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Role of Global Value Chains in Synchronization of CEE and EA Business Cycles

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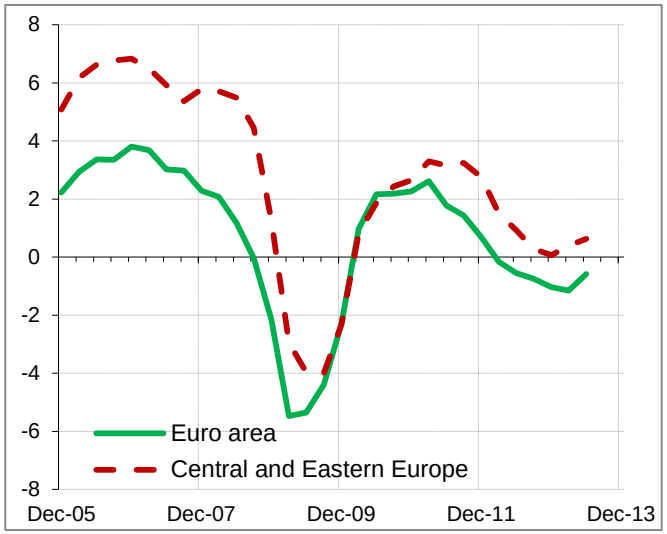
Overview

Business Cycle Co-movements across CEE and EA

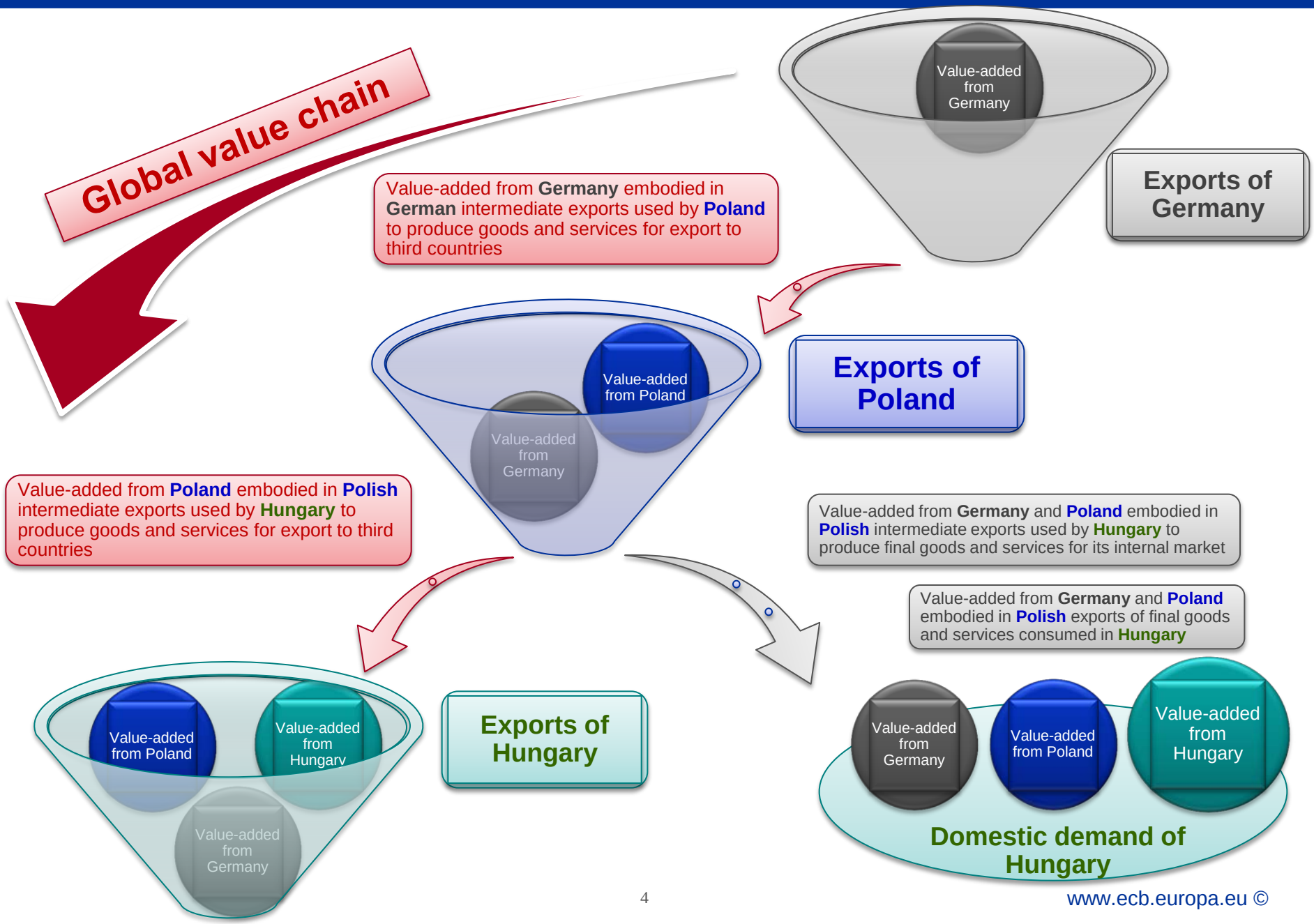
- Economic activity in CEE and the EA move in sync
- CEE follows the EA with a lag in economic downturns
- CEE and EA economies are inter-twined via financial and trade links
  - EA is CEE biggest trade partner
  - EA is the biggest provider of FDI in CEE
- International trade transmits business cycle fluctuations around the world
  - Frankel and Rose (1998)
  - Bems, Johnson, and Yi (2010)

Figure 1. Real GDP Growth Rate, 2006-13
(Annual per cent change; quarterly data)



Source: Eurostat and ECB staff estimates.
Notes: CEE data are weighted averages of country observations, using country shares in the 2011 GDP for the region, expressed in euros at actual exchange rates. CEE countries used in the chart: Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, and Romania. Historical data for the euro area are based on the present-day country membership in the zone.

Schematic Presentation of a Global Value Chain



Importance of global value chains for CEE

Table 1. Degree of Participation in Global Value Chains, 2009

(percentage points)

Reference country / Indicator	Value added from trade partners embodied in country total exports (in % of country total exports) [100 * FV / EXP]	Value-added from country embodied in trade partners total exports (in % of country total exports) [100 * IV / EXP]	Degree of participation in global value chains (in % of country total exports) [100 * (FV+IV) / EXP]	Importance of participation in global value chains for the national economy (in % of country GDP) [100 * (FV+IV) / GDP]
Central and Eastern Europe				
Bulgaria	32.1	15.7	47.8	22.7
Czech Republic	39.4	23.0	62.4	36.8
Hungary	39.9	16.7	56.6	43.9
Latvia	25.2	24.3	49.5	21.7
Lithuania	36.1	14.1	50.2	27.2
Poland	27.9	20.5	48.3	19.1
Romania	24.2	21.9	46.1	14.1
Euro area				
Austria	31.6	24.2	55.8	28.0
Germany	26.6	22.8	49.5	21.0
France	24.8	21.1	45.9	10.7
Italy	20.1	21.7	41.8	9.9
Other countries				
China	32.6	13.4	46.1	12.3
Japan	14.8	33.0	47.7	6.1
United States	11.3	28.5	39.8	4.5

Source: OECD-WTO Trade in Value Added (TIVA) database and ECB staff estimates.
Notes: FV denotes foreign value-added, IV stands for intermediate domestic value-added, and EXP denotes total exports.

Relative position of CEE in global value chains

Table 2. Positions of trade partners in global value chains vis-à-vis CEE countries in 2009

(unitless ratio)

Upstream ↓

Trade partners in GVC / CEE country	**Bulgaria**
Russian Federation	19.9
Japan	6.9
United States	4.4
Switzerland	2.9
Austria	2.0
France	1.9
Romania	1.9
China	1.8
Lithuania	1.6
Poland	1.5
Korea	1.4
Italy	1.4
Germany	1.3
United Kingdom	1.3
Czech Republic	1.3
Bulgaria	.
Netherlands	1.0
Spain	1.0
Hungary	0.8
Sweden	0.7
Latvia	0.5
Belgium	0.4

↓ Downstream

Upstream ↓

Trade partners in GVC / CEE country	**Hungary**
Russian Federation	11.4
Japan	8.6
United States	8.2
Korea	4.4
France	2.9
Netherlands	2.7
United Kingdom	2.3
Italy	2.2
Germany	2.1
China	2.0
Switzerland	1.7
Austria	1.7
Sweden	1.6
Romania	1.6
Poland	1.5
Lithuania	1.5
Spain	1.4
Belgium	1.4
Bulgaria	1.2
Czech Republic	1.1
Hungary	.
Latvia	0.9

↓ Downstream

Upstream ↓

Trade partners in GVC / CEE country	**Poland**
Russian Federation	11.5
Japan	6.0
United States	5.5
Korea	3.1
Italy	2.0
Spain	1.4
United Kingdom	1.4
China	1.3
France	1.3
Netherlands	1.3
Switzerland	1.2
Belgium	1.1
Poland	.
Austria	1.0
Romania	0.9
Germany	0.9
Bulgaria	0.7
Hungary	0.6
Lithuania	0.6
Sweden	0.6
Czech Republic	0.5
Latvia	0.5

↓ Downstream

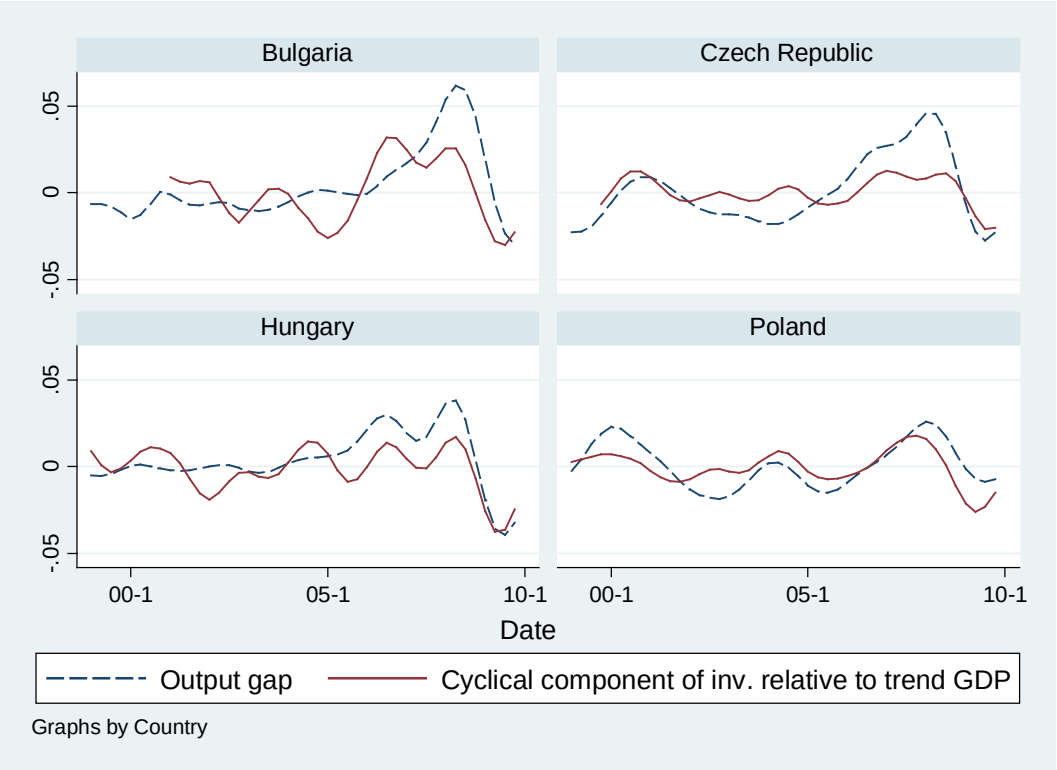
Source: OECD-WTO Trade in Value Added (TIVA) database and ECB staff estimates.

Notes: The uniform set of trading partners comprises of countries that are among the top-15 trade partners of at least three CEE countries in cross-border production chains . The tables show the relative importance of CEE countries "downstream" and "upstream" activities vis-à-vis their main trade partners in global value chains. The indicator is constructed as the ratio of: (i) the value added from a trade partner embodied in a CEE country's total exports (reflecting CEE countries' "downstream" activities); to (ii) the domestic value added from the CEE country exported and then embodied in the exports of that trade partner (reflecting CEE countries' "upstream" activities). The higher the value of the index, the more upstream the trade partner is situated in the global value chain relative to the CEE country's exporters.

Inventory adjustment over the business cycle

- Changes in inventories pro-cyclical in most CEE countries
- Account for a large share of the cyclical fluctuations of GDP

Figure 2. Cyclical Components of Real GDP and Inventories Relative to Trend GDP
(percentage points divided by 100)



Source: ECB staff estimates based on Eurostat data.

Role of global value chains in output synchronization

- Alessandria, Kaboski, and Midrigan (2011) standard 'import wedge':

$$\widehat{\omega}_t = m_t - \left(-\gamma p_t + c_t\right)$$

lower-case variables denote log-deviations from trend;
M_t – imports of goods (real);
P_t – relative price of imports;
C_t – aggregate expenditure (real).

- Augmented import wedge to account for inventory stock adjustments and import content of exports:

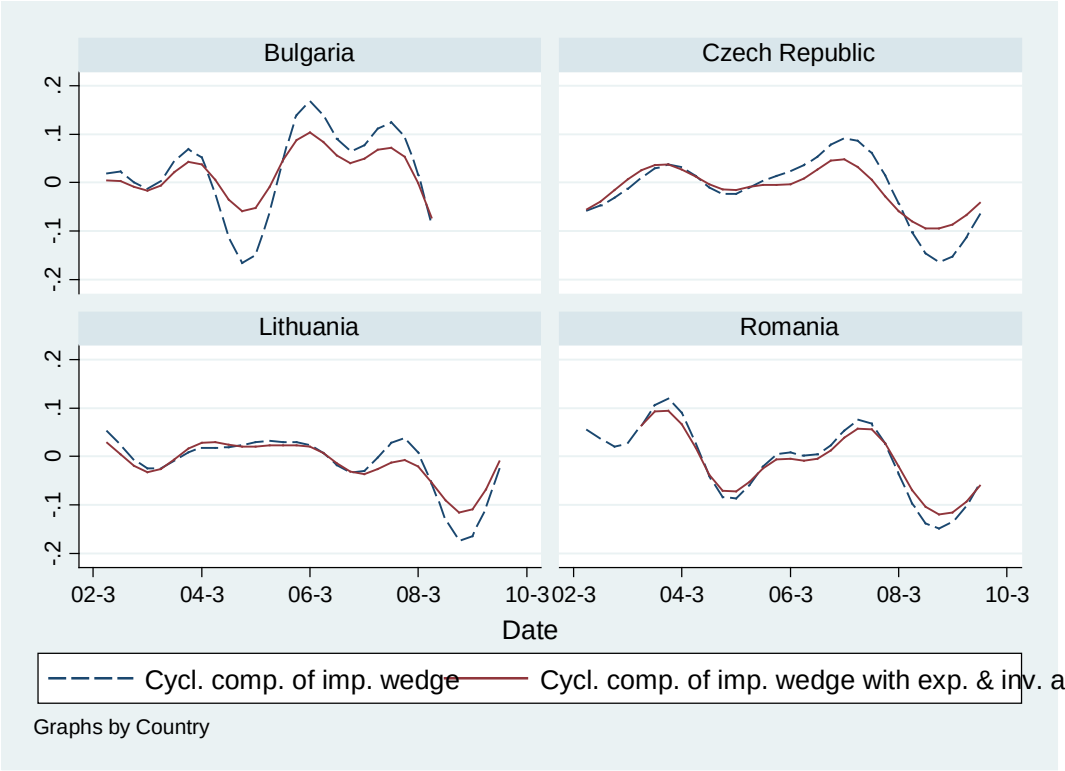
$$\omega_t = \widehat{\omega}_t - \alpha^m \frac{\overline{Y}}{\overline{M}} \left(\frac{\Delta Inv_t}{\overline{Y}_t} - \frac{\overline{\Delta Inv_t}}{\overline{Y}_t} \right) - \beta^m \frac{\overline{X}}{\overline{M}} x_t$$

ΔInv_t – change in aggregate inventories (real);
Y_t – GDP (real);
α^m – share of imported goods in total inventory stock;
M_t – imports of goods (real);
X_t – exports of goods (real);
β^m – import component of goods exports.

International vertical specialization and import fluctuations over the business cycle

- Inventory stock adjustments and the import content of exports account for a sizeable proportion of cyclical fluctuations of imports

Figure 3. Import Wedge with and without Accounting for Import Content of Exports and Inventories
(percentage points divided by 100)

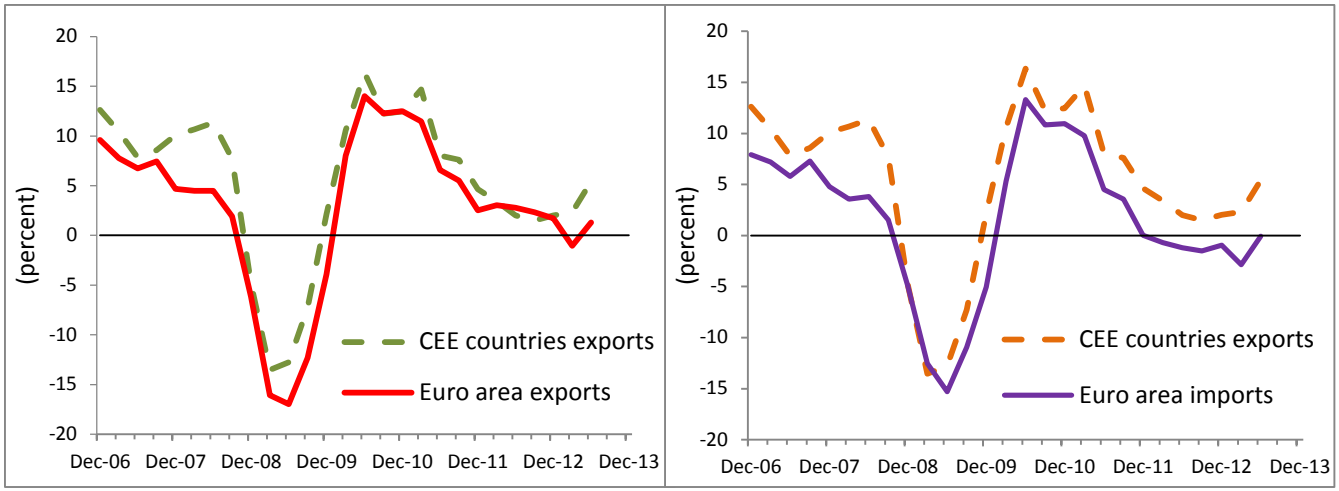


Source: ECB staff estimates based on Eurostat data.

In Conclusion—Global Value Chains and Business Cycle Synchronization

- Short-run impact on CEE countries
  - Vulnerability to industry-specific shocks emanating from the euro area
- Long-run implications for CEE countries
  - Decreased dependence on demand from the euro area
  - But increased susceptibility to common demand shocks

Figure 4. CEE Countries and Euro Area External Trade Dynamics, 2007-13
(quarter on last year's quarter growth rates, per cent)



Source: Eurostat and ECB staff estimates.
Notes Non-seasonally adjusted data.