Impact of the Euro adoption on international trade within the heterogeneous euro area

Svatopluk Kapounek
Vilnius University and Mendel Brno University

This project has received funding from European Social Fund under a grant agreement with the Research Council of Lithuania (LMTLT)

3rd workshop Economic Integration and the Transmission of Macroeconomic Shocks
December 11, 2020, Vilnius

TRADE OPENNESS OF THE EU COUNTRIES

Country Name	1983-1998	1999-2016	% change	Country Name	1983-1998	1999-2016	% change
Hungary	0.73	1.47	1.00	Sweden	0.63	0.84	0.34
Poland	0.45	0.78	0.71	Lithuania	0.92	1.23	0.33
Germany	0.45	0.74	0.64	Italy	0.40	0.52	0.31
Czech Republic	0.78	1.24	0.58	Slovenia	0.95	1.24	0.31
Ireland	1.17	1.76	0.51	France	0.43	0.55	0.27
Slovak Republic	1.07	1.52	0.43	Belgium	1.18	1.49	0.26
Greece	0.40	0.56	0.41	Netherlands	1.06	1.33	0.26
Spain	0.41	0.57	0.40	Latvia	0.86	1.02	0.19
Romania	0.53	0.75	0.40	Portugal	0.60	0.69	0.15
Austria	0.68	0.95	0.39	United Kingdom	0.49	0.55	0.12
Denmark	0.68	0.93	0.37	Estonia	1.47	1.42	-0.04
Finland	0.56	0.75	0.35				

Motivation

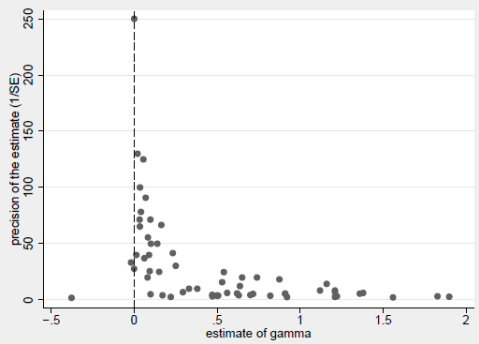
- Rose effect was overrated prior to financial crisis in 2007
- there is no robust evidence of euro adoption effects on trade after the 20 years of euro
- very few contributions have attempted to make causal inferences on global shocks and the spread of these shocks into the EU trading partners
- heterogeneous Europe

BRIEF LITERATURE OVERVIEW I

- currency union can be expected to increase trade and financial integration mainly due to the transaction costs and exchange rate risk decreasing (Mundell, 1961)
- increased trade in common currency area leads to industrial specialization between regions in the goods in which they have comparative advantage (Frankel and Rose, 1998)
- specialization effect leads to the divergence of the economies and eliminate positive effects of increasing international trade on economic growth (Krugman, 1993; Bayoumi and Eichengreen, 1992, 1996)
- single currency significantly boosts international trade, especially, one percent increase in trade raises income per capita by roughly 1/3 of a percent over a 20-year period (Rose and Engels, 2002)
- meta-analysis of the effect of common currencies shows that single currency increases bilateral trade by between 30 and 90 per cent (Rose and Stanley, 2005)

BRIEF LITERATURE OVERVIEW II

- „the Euro's trade promoting effect corrected for publication bias is insignificant" (Havránek, 2010)



Source: Havránek, T., 2010. Rose Effect and the Euro: Is the Magic Gone? Review of World Economics, 146(2), 241–261.

Brief literature overview III

- reported Rose effect of the Euro is significantly lower than that of other currency unions taken as a whole (Micco et al., 2003; Frankel, 2008)
- impact of the Euro adoption on the intra-euro area is between five and ten percent (Baldwin, 2008)
- integration within a group of trade partners (Cafiso, 2008)
- differentiation across regions and countries is particularly large in Central and Eastern Europe due to the industrial 'up-grading' and remaining 'locked in' in low-skill areas of production (Landesmann, 2003)
- transport cost effects, proxied by a country's GDP-weighted distance from others and by its land area, declined over time (Bleaney and Neaves, 2013)

EVIDENCE FROM GRAVITY MODELS

- disintegration in eastern Europe caused by trade intensity decrease after the Soviet Union collapse (Fidrmuc and Fidrmuc, 2003)
- advanced integration between the core EU members (Bussiere et al., 2008)
- the potential to intensify the trade and international production network in new EU members has not been exhausted yet (Frensch et al., 2016)
- alternate determinants of trade integration: common language and knowledge of languages (Egger and Lassmann, 2012; Fidrmuc and Fidrmuc, 2016), international rivers (Fidrmuc and Frensch, 2017), institutions, culture, infrastructure and geography (Hanousek and Kočenda, 2015)

CONTRIBUTION

- we identify impact of the Euro adoption on international trade within a group of euro area trade partners
  - euro adoption is represented by changes in **monetary independence and exchange rate stability**
- the particular attention will be put on V4 countries
- we incorporate international transmission of global shocks (at the European level) across national borders into the global econometric framework
  - economic activity, exchange rate movements (EUR/USD), ECB policy interest rate
- we deal with the problem of heterogeneity across the euro-area

TRADITIONAL MACROECONOMIC DATA

- 24 EU countries, monthly data, 1993M01–2017M05
- export of goods (FOB)
  - datasources: Direction of Trade (IMF)
  - log differences
- macroeconomic fundamentals: CPI, IR (interbank offered rate), NEER, REER, ER, IP index (industrial production)
  - datasources: Eurostat, OECD, IMF, ECB, national central banks
  - log differences
- X-12 ARIMA: CPI, IP index, exports

EURO ADOPTION CHANNELS I

- trilemma indexes (Aizenman, J., Chinn, D., Ito, H. 2010. The emerging global financial architecture: Tracing and evaluating new patterns of the trilemma configuration, Journal of International Money and Finance, 29: 615-–641)
  - Exchange Rate Stability index

$$ERS = \frac{0.01}{0.01 + stdev(\Delta(log(ER))}$$

monthly standard deviations of the daily exchange rate between the home country and the EUR/ECU, normalized between zero and one (datasource: national banks)

EURO ADOPTION CHANNELS II

- Monetary Independence index

$$MI = 1 - \frac{corr(IR_i, IR_j) + 1}{2}$$

  where IR refers to interbank offered 3month rate in home country i and IR_j to the basee country (Euro Area, Germany before 1998). Monthly index is calculated from daily data (datasource: national banks).
- Financial openness/integration index
  capital account openness (Chinn and Ito, 2006, 2008) is based on information regarding restrictions in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions

DMA I

- we employ Kalman filter to estimate time-varying parameter model

$$y_t = z_t\theta_t + \epsilon_t$$
$$\theta_t = \theta_{t-1} + \eta_t$$

where y_t represents log export of selected country and z_t contains all predictors, lagged export and intercept

$$z_t = \phi + \gamma y_{t-1} + \beta X_{t-1}$$

where X is vector of macroeconomic fundamentals and indices

DMA II

- we follow Koop and Korobilis (2012) and define K models as predictors $z_t^{(k)}$ for $k = 1, ..., K$

$$y_t = z_t^{(k)} \theta_t^{(k)} + \epsilon_t^{(k)}$$
$$\theta_t^{(k)} = \theta_{t-1}^{(k)} + \eta_t^{(k)}$$

  where $K = 2^{m\tau}$ for m explanatory variables in model and rolling forecasts which use estimation of $\hat{\theta}$ using data from $\tau - \tau_0$

- consider $L_t \in \{1, 2, ..., K\}$, then average DMA estimations at each t given available data in $t - 1$ is weighted

$$E(y_t | y^{t-1}) = \sum_{k=1}^{K} \pi_{t|t-1,k} z_t^k \hat{\theta}_{t-1}^{(k)}$$

  where $\pi_{t|s,l} = Pr(L_t = l | y^s)$

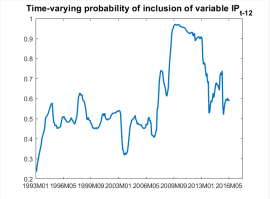
DMA III

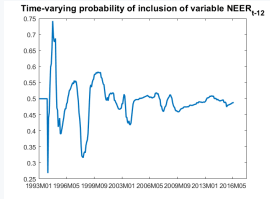
- time-varying probability to include the regressors into the model

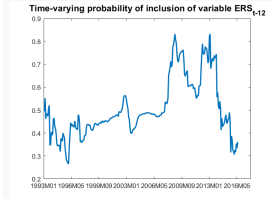
$$p(\Theta_{t-1}|y^{t-1}) = \sum_{k=1}^{K} p(\theta_{t-1}^{(k)}|L_{t-1} = k, y^{t-1}) Pr(L_{t-1} = k|y^{t-1})$$

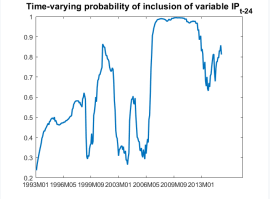
- we follow Raftery et al. (2010) to involve a forgetting factor for the state equation for the models
- DMS is based on the averaging over predictive results for every model selecting the highest value for $\pi_{t|t-1,k}$ at each point of time
- we consider TVP-VAR(2) and two forecast horizons: 12 and 24 months

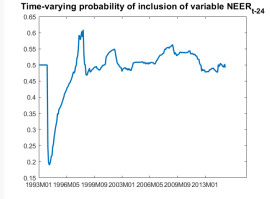
DMA: CZECH REPUBLIC

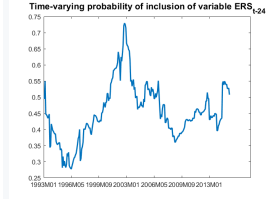




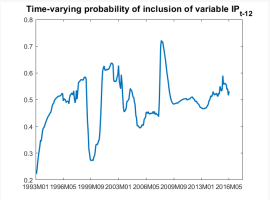


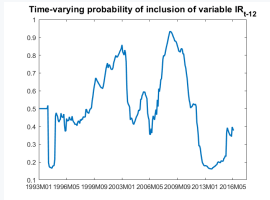


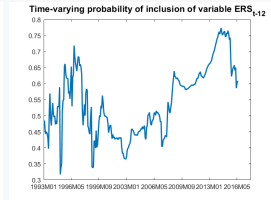


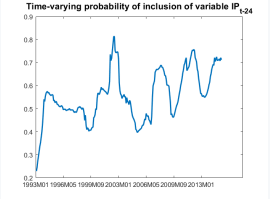


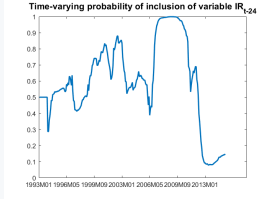
DMA: SLOVAKIA

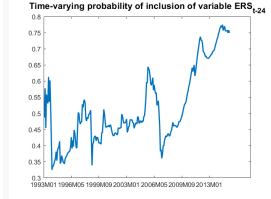












GVAR I

- we empirically assess the transmission of international trade shocks across countries in Europe using GVAR model
- estimations are based on Dees, Di Mauro, Pesaran and Smith (2007)
  - country-specific local VAR models (EX, IP index, inflation, REER, IR, MI index, ERS index) that are enlarged by a set of weakly exogenous and global variables (IP index, ER (EUR/USD), ECB policy IR)
  - deterministic trend component and unrestricted intercept
  - industrial production at domestic level is involved in our model as the foreign country shock
- Euro area as the region: AT, BE, DK, FR, DE, IT, LU, NL, FI, PT, ES
- other countries: UK, SE, BG, CZ, SK, EE, LV, HU, LT, HR, SI, PL, RO

GVAR II

- assuming that our global economy consists of N countries, every country $i = 1, \ldots, N$ is represented by a specification such as

$$x_{it} = a_{i0} + a_{i1}t + \phi_{i1}x_{i,t-1} + \Lambda_{i0}x^*_{i,t} + \Lambda_{i1}x^*_{i,t-1} + \pi_{i0}d_t + \pi_{i1}d_{t-1} + \epsilon_{i,t}$$

where x_{it} is a $k_i \times 1$ vector of endogenous variables in country i at time $t = 1, ..., T$, ϕ_{i1} that denotes the $k_i \times k_i$ matrix of parameters associated with the lagged endogenous variables

Λ_{ik} are the coefficient matrices of the k_i weakly exogenous vaariables, of dimension $k_i \times k_i$

d_t denotes the vector of strictly exogenous variables

$\epsilon_{it} \sim N(0, \sum_i)$ is the standard vector error term

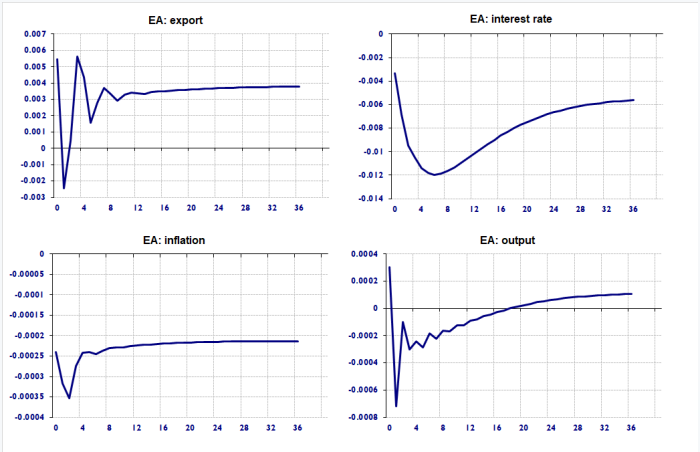
GVAR III

- the weakly exogenous or foreign variables $x^*_{i,t}$ are constructed as a weighted average of their global counterparts

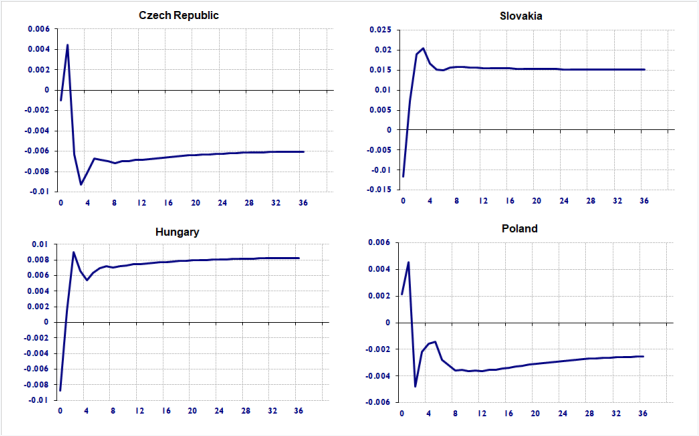
$$x^*_{it} = \sum_{j \neq i} \omega_{i,j} x_{j,t}$$

  where $\omega_{i,j}$ denotes the weight corresponding to the pair of country i and country j
- weights account for measurable economic and financial linkages among economies
- we use data on bilateral trade (Eickmeier and Ng, 2011)

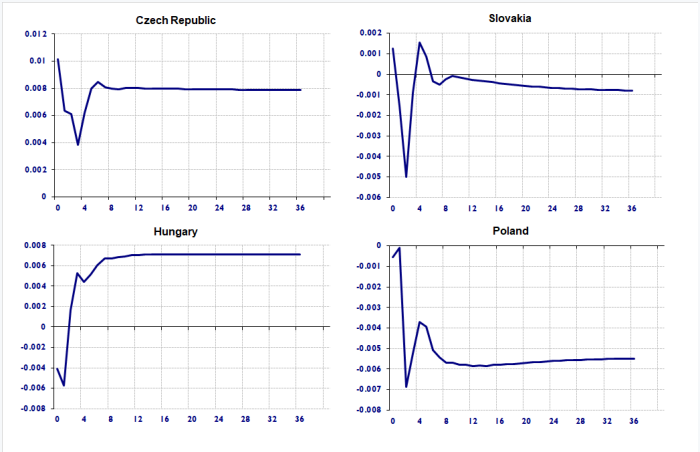
GVAR: ERS IN THE EURO AREA



GVAR: ERS SHOCK TO EXPORT



GVAR: MI SHOCK TO INDUSTRIAL PRODUCTION



CONCLUSIONS

- exchange rate stability has positive effect on the Euro Area exports, lower interest rates and inflation
- heterogeneous effect of exchange rate stability and monetary independence across the EU
- negative effects of exchange rate fixing of national currencies prevails in the Czech Republic and Poland, positive effects are identified in Slovakia and Hungary
- negative effects of monetary independence in Poland, on the contrary, positive effects of monetary independence in the Czech Republic and Hungary
- evidence of positive effects of euro adoption in Slovakia

Thank you for your attention . . .

Svatopluk Kapounek
kapounek@mendelu.cz