

# Business Cycle Synchronization in the CIS

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# Motivation

- 30 years since the disintegration of USSR - have the CIS countries integrated into the global economy?
- IMF (2012 and 2013 Economic Outlooks): in 2003-2012 the correlations of the region's growth with China, EU, and US increased and with Russia - decreased, as compared to the decade before; moreover, intraregional correlations fell while correlations with the rest of the world, especially China, rose
- Our questions: What are the relative roles of global and the CIS/regional factors in evolution of business cycles in CIS countries? Have the 2014-2015 regional and global events affected it?

## Brief Literature Outlook

- Some examples: Benzcur (2007), Benczur and Ratfai (2014), Vymyatnina and Antonova (2014), Caetano and Caleiro (2018)
- Overarching findings:
  - Low levels of business cycle synchronization regionally;
  - Business cycle fluctuations of CIS countries tend to be relatively more volatile and less persistent;
  - Although some economic co-dependence and spillovers exist, expansion of integration is crucial for a successful economic union

## Our Approach - Dynamic Factor Model

**Dynamic Factor Model** (as in Stock and Watson, 1991) - allows us to attribute growth rates to different factors (global, regional, and idiosyncratic)

$$\Delta y_{it} = \gamma_i c_{1t} + \delta_i c_{2t} + \eta_{it}, (1)$$

where  $\Delta y_{it}$  is growth rate of RGDP of country  $i$ ,  $c_{1t}$  is the CIS common component/factor,  $c_{2t}$  is the global common component, and  $\eta_{it}$  is the idiosyncratic component;

$$c_{it} = \beta_i c_{it-1} + v_{it}, (2)$$

$$\eta_{it} = \phi_i \eta_{it-1} + e_{it}, (3)$$

the common components<sup>1</sup> and the idiosyncratic components are assumed to follow an AR(1) model

<sup>1</sup> $i=1$  (CIS), 2 (global)

## Our Approach - Variance Decomposition

Seeing that a country  $i$ 's growth rate is a sum of three orthogonal components, we can write its variance the following way:

$$\text{var}(\Delta y_{it}) = \gamma_i^2 \text{var}(c_{1t}) + \delta_i^2 \text{var}(c_{2t}) + \text{var}(\eta_{it}), (4)$$

We can calculate how much variation across countries is in common, or how much of the total variation in a country's growth is driven by common components:

$$\text{Share of the CIS component} = \frac{\gamma_i^2 \sigma_{c_1}^2}{\gamma_i^2 \sigma_{c_1}^2 + \delta_i^2 \sigma_{c_2}^2 + \sigma_{\eta_i}^2} (5)$$

and

$$\text{Share of the global component} = \frac{\delta_i^2 \sigma_{c_2}^2}{\gamma_i^2 \sigma_{c_1}^2 + \delta_i^2 \sigma_{c_2}^2 + \sigma_{\eta_i}^2} (6)$$

- Quarterly real GDP data from 2001 to 2016;<sup>2</sup>
- Sample CIS countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine<sup>3</sup>;
- We add EU, Switzerland, UK, US, and China to the sample for a better measurement of the common global factor

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<sup>2</sup>The time span is limited due to restricted data availability. Data was obtained from the IMF International Financial Statistics (IFS) database and the OECD Stat website.

<sup>3</sup>Tajikistan and Uzbekistan are not included due to missing data.

## Results - Regional Cycle Co-movement

Country	Estimate	Standard error
Armenia	1.173	0.316
Azerbaijan	0.743	0.227
Belarus	1.298	0.301
Georgia	0.217	0.175
Kazakhstan	0.287	0.292
Kyrgyzstan	0.754	0.353
Moldova	0.648	0.564
Ukraine	0.763	0.229

**Figure 1:** Loadings on the CIS/regional factor

- The loadings on the common CIS component of all the countries in our sample are positive, signifying the congruent co-movement of the business cycles within the region on average for our sample period;
- Belarus has the highest loading on the common regional factor, followed by Armenia and Ukraine, and Georgia has the lowest

## Results - Global Cycle Co-movement

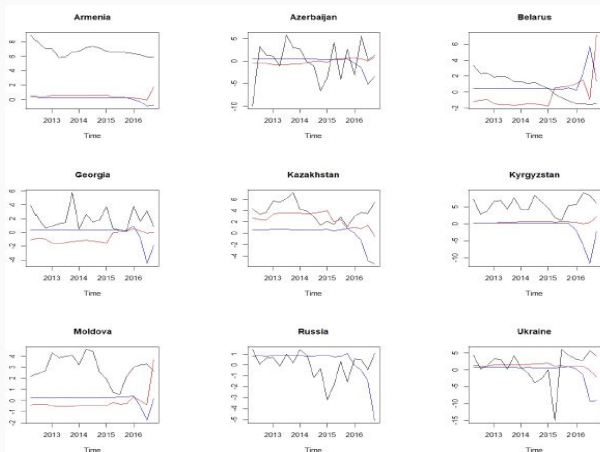
Country	Estimate	Standard error
Armenia	0.414	0.128
Azerbaijan	0.461	0.116
Belarus	0.422	0.128
Georgia	0.381	0.103
Kazakhstan	0.528	0.144
Kyrgyzstan	0.206	0.164
Moldova	0.223	0.093
Russia	0.761	0.114
Ukraine	0.590	0.124

**Figure 2:** Loadings on the global factor

- The loadings on the common global component of all the CIS countries in our sample are also positive, conveying positive co-movement of the business cycles with the world on average;
- Among the CIS countries, Russia has the highest loading on the global component, followed by Ukraine and Kazakhstan. Kyrgyzstan and Moldova have the lowest loadings



# Results - Time variation of the cycle loadings in 2012-2016



- In red - CIS factor loading, in blue - global factor loading, in black - RGDP growth rate;
- The role of the CIS factor increased in 2015, while the size of the global loadings overall dropped, and both factors show more volatility after 2014

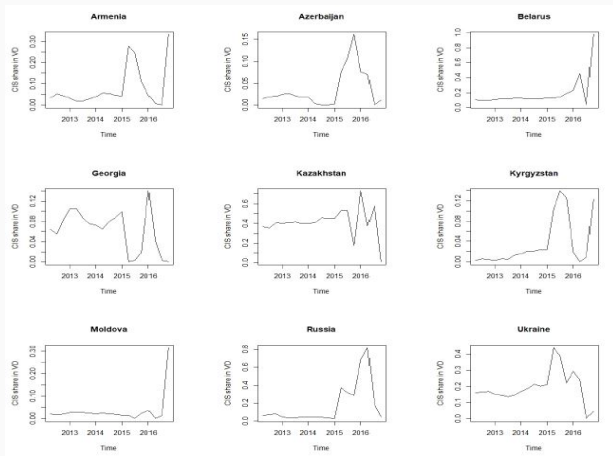
## Results - Variance Decomposition

Country	CIS component	Global component	Idiosyncratic component
Armenia	0.404	0.125	0.470
Azerbaijan	0.173	0.167	0.660
Belarus	0.471	0.124	0.405
Georgia	0.015	0.118	0.867
Kazakhstan	0.027	0.233	0.740
Kyrgyzstan	0.178	0.033	0.789
Moldova	0.183	0.054	0.762
Russia	0.294	0.424	0.282
Ukraine	0.181	0.269	0.550

**Figure 3:** Variance decomposition

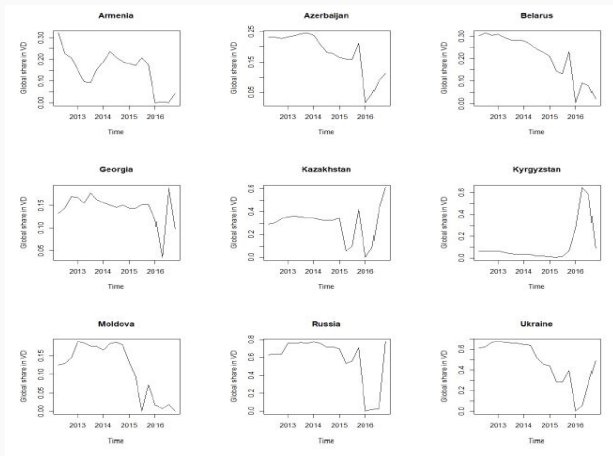
- The shares of the common CIS component in total variations of the CIS countries are quite small (low level of regional business cycle synchronization). The shares of total variation explained by the global component are also quite modest;
- Russia has the highest share of total variation explained by the global component while Belarus - the highest share of total variation explained

# Results - Increase in regional business cycle synchronization in 2015



- This figure shows how much of the total variation in a country's growth was driven by the CIS factor in 2012-2016

# Results - Decrease in business cycle synchronization with the rest of the world in 2015

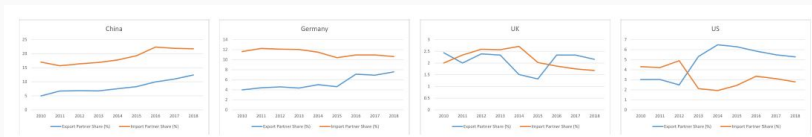


- This figure shows how much of the total variation in a country's growth was driven by the global factor in 2012-2016

# Possible Interpretation - A Trade Angle



**Figure 4:** Russian export and import trade shares accounted by CIS partners



**Figure 5:** Russian export and import trade shares accounted by selected global partners

## Possible Interpretation - A Trade Angle

- Figures 4 and 5 show that in 2015-17 the import shares of Russian merchandise trade accounted for by CIS countries was increasing for most CIS countries while it was decreasing for Germany, UK, and US. Although the import shares for some countries returned to the 2014-levels in 2018, they stayed on levels higher than the 2014 ones for Armenia, Belarus, Georgia, and Moldova;
- The export shares for most CIS countries has been on the rise since 2016 while it flattened or decreased for Ukraine, Germany, UK, and US;
- Thus, we surmise that there was at least a temporary trade redirection for Russian exports and possibly a more permanent one for the imports. This may help explain the decrease in synchronization with the global component and the increase in synchronization with the CIS component: although there was a decrease in the volume of trade, trade flows between Russia and the CIS became more directed at one another;
- Total intra-region trade grew from 14% to 16% from 2012 to 2016.

## Possible Interpretation - A Trade Angle

- Frankel and Rose (2008): more integration leads to more trade, which in turn leads to higher business cycle synchronization;
- More integration among countries with correlated business cycles might amplify the underlying mechanisms of trade - this then might generate more correlation through conversion of some of the idiosyncratic shocks into common shocks;
- Consistent with our results: the 2014 Russo-Ukrainian conflict grew into a common shock for the CIS countries;
- Moreover, Russia bears a considerable impact on the regional economies as a channel for spillovers from Europe (IMF, 2012). As Russia's trade and other connections with the West suffered, it transmitted to the whole region. Thus, as Russia became more disconnected with the global cycle, the CIS countries had to follow suit. The overall instability in the synchronization in 2014-2016 could be rationalized by countries adapting and readjusting to the aftermaths of the sanctions and the global slowdown.

# Conclusions

- Using dynamic factor model analysis, we show that business cycles as measured by growth rate of RGDP for the CIS are not much synchronized with the regional and global cycles on average;
- We also witness a notable heterogeneity of the results across countries in terms of their business cycle synchronization, which largely corresponds with the specifics of bilateral and intraregional relations. This suggests that a common macroprudential policy may not be an effective tool. It also poses a question mark on the feasibility of forming of a currency union.



# Conclusions

- Moreover, we find that around 2015 the shares of total variation explained by the CIS and the global factors moved in opposite directions - the 2014-2015 regional and global events have turned the CIS countries closer to Russia, even if for a short time;
- We attribute this to the regional spillover effects from the Russo-Ukrainian conflict and the subsequent sanctions – the unintended consequences of sanctions with regional factor compensating for the decline in the role of global factor in business cycle synchronization.

# Questions?

## Thank you for your time and attention!

Kishor, N. K., & Giorgadze, S. (2022). Business cycle synchronization in the CIS region. *Economics of Transition and Institutional Change*, 00, 1– 24.