Assessing the Trade Integration and Business Cycle Synchronization: A Reappraisal with
Focus on Central and Easten Europe

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"Reassessment of the OCA theory in the
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Euro4Europe

PROJECT "EURO4EUROPE"

The aim – to reexamines the relationship between trade integration and business cycle synchronization (BCS) using new value-added trade data for 28 European
Economies during 2005–2019.

The main question
Over the past decade and a half, trade integration has increased rapidly within the world economy,
and particularly so within Central and East Europe with the other part of the Europe.
Not only have Central and East Europe economies traded more with one another, they have also traded differently, becoming more vertically integrated as a tight-knit supply-chain network across the region was formed. Have changes in the intensity of trade integration, led economies to a way of marching with each country as close as possible to the one and disproportionately so within Central and East Europe and the whole Europe either?

A Bird's Eye View of the Literature

The interrelation of trade integration and business cycle synchronization (BCS) has covered a large number and wide scope of
 extensive research, motivated in good part by the optimum currency area literature that was applyed by Mundell (1961) and McKinnon (1963) and given new revision by Frankel and Rose (1997, 1998).

 A wide range of empirical papers (Baxter and Kouparitsas, 2005; Park and Shin, 2009; Constantinescu and others, 2015; Lukmanova and Tondl, 2015), have ephasized that trade intensity rises synchronization, although the extent of the impact varies across studies.

A Bird's Eye View of the Literature

While existing studies have relied on a variety of approaches including
cross-section, pooled and simultaneous equation techniques, and paid a good deal of attention
to endogeneity issues, they have typically not accounted for fixed country-pair factors and
common global shocks.

As stressed by Kalemli-Ozcan, Papaioannou and Peydro (2013),
controlling for both is required to address omitted variable bias and thereby identify a causal
link.

Abiad and others (2013) find the relationship between trade integration
and BCS to be insignificant, and that between financial integration and BCS to change sign
relative to a cross-section regression, when such controls are added in a panel setup. Earlier
studies that accounted for country-pair heterogeneity also found weaker or no effects of
overall trade intensity on BCS (Calderon, Chong and Stein, 2007; Shin and Wang, 2004),
although they found the type of trade to matter.

A BIRD'S EYE VIEW OF THE LITERATURE

TRADE INTEGRATION. 1

☑ The traditional trade theory disclose the cohesion when openness to trade should influence to a greater specialization across countries. Practically insofar as business cycles are previelded by industry-specific supply shocks, more intensive trade integration should reduce BCS.

TRADE INTEGRATION. 2

☑ If the intra-industry prevails for trade patterns of specialization and trade, intensive trade integration should be directly linked with a higher degree of output co-movement in the presence of industry-specific supply shocks.

If business cycles principally are influenced by demand factor, the intensive trade integration should also enlarge BCS, despite whether the patterns of specialization are dominated by inter- or intra-industry trade.

A Bird's Eye View of the Literature

Given the inexactness of meaning in the theory, the influence of trade integration on BCS is basically an empirical issue.

Essentially, there has been a heavily investigate area, with cross-sectional regression and simultaneous equation approaches basically finding a substantial positive influence—with some dissents regarding its extent—and most actual panel regression work controlling for country-pair fixed inter-connetions and common global shocks finding no effect.

Policy coordination

nstead of magnitude and pattern of trade integration, policy matters for BCS. In details, if two countries synchronize their legal developemant practices by implementing expansionary or contractionary policies at the same time, BCS between these two would be expected to increase, all else equal.

Inklaar and others (2008), using data on some developed economies, noted that in common with monetary and fiscal policies have a strong impact on BCS. Similarly, Shin and Wang (2016), reseached Asian countries, and found that monetary policy coordination has a significant and positive impact on BCS.

Data. Trade intensity

Bilateral trade intensity is the most frequently featured trade variable in the literature. For the purpose of this reseach it is explained by the standard definition, except define it in a value-added sense using the pricipals of OECD-WTO calculation on trade in value added in goods and services.

$$T_{ijt} = \frac{DVA_t^{ij} + DVA_t^{ji}}{GDP_{it} + GDP_{jt}}, \qquad where$$

T_{ijt} - the bilateral trade intensity of country-pair i and j at time t;

$GDPit$ - the GDP of country i at time t;

DVA_t^{ij} - the domestic value added exported, both directly and indirectly, from country i to country j in year t.

The indirect component includes the domestic value added exported by country i to a third country j, as intermediate inputs into the production of goods and services exported by country i to country j.

Median Bilateral Trade Intensity within the other European Countries, 2004 - 2019
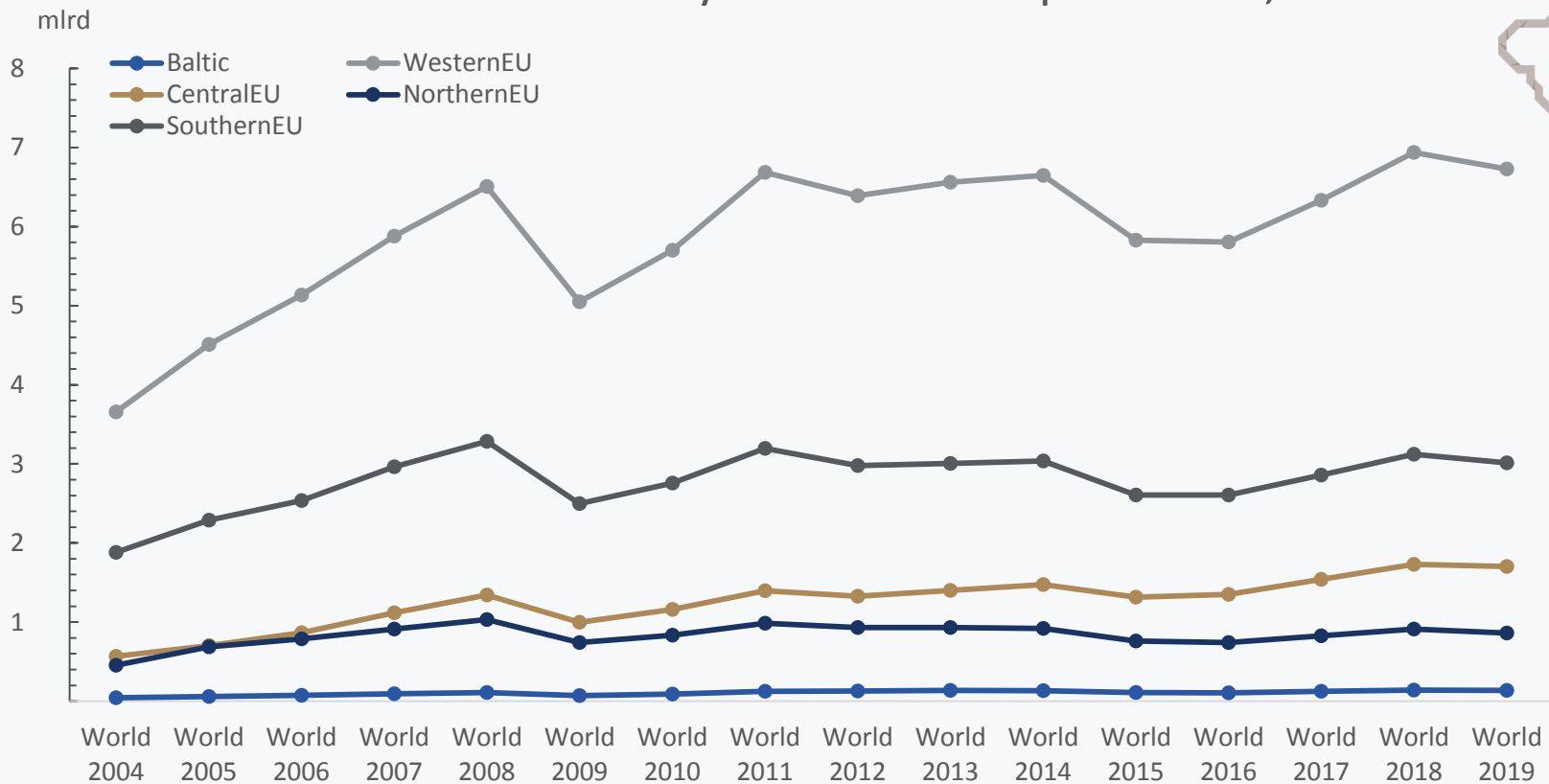
Data. Vertical integration

The vertical integration between two countries is measured by the extent to which one country's exports in value-added terms rely on intermediate inputs from the other country. Like trade intensity, it is also defined bilaterally

$$VI_{ijt} = \frac{FVA_t^{ij} + FVA_t^{ji}}{DVA_{it} + DVA_{jt}}, \qquad where$$

VI_{ijt} - the vertical trade integration between countries i and j;

FVA_t^{ij} - the share in country i's exports that is attributable to the (foreign) value-added content coming from country j.

DVA_t^{ij} - the domestic value added exported, both directly and indirectly, from country i to country j in year t

Median Vertical Trade within European Union, 2004 - 2019
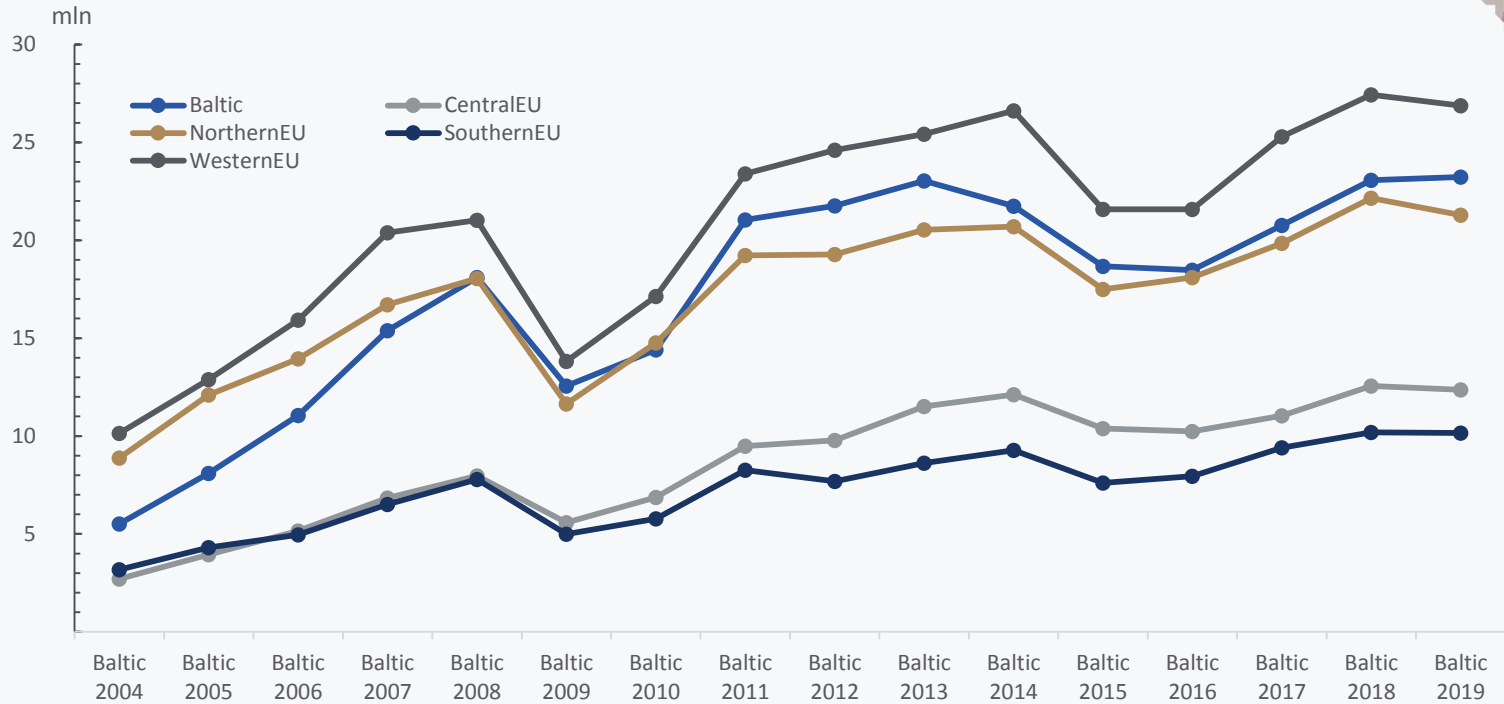
Data. Intra-industry trade

The bilateral intra-industry trade is measured by the Grubel and Lloyd (1975) index, IIT_{ijt} for a country pair i-j in year t

$$IIT_{ijt} = 1 - \left[\frac{\sum_{h=1}^{n} \left| X_t^{ij,h} - M_t^{ij,h} \right|}{\sum_{h=1}^{n} \left(X_t^{ij,h} + M_t^{ij,h} \right)} \right], \quad where$$

$X_t^{ij,h}$ and $M_t^{ij,h}$ are the exports from / imports to country i to/from country j in industry h.

Degree of Intra-Industry Trade

Median Bilateral Grubel-Loyd Index, values between 0 and 1
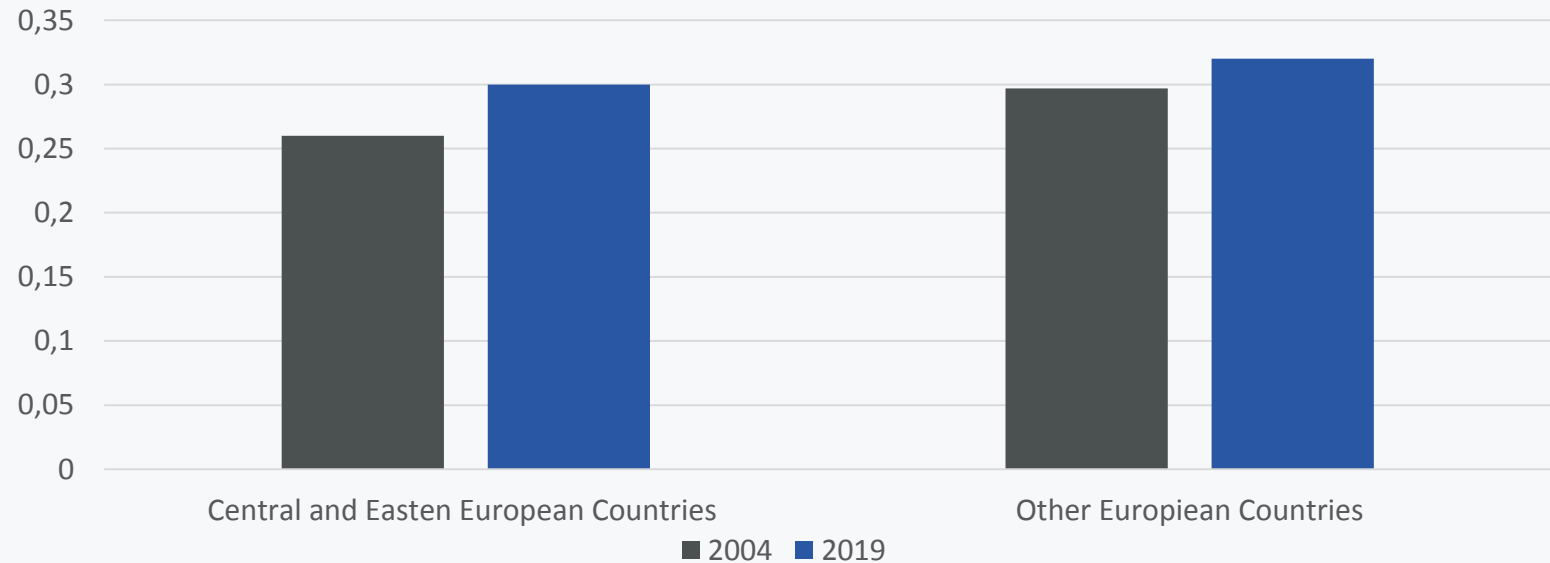
Calculated as period medians of the median country pairs in each group

The main model

The model focuses exclusively on the impact of trade and specialization on BCS.

$$QCORR_{ijt} = \alpha_{ij} + \alpha_t + f(TRADE_{ijt-1}) + \varepsilon_{ijt}, \qquad where$$

$QCORR_{ijt}$ - the instantaneous quasi-correlation between country-pair i and j at time t;
α_{ij} - the country-pair fixed effect, which accounts for fixed factors such as gravity-type variables or other unobservable time-invariant idiosyncratic factors specific to country-pair i and j;
α_t - a time effect, which accounts for time-varying common factors affecting all countries.
TRADE captures the three trade variables mentioned previously, i.e. trade intensity, vertical integration, intra-industry trade.

Calculation proposed by Abiad and others (2013)

ADVANTAGES OF THE METHOD

ADVANTAGE 1

- enables the calculation of co-movement at every point in time rather than over an interval of time.
- In this reseach there is used annual data over the past two decades, the rolling correlation measure would likely be dominated by outliers during the financrisis.

ADVANTAGE 2

the quasi-correlation measure retains some nice statistical properties.

- it can be easily shown that the period mean of the measure would asymptotically converge to the standard Pearson correlation coefficient.
- at any point in time, the measure is not ecessarily bounded between -1 and 1.
- As argued by Otto and others (2001) and Inklaar and others (2008), if the BCS measure lies between -1 and 1, the error terms in the regression explaining it are unlikely to be normally distributed.

Business Cycle Synchronization and Trade Integration

Dependent Variable: Quasicorrelation of output growth rates	OLS (1)	OLS (2)	IV (3)	OLS (4)	OLS (5)	IV (6)
Trade Intensity (Gross)	0.0378 (0.0197)					
Trade Intensity (Value Added)		0.0429*** (0.0122)	0.352*** (0.066)	0.0633*** (0.0151)	0.1526*** (0.0594)	0.0671*** (0.0709)
Intra-industry Trade				0.00355*** (0.00112)	0.00326*** (0.00166)	0.00377*** (0.00119)
Vertical Trade Integration -						-0.1244*** (0.0227)
Country-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F-statistic			49.61			49.75
R-squared	0.57	0.57	0.57	0.57	0.57	0.57
Observations	22400	22397	22397	22400	22400	22400

The estimated model is: $\alpha_{ij} + \alpha_t + f(TRADE_{ijt-1}) + \varepsilon_{ijt}$ * p<0.10 , ** p<0.05 , *** p<0.01

Conclusions in short

It`s identified a strong positive impact of trade intensity on BCS—conditional on various controls, global common shocks and country-pair heterogeneity—that is absent when gross trade data are used.

That effect is strengthening in crisis times, pointing to trade as an important crisis propagation mechanism.

Bilateral intra-industry trade and trade specialization correlation also appear to increase co-movement, indicating that not only the intensity but also the type of trade matters.

THANK YOU!