NATIONAL BANK OF UKRAINE

Exchange Rate Pass-Through and Cross-Country Spillovers: Some Evidence from Ukraine and Russia

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Research Motivation

- Understanding the mechanism of **exchange rate pass-through** (ERPT) to domestic inflation is of the great importance for monetary policy

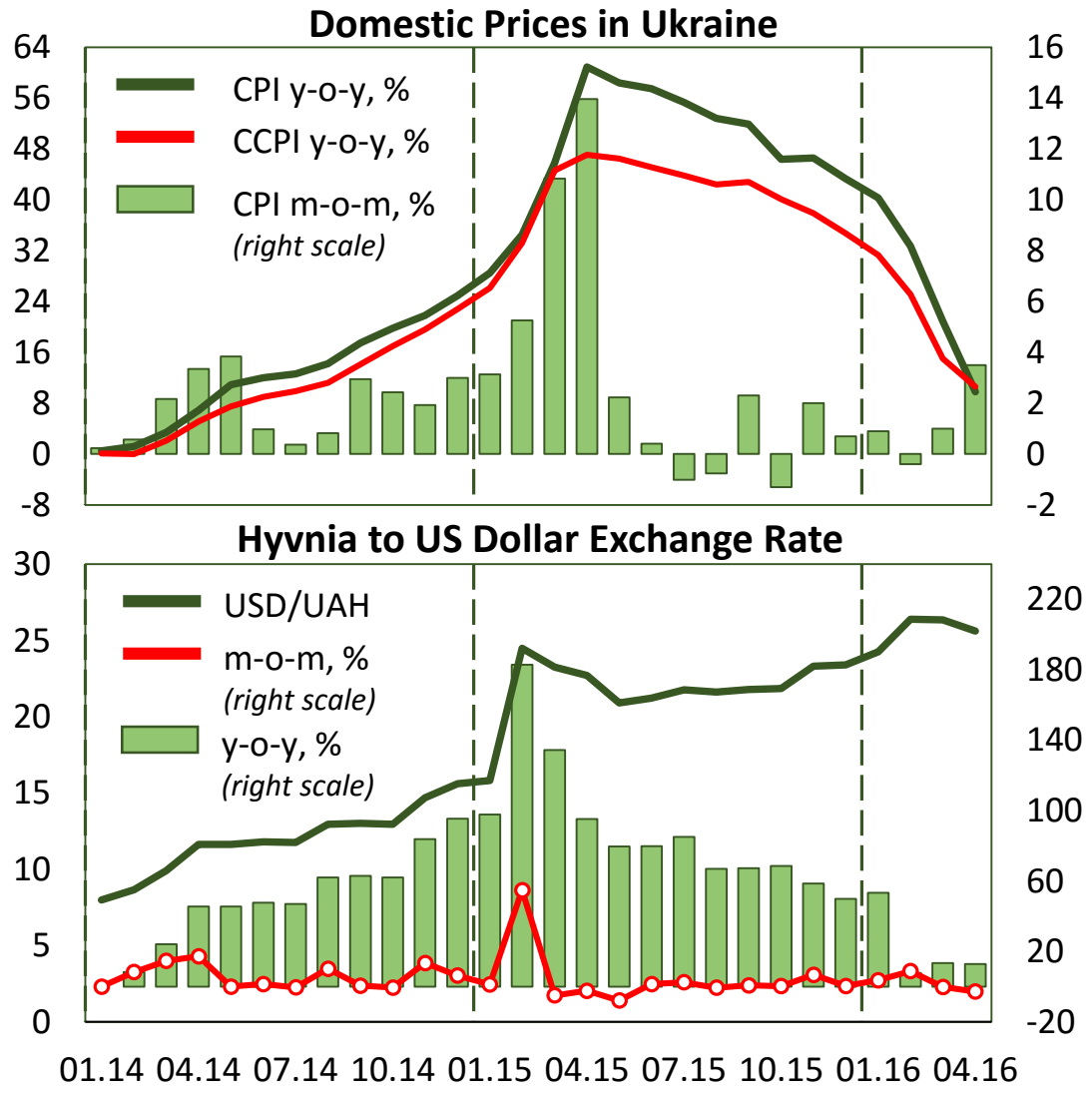
- **"Hot issue"** for Ukraine:
  - transition to inflation targeting
  - from fixed towards floating exchange rate
  - small open economy
  - uncertainties due to military conflict
  - international trade restrictions with Russia

- **Empirical literature for Ukraine is scarce:**

Source	Price Index	Data set	Exchange Rate	Ukraine
Korhonen & Wachtel (2005)	CPI	1999 – 2004	USD	0.63 - 0.64
			EUR	0.24 - 0.28
Beckmann & Fidrmuc (2013)	CPI	1999 – 2010	USD	0.45
			EUR	0.25
Novikova & Volkov (2012)	Core CPI	2004 – 2012	USD	0.35 - 0.47

Stylized Facts

- **2014 – 2015H1**
  - Rapid depreciation:
    - Shifts in risk premium
    - Adjustments to BoP mismatches
    - ToT/external demand shocks
  - Peak inflation – up to 60.9% annually
  - high ERPT
- **2015H2 – 2016**
  - Macroeconomic stabilization
  - Gradual depreciation under floating regime:
    - ~~Shifts in risk premium~~
    - ~~Adjustments to BoP mismatches~~
    - ToT/external demand shocks
  - lower ERPT



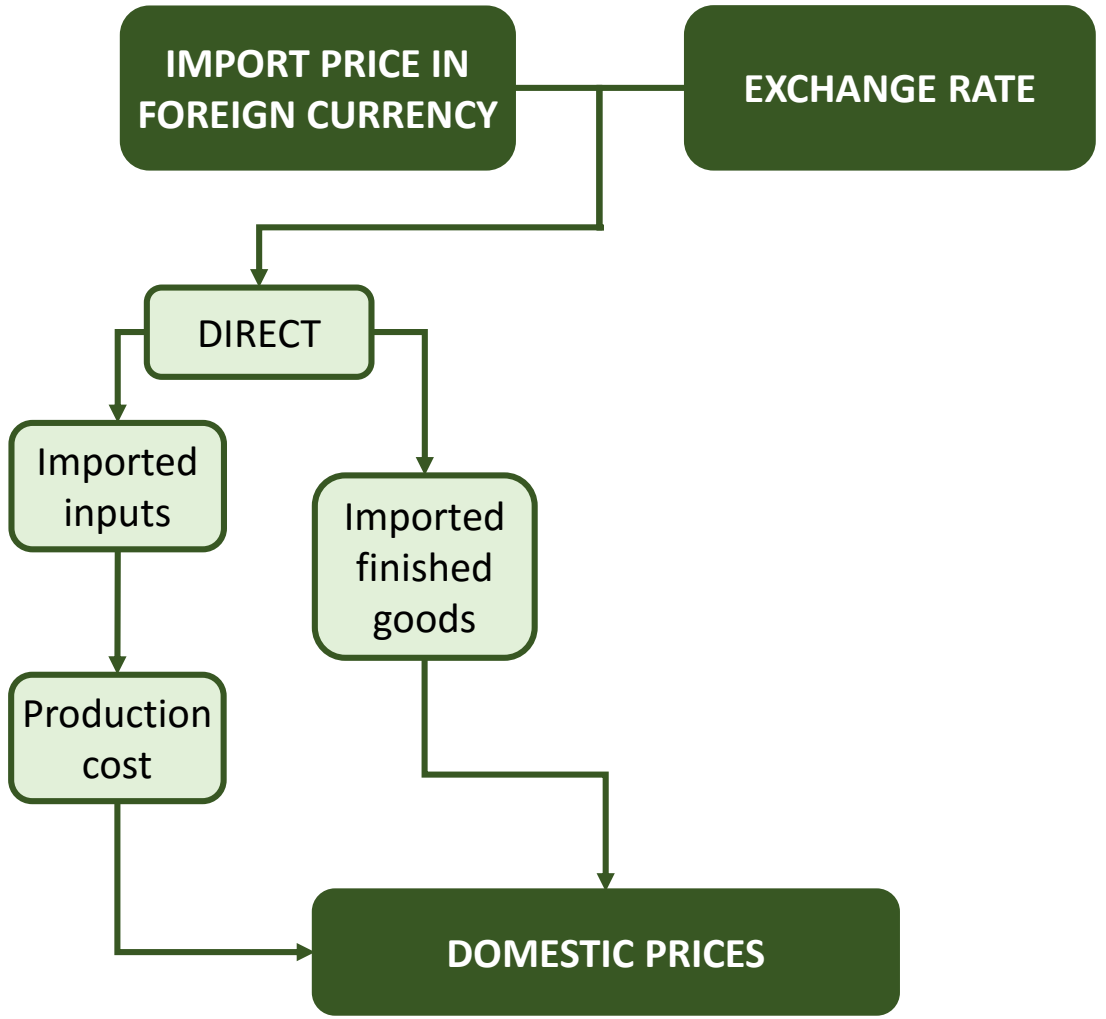
Source: State Stats Service of Ukraine

Theoretical Evolution of ERPT

- **ERPT TO DOMESTIC PRICES:**
- *Direct effect:*
  - ERPT to prices of imported goods for domestic consumption and imported inputs for domestic production

Two stands of literature:

- Pricing-to-market
  (Dornbusch, 1987)
- Currency Pricing Strategy
  (Betts & Devereux, 1996)



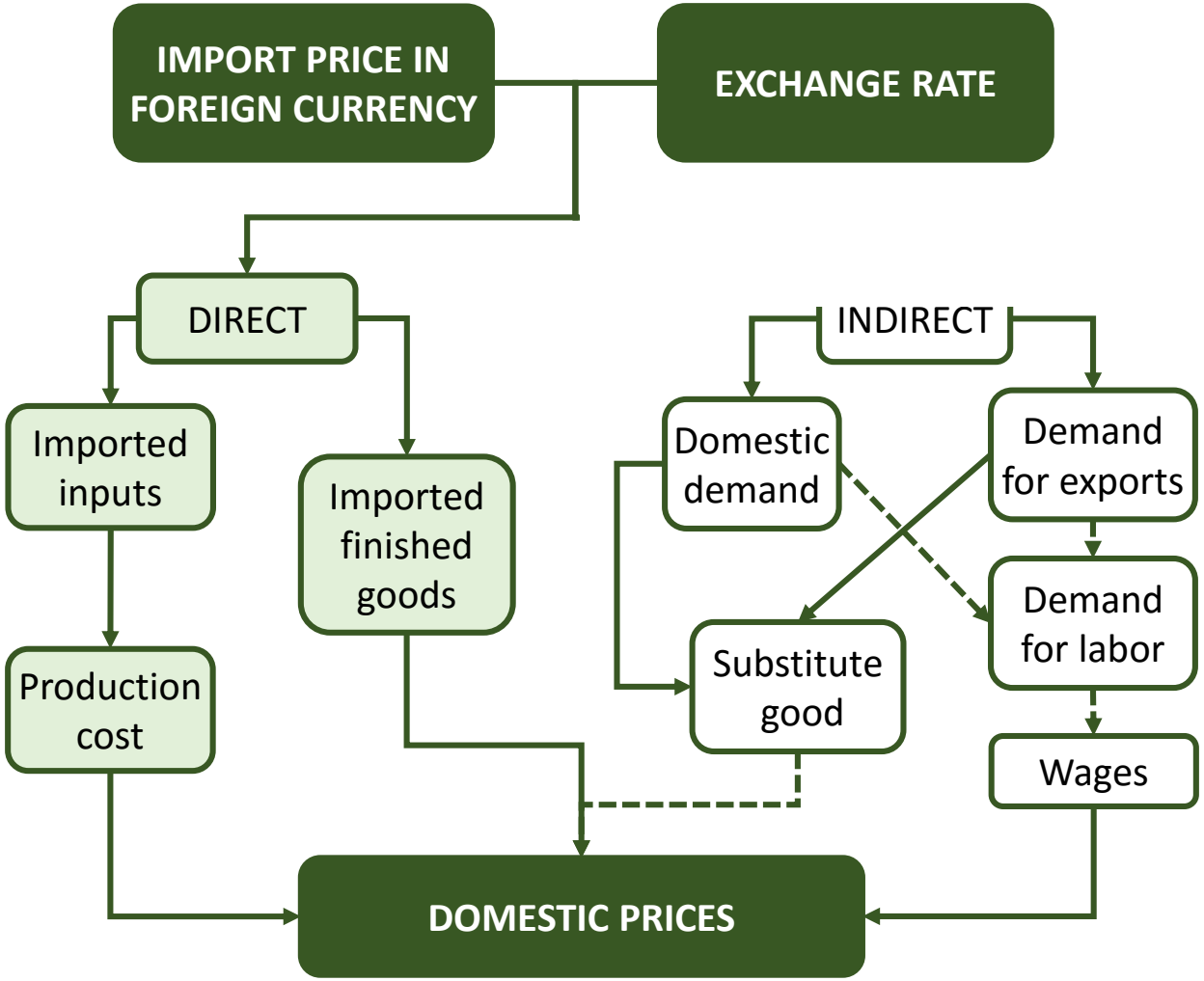
Source: based on Lafleche (1996-97)

Theoretical Evolution of ERPT

- **ERPT TO DOMESTIC PRICES:**
- *Indirect effect:*
  - transmission through changes in the domestic and foreign demand

Empirical literature:

- Extensions to “direct effect” analysis *(Bailliu & Fujii, 2004)*
- Distribution chain of pricing *(McCarthy, 2000, 2007)*



Source: based on Lafleche (1996-97)

Theoretical Evolution of ERPT

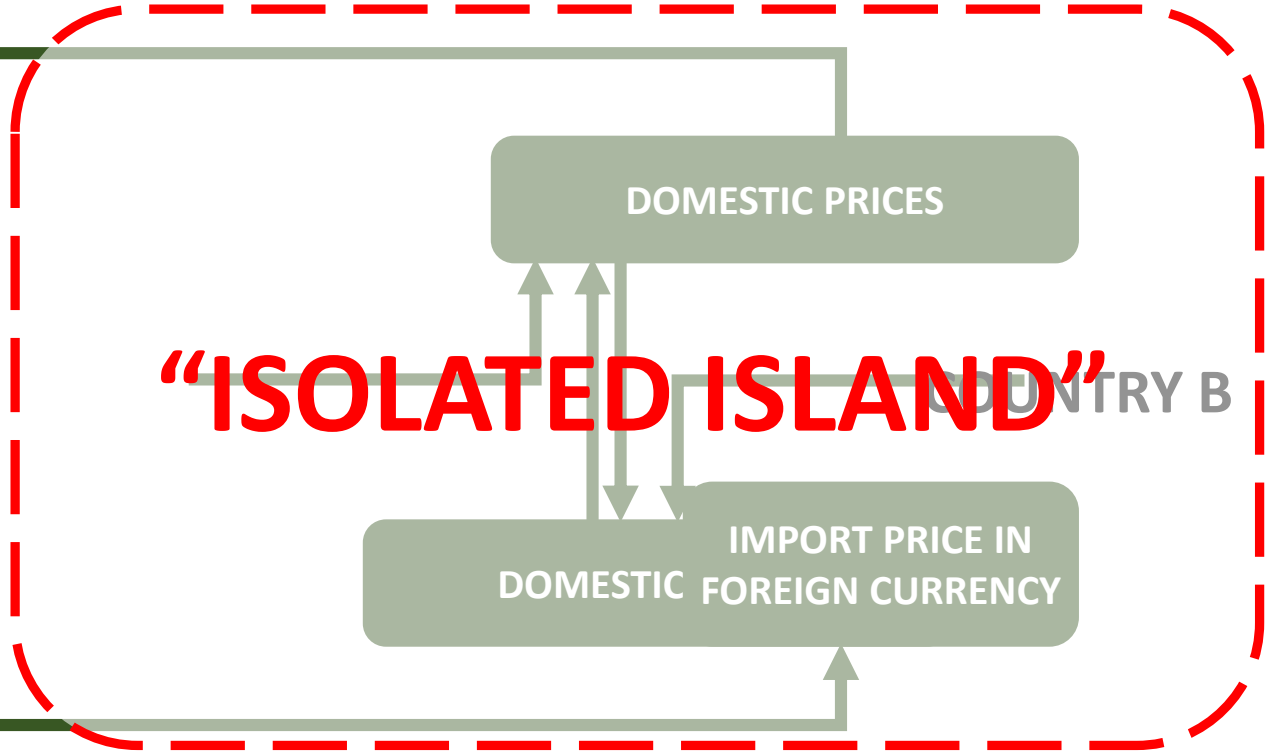
- **ERPT & CROSS-COUNTRY SPILLOVERS: small open economies**
  - Consider 2 countries A and B
  - Domestic prices of A and B are affected by external shocks from abroad
  - the possibility of transmission of such shocks to other countries is neglected

Spillovers due to trade linkage

- IMF Spillover Report (2014) :

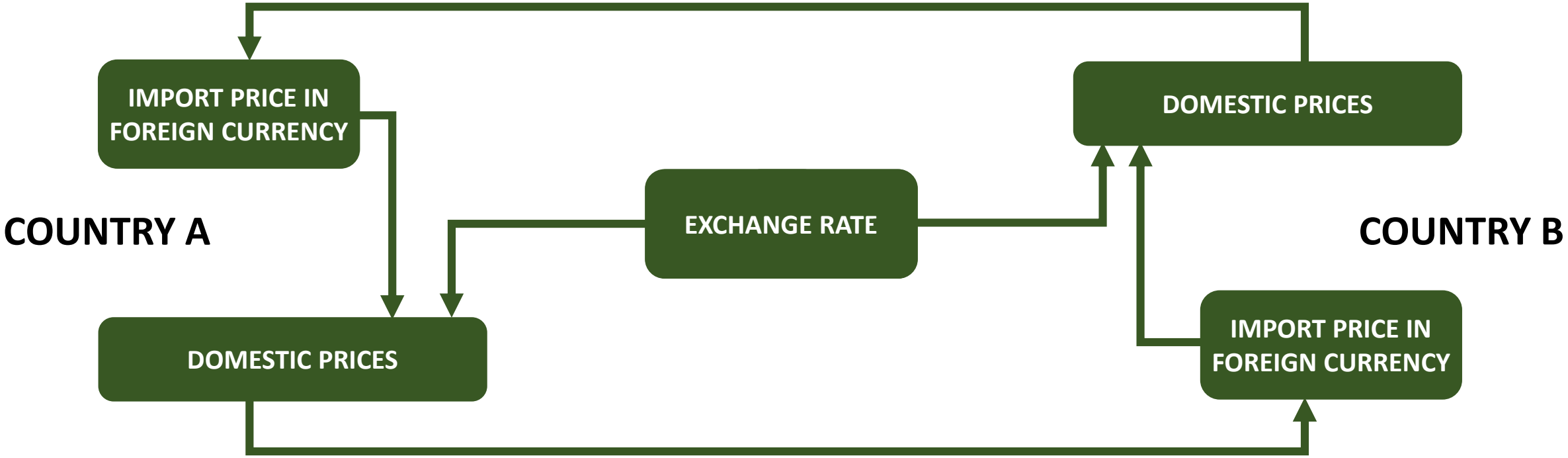
"The world economy has entered a new phase with respect to spillovers as tail risks associated with the global financial crisis have faded"

COUNTRY A



Theoretical Evolution of ERPT

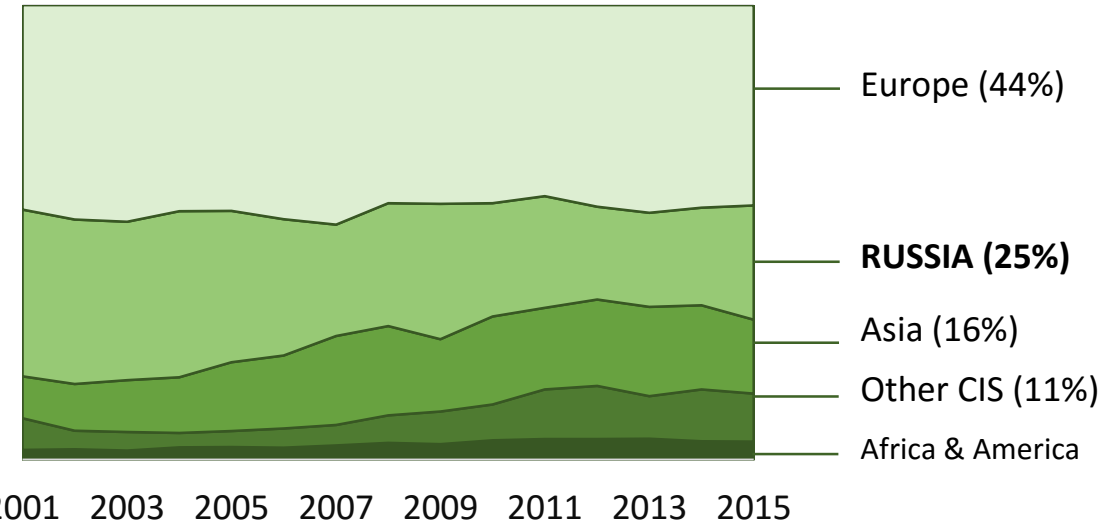
- **ERPT & CROSS-COUNTRY SPILLOVERS:**
  - *Consider 2 countries A and B*
  - *Spillovers due to trade linkage*
  - ***Spillovers due to ER interdependencies***



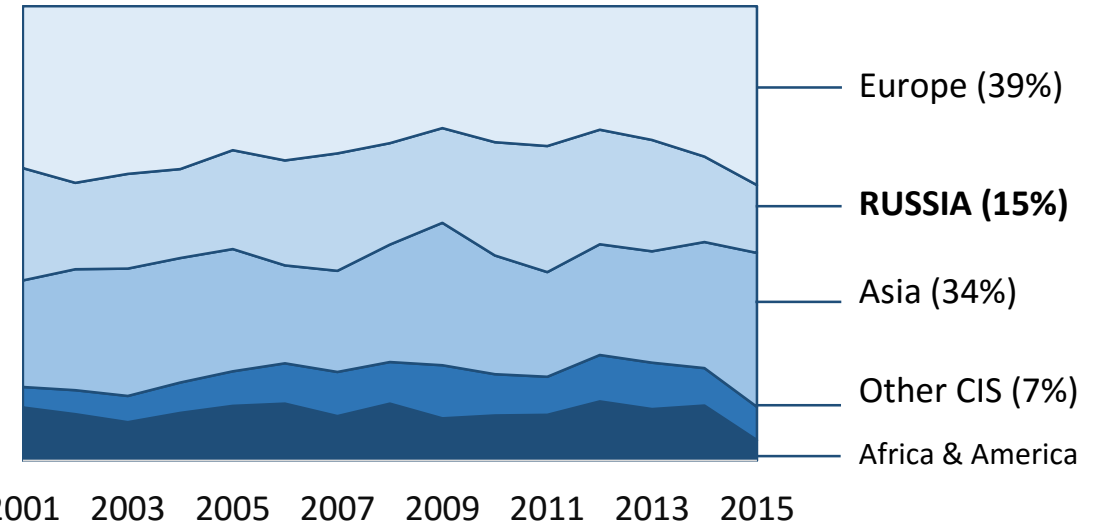
Linkage between Ukraine and Russia

- Being open economies, **Ukraine** and **Russia** are sensitive to external shocks
- Different in size, import structure, monetary and exchange rate policies
- **UKRAINE** – energy import dependent
- 2015: 25% of imports from Russia – transmission of external shocks through trade channel
- Russia is one of the major exporting market for Ukraine – changes in Russian demand might be reflected in Ukrainian prices

UKRAINE: merchandise **IMPORTS** by trading partners



UKRAINE: merchandise **EXPORTS** by trading partners



Source: International Trade Center Stats

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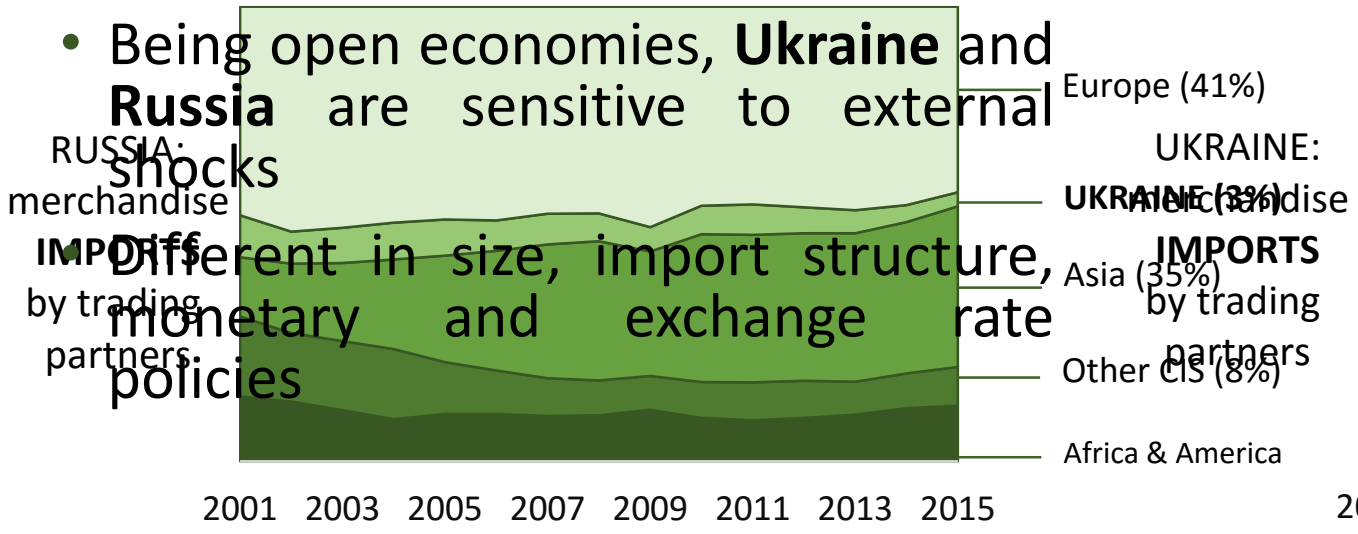

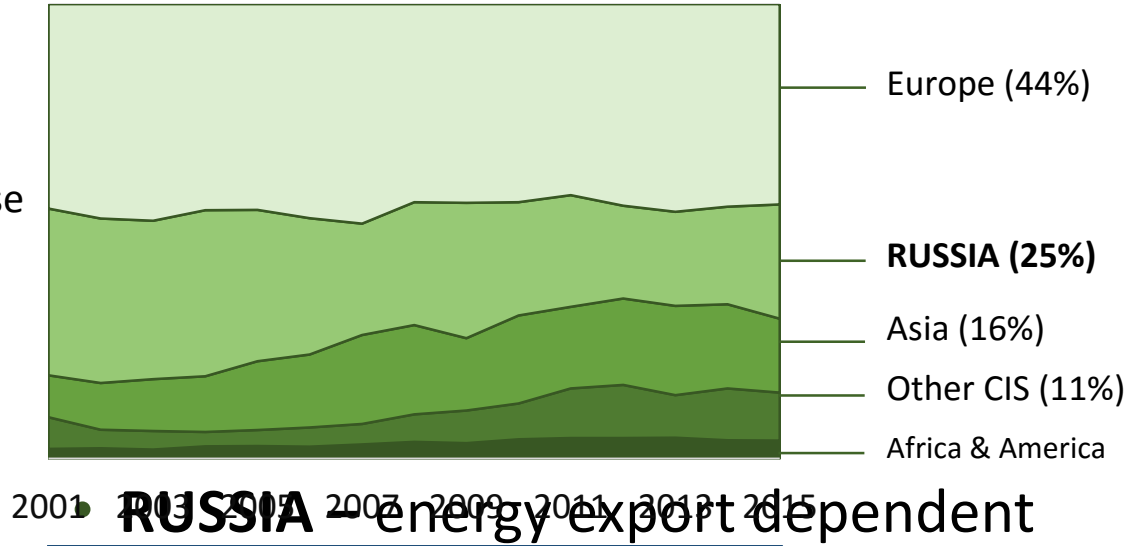

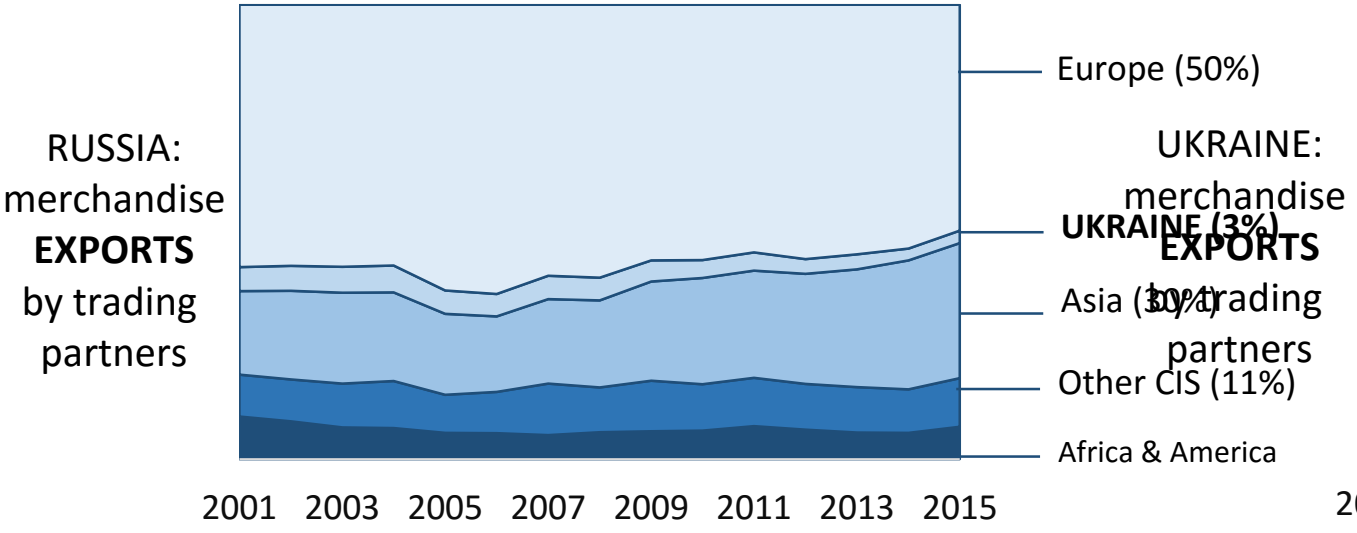

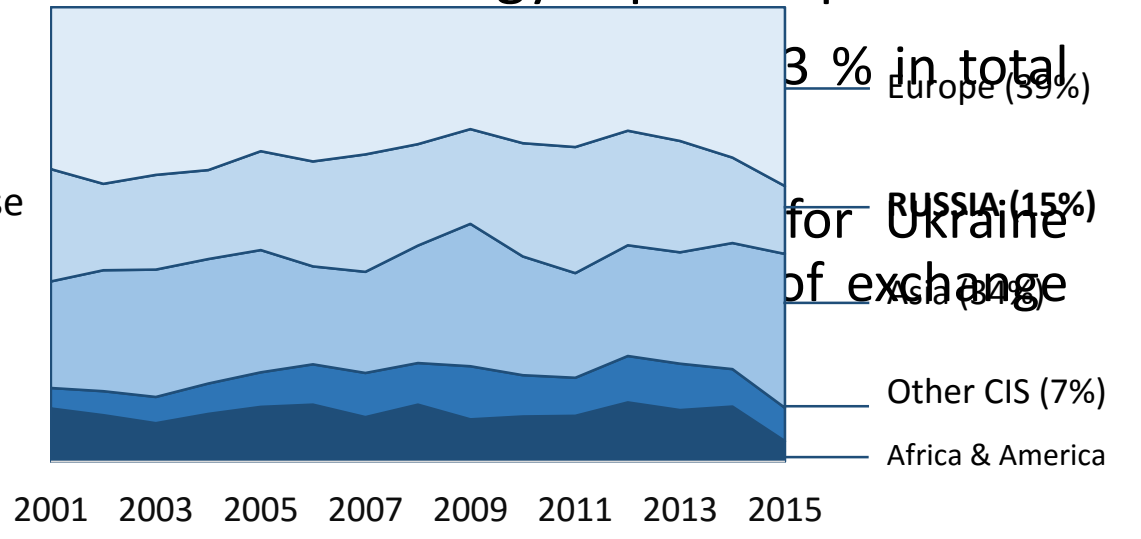

- **RUSSIA** – energy export dependent
- 3 % in total
- for Ukraine
- of exchange

Source: International Trade Center Stats

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Analytical Framework

- **PANEL VECTOR AUTOREGRESSIVE MODEL (PVAR)**
  - *"A powerful tool to address interesting questions related to transmission of shocks across units in interdependent world" (Canova & Ciccarelli, 2013)*
- **BILATERAL PANEL VAR (BPVAR)**
  - Similar to Panel VARs
  - Ease of interpretation
  - Solves dimensionality problem

$$Y_{1,t} = A_{01}(t) + A_{11}(\ell)Y_{1,t-1} + A_{12}(\ell)Y_{2,t-1} + \epsilon_{1t}$$
$$Y_{2,t} = A_{02}(t) + A_{21}(\ell)Y_{2,t-1} + A_{22}(\ell)Y_{1,t-1} + \epsilon_{2t}$$

- $Y_{i,t}$ *vectors of endogenous variables of the each unit i*
- $A_{0i}(t)$ *deterministic components of the data*
- $A_i(\ell)$ *a polynomial in the lag operator for each unit i*
- $\epsilon_t = [\epsilon_{1t}, \epsilon_{2t}] \sim iid(0, \Sigma)$ *vectors of random disturbances*

- Tree characteristic features:
  - **dynamic interdependency** – lags of all endogenous variables of all units enter the model for each unit
  - **static interdependency** – residual correlation across units
  - **cross-sectional heterogeneity** – unit specific intercept and variance of shocks

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- **Empirical implications of BPVARs**
  - *Voss & Willard (2009)* – identification of both US and Australian monetary policy innovations
  - *Schneider & Fenz (2011)* – transmission of structural shocks between the US and the euro area
  - *Ilzetzki & Jin (2013)* – the impact of U.S. monetary and fiscal policy shocks on 8 largest economies outside the US

Methodology & Data

- **BILATERAL PANEL VAR for Ukraine and Russia**
  - Estimating the response of domestic prices to exchange rate movements considering cross-country spillovers

BPVAR (A):

- Trade linkage
- IRF: UA & RU price responsiveness to 1% UAH/RUB depreciation (comparing to individual VARs)
- $Y_t = [PF, \quad IPI_{RU}, \quad IPI_{UA}, \quad ER_{UAH/RUB}, \quad CCPI_{RU}, \quad CCPI_{UA}]$

BPVAR (B):

- ER interdependencies
- IRF: UA & RU price responsiveness to 1% USD/RUB and USD/UAH depreciation
- $Y_t = [POE, PF, IPI_{RU}, IPI_{UA}, ER_{USD/RUB}, ER_{USD/UAH}, CCPI_{RU}, CCPI_{UA}]$

- *CCPI – Core consumer price index*
- *ER – Nominal exchange rate*
- *IPI – Industrial production index*
- *PF – Fuel price index (IMF)*
- *POE – OECD consumer price index*

- *All variables are in logs and* $I\sim(1)$

Results: BPVAR (A)

- **BPVAR (A)**

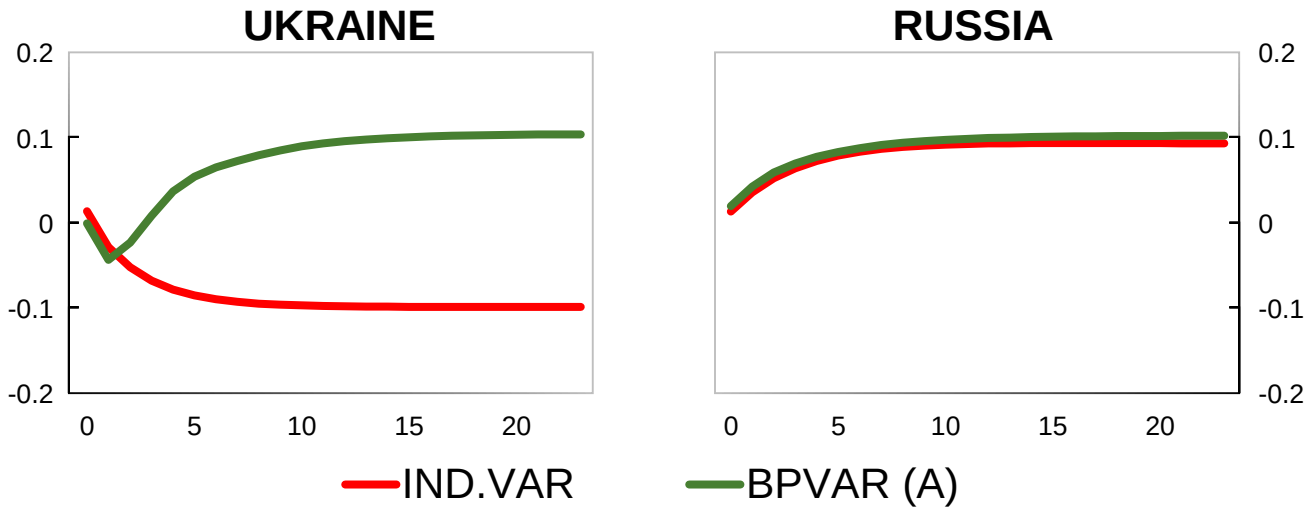
- Russia: **no spillover effect**

Spec.	ERPT	T-stat
Indiv. VAR	*0.09*	*6.19*
BPVAR (A)	*0.10*	*5.23*

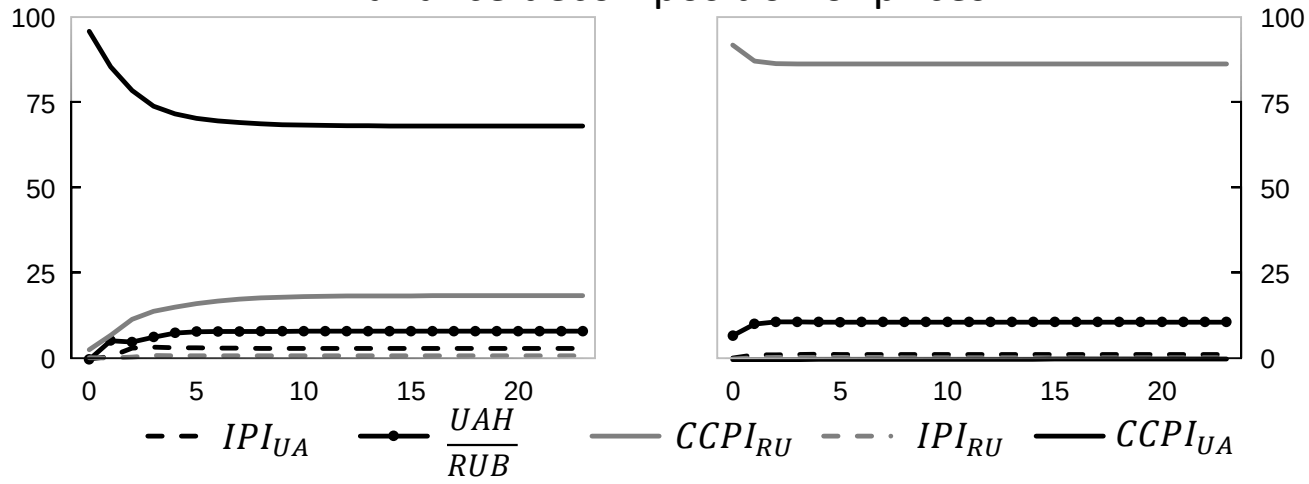
- Ukraine: **sufficient spillovers**

Spec.	ERPT	T-stat
Indiv. VAR	*-0.10*	*4.48*
BPVAR (A)	*0.11*	*2.79*

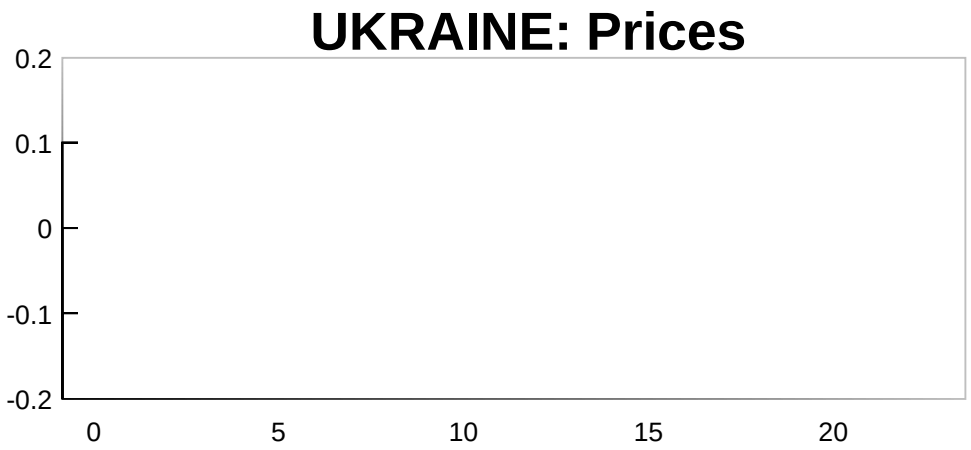
Cumulative response of prices to 1% UAH/RUB depreciation

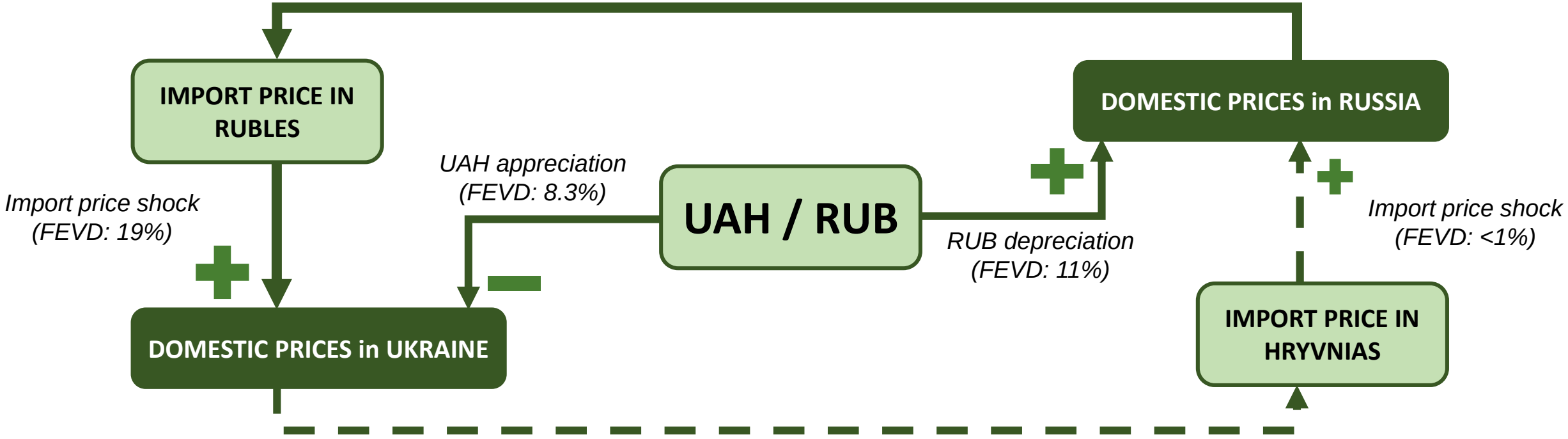


Variance decomposition of prices



Results: BPVAR (A)





Results: BPVAR (B)

- **BPVAR (B)**

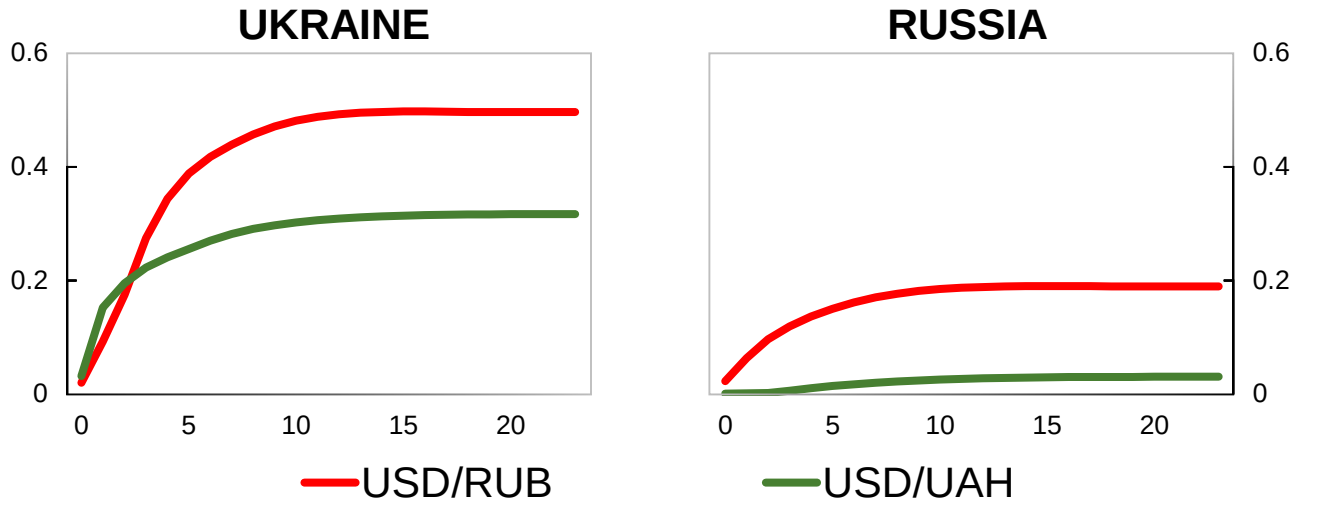
- Russia: **no spillover effect**

Spec.	ERPT	T-stat
USD/RUB	*0.19*	*5.68*
USD/UAH	*0.03*	*1.11*

- Ukraine: **sufficient spillovers**

Spec.	ERPT	T-stat
USD/RUB	*0.52*	*7.50*
USD/UAH	*0.30*	*7.33*

Cumulative response of prices to
1% USD/RUB and USD/UAH depreciation



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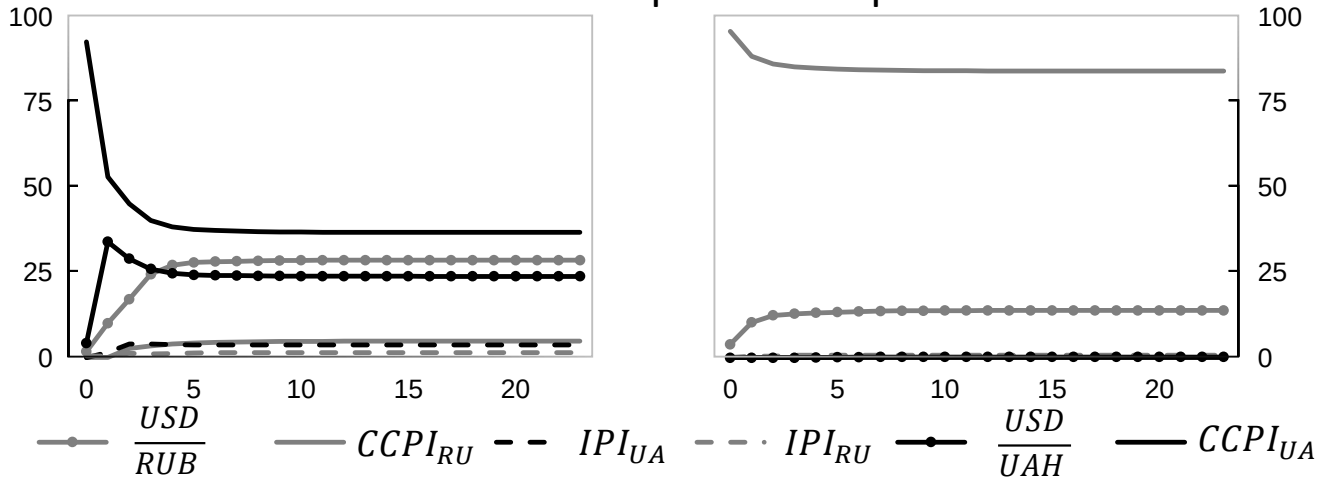

Concluding Remarks

- We enrich the literature on exchange rate pass-through by inclusion a panel dimension taking into account potential spillover effects across countries
- In particular, we provide some evidence on the existence of sufficient cross-country spillovers in the ERPT mechanism between Ukraine and Russia. The results are robust to different specifications, including different measures of exchange rate (USD, EUR, NEER)
- Transition to IT requires a thorough understanding of the price reaction to external shocks. The results might be useful for the NBU's monetary policy in analyzing the impact of Russian economy on Ukrainian consumer price level
- Further research could be focused on the ERPT analysis considering cross-country interdependencies from the multilateral perspective (e.g. Global VARs) accounting for higher-order transmission channels (Georgiadis, 2015)

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THANK YOU