

How Sustainable are Public Debt Levels in CEE?

Evidence for Selected CESEE Countries from a Stochastic Debt Sustainability Analysis

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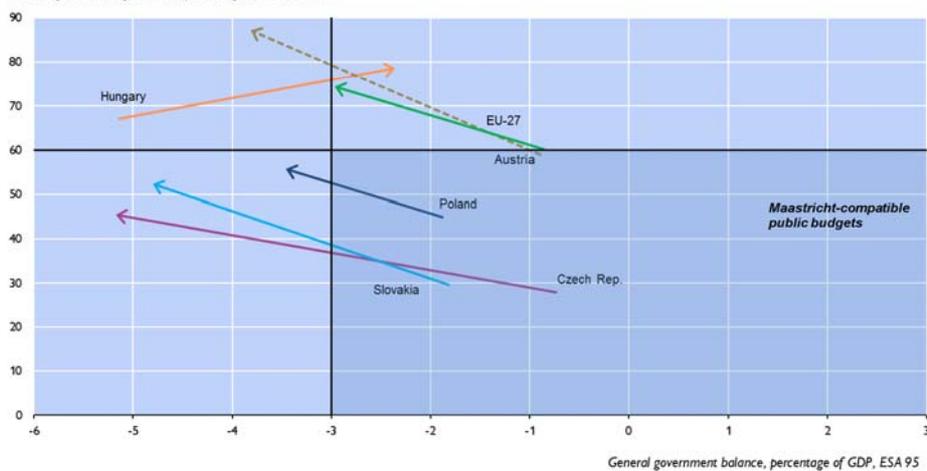
wiiw Spring Seminar 2013
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Opinions expressed do not necessarily reflect the official viewpoint of the OeNB or the Eurosystem

Public Debt: An Issue in CESEE?

Fiscal Developments in CEE-4, compared with Austria and EU-27, between 2007 and 2012

General government gross debt, percentage of GDP, ESA 95



Source: European Commission, AMECO database. 2012 data are forecasts as of 15th March 2013.

Note: The first observation point (2007) is marked by the name of the country, the last observation point (2012) by the end of the arrow.

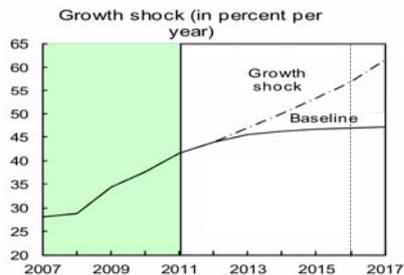
What is Special about Public Debt in Emerging Economies?

- Comparatively **low debt tolerance thresholds**: in 55% of the defaults recorded in EMs, public debt was below 60% of GDP (IMF, 2003)
- **Limited tax raising capacity** (e.g. due to a large informal sector)
- **Volatile** revenue base and volatile expenditures
- **Pro-cyclical discretionary fiscal policy**
- **'When it rains it pours'**-phenomenon (Kaminsky et al., 2004)
- High share of **FX-denominated liabilities**
- **Short time series** of economic and fiscal data with **structural breaks**

1. Stochastic Debt Sustainability Analysis: Framework

Debt Sustainability Analysis (DSA) Approaches

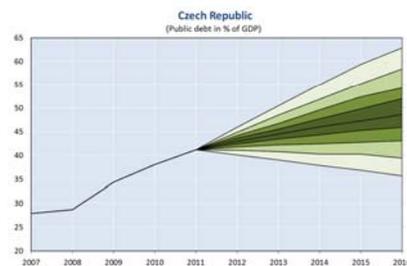
Deterministic DSA (IMF)



Source: IMF Article IV Consultation Report of the Czech Republic, 2011

- Single debt trajectories
- A few stylized, **isolated** shocks (e.g. growth shock)
- Exogenous fiscal policy (FP)

Stochastic DSA



- Follows Celasun et al. (2007)
- Debt paths frequency distribution
- Many random shocks with **interaction** among macro variables
- FP reacts to debt and macro shocks

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Debt Sustainability: Definition

- Both deterministic and stochastic DSAs produce only **projections** of future debt paths, **not an explicit assessment** of their sustainability
- But, to assess sustainability, **realistic projections** taking into account possible risks, are necessary

- **Strict sustainability:** $\lim_{t \rightarrow \infty} E(d_t) = 0$ and $\lim_{t \rightarrow \infty} E(\sigma_{d_t}^2) < \infty$
→ non-exploding debt path

- **Not useful in empirical applications:** not possible to make forecasts over infinite horizon

- Hence a weaker definition, e.g. (Ferrucci & Penalver, 2003):

There is a reasonably high probability (say 75%) that debt-to-GDP (d_t) is *not* higher at the end of the forecast horizon than at the beginning

$$P(d_t \geq d_{t+\tau}) > 0.75$$

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Building Blocks of the S-DSA

- Debt-deficit stock-flow identity (for a sovereign issuing in FX):

$$d_t \equiv d_t^f + d_t^d = (1 + g_t)^{-1} \left[\overbrace{(1 + r_t^f)(1 + \Delta z_t)d_{t-1}^f}^{\text{FX debt}} + \overbrace{(1 + r_t)d_{t-1}^d}^{\text{LC debt}} \right] - pb_t + s_t$$

- d_t^f ...FX debt, d_t^d ...LC debt, r_t or r_t^f ...real domestic or foreign interest rate, z_t ...real effective exchange rate, g_t ...real GDP growth, pb_t ...primary balance, s_t ...stock-flow adjustment, og_{t-k} ...output gap

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- Fiscal reaction function:

$$pb_t = f(pb_{t-1}, d_{t-1}, og_{t-k}, X_t)$$

→ 8 CESEEs FE panel,
annual data: 1995-2011

- VAR model for non-fiscal determinants of debt:

$$(r_t^f, r_t, g_t, \Delta z_t) = f(r_{t-1}^f, r_{t-1}, g_{t-1}, \Delta z_{t-1})$$

→ 4 CEEs, individual models,
quarterly data: 1995-2011

- 1000 simulations for 5 years (2012-2016) → debt paths distribution → 'fan-chart'

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2. Average Fiscal Policy Patterns: Fiscal Reaction Function

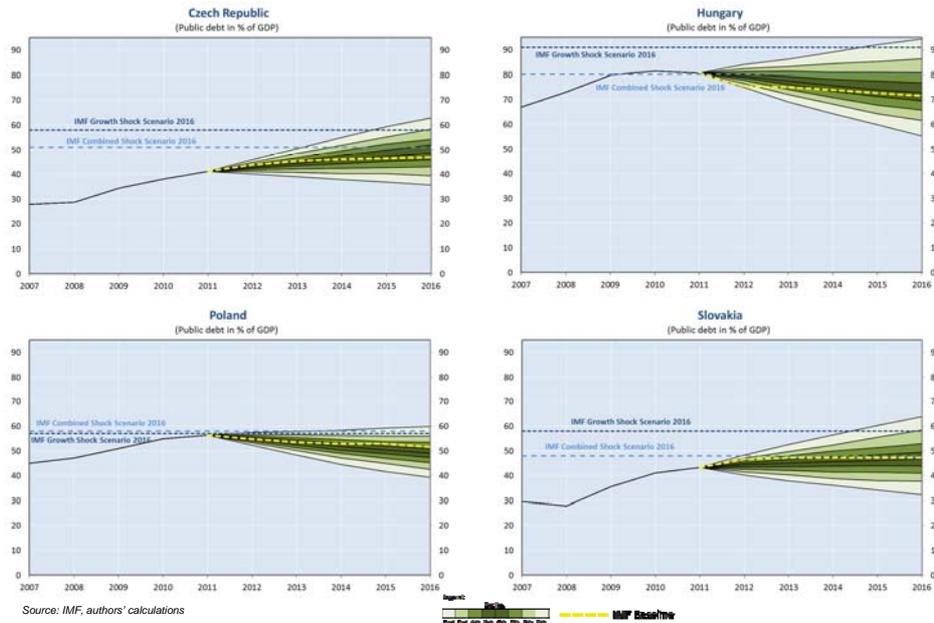
Fiscal Reaction Function Estimates

Dependent variable: primary balance as % of GDP	Fixed Effects baseline	Fixed Effects boom vs. recession	Fixed Effects nonlinearities	Fiscal Policy:
First lag primary balance ratio	0.301*** [0.045]	0.297*** [0.049]	0.300*** [0.049]	→ persistent
Second lag primary balance ratio				
First lag debt ratio	0.053**	0.055**	0.060	→ reacts to debt (with correction)
Lagged debt spline (40%)			-0.011	
Output gap (Hodrick-Prescott)	0.322**		0.324**	→ 'counter-cyclical'
First lag OG (HP)	-0.156*		-0.150**	→ 'pro-cyclical' with a lag
Positive OG (HP)		0.486*		}
First lag of positive OG (HP)		-0.234*		
Negative OG (HP)		-0.003		
First lag of negative OG (HP)		-0.094		
CPI-inflation	0.083*	0.082*	0.084*	
Crisis dummy	-1.089*	-1.235**	-1.087*	
Constant	-3.305**	-3.562**	-3.489**	→ deficit-biased
Observations	116	116	116	
(Overall) R-squared	0.503	0.508	0.498	
Hansenp				
ar1p				
ar2p				
No of collapsed instruments				

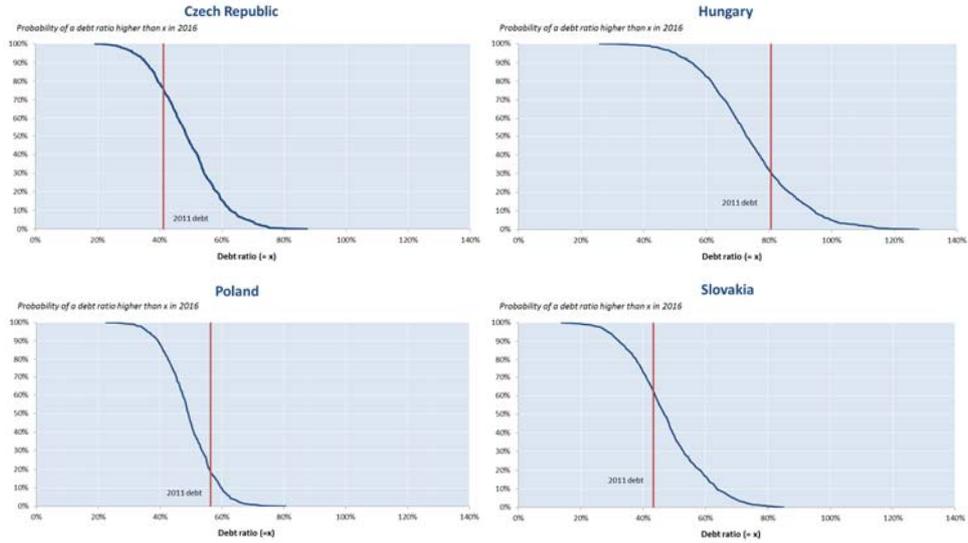
Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1

3. Baseline Results vs. Alternative Scenarios

Stochastic DSA (Baseline Results) vs. Deterministic DSA

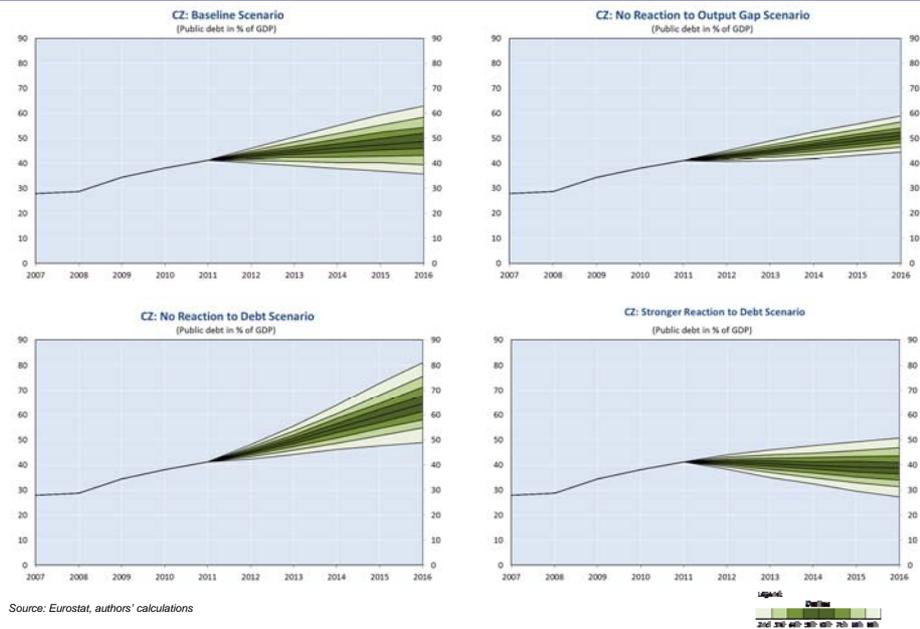


Empirical Probabilities for the Debt Ratio to Exceed Given Values by 2016



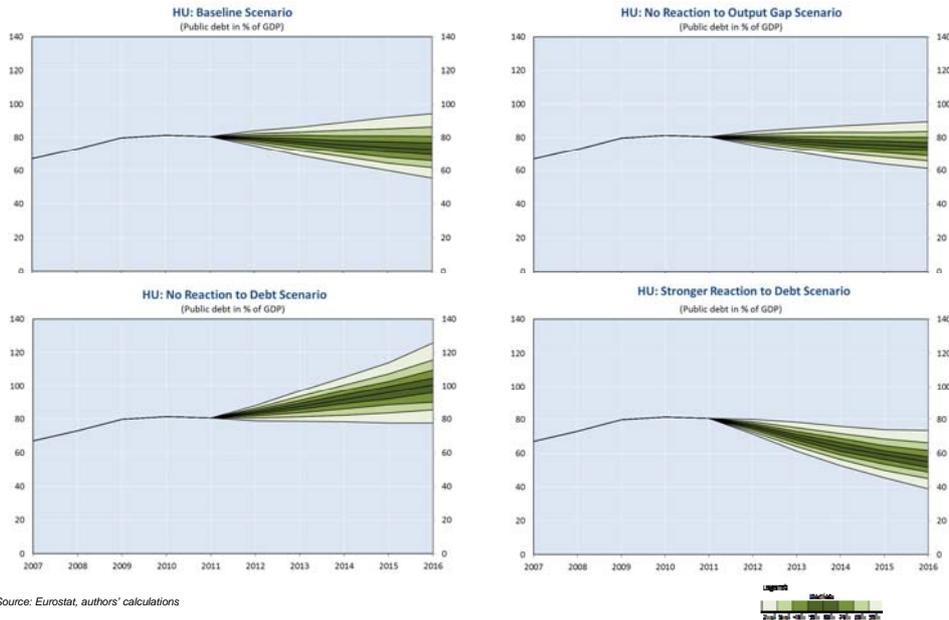
Source: Eurostat, authors' calculations

Baseline Results vs. Alternative Scenarios: Czech Republic



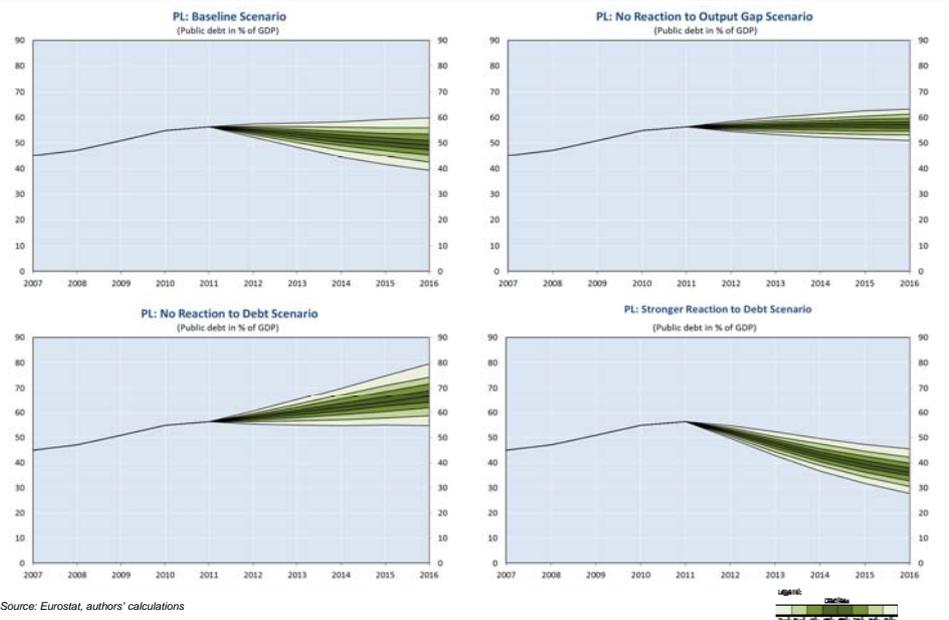
Source: Eurostat, authors' calculations

Baseline Results vs. Alternative Scenarios: Hungary



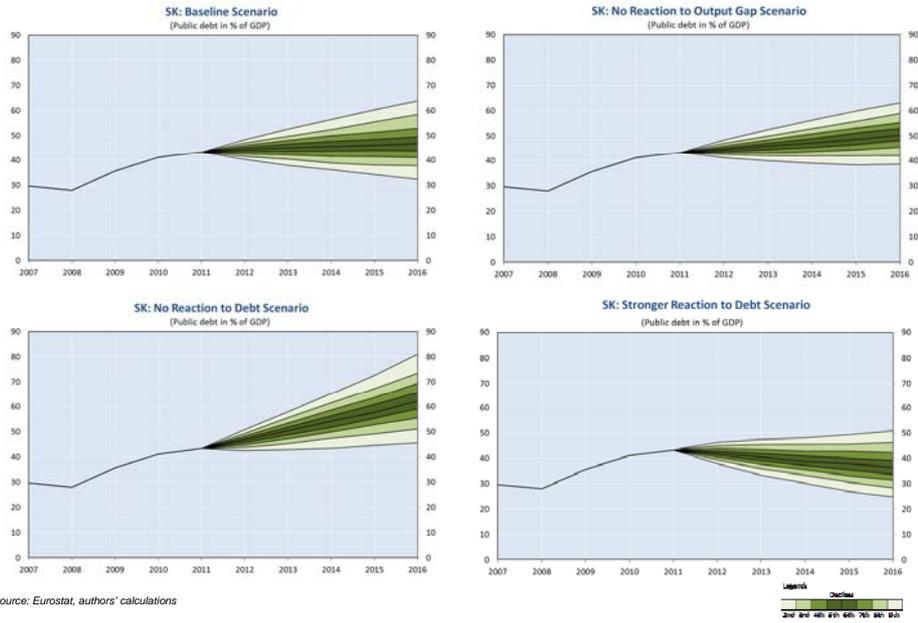
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Baseline Results vs. Alternative Scenarios: Poland



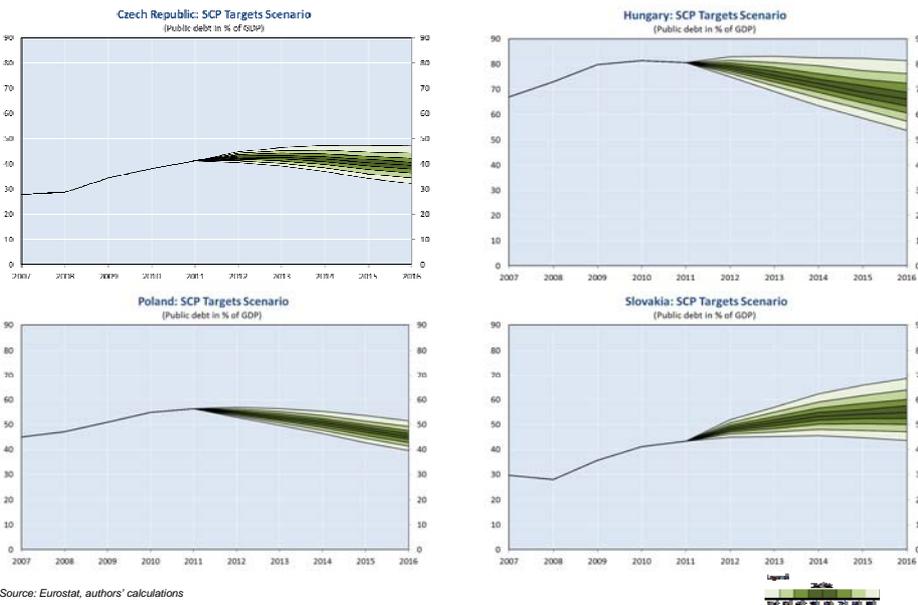
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Baseline Results vs. Alternative Scenarios: Slovakia



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Stability and Convergence Programmes (SCP) Targets Scenario



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4. Summary

Country Results & Policy Conclusions I.

- In our panel of CESEE countries, **the primary balance** reacts:
 - With persistence
 - In a debt-correcting manner
 - Counter-cyclically
- **Median debt projections suggest sustainability** (non-explosive debt paths). However, its **achievement is still subject to notable risks:**
 - Highest probability of an increasing debt ratio from 2012 until 2016 in the *Czech Rep.* and *Slovakia* (but still below 75%)
 - Although *Hungary* shows a decreasing median debt path, there is a probability of at least 30% that the debt ratio increases until 2016.
 - The probability that *Poland* surpasses the 60% debt-to-GDP threshold until 2016 is rather small (at most 10%)

Country Results & Policy Conclusions II.

- Impact of different policy scenarios
 - **Acyclical fiscal policy reduces uncertainty**, but leads to **somewhat larger median debt projections** (e.g. due to deficit bias).
 - A policy that does **not take debt developments into account** leads to a **clearly larger probability of exploding debt** paths.
 - In turn, if countries put **more weight on debt stabilization** than in the past, their mean **debt ratios can be squeezed rather quickly** to moderate levels.
 - **Complying with the defined Stability and Convergence Programmes targets limits the overall risks** to the debt outturns and reduces debt ratios in most countries.
- Probability distribution of future debt realizations captures **interactions among the macroeconomic and fiscal variables being shocked**
 - A more plausible range of risks depicted → allows for a better-informed policy reaction should these risks materialize

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Concluding Remarks

- **Value added**
 - First S-DSA explicitly for CESEE countries → appropriate to account for intrinsic economic volatilities in emerging market economies
 - Augmented approach of Celasun et al. (2007): we account for a wider set of fiscal policy determinants and for possible non-stationarity of the time series; calibration of Fiscal Reaction Function for alternative scenarios
- Some **caveats** for the S-DSA methodology → further research necessary
 - Lack of feedback from fiscal policy to the macro environment (e.g. fiscal multipliers or reaction of interest rates via risk premia)
 - Model and parameter uncertainty not yet captured in the fan charts
 - Shocks are drawn from a normal distribution: asymmetry or fat tail events not captured

Paper URL: http://www.oenb.at/de/img/feei_2012_q4_studies_eller_urvova_tcm14-251595.pdf

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Thank you.