NÁRODNÁ BANKA SLOVENSKA
EUROSYSTÉM

MUSE: Monetary Union and Slovak Economy model

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Modern tools in macroeconomics: DSGE models – **D**ynamic **S**tochastic **G**eneral **E**quilibrium models

- microeconomic foundations – optimizing behavior of economic agents
- rational expectations
- general equilibrium framework

advantages

- theoretically well-grounded
- simulate counterfactual scenarios
- capable to replicate historical data – interpret history, forecast future

Outline

- motivation
- model
- parameterization
- model evaluation

Motivation

DSGE model of the Slovak economy as a part of the eurozone helps:

- understand working of a small economy within a monetary union
- analyze effects of different macroeconomic policies
- identification of structural shocks and their effects
- learn about the economy through estimation of structural parameters

Our contribution

model of two economies

- Zeman, Senaj (2009) – calibrated model of a small open economy with exogenous foreign sector

first DSGE model confronted with the Slovak data:

- some parameters calibrated to meet long-run properties of the economies
- some parameters estimated with Bayesian methods

The model

Model structure

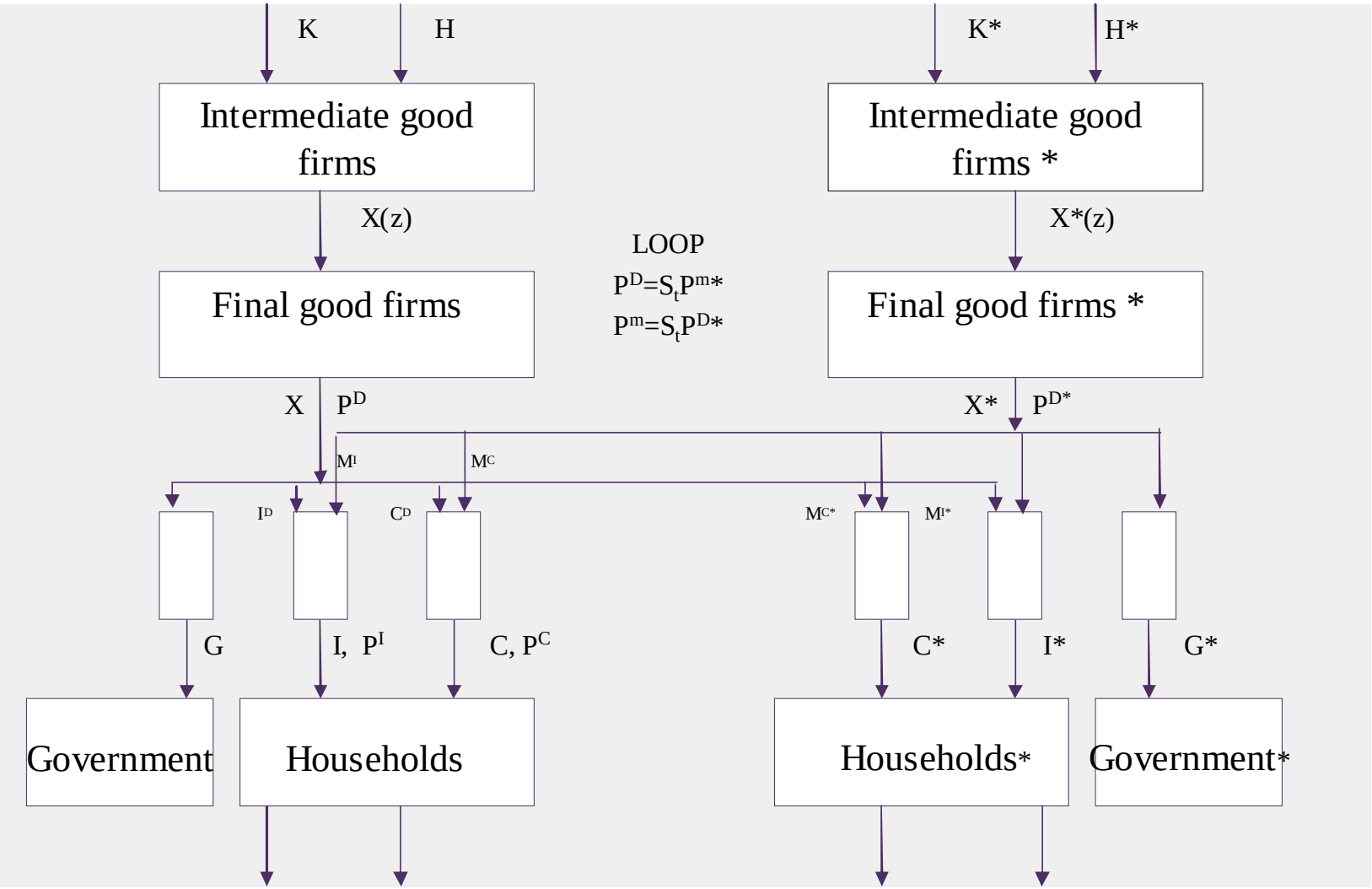
geography of the model

- Slovakia – small open economy
- Euro area – rest of the world
- symetric in structure

two regimes

- independent monetary policy authorities in both countries
- monetary union

Model structure



Parametrization

Four types of parameters

1. structural parameters determining the steady state of the model
2. structural parameters affecting dynamic properties of the model
3. AR coefficients of the structural shocks
4. standard deviations of the structural shocks

- **parameterized in two steps**

Two step approach

calibration	Bayesian approach

SK	Euro area
structural parameters determining SS	structural parameters determining SS
structural par. affecting dynamic properties	structural par. affecting dynamic properties
AR coefficients of the shocks	AR coefficients of the shocks
standard deviations of the shocks	standard deviations of the shocks

First step

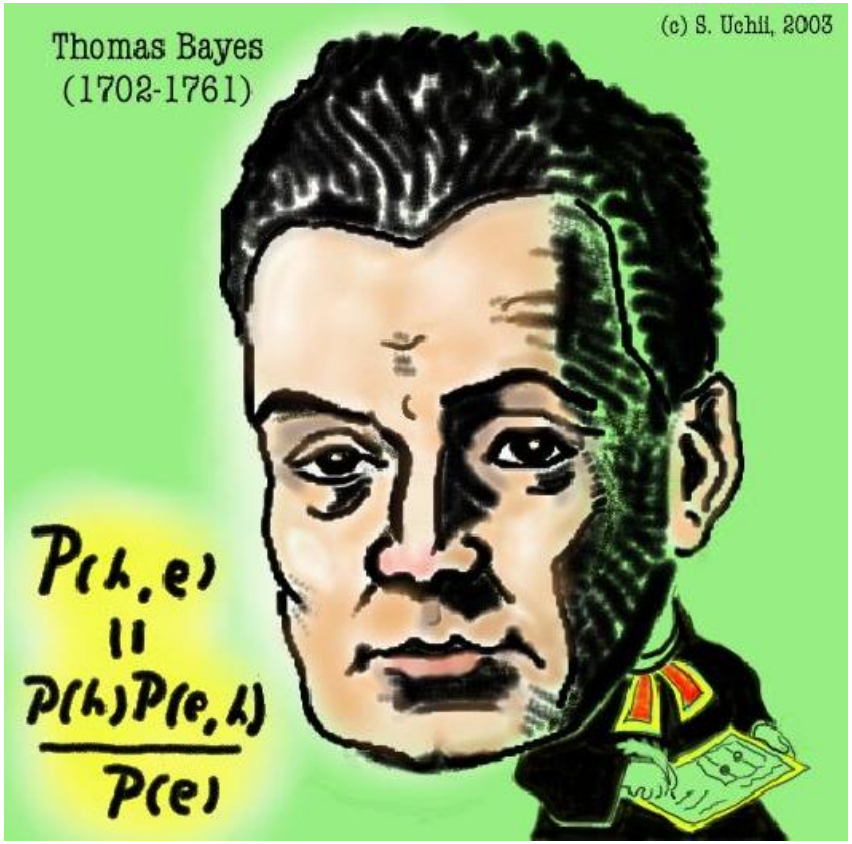
Parameters determining steady state take values such that the ratios of selected model variables correspond to their empirical counterparts

	SK	EA
I/X	0.22	0.20
C/X	0.55	0.60
Im/X	0.26	0.003
Im^I/X	0.10	0.001
Im^C/X	0.16	0.003
G/X	0.18	0.20
TB/X	0.00	0.00
n	0.01	0.99

Second step

Bayesian approach used – estimated 34 parameters that do not affect the steady state of the model

- monetary policy rule, price and wage stickiness and adjustment costs
- structural shocks



Data

seasonally adjusted, per capita

2Q 1997 – 4Q 2008

for both regions the following time series were used

- real GDP
- real consumption
- real investment
- real compensations
- short term (3M) nominal interest rate
- GDP deflator

Evaluation of the model

Two regimes of MP

autonomous monetary policy

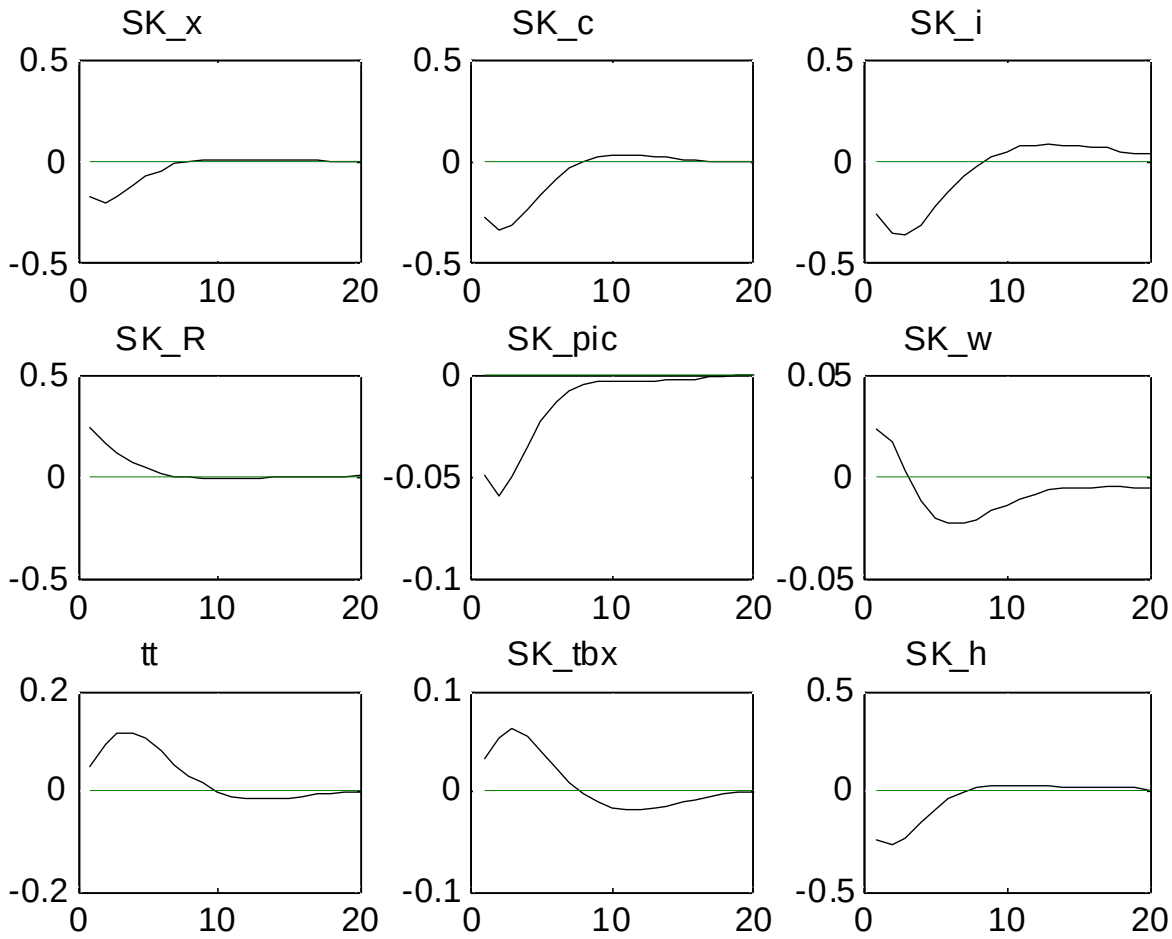
- calibrated + estimated parameters

SK part of the monetary union

- structural parameters unchanged
- changed Taylor rule in SK

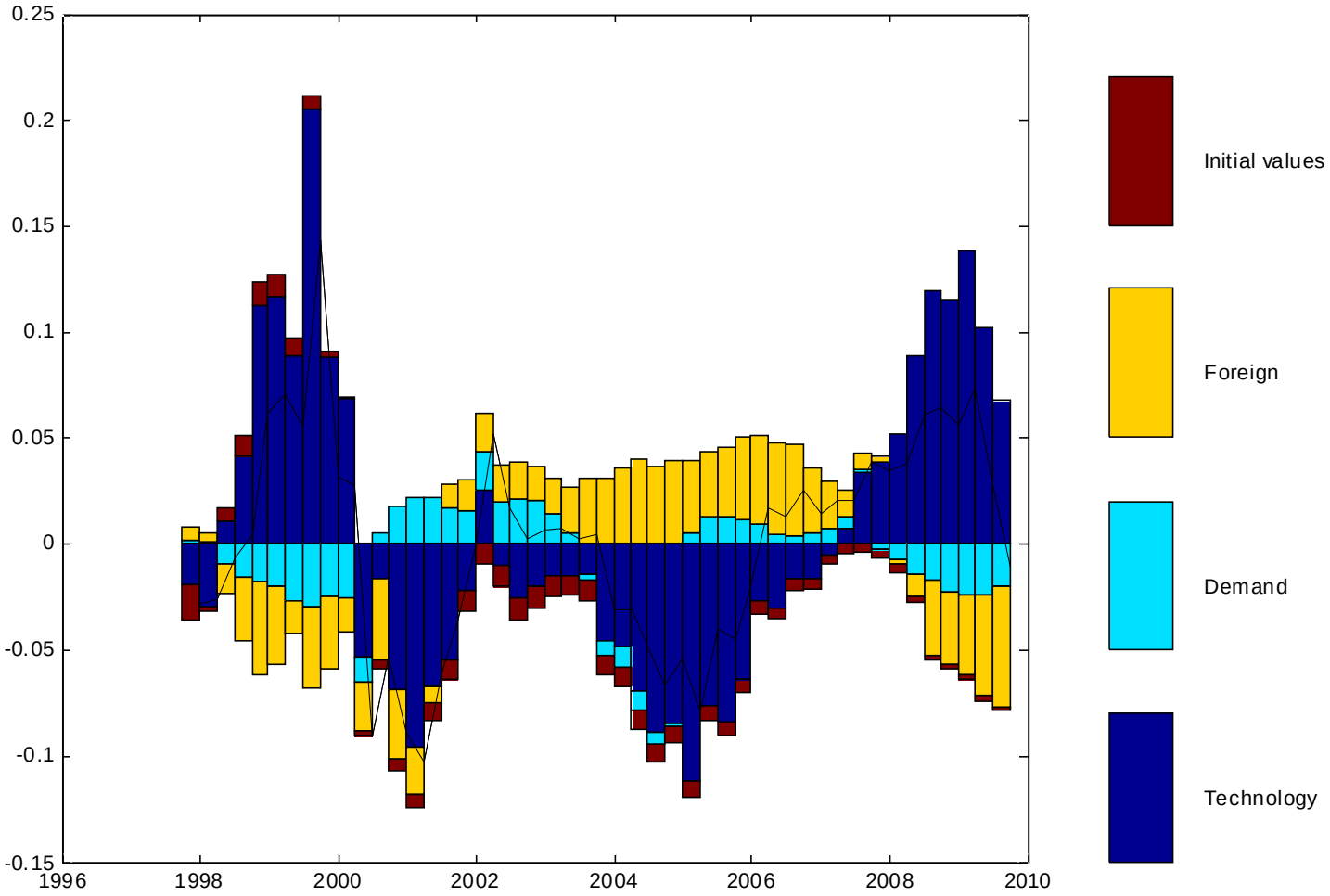
IRF – monetary policy shock

+0.25 p.p. , monetary union



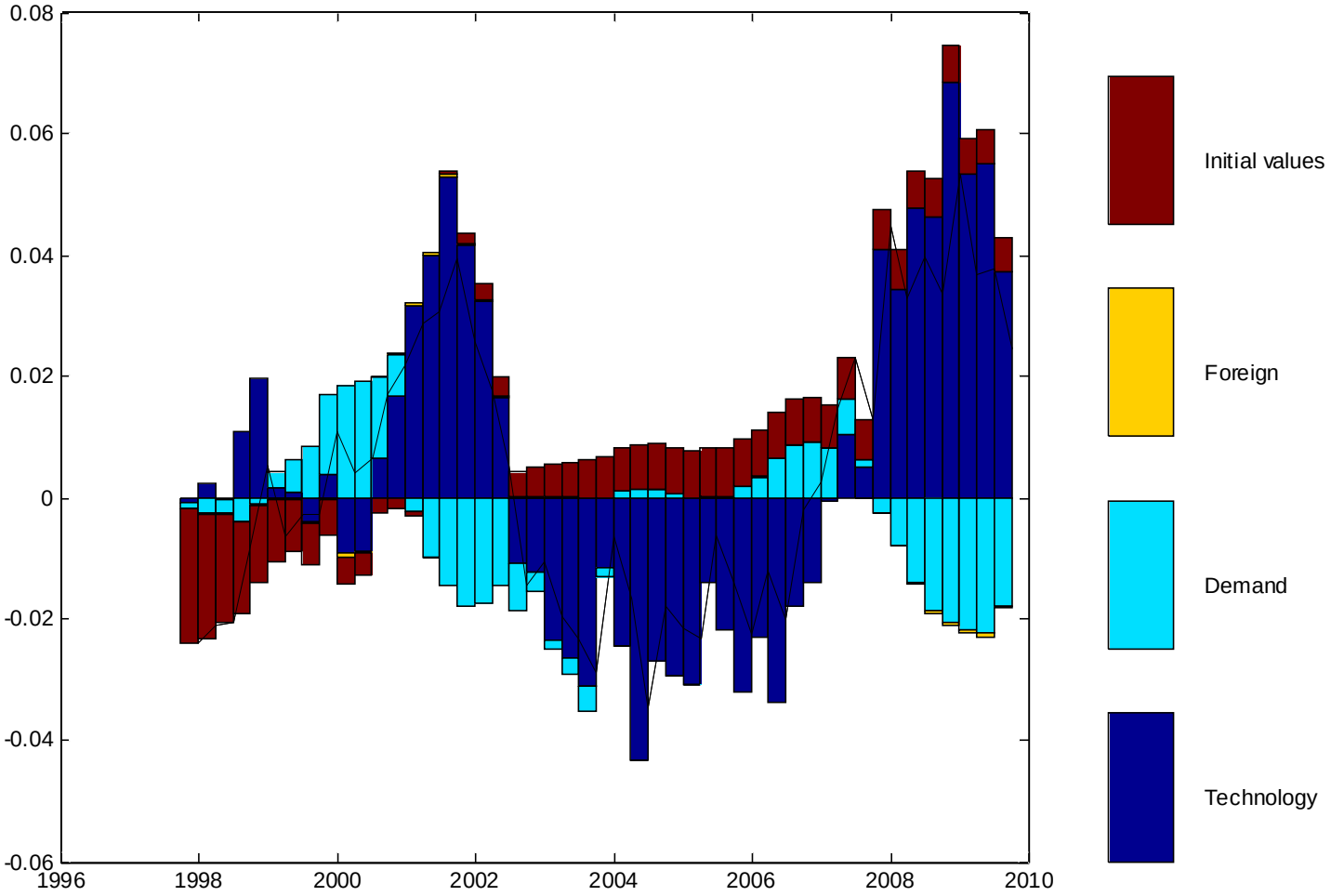
Structural decomposition

SK investment



Structural decomposition

EA investment



Conclusion

model of two economies

long-run equilibrium resembles some features of the Slovak (and eurozone) economy

Bayesian method of estimation

use of the model:

- simulation of counterfactual scenarios
- interpretation of history, identification of structural shocks
- forecasting