

Dynamics and determinants of Russia's geoeconomic strength in relation to the Central and Eastern European region

Paweł Piotr Śliwiński, *Poznan University of Economics and Business
(Poznan, Poland)*

E-mail: pawel.sliwinski@ue.poznan.pl

ORCID ID: 0000-0001-8479-3252

Abstract

The aim of the article is to examine the dynamics and the determinants of the geoeconomic strength of Russia in relation to the Central and Eastern European countries (CEE-11) belonging to the European Union. The article confirms the research hypotheses that: (i) since 2014, the geoeconomic balance of power in Central and Eastern Europe began to change significantly in favor of the CEE-11 region, (ii) the economic sanctions imposed on Russia after 2014 negatively influenced its geoeconomic strength in relation to the CEE-11 region by reducing the export and import flows, as well as FDI net inflows in Russia compared to the CEE-11 countries. Panel regression analysis (ordinary least squares and fully modified ordinary least squares) was used to test the second hypothesis. All data used in the article comes from the World Bank database and covers the period from 2004 to 2020.

Keywords: geoeconomics, Central and Eastern European countries (CEE-11), Russia, economic sanctions, geoeconomic strength

Dynamika i determinanty siły geoeconomicznej Rosji w relacji do regionu Europy Środkowo-Wschodniej

Streszczenie

Celem artykułu jest zbadanie dynamiki i uwarunkowań siły geoeconomicznej Rosji w stosunku do krajów Europy Środkowo-Wschodniej (EŚW-11) należących do Unii Europejskiej. Artykuł potwierdza postawione w nim hipotezy badawcze, że: (i) po 2014 roku geoeconomiczny układ sił w Europie Środkowo-Wschodniej zaczął się istotnie zmieniać na korzyść regionu EŚW-11 oraz (ii) sankcje

gospodarcze nałożone na Rosję po 2014 roku negatywnie wpłynęły na jej siłę geoeconomiczną w stosunku do regionu EŚW poprzez zmniejszenie przepływów eksportowych i importowych oraz napływów netto BIZ do Rosji w porównaniu z krajami EŚW. Do przetestowania drugiej hipotezy wykorzystano analizę regresji panelowej (metodę najmniejszych kwadratów, OLS oraz w pełni zmodyfikowaną metodę najmniejszych kwadratów, FMOLS). Wszystkie dane wykorzystane w artykule pochodzą z bazy Banku Światowego i obejmują okres od 2004 do 2020 roku.

Słowa kluczowe: geoeconomia, kraje Europy Środkowo-Wschodniej (EŚW-11), Rosja, sankcje gospodarcze, siła geoeconomiczna

The situation in Ukraine, started in 2014, and especially its escalation in 2022, resulted in greater interest in the region of Central and Eastern Europe among geopoliticians. Geopolitics may be seen as a way for study of foreign policy through the analysis of geographic, military, and economic potential. Geopolitical thinking assumes the existence of asymmetries in international relations. Differences in potential may be used by countries to pursue their interests in their international politics, which include, e.g. the control over the key geographical area and economic rivalry. Various factors contribute to the geopolitical potential. The most important of them are: geographic location, territory, population, military capability, natural resources, size of the economy, and the so-called *soft power*, e.g. the attractiveness of a particular country's culture or the effectiveness of its diplomacy.

Geoeconomics is a state strategy focused on competition between the states, pursued by economic goals, means, and methods (Halizak 2012)¹. It relies on the strategic utilisation of national wealth to obtain geostrategic objectives (Olsen 2022). Thus, geoeconomics combines the logic of geopolitics with the tools of economics (Blackwill, Harris 2016). The effectiveness of the geoeconomic policy is highly related to the geoeconomic endowments, especially including GDP².

GDP measures the market value of all goods and services produced in a country, and it is the most used measure of economic welfare. In the long run, GDP can matter even more than force (Gelb 1991).

The article's aim is to examine the dynamics and the determinants of the geoeconomic strength of Russia in relation to Central and Eastern European countries belonging to the European Union (CEE-11)³. The geoeconomic potential is measured as the relation between the GDP of Russia and the GDP of the CEE-11 countries treated as one region.

¹ The ultimate goal of economic policy is the wealth and development of the country and, consequently, the prosperity of its inhabitants.

² Besides GDP also other economic data can be used to study the geoeconomic comparative strength/potential: GNI, GDP per capita, and GNI per capita. GDP is based on the location of production and it measures the market value of all goods and services produced within a country. GNI is based on ownership. This measure is based on GDP adjusted for income earned by residents abroad and income earned by non-residents in the country. Per capita measures provide information on the standard of living of citizens, as opposed to values such as GDP or GNI, which provide aggregate information. They are better measures of comparing the personal well-being of the citizens.

³ The CEE-11 region includes the next countries: Bulgaria (accessed in 2007), Croatia (2013), Czech Republic (2004), Estonia (2004), Hungary (2004), Latvia (2004), Lithuania (2004), Poland (2004), Romania (2007), Slovakia (2004), and Slovenia (2004). The dates of joining the EU are presented in brackets.

The **first research hypothesis** is that due to the situation in Ukraine since 2014 Russia has been losing its economic advantage in relation to the CEE-11 region, which until 1989 was in the sphere of its influence. Russia's dynamics of relative geoeconomic power can have a big impact on its geopolitical strength, for example, modernising and increasing its armed forces including weaponry requires investments⁴. The relative economic position of other countries is related also to the possibility of attracting foreign capital or technology, joining international organisations, conducting monetary, fiscal, and exchange rate policy, or to the direction of economic migration.

The **second research hypothesis** is a consequence of the first one and relates to the determinants of the balance of economic power in Central and Eastern Europe measured by the relation of the CEE-11 countries' GDP to Russia's GDP. It is assumed that next to the basic determinants of economic growth, which are commonly mentioned in the scholarly literature (such as e.g. the dynamics of investment and labour force, or changes in institutional factors), geoeconomic tools may be of significant importance. The hypothesis assumes that the economic sanctions imposed on Russia after 2014 negatively influenced its geoeconomic strength in relation to the CEE-11 region by reducing the relative export and import flows, and FDI inflows in Russia compared to the CEE-11 countries. Panel regression analysis (ordinary least squares and fully modified ordinary least squares) was used to test the second hypothesis. Russia and the CEE-11 countries belonging to the EU and the period under investigation (2001–2020) were chosen for statistical research due to data availability.

This article is organised into five sections. Following the introduction, section 2 presents the dynamics of Russia's geoeconomic strength in relation to the CEE-11 region and verifies the first research hypothesis. Section 3 is aimed on selection the determinants of changes in Russia's geoeconomic position based on theories of economic growth. It also describes data and empirical methodology to be used in the econometric study to verify the hypothesis on the determinants of Russia's geoeconomic strength in relation to the CEE-11 countries. Section 4 presents and discusses research results, and the last section concludes all the findings.

The dynamics of Russia's geoeconomic strength in relation to the Central and Eastern European region

To measure the geoeconomic potential of Russia in relation to the CEE-11 region, the data on Russia's GDP and GDP per capita were divided respectively by GDP and GDP per capita of the CEE-11 countries⁵. The macroeconomic aggregates were measured both in current U.S. dollars and converted to international dollars using *purchasing power parity* (PPP). Nominal GDP measured in current dollars informs about the possibilities of purchasing goods or services on the foreign market. However, nominal values can be

⁴ Military power is the most important instrument of action in geopolitics (Halizak 2012).

⁵ To measure GDP per capita in CEE-11 region, cumulated GDP of CEE-11 region was divided by their total population

highly influenced by fluctuations in currency exchange rates. On the other hand, GDP calculated according to PPP takes into account the differences in prices between countries and generally informs about the standard of living in a given country. The statistical data for analysis presented in this article were taken from the World Bank database. The definitions of macroeconomic categories used in the analysis of the relative geoeconomic strength are presented in *Table 1*.

Table 1: The definitions of macroeconomic categories used in the analysis of the relative geoeconomic strength.

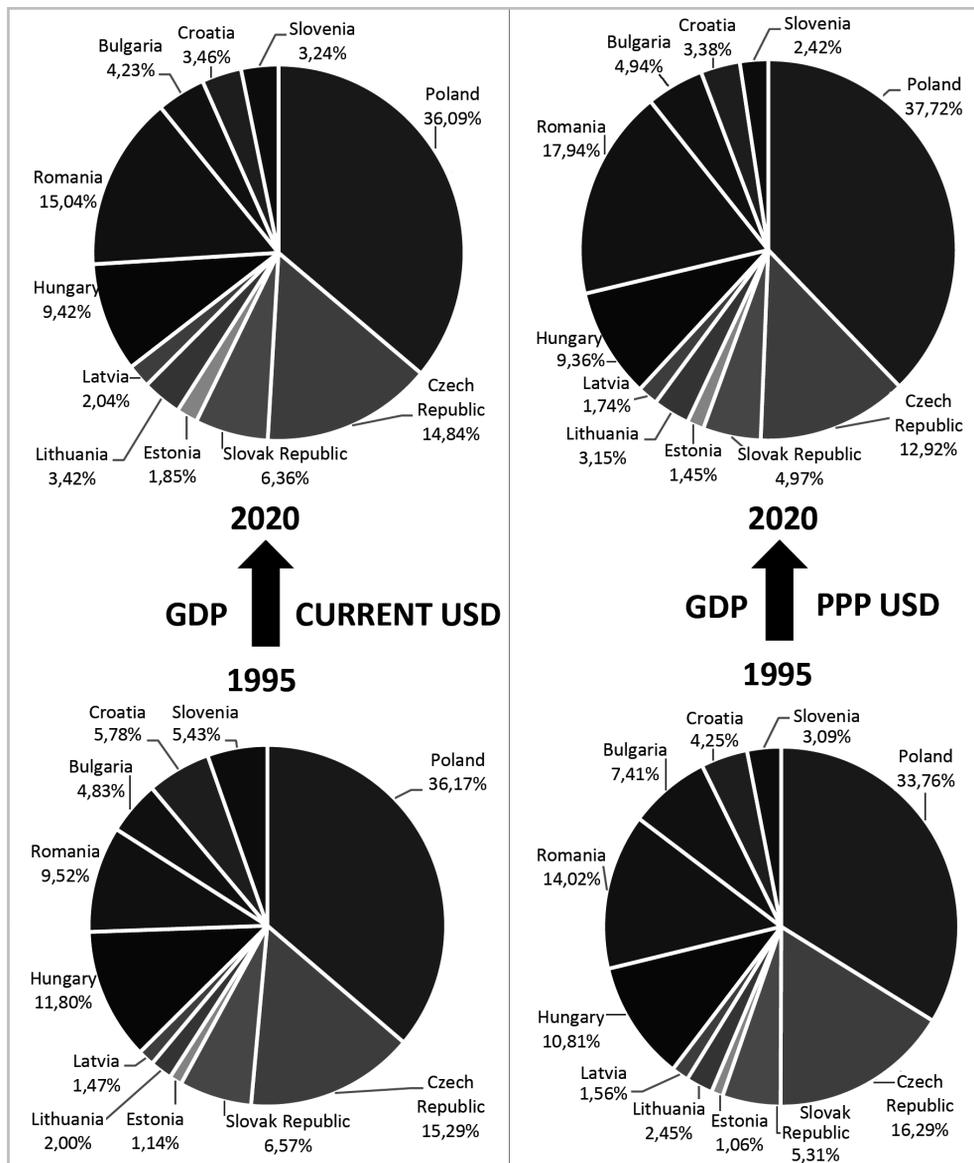
Variable	Definition
GDP (current USD)	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single-year official exchange rates.
GDP (PPP, constant 2017 international USD)	PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. Data are in constant 2017 international dollars.
GDP per capita (current USD)	GDP per capita is gross domestic product divided by midyear population. Data are in current U.S. dollars.
GDP per capita, PPP (constant 2017 international USD)	PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. Data are in constant 2017 international dollars.

Source: World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

When verifying the first hypothesis, the CEE-11 countries were treated as one economic area, but in fact they are not a homogenous group. Among 11 CEE economies, the region was dominated by the Polish economy with a 36.1% share in the region's GDP measured in current USD and 37.7% in the region's GDP converted to international dollars using PPP in 2020 (see: *Figure 1*). The share of the other economies in the CEE-11's GDP is also changing in time. The rising share can be seen in the case of Romania (an increase in the share in the region's GDP measured in current USD from 9.5% in 1995 to 15% in 2020, and in case of PPP conversion – from 14% to 17.9%). The Baltic states achieved a similar success (7.3% in 2020 against 4.6% in 1995 in the case of GDP in current dollars). The impact on the GDP of the Western Balkans region is declining: in Slovenia (e.g. decreasing share in CEE-11 GDP measured in current dollars from 5.4% to 3.2%), in Croatia (decrease

from 5,8% to 3,5%), as well as in Hungary (decrease from 11,8% to 9,4%). Detailed statistics can be found in *Figure 1*.

Figure 1: Share of individual countries in the GDP of the CEE-11 region in 1995 and 2020.

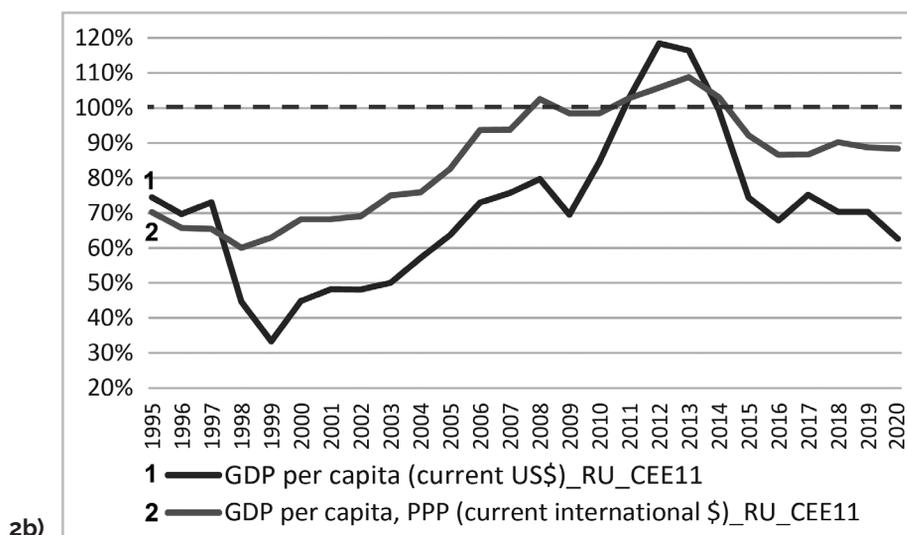
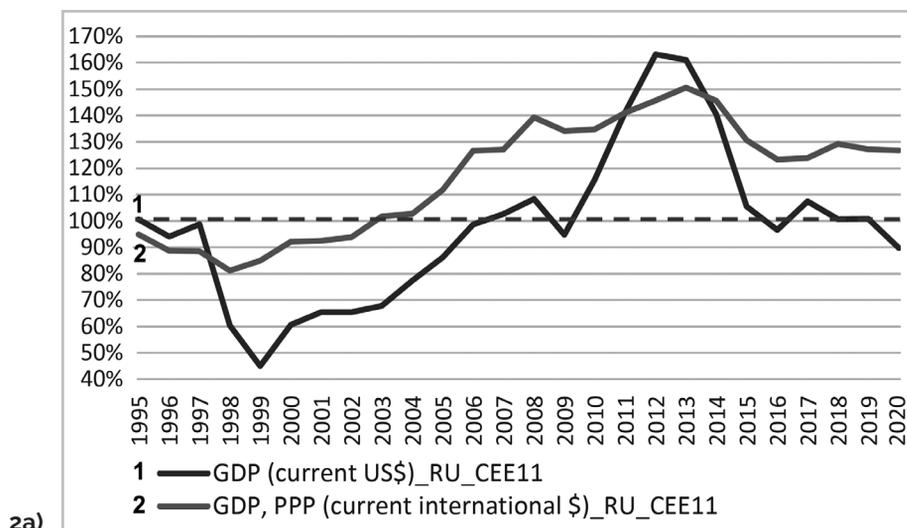


Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

The dynamics of Russia's geoeconomic potential in relation to the CEE-11 region are presented in *Figures 2(a,b)*. It is characterised by three periods: (i) a period of deterioration of Russia's geoeconomic potential: 1995–1999, (ii) a period of strong improvement: 2000–2013, and (iii) a period of renewed geoeconomic strength deterioration: 2014–2020.

- i. **1995–1999:** Russia's GDP (current USD) was equal to 100.6% of the CEE-11 region in 1995, but it plunged to only 45.0% in 1999 as a consequence of negative GDP growth in three out of five years in this period and because of the financial crisis in Russia in 1998. The Russian ruble was significantly devaluating during the whole period, but only in the third quarter of 1998 it lost about two-thirds of its value. GDP per capita measured in current USD fell to an extremely low level in 1999 (33.4%) compared to GDP per capita in the CEE-11 region. In the internal market, which takes into account domestic purchasing power, the situation was better, but also then Russia's economic potential was much lower compared to the CEE-11 region.
- ii. **2000–2013:** the Russian economy rebounded fairly quickly after the crisis, which was helped by improving Russian price competitiveness as a consequence of ruble depreciation and the rising crude oil prices. The impressively fast economic growth and the appreciation of the ruble against the dollar meant that already in 2007 the Russian GDP in current dollars was higher than the GDP of the CEE-11 region (index 102.6%). Taking into account PPP, it exceeded the CEE-11 region level already in 2003. Russia achieved its maximum economic advantage over the CEE-11 region in terms of GDP in 2012–2013. Russia's GDP in current dollars was then over 160% of the CEE-11 region's GDP, and when calculated taking into account PPP, it reached its peak in 2013 (150.55%). Russia's economic successes translated into its citizens' well-being. From 2011 to 2013, GDP per capita (current prices in USD) was higher than in the CEE-11 region (the indicator reached its maximum value in 2012 at 118.4%). Taking into account the purchasing power in the domestic market, GDP per capita in Russia from 2008 to 2014 was usually slightly above the corresponding value in the CEE-11 region.
- iii. **2014–2020:** the slowdown in economic growth in Russia that already began in 2013 was generally presented throughout the period. Situation in Ukraine in 2014 hampered Russia's investments and GDP growth, hindering economic restructuring and modernisation (Havlik 2014). In 2020, only GDP based on the purchasing power parity was higher than the corresponding value in the CEE-11 region (126.7%). In turn, GDP at current prices amounted to merely 89.7% of the GDP of the CEE-11 region. Apart from slowing the pace of economic growth, this was also due to the progressive depreciation of the ruble. As a consequence, the relative quality of life in Russia, measured by GDP per capita, has deteriorated. At current prices, the indicator for Russia's GDP per capita was only 62.6% of the CEE-11 level, and it went back to the 2005 values. GDP per capita including purchasing power was 88.4% of the corresponding level in CEE-11.

Figures 2 (a, b): The dynamics of the geoeconomic potential of Russia in relation to the CEE-11 region (1995-2020): 2a) – dynamics measured for GDP (in current dollars and converted to international dollars using PPP); 2b) – dynamics measured for GDP per capita (in current dollars and converted to international dollars using PPP).



Source: own study based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

Variables, research data and method

The selection of variables

Positive verification of the hypothesis of the deterioration of Russia's geoeconomic strength towards the CEE-11 region in recent years opens the way to search for the reasons for this state of affairs. Potential determinants of changes in Russia's geoeconomic potential in relation to the CEE-11 region should be sought in the factors responsible for the pace of economic growth. The choice of variables used to verify the second hypothesis refers to the literature on economic growth⁶.

The Harrod–Domar model is the starting point for considering the determinants of economic growth. Harrod (1939) and Domar (1947) developed a model based on Keynes' analysis. In their model, the GDP growth rate is determined by the savings rate, which allows greater investment, which in turn increases the existing production capacity of the economy. Thus, capital accumulation and its productivity play a fundamental role in the process of economic growth. The Harrod–Domar concept was refined by Solow (1956) and Swan (1956), whose neoclassical model – using the Cobb–Douglas production function with two production factors: physical capital (fixed assets) and human capital (labour) – was expanded to include the impact of labour productivity and technological progress on economic growth. In contrast to the Solow–Swan model, which treats technical progress and the savings rate as exogenous factors, endogenous growth models recognise technical progress related to investments in human capital (expenditure on education: Lucas 1988) and innovation (research & development: Romer 1986) as a key factors of economic growth.

Proponents of the institutional approach (e.g. Abramovitz 1986; Barro 1991; Hall, Jones 1997; Acemoglu, Robinson 2010) argued that an important condition influencing economic growth, apart from access to physical capital, human capital, and modern technologies, is the existence of institutional solutions that enable a society to make optimal use of human and physical capital, and its technology.

The openness of the economy to foreign trade along with the capital flows, which are associated with the flow of production factors and technologies, contributes also to the increase of economic growth (Srinivasan, Bhagwati 1999). Opening to international trade allows the economy to take advantage of its comparative advantages, ensuring the optimal allocation of domestic factors of production, and opening to foreign capital enables the use of those factors of production that are insufficiently present in the country (Li, Liu 2005). Through openness to the flow of knowledge and technology, the country can benefit from innovations created abroad (Grossman, Helpman 1991; Cotton, Ramachandran 2001). In turn, the role of the real exchange rate in the growth process was analysed by Eichengreen (2008). Another stream of literature is devoted to the issue of natural resources and economic growth (Havranek et al. 2016). Especially energy occupies an important place in countries' economies. The asymmetric effect of energy prices

⁶ A broader overview of various theories of economic growth and the results of empirical research on the determinants of economic growth can be found e.g. in publication: Śliwiński (2011).

on economic growth can be shown e.g. in the case of oil-producing and oil-consuming countries (Bozkurt et al. 2015).

Taking into account the above short review of the literature on economic growth, the potential determinants of the dynamics of Russia's geoeconomic power in relation to the CEE-11 region were selected and subjected to further econometric analysis. *Table 2* contains the definitions of determinants that were used in this article to verify the second hypothesis formulated in introduction.

Table 2: Definitions of the determinants of economic growth used in the econometric analysis.

Variable	Definition
Gross capital formation (<i>I</i>)	Gross capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and „work in progress“. Data are in current U.S. dollars.
Labour force (<i>L</i>)	Labour force comprises people ages 15 and older who supply labour for the production of goods and services during a specified period. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers.
Exports and imports of goods and services (<i>XM</i>)	Exports and imports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to nonresidents of general merchandise, net exports of goods under merchandising, nonmonetary gold, and services. Data are in current U.S. dollars.
Foreign direct investment, net inflows (<i>FDI</i>)	Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy. Ownership of 10 percent or more of the ordinary shares of voting stock is the criterion for determining the existence of a direct investment relationship. Data are in current U.S. dollars.
Crude oil prices (<i>CO</i>)	Crude Oil West Texas Intermediate (WTI) cash prices calculated for each year as the arithmetic mean of prices at the end of each quarter

Sources: api.worldbank.org, stooq.pl

Research data

The research is based on yearly data on the ratios of individual CEE-11 countries' GDP to Russia's GDP measured in current prices. The explanatory variables, except for crude oil prices, are the relations of individual CEE-11 countries' and Russia's potential determi-

nants of their GDP growth presented in *Table 2*. Descriptive statistics of the variables are presented in *Table 3*.⁷

The data set is focused on Russia and individual CEE-11 countries. Annual data from 2001 to 2020 were utilised. It was caused by the availability of the data in the World Bank database. All variables are downloaded from the WDI online database of the World Bank excepting crude oil prices, which were downloaded from <https://stooq.pl>. As the data on net inflows of foreign direct investments for Hungary are very volatile and fluctuated substantially, Hungary was excluded from the econometric analysis which takes into account this variable.

Table 3: Descriptive statistics of the variables.

	i-th CEE-11 country to Russia GDP in current dollars ratio (GDP_{it})	i-th CEE-11 country to Russia gross capital formation ratio (I_{it})	i-th CEE-11 country to Russia labour force ratio (L_{it})	i-th CEE-11 country to Russia exports and imports of goods and services ratio (XM_{it})	i-th CEE-11 country to Russia foreign direct investment, net inflows ratio (FDI_{it})	Crude oil prices (CO_t)
Mean	9.31%	10.08%	6.00%	18.88%	31.85%	62.59
Median	4.81%	5.45%	3.61%	10.42%	11.74%	60.61
Maximum	62.26%	58.20%	24.75%	92.40%	1782.17%	98.63
Minimum	1.04%	1.20%	0.90%	2.21%	-732.68%	25.30
Std. Dev.	10.45%	10.44%	6.56%	17.80%	137.77%	23.92
Observations	220	220	220	220	220	220

Source: own elaboration based on World Bank, http://databank.worldbank.org/data/download/WDI_excel.zip

The analysis of *Table 3* demonstrates that the CEE-11 region has a relative advantage over Russia in terms of gross capital formation, exports and imports of goods and services, and net inflows of foreign direct investment. The average values of these variables ratios are higher than the ratio showing the relation of individual CEE-11 countries' GDP to Russia's GDP measured in current dollars. In turn, Russia has a relative advantage over the CEE-11 countries in terms of the labour force.

Empirical method

Data used for the *panel data estimation* are cross-sectional data pooled over 20 years' time periods (data for each country plus average yearly crude oil prices). The general form of panel models is written as:

⁷ If the ratio is equal to 100%, it would mean that in a given period the value of e.g. gross capital formation for the i -th CEE-11 country is the same as for Russia. If it were, for example, 50%, it would mean that it accounts for half of the Russian investments.

$$GDP_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 L_{it} + \beta_3 XM_{it} + \beta_4 FDI_{it} + \beta_5 CO_t + \varepsilon_{it}$$

where:

$$GDP_{it} \text{ denotes the ratio } \frac{\text{gdp in current dollars at } t \text{ period in } i \text{ CEE-11 country}}{\text{gdp in current dollars at } t \text{ period in Russia}},$$

$$I_{it} = \frac{\text{gross capital formation at } t \text{ period in } i \text{ CEE-11 country}}{\text{gross capital formation at } t \text{ period in Russia}},$$

$$L_{it} = \frac{\text{labour force at } t \text{ period in } i \text{ CEE-11 country}}{\text{labour force at } t \text{ period in Russia}},$$

$$XM_{it} = \frac{\text{exports and imports of goods and services at } t \text{ period in } i \text{ CEE-11 country}}{\text{exports and imports of goods and services at } t \text{ period in Russia}},$$

$$FDI_{it} = \frac{\text{FDI, net inflows at } t \text{ period in } i \text{ CEE-11 country}}{\text{FDI, net inflows at } t \text{ period in Russia}},$$

CO_t – crude oil prices at t period, β_0 stands for the overall constant, ε_{it} are error terms.

Preliminary regressions for panel data included the pooled *ordinary least squares* (OLS) models performed on all available observations (balanced panels). As panel unit roots tests demonstrated that variables are nonstationary,⁸ *fully modified ordinary least square* (FMOLS) model was also applied. It resulted from the cointegration of the heterogeneous panel⁹ and assumed endogeneity of variables. In the FMOLS technique heterogeneous first-stage long-run coefficients option was used to capture heterogeneity. Pedroni (2000, 2004) demonstrated that the FMOLS technique should be more powerful than the OLS model when working with a cointegrated panel meaning that it allows researchers to selectively pool the long-run information contained in the panel while permitting the short-run dynamics and fixed effects to be heterogeneous among different members of the panel.

Research results and discussion

The hypothesis on a positive relationship between CEE-11 to Russia GDP ratio (GDP_{it}) and (i) CEE-11 to Russia exports and imports of goods and services ratio (XM_{it}), and (ii) CEE-11 to Russia foreign direct investment net inflows ratio (FDI_{it}) was tested by panel regression models. The control variables chosen for econometric analysis are CEE-11 to Russia gross capital formation ratio (I_{it}), CEE-11 to Russia labour force ratio (L_{it}) and crude oil prices (CO_t). Positive relationship between dependent variable (GDP_{it}) and (i) CEE-11 to

⁸ Fisher-type test using Augmented Dickey and Fuller – ADF (see: Maddala, Wu 1999; Choi 2001) was applied to test panel unit roots.

⁹ The Pedroni test (see more: Pedroni 2002) was used for co-integration analysis to test for the presence of long-run relationships among integrated variables.

Russia gross capital formation ratio (I_{it}), and (ii) CEE-11 to Russia labour force ratio (L_{it}) are assumed in contrast to the relationship between dependent variable (GDP_{it}) and crude oil prices ratio (CO_t) where negative relationship is expected.

$$GDP_{it} = f[\overbrace{I_{it}}^{+}, \overbrace{L_{it}}^{+}, \overbrace{XM_{it}}^{+}, \overbrace{FDI_{it}}^{+}, \overbrace{CO_t}^{-}]$$

Table 4 summarises the estimation of OLS and FMOLS panel regression models. The I OLS and III FMOLS models contain the data for all CEE-11 countries, the models II and IV omit Hungary and replace the gross capital formation ratio with the net inflow of foreign direct investment ratio.

Table 4: Results of panel regressions.

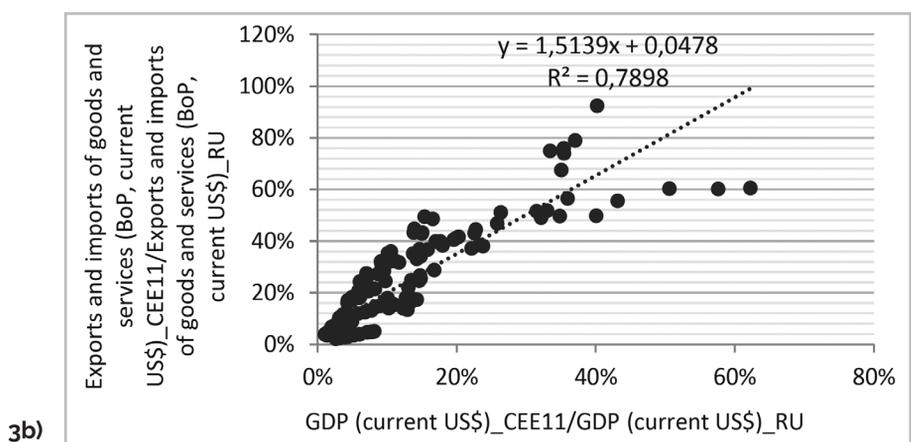
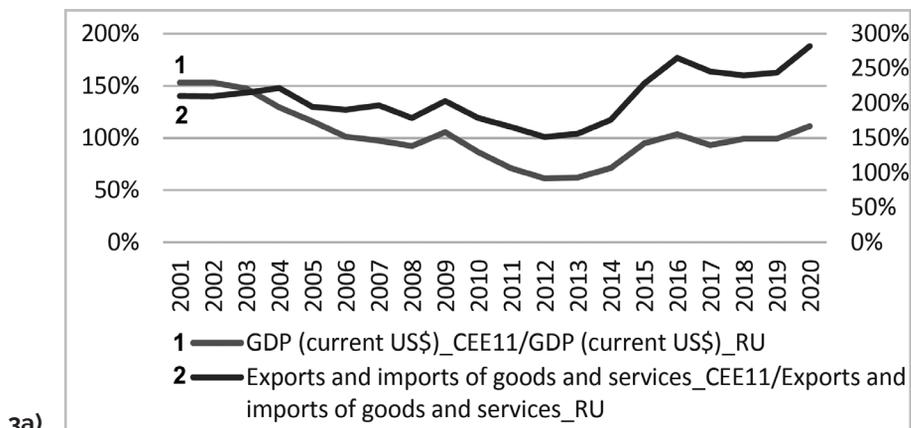
Dependent variable: CEE-11 to Russia GDP ratio – GDP_{it}				
Variable	OLS (Model I)	OLS (Model II)	FMOLS (Model III)	FMOLS (Model IV)
β_0	-0.00 (-0.44)	0.02 (2.69)***		
I_{it}	0.66 (23.76)***		0.38 (26.53)***	
L_{it}	0.41 (11.00)***	0.82 (12.71)***	0.85 (2.39)**	-2.25 (2.87)***
XM_{it}	0.06 (3.99)***	0.22 (8.19)***	0.12 (3.42)***	0.37 (7.01)***
FDI_{it}		0.04 (4.62)***		0.01 (2.74)***
CO_t	-0.00 (-2.23)**	-0.00 (3.87)***	-0.00 (-4.74)***	-0.00 (-9.82)***
R-squared	0.971	0.909		
Cross-section	11	10	11	10
Periods	20	20	19	19
Total panel	220	200	209	190
*** – significant at the 1 percent level; ** – significant at the 5 percent level; * – significant at the 10 percent level				

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip.

The following observations describing the dynamics of CEE-11 to Russia GDP ratio can be derived from the panel regressions presented in Table 4.

- i. **Exports and imports:** openness of the economy measured by a sum of exports and imports play a positive role in shaping the geoeconomic balance in Central and Eastern Europe. The analysis demonstrates that the higher the sum of exports and imports in the CEE-11 countries in relation to the value of foreign trade in Russia, the weaker the Russian geo-economic position in relation to the CEE-11 region. In the Figures 3(a,b) we can see correlated behavior of two analysed ratios measured both for the entire region (3a) and for each CEE-11 country (3b). This observation was confirmed in all the regressions from Table 4.

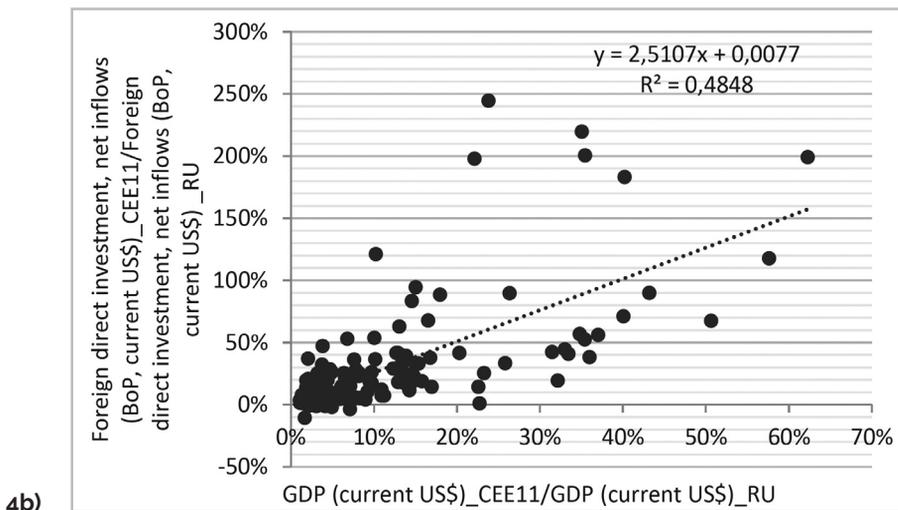
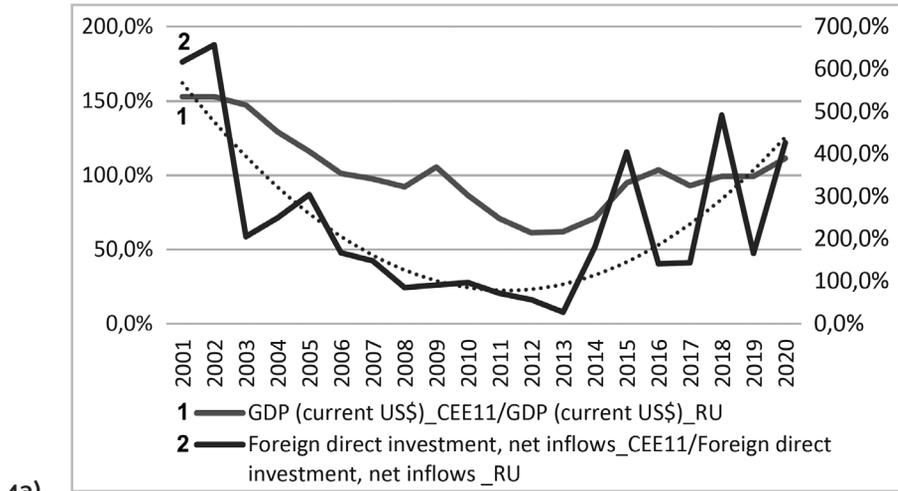
Figures 3 (a, b): The dynamics of CEE-11 region to Russia GDP ratio vs CEE-11 to Russia exports-imports ratio (3a), and individual CEE-11 countries to Russia export-import ratios vs individual CEE-11 countries to Russia GDP ratios (3b).



Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

- ii. **Net inflows of FDI:** a positive relationship was also discovered for the ratio showing the relation of net FDI inflows for CEE-11 and Russia. It is significant in all regressions, which included this ratio as a variable, although the beta coefficient is smaller than in the case of foreign trade CEE-11 to Russia ratio. The charts presented in *Figures 4(a,b)* demonstrate that in the long run the relatively more foreign direct investment inflow to CEE-11 region than to Russia, the worse Russian geoeconomic strength towards the CEE-11 region becomes.

Figures 4 (a, b): The dynamics of CEE-11 region to Russia GDP ratio vs CEE-11 to Russia net inflow of foreign direct investment ratio (4a), and individual CEE-11 countries to Russia net inflow of foreign direct investment ratios vs individual CEE-11 countries to Russia GDP ratios (4b).

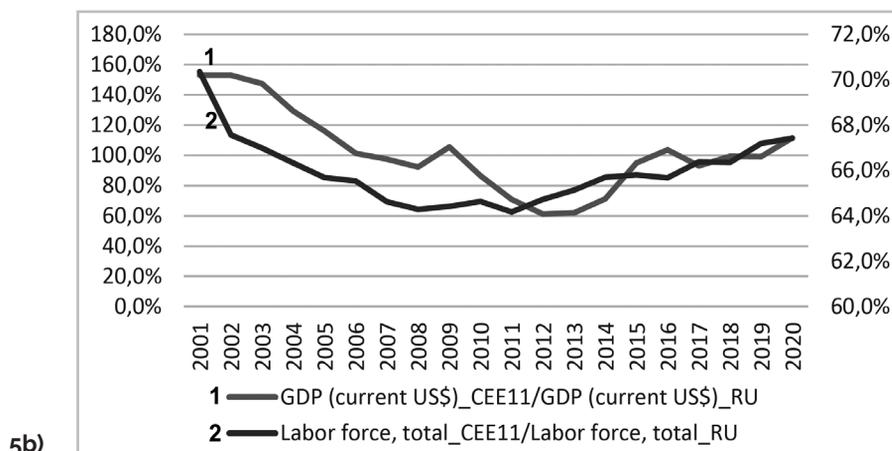
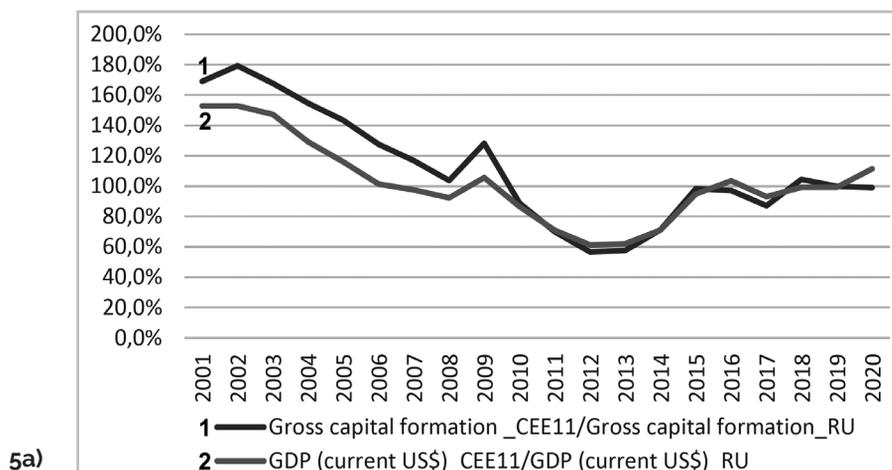


Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

iii. **Gross capital formation and labour force:** as expected, there are also positive relationships in the case of investment (gross capital formation) and number of the labour force, and the balance of geoeconomic power in Central and Eastern Europe. The higher dynamics of investment and the bigger employment in CEE-11

countries compared with Russia, the better the geoeconomic strength of CEE-11 in relation to Russia is. *Figures 5(a,b)* demonstrate the correlated behavior of CEE-11 to Russia gross capital formation and labour force ratios with CEE-11/Russia GDP ratios. These observations were generally confirmed in panel regressions.

Figures 5 (a, b): The dynamics of CEE-11 to Russia GDP ratio vs CEE-11 to Russia gross capital formation ratio (5a), and the dynamics of CEE-11 region to Russia GDP ratio vs CEE-11 to labour force ratio (5b).

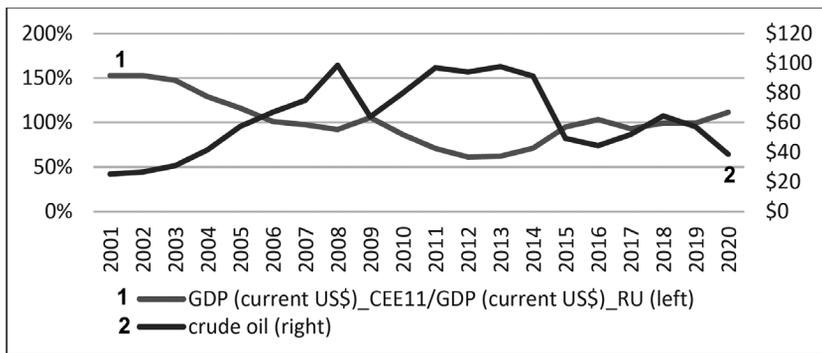


Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

iv. **Crude oil prices:** natural resources play a crucial role in the Russian economy. "Russia's role in the global economic system today [...] is dominated by the export

of natural resources, particularly oil and gas" (Bradshaw, Connolly 2016: p.700). The volatility of prices in global resource markets has also a big impact on Russia's geo-economic strength in relation to the CEE-11 region. This is confirmed in *Table 4* and *Figure 6*, which demonstrate a negative relationship between the crude oil prices and the economic power of the CEE-11 region. In general, the higher prices of natural resources exported from Russia, the better the economic situation of Russia manifested not only internally (e.g. via higher revenues to Russia's federal budget) but also externally improving the economic power in relation to other countries.

Figure 6: The dynamics of CEE-11 to Russia GDP ratio vs crude oil prices.



Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

Conclusions

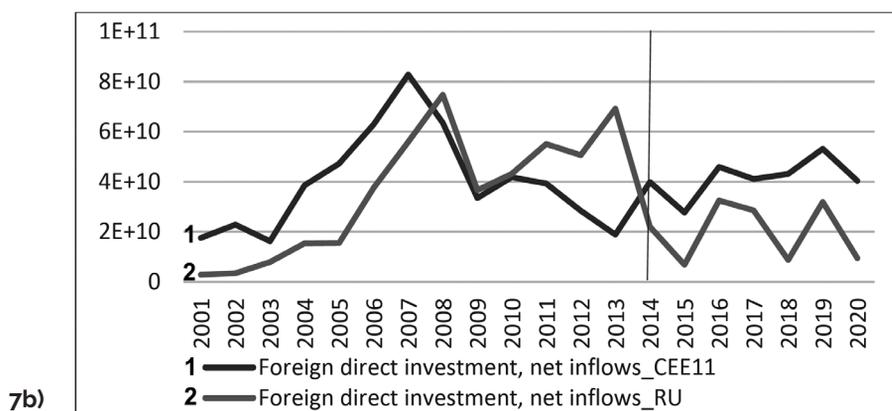
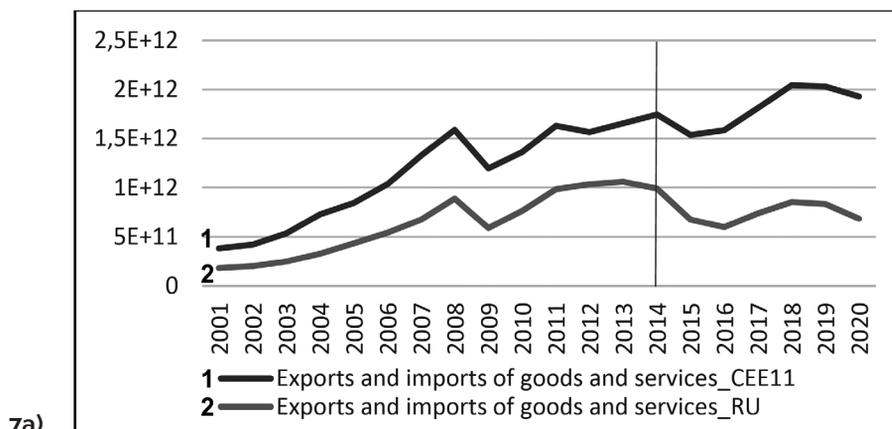
The article confirms the research hypotheses that:

- i. In the period after the year 2014, Russia's geo-economic strength in Central and Eastern Europe stopped improving. In 2014, the geo-economic balance of power in Central and Eastern Europe began to change in favor of the CEE-11 region, both when measured by the ratio of Russia's GDP to the CEE-11 region, measured in current dollars, and international dollars using purchasing power parity.
- ii. The economic sanctions imposed on Russia after 2014 have negatively influenced its geo-economic strength in relation to the CEE-11 region by reducing the relative export and import flows, and FDI net inflows in Russia compared to the CEE-11 countries.

The geo-economic strength of a state can be defined in terms of wealth and competitive advantage. Its improvement can be achieved based on both domestic and foreign resources in the form of acquiring and attracting foreign production factors to a given economy, primarily technology and capital. The flows of goods and services are also an important element in creating geo-economic strength. Export enables the expansion of the demand base for goods produced domestically, while import enables the acquisition of resources, sometimes of strategic importance, which are either absent in the country or produced at a high cost.

Economic sanctions on capital and trade flows are an essential component of geoeconomic tools, imposed on Russia. They entail the alteration of economic flows to advance political objectives (Portela 2021). The sanctions imposed on Russia had an impact on foreign direct investment (FDI) and other trade flows to and from Russia. *Figure 7(a)* demonstrates that since 2014 trade flows to and from Russia deteriorated, in contrast to the CEE-11 countries, in which the sum of export and import accelerated. *Figure 7(b)* shows that also since 2014, capital in the form of FDI has been flowing more into the CEE-11 region than into Russia. These observations are also confirmed in econometric studies and provide a positive empirical assessment of the effects of sanctions on Russia's investment and trade flows.

Figures 7 (a, b): The dynamics of the sum of exports and imports of goods and services from and to the CEE-11 region and Russia (7a), and the dynamics of foreign direct investment net inflows to the CEE-11 region to Russia (7b).



Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

Apart from the aspect of economic sanctions as a geoeconomic tool aimed at Russia, an important element influencing the size and direction of investments and trade flows is the attractiveness and competitiveness of Russian economy. In case of Russia, the attractiveness of its economy in relation to the CEE-11 region is falling, which will not be conducive to the improvement of Russia's geoeconomic strength in the nearest future. Let's hope that the deteriorating geoeconomic power of Russia can produce substantial geopolitical returns and will contribute to ending the conflict in Ukraine on the terms accepted by the attacked country.

Paweł Piotr Śliwiński – PhD, D.Sc., university professor and a head of International Finance Department at the Poznan University of Business and Economics. In the academic research he specialises in international economics, international finance, corporate finance and capital markets. He graduated from PUEB (international trade), but also studied managerial economics at the Antwerp University in Belgium and macroeconomics at the Tilburg University in the Netherlands.

Paweł Piotr Śliwiński – dr hab., profesor uczelni i kierownik Katedry Finansów Międzynarodowych na Uniwersytecie Ekonomicznym w Poznaniu. W pracy naukowej specjalizuje się w ekonomii międzynarodowej, finansach międzynarodowych, finansach przedsiębiorstw i rynkach kapitałowych. Jest absolwentem Akademii Ekonomicznej w Poznaniu (ekonomika i organizacja handlu zagranicznego), ale studiował także ekonomię menedżerską na Uniwersytecie w Antwerpii w Belgii oraz makroekonomię na Uniwersytecie w Tilburgu w Holandii.

➔ References:

- ABRAMOVITZ Moses (1986), *Catching Up, Forging Ahead, and Falling Behind*, "Journal of Economic History", vol. 46, no. 2.
- ACEMOGLU Daron, ROBINSON James (2010), *The Role of Institutions in Growth and Development*, in: David Brady, Michael Spence (eds), *Leadership and Growth*, World Bank Publications.
- BARRO Robert J. (1991), *Economic Growth in a Cross Section of Countries*, "Quarterly Journal of Economics", No. 106.
- BLACKWILL Robert D., HARRIS Jennifer M. (2016), *War by Other Means: Geoeconomics and Statecraft*, April 2016, Harvard University Press.
- BOZKURT Özlem Gül, ERDEM Cumhur, EROĞLU İlhan (2015), *Identifying the factors affecting the economic growth of oil-producing countries*, "Int. J. Trade and Global Markets", vol. 8, no. 2.
- BRADSHAW Michael J., CONNOLLY Richard (2016), *Russia's natural resources in the world economy: history, review and reassessment*, "Eurasian Geography and Economics", vol. 57, issue 6, DOI: 10.1080/15387216.2016.1254055
- CHOI In (2001), *Unit Root Tests for Panel Data*, "Journal of International Money and Finance", vol. 20, issue 2.
- COTTON Linda, RAMACHANDRAN Vijaya (2001), *Foreign Direct Investment in Emerging Economies, Lessons from sub-Saharan Africa*, Discussion Paper No. 2001/82, United Nations University, World Institute for Development Economics Research.

- DOMAR Evsey David (1947), *Expansion and Employment*, "American Economic Review", vol. 37.
- EICHENGREEN Barry (2008), *The Real Exchange Rate and Economic Growth*, "Commission on Growth and Development Working Paper", no. 4, World Bank, Washington, DC.
- GELB Leslie H. (1991), *GDP Now Matters More Than Force: A U.S. Foreign Policy for the Age of Economic Power*, "Foreign Affairs", vol. 89, no. 6. <https://www.foreignaffairs.com/articles/united-states/2010-10-21/gdp-nowmatters-more-force> (21.10.2010).
- GROSSMAN Gene M., HELPMAN Elhanan (1991), *Innovation and Growth in the Global Economy*, MIT Press, Cambridge.
- HALIŻAK Edward (2012), *O istocie geoekonomicznego działania*, in: Edward Haliżak (ed.), *Geoekonomia*, Warszawa.
- HALL Robert E., JONES Charles I. (1997), *Levels of Economic Activity across Countries*, "American Economic Review", vol. 87(2).
- HARROD Roy F. (1939), *An Essay in Dynamic Theory*, "The Economic Journal", vol. 49, no. 193.
- HAVLIK Peter (2014), *Economic Consequences of the Ukraine Conflict*, "Policy Notes and Reports", no. 14, The Vienna Institute for International Economic Studies, <https://wiiw.ac.at/economic-consequences-of-the-ukraine-conflict-dlp-3427.pdf> (30.11.2014).
- HAVRANEK Tomas, HORVATH Roman, ZEYNALOV Ayaz (2016), *Natural Resources and Economic Growth: A Meta-Analysis*, "World Development", vol. 88, DOI: 10.1016/j.worlddev.2016.07.016
- LI Xiaoying, LIU Xiaming (2005), *Foreign direct investment and economic growth: an increasingly endogenous relationship*, "World Development", vol. 33, DOI: 10.1016/j.worlddev.2004.11.001
- LUCAS Robert E. (1988), *On the Mechanics of Economic Development*, "Journal of Monetary Economics", vol. 22.
- MADDALA G. S., WU Shaowen (1999), *A comparative study of unit root tests with panel data and new simple test*, "Oxford Bulletin of Economics and Statistics", vol. 61, issue S1, DOI: 10.1111/1468-0084.0610s1631
- OLSEN Kim B. (2022), *The Geoeconomic Diplomacy of European Sanctions*, Leiden, The Netherlands.
- PEDRONI Peter (1999), *Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors*, "Oxford Bulletin of Economics and Statistics", vol. 61, issue 51, DOI: 10.1111/1468-0084.0610s1653
- PEDRONI Peter (2000), *Fully modified OLS for heterogeneous cointegrated panels*, "Department of Economics Working Papers", no. 2000-03, Department of Economics, Williams College.
- PEDRONI Peter (2004), *Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis*, "Econometric Theory", vol. 20, issue 3, DOI: 10.1017/S0266466604203073
- PORTELA Clara (2021), *The EU and the strategic use of sanctions as a geo-economic tool*, <https://www.boell.de/en/2021/02/03/eu-and-strategic-use-sanctions-geo-economic-tool> (03.02.2021).
- ROMER Paul M. (1986), *Increasing Returns and Long-Run Growth*, "Journal of Political Economy", vol. 94, no 5.
- ŚLIWIŃSKI Paweł (2011), *Przepływy kapitału międzynarodowego a wzrost gospodarczy w krajach Europy Środkowo-Wschodniej w latach 1994–2008*, Poznań.
- SOLOW Robert Merton (1956), *A Contribution to the Theory of Economic Growth*, "Quarterly Journal of Economics", vol. 70

SRINIVASAN T. N., BHAGWATI Jagdish (1999), *Outward-Oriented and Development: Are Revisionists Right?*, "Center Discussion Paper", no. 806, Yale University, Economic Growth Center. DOI: 10.22004/ag.econ.28476

SWAN Trevor W. (1956), *Economic Growth and Capital Accumulation*, "Economic Record", vol. 32.