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FIW

Seminar in International Economics
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Macroeconomic Stability and the Single European Labor Market

Timo Baas (with Marjan Aikimbaeva)
University of Duisburg-Essen

This seminar series is an activity in the framework of FIW ('Forschungsschwerpunkt Internationale Wirtschaft'), which is a project designed to build a center of excellence in research on International Economics, funded by the Austrian Ministry of Science, Research and Economy (BMWFW).

Macroeconomic Stability and the Single European Labor Market

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Outline

1. Motivation
   - Macroeconomic Shocks and the Common Labor Market
   - Previous Work
2. The model
3. Results
   - Data
   - Impulse Response Functions
   - Historical Decomposition

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Labor Mobility

- Increased substantially after 2004
  - 3.2 (1.7) per cent of EU-citizens are mobile
  - 0.2 per cent are on the move every year
  - Dao et al. (2013)
    - 10 sacked workers: 1 unemployed, 6 inactive, 3 migrating
- Is significantly lower than in the US
  - 2 per cent of US-Americans on the move every year
  - Dao et al. (2013)
    - 10 sacked workers: 2 unemployed, 2 inactive, 6 migrating

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Lack of Mobility

- Language
  - 24 official languages
  - 5 semi-official languages
  - 7 main minority languages
- Culture
  - Historical Divisions
  - Law
  - Regions
- Caveats
  - Welfare systems
  - Education / Training

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A Common Market

- 1957
  - Accept job-offers
  - Move freely
- 1999
  - EU-citizenship
  - Freedom of movement
  - Non-discrimination
- Today's issues
  - Differences in social security systems
  - Taxation
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More Heterogeneous Union

- 2004 Accession
  - Wages one third of EU-average
  - High youth unemployment
- 2007 Accession
  - Wages one fifth of EU-average
  - Minorities

Maroeconomic shocks

- Decision to move depends on economic conditions
- A two-step migration approach
- Migration as a shock absorber

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  - Cycle properties of European migration to the US
  - 19th and early 20th century
- Easterlin (1966), Kelley (1965), Gallaway et al. (1971)
  - Confirm the business cycle impact on migration
  - Destination country drives migration
- Borjas (2001)
  - Fixed migration costs
  - Regions are close substitutes
  - Two stage decision process

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Recent studies

- Barrett (2010)
  - Migrants are more respondent to shocks
  - Increase labor market flexibility
- Bertoli et al. (2013)
  - "Diversion" from Southern-Europe to Germany
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- Mandelman et al. (2014)
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Our contribution

- Two county, two sector DSGE model
  - Endogenous migration decision
  - Sticky prices (Calvo-type)
  - Migrant and native labor imperfect substitutable
- Bayesian estimation
  - Time-series of bilateral movement Poland-Germany
  - Mixed frequency approach
  - Estimate model parameters
- Address the response to macroeconomic shocks
  - Impact of technology, labor supply, preference and exchange rate shocks
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Households

- Utility

$$\max \mathbb{E}_0 \sum_{t=0}^{\infty} \beta_t \ \kappa_t \left\{ \ln \left[(1-\alpha)^{\frac{1}{\eta}} \ c_{d,t}^{\frac{\eta-1}{\eta}} + \alpha^{\frac{1}{\eta}} \ c_{f,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}} + \psi \ \omega_t \ \ln(1-l_t) \right\}$$

- Varieties

$$c_{d,t} = \left(\int_0^1 d_{d,t}(i)^{\frac{\varepsilon-1}{\varepsilon}} di \right)^{\frac{\varepsilon}{\varepsilon-1}} ; c_{f,t} = \left(\int_0^1 c_{f,t}(i)^{\frac{\varepsilon-1}{\varepsilon}} di \right)^{\frac{\varepsilon}{\varepsilon-1}}$$

- Budget constraint

$$\int_0^1 \left[p_{d,t}(i) c_{d,t}(i) + p_{f,t}(i) c_{f,t}(i) \right] di + k_{d,t+1} = w_t l_{d,t} + r_{d,t} k_{d,t} + (1-\delta) k_{d,t}$$

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Firms

- Production

$$y_t = \left[\alpha k_t^{\phi} + (1-\alpha) L_t^{\phi}\right]^{\frac{1}{\phi}},$$

- Labor

$$L_t = \left\{\gamma l_{d,t}^{\theta} + (1-\gamma) l_{f,t}^{\theta}\right\}^{1/\theta}$$

- Labor demand

$$\frac{l_t^*}{l_t} = \left(\frac{w_t}{e_t w_t^*}\right)^{\theta} \left(\frac{1-\gamma}{\gamma}\right)^{\theta}.$$

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Calvo

- Price setting

$$P_t^*(i) = \frac{\varsigma}{(\varsigma - 1)} \frac{\sum_{j=0}^{\infty} (\nu\beta)^j E_t(\lambda_{t+j} P_{t+j}^{\varsigma} Y_{t+j} \varepsilon_{t+j})}{\sum_{j=0}^{\infty} (\nu\beta)^j E_t(\lambda_{t+j} P_{t+j}^{\varsigma-1} Y_{t+j})}.$$

- Philips curve

$$\pi_t = \beta E_t \pi_{t+1} + \frac{(1-\nu)(1-\nu\beta)}{\nu} \hat{\varepsilon}_t,$$

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Risk Sharing, Monetary policy, Shocks

- Risk sharing

$$\beta \left(\frac{E_t \left\{ c_{t+1}^* \right\}}{c_t^*} \right)^{-\sigma} \left(\frac{\pi_t^* e_t^{-1}}{E_t \left\{ \pi_{t+1}^* e_{t+1}^{-1} \right\}} \right) = E_t \left\{ q_{t,t+1} \right\}$$

- Monetary policy

$$\ln \left(R_t / R \right) = \rho_r \ln \left(R_{t-1} / R \right) + \rho_y \ln \left(Y_t / Y \right) + \rho_\pi \ln \left(\pi_t / \pi \right) + \varepsilon_{r_t},$$

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Shocks

- Labor supply

$$\omega_t = \rho_\omega \omega_{t-1} + \varepsilon_{\omega,t} \ , \varepsilon_{\omega,t} \sim N(0,1)$$

- Preference

$$\kappa_t = \rho_\kappa \kappa_{t-1} + \varepsilon_{\kappa,t} \ , \varepsilon_{\kappa,t} \sim N(0,1)$$

- Technology

$$z_t = \rho_z z_{t-1} + \varepsilon_{z,t} \ , \varepsilon_{z,t} \sim N(0,1)$$

- Exchange rate

$$\psi_t = \rho_\psi \psi_{t-1} + \varepsilon_{\psi,t} \ , \varepsilon_{\psi,t} \sim N(0,1)$$

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Data Sources

- German Statistical Office (DESTAT)
  - Bilateral migration flows (monthly)
- Federal Employment Agency
  - Employment (monthly)
- OECD
  - GDP (quarterly)
  - Private Consumption (quarterly)
  - Exchange rate (monthly)
  - Employed population Poland (quarterly)

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Prior Distribution

Table 1: Prior and Posterior Distributions

Description	Parameter	Prior Distributions			Posterior Distributions	
		Density	Mean	Std.Dev.	Mean	Std.Dev.
Elasticity of Substitution	σ	Inv. Gamma	2.86	0.633	10.301	0.6330
Share of Foreign Labor	γ	Normal	0.0263	0.01	0.26	0.01
Tech.Shock (D)	ρ_z	Beta	0.75	0.10	0.9089	0.1
Preference Shock (D)	ρ_κ	Beta	0.75	0.10	0.9354	0.1
Labor Supply Shock(F)	ρ_μ	Beta	0.75	0.10	0.8985	0.1
Tech.Shock (F)	ρ_m	Beta	0.75	0.10	0.9405	0.1
Preference Shock (F)	ρ_λ	Beta	0.75	0.10	0.8074	0.1
Tech.Shock (D)	ϵ_z	Inv.Gamma	0.1	2	2.2725	2
Preference Shock (F)	ϵ_κ	Inv.Gamma	0.1	2	4.70	2
Labor Supply Shock(F)	ϵ_μ	Inv.Gamma	0.1	2	7.37	2
Tech.Shock (F)	ϵ_m	Inv.Gamma	0.1	2	11.93	2
Preference Shock (F)	ϵ_λ	Inv.Gamma	0.1	2	2.281	2
Calvo parameter (D)	η_f	Beta	0.75	0.10	0.7303	0.0112
Elast.of Subst.goods (F)	η_f	Gamma	2	0.75	2.64	0.05
Taylor rule output (D)	ρ_y	Normal	0.125	0.05	0.1093	0.0068
Taylor rule inflation(D)	ρ_π	Normal	1.5	0.125	1.41	0.0159
Taylor rule int.rate(D)	ρ_r	Beta	0.75	0.10	0.78	0.0191
Taylor rule output (F)	ρ_{yf}	Normal	0.125	0.05	0.1183	0.0155
Taylor rule inflation (F)	ρ_{π_f}	Normal	1.5	0.125	1.517	0.0335
Taylor rule int.rate (F)	ρ_{rf}	Beta	0.32	0.10	0.2792	0.0204

Variance Decomposition

Obs. Variable	ε_z	ε_m	ε_ω	ε_d	ε_{df}	ε_{exr}	
Output (D)	8.70	2.84	0.73	72.83	13.95	0.95	
Output (F)	0.15	41.53	0.03	3.26	44.77	10.26	
Composite Labor (D)	1.98	1.24	4.45	87.15	4.55	0.62	
Immigrants (D)	0.22	14.38	0.01	2.46	77.52	5.40	

Variance decomposition for period 100

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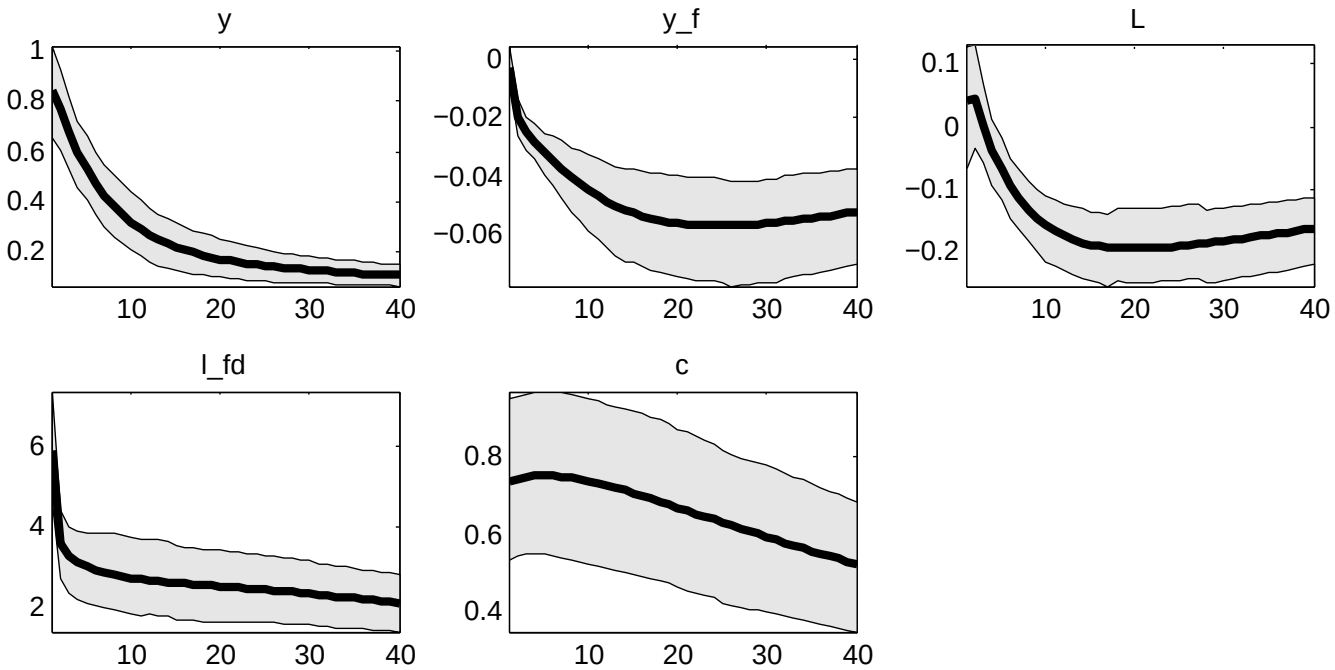
Impulse Response Functions

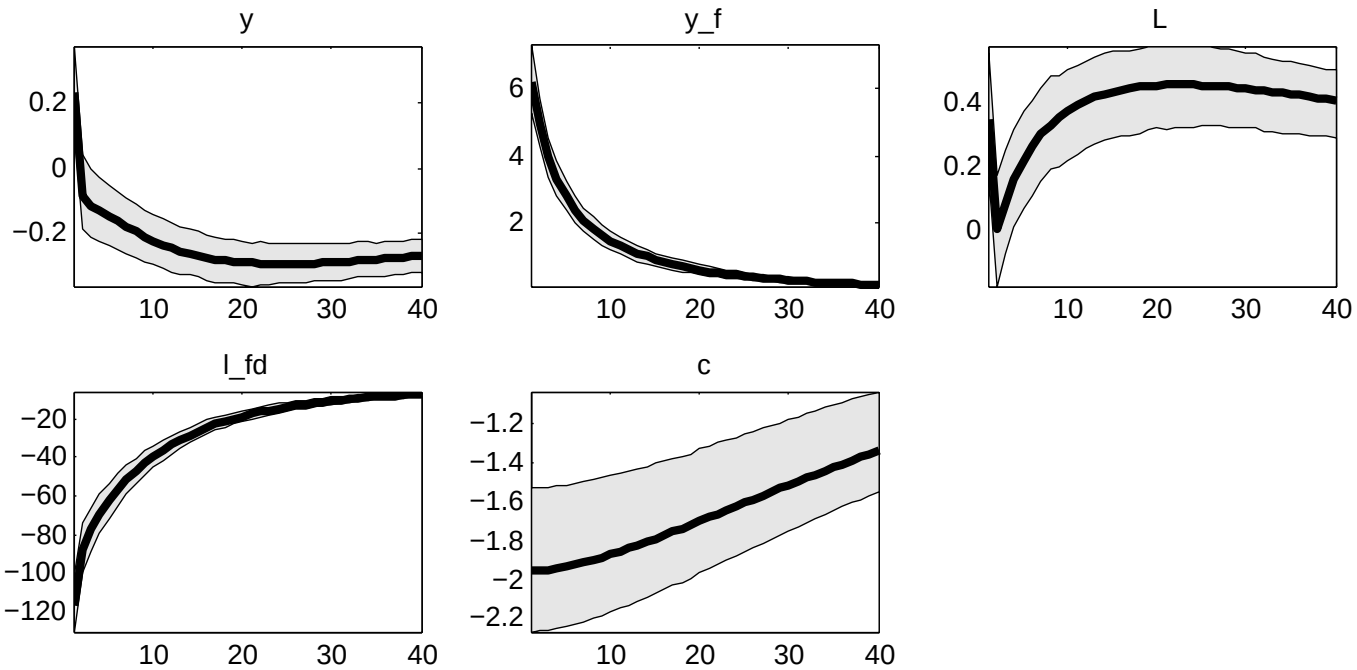
- Technology shocks in home and foreign affect migration
- Weak impact of exchange rate shocks
- Weak and ambiguous impact of preference shocks in the destination

Technology Shock Home



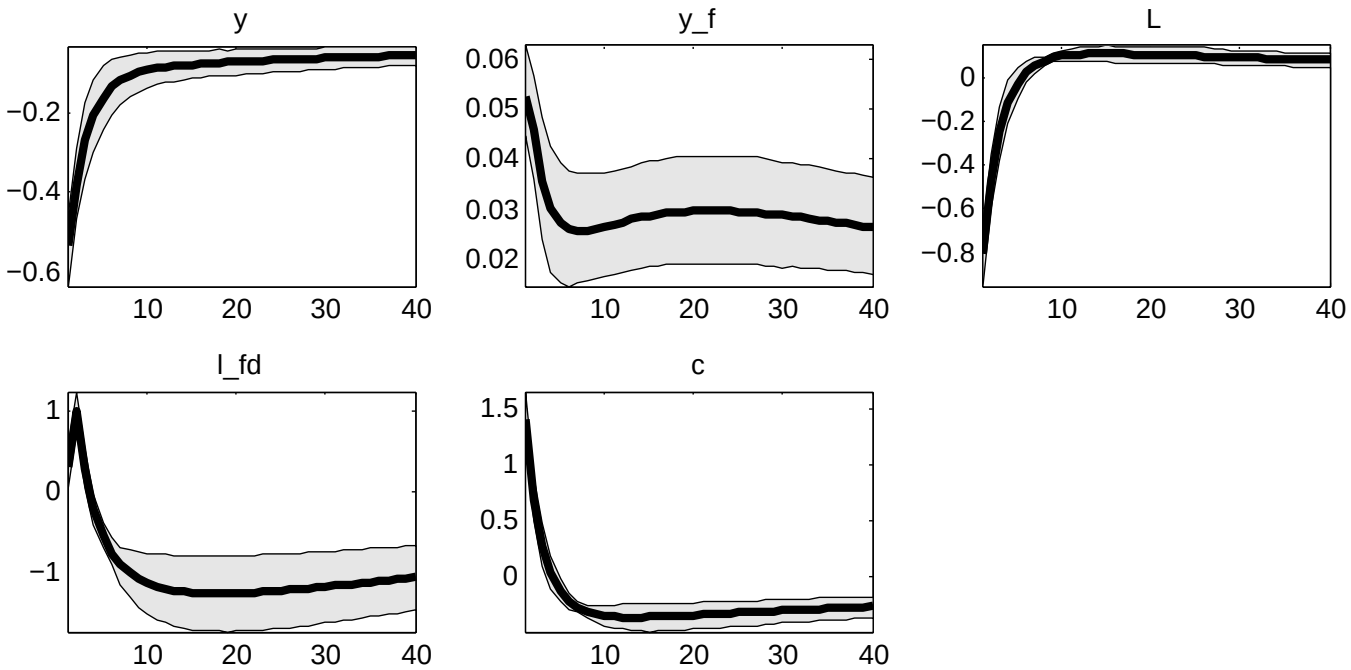
Impulse response functions to a positive technology shock in the domestic country with 5 to 95 per cent confidence intervals.
Notes: Each panel shows the response of the model variables to a technology shock of one. The horizontal axes measure time, expressed in months.

Technology Shock Foreign



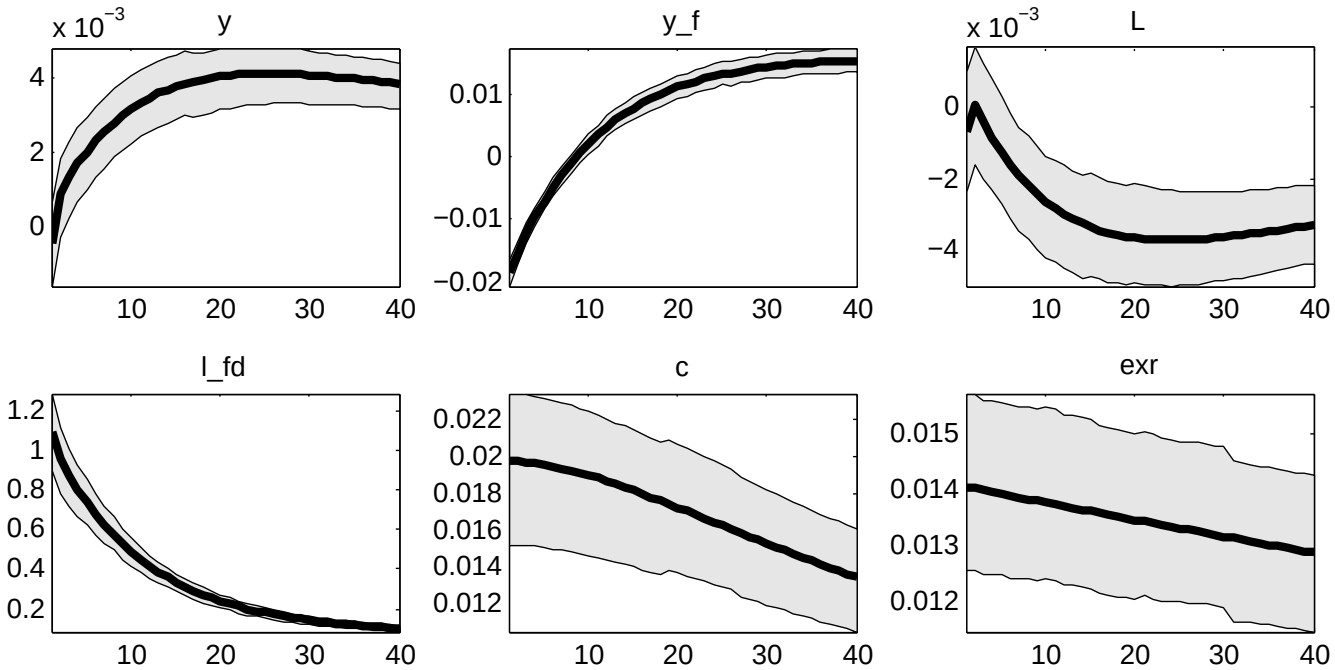
Impulse response functions to a positive technology shock in the foreign country with 5 to 95 per cent confidence intervals.
Notes: Each panel shows the response of the model variables to a technology shock of one. The horizontal axes measure time, expressed in months.

Preference Shock Home



Impulse response functions to a positive domestic preference shock in the domestic country with 5 to 95 per cent confidence intervals.
Notes: Each panel shows the response of the model variables to a technology shock of one. The horizontal axes measure time, expressed in months.

Exchange Rate Shock



Impulse response functions to a positive exchange-rate shock with 5 to 95 per cent confidence intervals.
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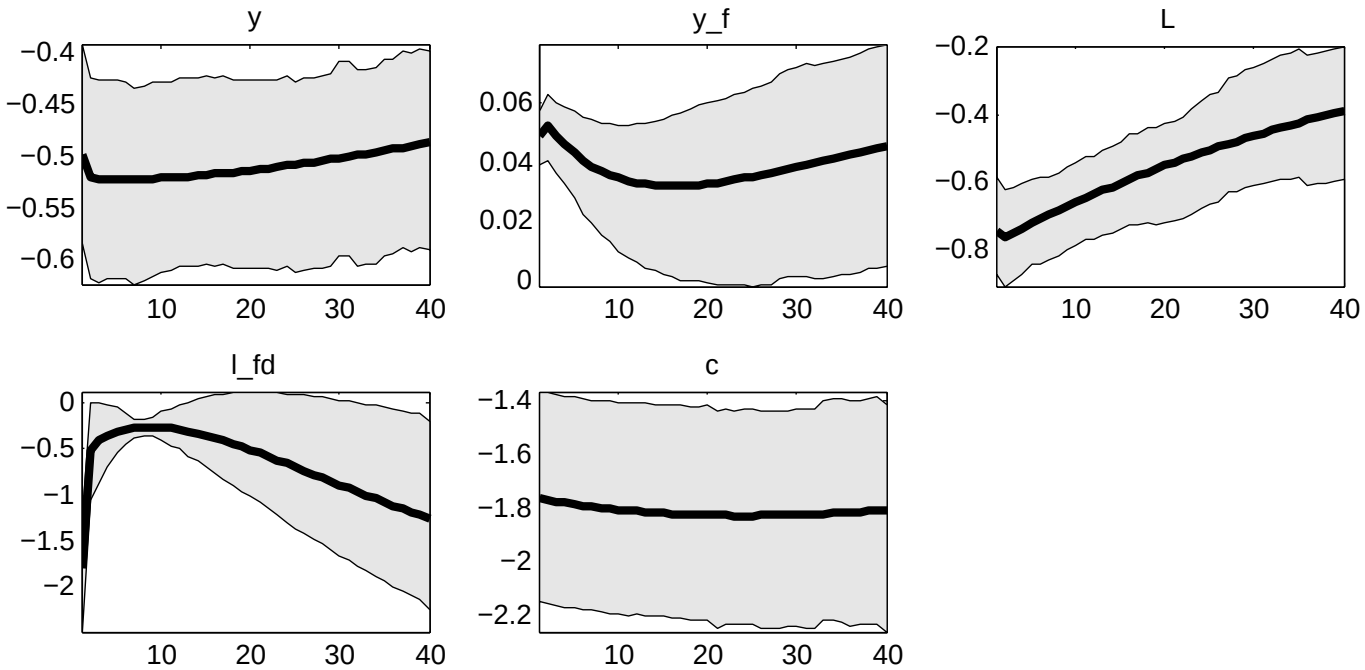
Labor Supply Shock



Impulse response functions to a positive labor supply shock in the domestic country with 5 to 95 per cent confidence intervals.
Notes: Each panel shows the response of the model variables to a technology shock of one. The horizontal axes measure time, expressed in months.

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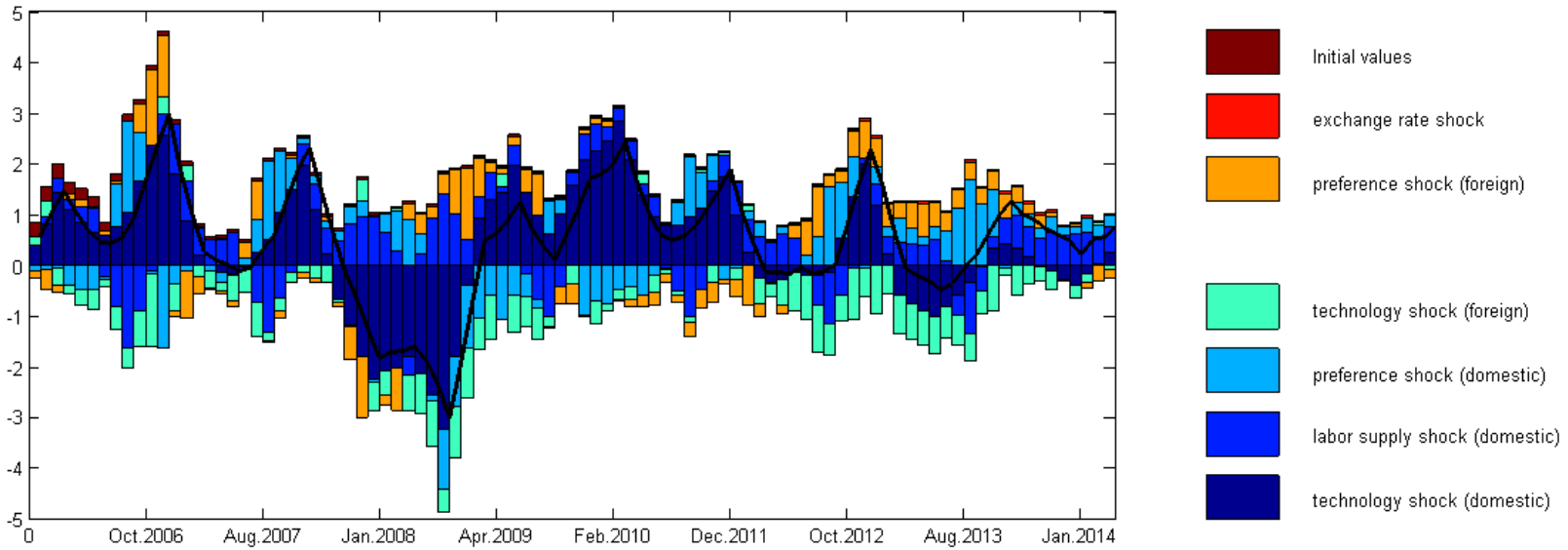
Historical Decomposition

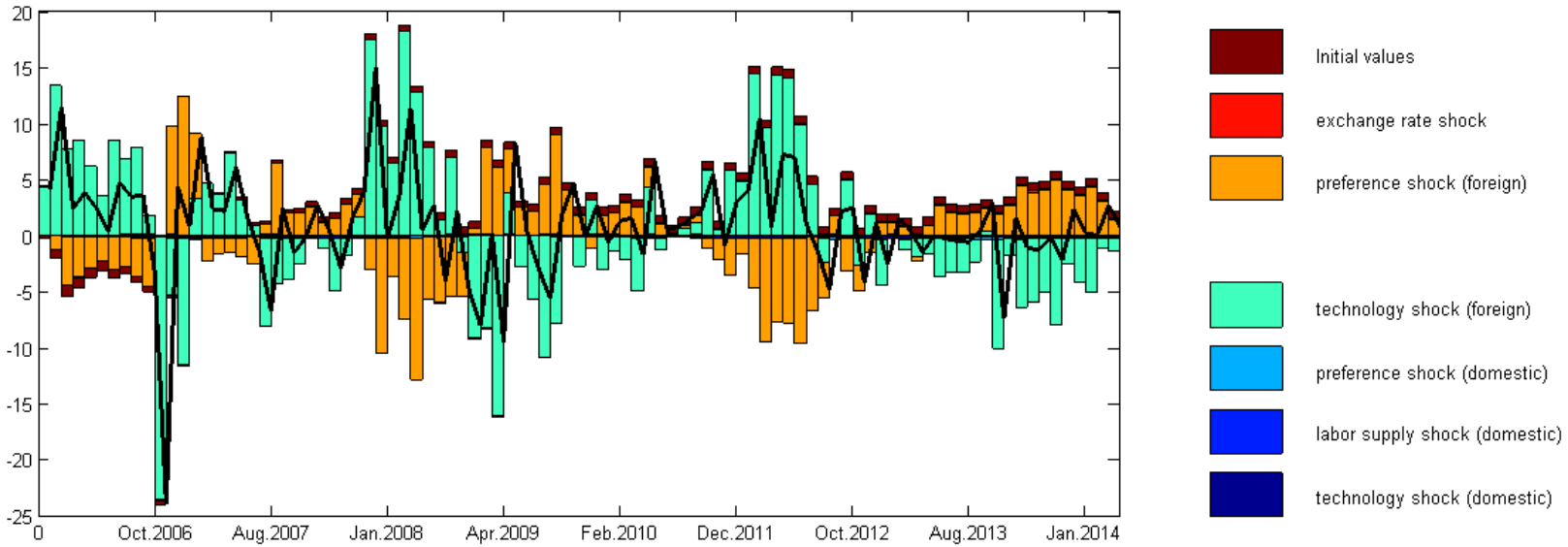
- Shocks can explain deviations in output for Germany and Poland
- Migration flows are predominantly determined by home country shocks
- Preference shocks and technology shocks outpace exchange rate shocks

Output Germany



Historical decomposition of output for Germany in the sample period 1/2006 to 12/2014.

Output Poland



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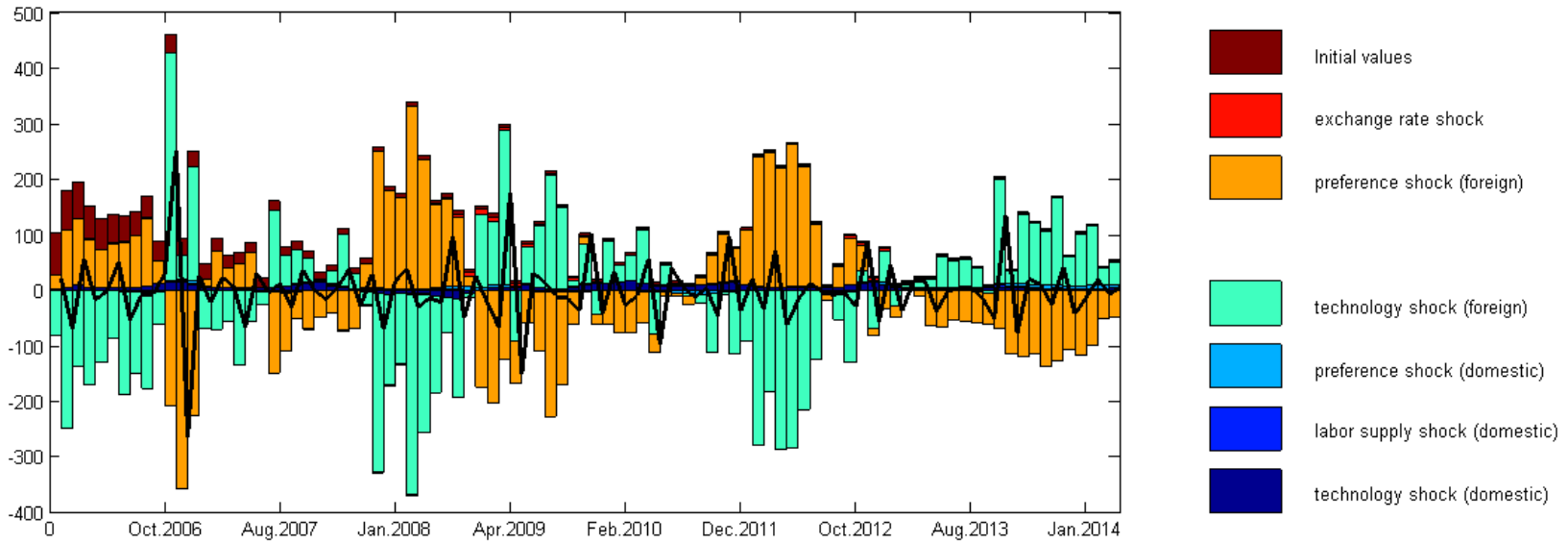
Migration flows



Historical decomposition of the immigration time-series for Germany in the sample period 1/2006 to 12/2014.

Summary

- Migration flows are affected by the business cycle
- Shocks of the home country are more important than those of the destination
  - Preference and technology shocks
- This holds also true for other country pairs (UK - Poland)