



Financial Stress
Index (FSI) and
Economic
Sensitivity Index
(ESI)

M. Krzak, K.
Wasik, G.
Poniatowski

Financial Stress Index (FSI) and Economic Sensitivity Index (ESI)

CASE Seminar

M. Krzak, K. Wasik, G. Poniatowski

May 9, 2014

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FSI/ESI

- **Financial Stress Index (FSI)** reflects the overall situation on financial markets. Index captures elevated asset prices, sudden increase of uncertainty in asset pricing, higher risk aversion, losses of liquidity and increased uncertainty in the banking sector.
- **Economic Sensitivity Index (ESI)** is an indicator of sustained economic growth and stability of public finance.



Components

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Financial stress

- uncertainty about the value of assets
- asymmetry of information
- propensity to invest in risky and illiquid assets
- liquidity

Economic sensitivity

- slow or over-extensive GDP growth
- unstable public finance
- current account deficits
- high and volatile inflation



Financial and bond markets uncertainty

Financial Stress Index (FSI) and Economic Sensitivity Index (ESI)

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- conditional variance of stock market indices; ARCH(1)
- conditional variance of exchange rates; ARCH(1)
- long-term interest rates; 10-years Treasury bond values and spreads (regarding US-bonds)

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Asymmetry of information

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Asymmetry of information on the interbank market. Expressed as difference between interbank interest rates (*bid* and *offer*). The higher spread, the higher risk premia due to the information asymmetry.



Remaining components

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Risky assets

Long-term deposits as illiquid assets. **Value of transactions on the stock market** as a measure of risk aversion. **Variable:** change (q/q) in the value of stock indices.

Liquidity

Ratio between turnover and market capitalization on the stock exchange.



Deviation of economic growth from its long-run trend

Assumption: **negative correlation between volatility and GDP growth in developing countries** (see Ramey and Ramey [2000], Acemoglu et. al. [2003] or Hnatkovska and Loayza [2005]). Long-trend estimated using HP-filter.



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- Economic sensitivity is characterized by low and stable inflation (**Consumer Price Indices**)
- **Current account** reveals structural competitiveness, large deficits are dangerous for economic stability.
- **Foreign reserves** reduce vulnerability to speculative attacks.
- **External debt** reflects structure of public debt.



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FSI & ESI forecasts



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- FSI - principal components of main variables in financial and banking system
- Strong correlation between FSI and macroeconomic data (e.g. GDP or CPI)
- Industrial Production Index (IP) in monthly values used as a proxy of GDP
- Stationarity dataset (first differences)
- Filtering data using Hodrick-Prescott filter (to recover general trend)
- Estimate VAR using Δ FSI, Δ CPI and/or Δ IP



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Vector Autoregression (VAR) model

In general form:

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + e_t \quad (1)$$



ESI forecasting method

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Only quarterly data available (insufficient number of observations to estimate VAR)

Solution

- Dynamic panel model as proposed in Arellano-Bond [1991], using Generalized Method of Moments (GMM)
- Correlation between ESI and FSI
- Parameters of the model used in forecasting procedure



ESI forecasting method

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- General form of the Model

$$ESI_{it} = \beta + \beta_1 ESI_{it-1} + \beta_2 ESI_{it-2} + \beta_3 FSI_{it-1} + u_{it} \quad (2)$$

- where: $u_{it} = v_i + e_{it}$
- v_i is an unobserved individual-level effect
- e_{it} is an observation specific error.



Panel Model Results

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Table: Estimation results: GMM Panel Model

Variable	Coefficient	(Std. Err.)
L.esi	1.261**	(0.052)
L2.esi	-0.292**	(0.060)
L.fsi	-0.046*	(0.019)
Intercept	-0.014	(0.024)

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Δ FSI forecasts

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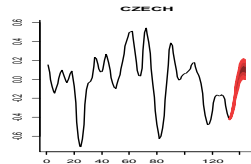
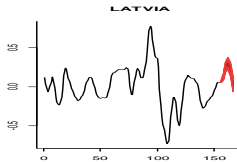
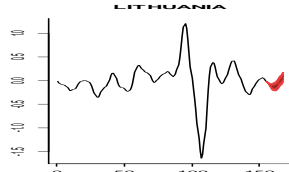
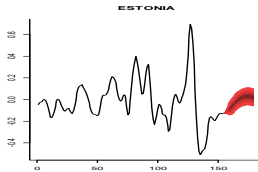
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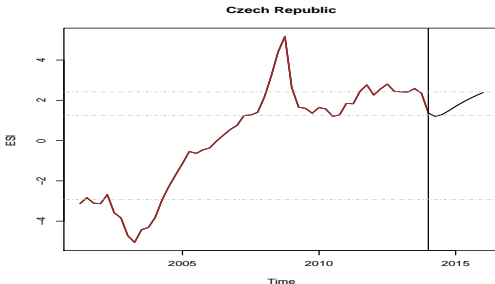
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- economic sensitivity elevated and increasing
- FSI in lowest 20% of observations

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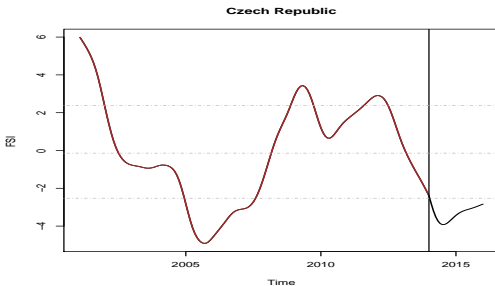
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■ financial stress at 2005-2006 levels



Estonia ESI

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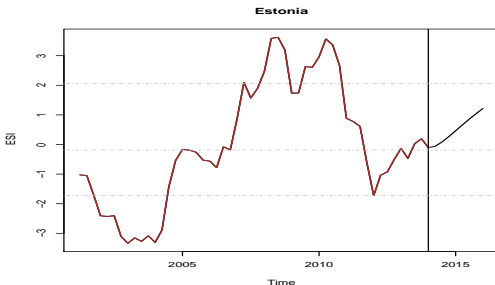
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- trend reversal
- above the median but below highest 20% of observations



Estonia FSI

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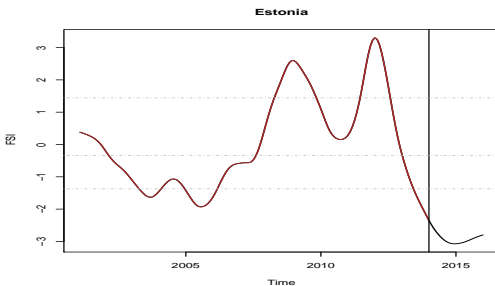
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■ economic stress at it's lows

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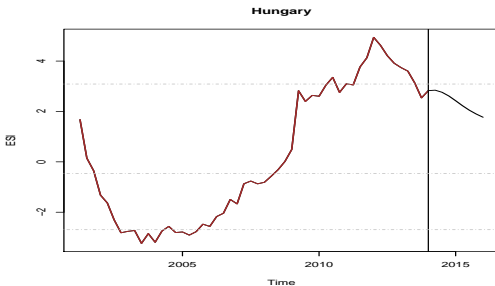
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■ economic sensitivity decreasing

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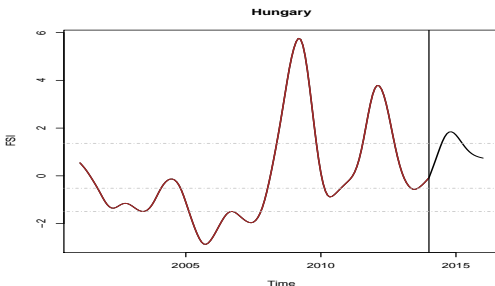
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- local maximum in 2014
- downtrend to level above the median but away from fifth quantile of observations



Lithuania ESI

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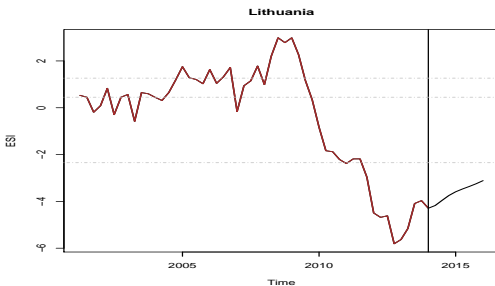
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- economic vulnerability at low levels
- well below median

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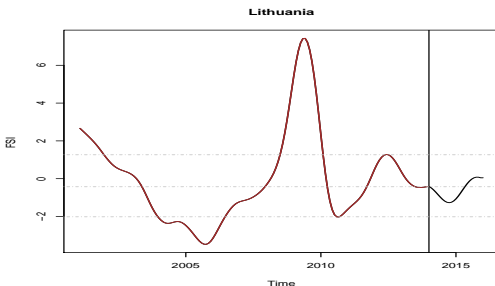
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- adoption of euro did not have a significant impact on the FSI
- close to median

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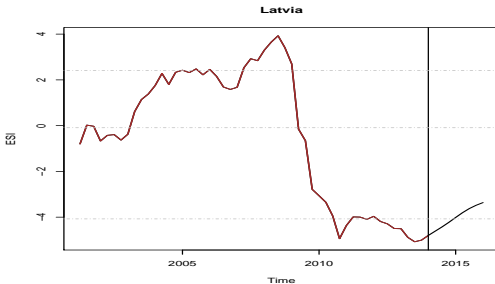
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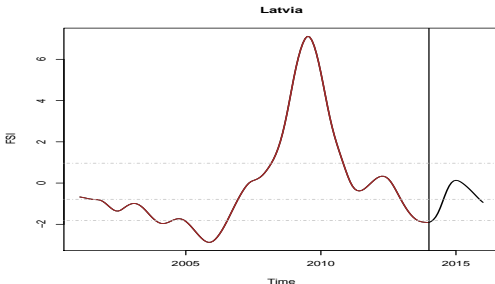
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- pick-up before the adoption of the euro
- very close to median at end of forecast horizon



Poland ESI

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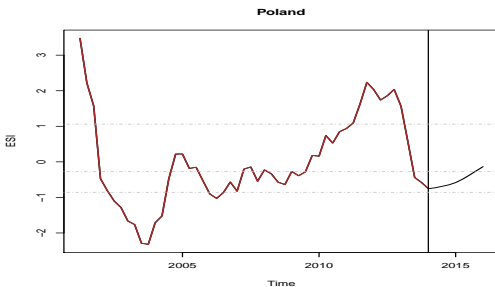
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■ stable economic sensitivity



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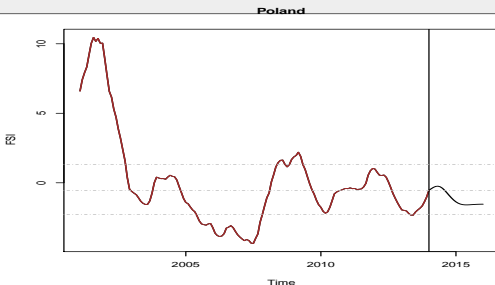
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- stabilization on financial markets
- resume declining trend to level well below the median
- stable in 2015 at levels above cutoff point of lowest quantile





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Thank you for your attention!