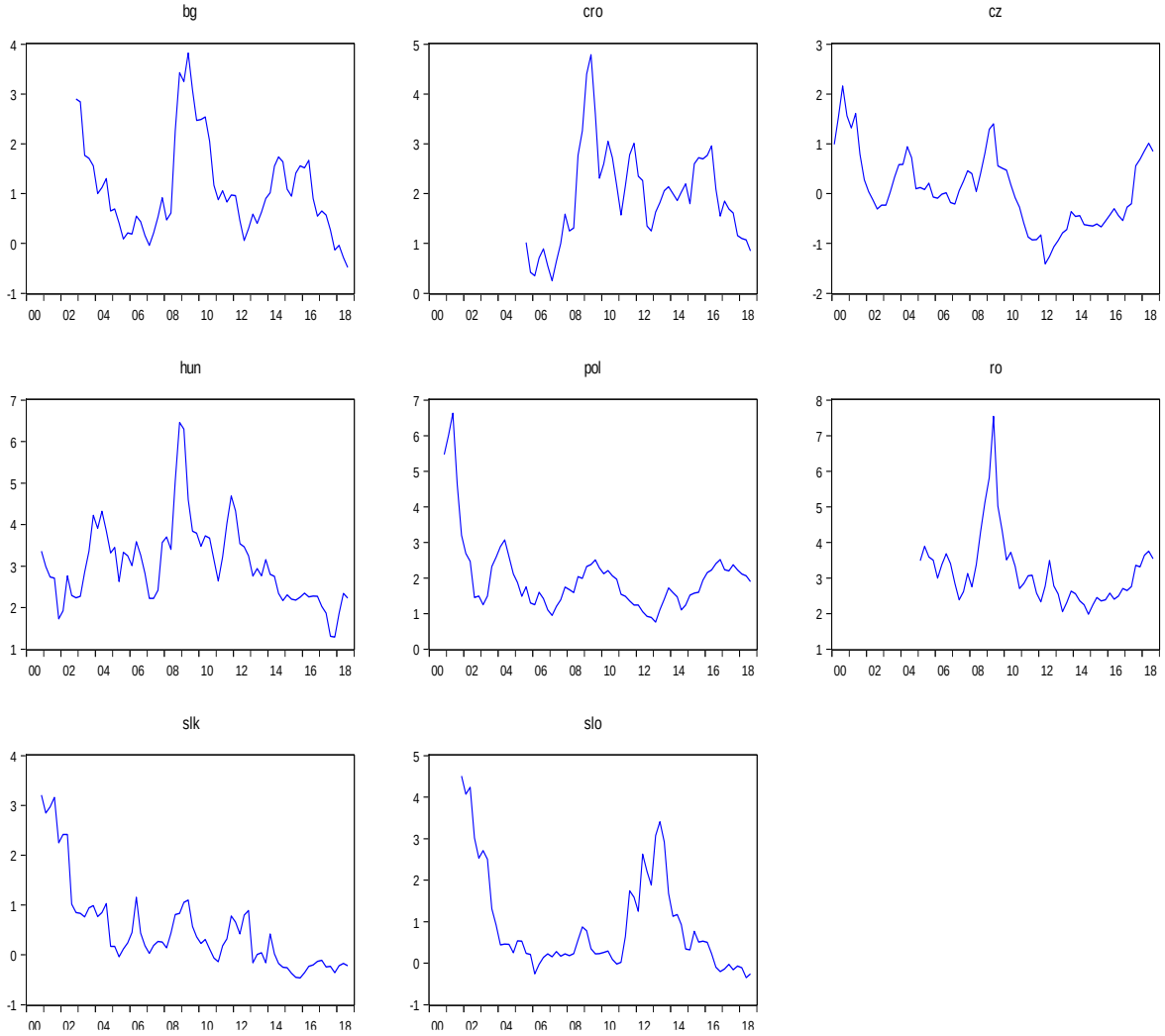
  - *Step 2 – unit root tests*
    - if the difference $\tilde{y}_{i,t}$ is **stationary** there is evidence of convergence of interest rates
    - Augmented Dickey Fuller test – mostly used methodology
    - However, ADF test performs weakly in presence of **structural breaks** → Bai-Perron (1998, 2003) test

Money market interest rates in CEE - differences



- Pronounced deviations from EA during 2008/9 and 2012 crisis
- Most series stabilized after 2014 – QE?
- Czechia and Romania started to diverge in last period – idiosyncratic causes (monetary and fiscal policy)

10y bond yields in CEE - differences



- Pronounced deviations from EA during 2008/9 and 2012 crisis
- Most series stabilized after 2014 – QE?
- Czechia and Romania started to diverge in the last period – idiosyncratic causes (monetary and fiscal policy)
- Bulgaria, Croatia and Slovenia – strong compression of yields

Results (I) – 3m money market rates

	Intercept	Breaks	Trend and intercept	Breaks
Bulgaria	0.87	2012Q1	0.02**	2008Q3
Croatia	0.00***	2009Q3	0.08*	2009Q3
Czechia	0.93	2017Q3	0.25	2008Q3
Hungary	0.15	2012Q3	0.05**	2008Q3
Poland	0.22	2012Q3	0.08*	2008Q2
Romania	0.06*	2009Q4	0.17	2003Q4
Slovenia	EA		EA	
Slovakia	EA		EA	

numbers in the table represent p-values; ***,** and * indicate that series are stationary at 1%, 5% and 10% level of significance

- there is evidence of convergence of 3m money market interest rates of CEE countries with the EA
- dates of detecetd breakpoints indicate that global financial crisis and European debt crisis led to divergence of interest rates

Results (I) – 10y bond yields

	Intercept	Breaks	Trend and intercept	Breaks
Bulgaria	0.00***	2012Q2	0.00***	2014Q1
Croatia	0.57	2016Q2	0.37	2011Q2
Czechia	0.98	2010Q1	0.98	2009Q2
Hungary	0.13	2012Q3	0.04**	2010Q1
Poland	0.94	2014Q1	0.12	2015Q1
Romania	0.00***	2009Q2	0.76	2009Q4
Slovenia	0.93	2016Q1	0.25	2016Q1
Slovakia	0.02	2012Q4	0.00***	2014Q3

numbers in the table represent p-values; ***,** and * indicate that series are stationary at 1%, 5% and 10% level of significance

- weaker evidence of convergence of 10y bond yields of CEE countries with the EA
- dates of detecetd breakpoints indicate that global financial crisis and European debt crisis led to divergence of interest rates

Conclusions

- globalization and finacnial integration led to a higher degree of **integration of international financial markets**
- EU – no barriers on capital flows – expected strong **integration of financial markets**
- our results are supportive for this view – there is **evidence of convergence** of money market interest rates and yield between CEE countries and the euro area as benchmark
- interest rates in CEE are mostly driven by a **common factor**
- convergence of money market interest rates **more pronounced** compared to yields – short term money market more efficient and integrated?
- however, **common shocks** (global financial crisis and European debt crisis) had notable effects on convergence
- generally more stable developments after 2014 – contribution of **QE**?

Thank you!