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Geo-economics and Geopolitics in Europe from the Aspect of a Centre-Periphery Divide

ABSTRACT

The paper gives a comprehensive geo-economic analysis of Europe, providing a new, distance-based definition of core (360 km), centre (720 km), semi-periphery (1440 km) and periphery (over 1440 km), which is also relevant for other, non-European economies. The main finding of the paper is that transportation costs per unit are much higher for peripheral economies than central ones which might question the rationale behind a close economic integration for peripheral countries with the centre when shipping low value-added exports. However, integration with the centre is still beneficial for semi-peripheral producers. The paper also compares the Lower Rhine Centre with two other historical centres, notably Moscow and Istanbul, concluding that the latter two are economically significantly weaker and thus cannot be an alternative integration vector for semi-periphery or periphery with high value-added exports. The findings of the paper would favour a significant reform of the European Monetary Union, arguing for a common currency of central countries (including UK, Denmark and Switzerland) while reintroducing national currencies at the periphery. However, political realities do not match usually geo-economic rationale as close neighbours who are destined for close economic cooperation often have troubled historical ties.

Keywords: Centre-Periphery; Economic Geography; Integration; European Union; Transportation Cost

INTRODUCTION¹

The causes of the European economic crisis and especially that of several Eurozone countries, the North-South and East-West differences in Europe have extensive literature; the purpose of this study is not to summarize the different theories, but to provide an alternative, geography-based explanation for various phenomena. First I have to highlight an important distinction: there is no crisis in the Eurozone or the EU as a whole – as often claimed by the opponents of European integration inside and outside the EU – but there is/was a crisis in several Eurozone countries. The causes are multiple but there is one underlying condition which is not highlighted enough in mainstream political and economic discourse: the Centre-Periphery divide. Centre-Periphery divide has various interpretations: it could be used in a global sense as in case of the World Systems Theory of Immanuel Wallerstein (WALLERSTEIN 2004). However, this paper would use it in a regional sense, more in line with the Paul Krugman's New Economic Geography (KRUGMAN 1991 and FUJITA-KRUGMAN-VENABLES 1999).

Since the fall of the Roman Empire and the Muslim conquest of North Africa and the Near East, the economic centre of Europe had been the Lower Rhine area, i.e. present-day Netherlands, Belgium and the Ruhr area of Western Germany, which is roughly corresponding to the core area (Austrasia) of the Frankish Empire in the early Middle Ages. Whether the rise of the Franks was caused by them holding this key economic centre or the political successes of the Franks helped the region to emerge to a central role, this region became the manufacturing centre of Western Europe as well as the meeting point of the Levantine and Hanseatic trade routes, and later the core region of capitalist and democratic development feeding in also Trans-Atlantic trade from the 16th century.

THE CENTRE AND THE PERIPHERY

The Lower Rhine area also became the centre of the European integration in the 20th century, being the core of a wider area including London (metro area 13,8 million), Paris (12,1 million),² Rhine-Ruhr metropolitan region (11,3 million),³ and Randstad (6,4 million)⁴ with more than 100 million consumers and very high technological development, with Brussels (metro 2,5 million) roughly in the geographical centre. The Lower Rhine also became the “warehouse” of non-European goods through the ports of Rotterdam (1st in Europe, 437 mt goods handled in 2015), Antwerp (2nd, 190 mt) and Amsterdam (4th, 99 mt)⁵ – thus it became (stayed throughout history) the manufacturing, retail and consumer centre of Europe. This also means that a significant part of extra-EU exports of the semi-periphery has to be shipped to the Centre before leaving the EU.

It is rather difficult, artificial and simplifying to delimitate the area of the Centre and to decide where the semi-periphery begins. But as all economic models are over-simplifying, I would choose the range of 720 km from Brussels, the “capital of Europe” and the geographic centre of the central

¹ This work is a result of the author's own research; it does not represent the views of the Hungarian Government; the Hungarian Ministry of Foreign Affairs and Trade or the views of their officials. The essay was a voluntary undertaking, not being part of any project and not getting any financing from any persons or legal entities.

² Eurostat data for 2015 (<http://ec.europa.eu/eurostat/web/metropolitan-regions/data/database>)

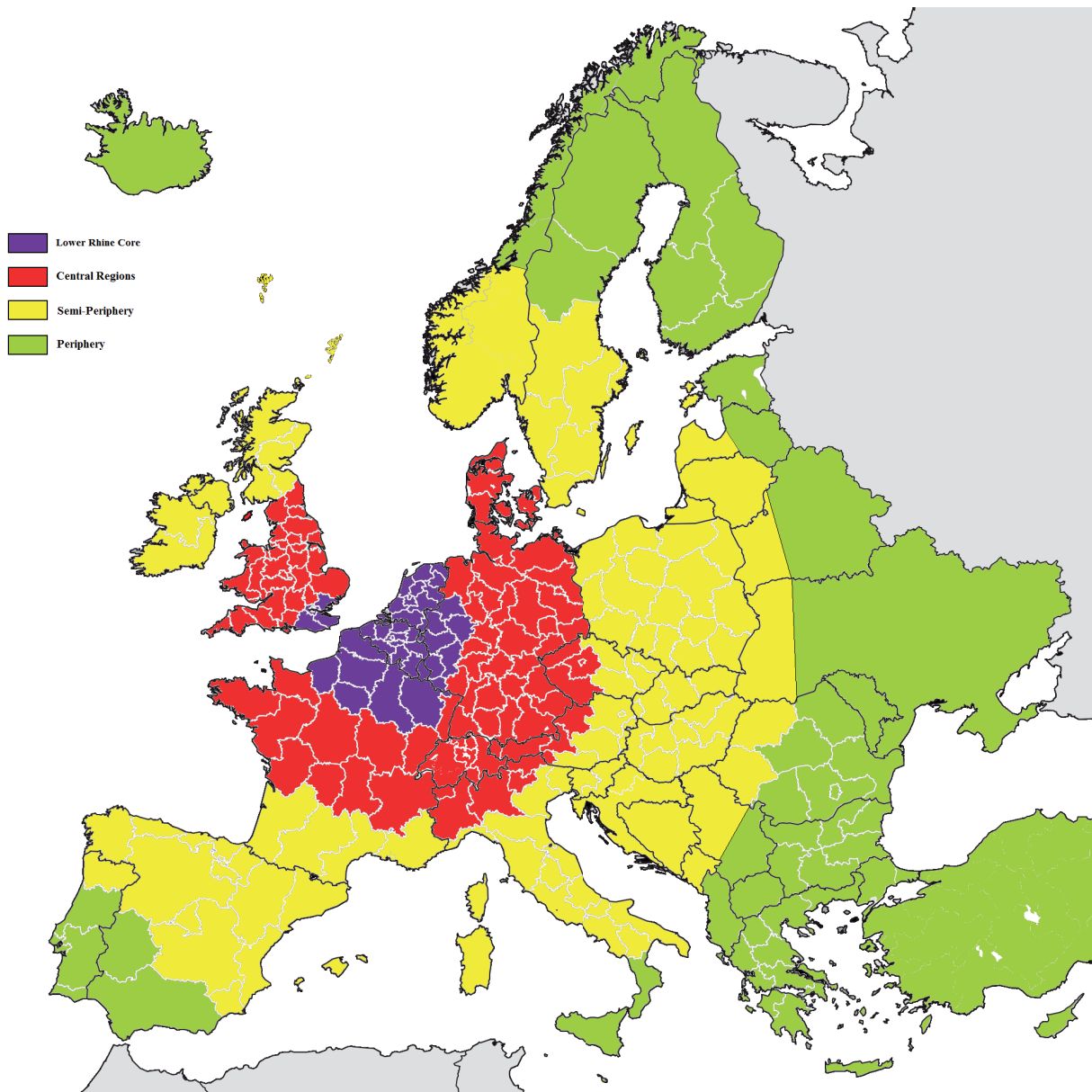
³ Compiled from <https://www.it.nrw.de/statistik/a/daten/amtlichebevoelkerungszahlen/index.html>

⁴ Sum of Amsterdam, Rotterdam, Utrecht and the Hague metro areas from Eurostat 2015

⁵ Eurostat data for 2015 (http://ec.europa.eu/eurostat/statistics-explained/index.php/Maritime_ports_freight_and_passenger_statistics)

micro-region. The argument is that one truck with one driver without stopping or violating the European rules (8 hours drive = one working day) can transport the cargo from the starting point 720 km-long with an average 90 km/h speed (while this choice might seem artificial and simplifying, later in the article we can see its relevance). Any further transport would need another driver or stopping the truck for several hours or violating the rules – all resulting in higher economic costs. With doubling this distance, we can get the border of the semi-periphery and the periphery around 1440 km. With halving the distance, we will get the main core or a 360 km-wide region around Brussels containing the Benelux, London and Southeast England, Paris and North-East France, as well as the German federal states of Saarland, North Rhine-Westphalia, and Rhineland-Palatinate. The main point is that from any end of the core you can get to the opposite end driving less than 8 hours. The main European financial centres (London, Paris, and Frankfurt) are situated on the edges of the core. In the following calculations I use not only EU-28 but European Economic Area (EEA) data, as geographically Switzerland, Liechtenstein and Norway cannot be excluded from the analysis.

Fig. 1: Geo-economic regions of Europe (Source: Author's own work)



The centre contains roughly half of the EEA population and 2/3 of the GDP (see Purple+Red area on Fig. 1, for data see Supplementary Table). In the simplistic model, we can argue that all EU/EEA producers, who are selling their products on the internal EU market, would sell 2/3 of their goods in the Centre and only 1/3 elsewhere around the EU. On the other hand, the periphery (see Green on Fig. 1) makes up only 7% of the GDP, so on average every producer would try to sell only 7% of their products there. What will be the difference between the transportation cost – and thus the final cost – of a product coming from the Centre and the Periphery, respectively if we assume that transportation cost is 1X until 720 km, 2X between 720 and 1440 km, and 3X over 1440 km (Table 1)?

Table 1: Transportation costs in an integration – simplistic model (where X=basic transportation cost/unit)
(Source: Author's own work)

Producer/Sale	Centre	Semi-periphery	Periphery	SUM cost	%
Centre	0,65X	0,28*2X=0,56X	0,07*3X=0,21X	1,42X	100%
Semi-periphery	0,65*2X=1,3X	0,28X	0,07*2X=0,14X	1,72X	121%
Periphery	0,65*3X=1,95X	0,28*2X=0,56X	0,07X	2,58X	182%

As we can see from the simplified model in the table, the average transportation cost for a producer on the periphery would be more than 80% higher than a producer in the centre in the same product segment. This results in a significant loss of competitiveness for the peripheral producer not only in the central but also on local markets. The producers from the Centre may sell their products on peripheral markets below the actual “production + transportation” cost as their relative loss would be offset by profits on the Central market, while Peripheral producers might have to sell the goods at a higher price on the local market to offset the losses from transportation cost to Central markets. As we can see also from the table, for the Semi-periphery, the relative loss of competitiveness is 20% as higher transportation costs to the Centre are mitigated by the higher competitiveness on local Semi-Peripheral markets as well as on increased sales on the periphery (e.g. Poland has a very positive trade balance with Ukraine, Hungary with Romania, Slovenia with the Western Balkans etc.). Offsetting the 20% transport cost loss with lower wages is also a possibility for the Semi-Periphery but offsetting 80% with wages in a region where the free movement of workers applies is unlikely.

The loss of competitiveness for the Peripheral producer depends on the absolute cost of the product – the higher value-added, the less impact of transportation in the final cost. This means that on the periphery, any country or company can only be successful if it has a high-tech high-cost product where transportation cost has marginal effect, while low value-added sectors would suffer the most. This explains the difference between the success of Finland, Estonia and to some extent Ireland, and the constant backwardness of the Portuguese, Andalucian, Southern Italian and Greek economy, regardless of the huge historical financial transfers from the EU and member state budgets.

Example (own calculations): Product A has a production cost of 100 € and basic transportation cost of 20 €. The producer in the core region sells 100 units of Product A in the EEA market, that would mean $100 \times 100 = 10\,000$ € production cost and an average $1,42 \times 100 \times 20 = 2840$ € transport cost, overall 12 840 €. If we assume that the product would be priced for the whole market, they could sell it for 140 €/unit with 11,6 € profit/unit.

Semi-peripheral producer would face a similar 10 000 € production cost but $1,72 \times 100 \times 20 = 3440$ € transport cost, overall 13 440 € which can still be sold for 140 €/unit in the EU market competitively. However, our semi-peripheral company would only earn 5,6 € profit/unit. This is a limited disadvantage compared to central producers which would result in lower investment into modernization or push the company to lower basic production cost (wages) but still makes it possible to compete with central producers.

Peripheral producer with 10 000 € production cost would have to bear $2,58 \times 100 \times 20 = 5160$ € transport cost, resulting in overall cost of 15 160 € (18% higher than centre), so it cannot go below 152 € per unit as a sales price or would need to significantly reduce production cost, with more than 10%. One possibility is lowering wages but workers than possibly would move to central and semi-peripheral companies for higher wages when free movement of workers is a rule. Alternatively, the peripheral country could keep the wages intact in local currencies but devaluate the currency by more than 10% (this is impossible when the periphery and the centre are in a currency union).

In a similar case, if Product B has a production cost of 100 € and basic transportation cost of 5 €, central producers would have 10 710 € cost per 100 unit, semi-peripheral 10 860 € and peripheral 11 290 € (1,4% higher than Centre), so the difference would shrink but could still impact the market position. However, at 1 € transportation cost/unit (Product C), the results would give 10 142, 10 172 and 10 258 € (1,14% higher than Centre) final cost, respectively, where peripheral disadvantage would nearly diminish.

One may raise the question how distant exporters (like China or Bangladesh) might export low value-added goods in bulk to the European Centre when it is disadvantageous for much closer European peripheral producers. The answer lies in different regulatory framework, which leads to non-transport related price advantages for the distant exporters (e.g. lower environmental and labour protection standards, government subsidies, lower wages etc.). These advantages cannot be generated for European peripheral economies as they should observe a similar regulatory framework and there is free movement of workers within the EU. Common currency inside the Eurozone/USD zone also excludes exchange rate manipulation, which is available for distant players exporting to the European/American market.

OTHER HISTORICAL CENTRES

The analysis above suggests that for the Periphery, the costs of economic integration can be higher than the benefits if we assume mutual market opening. It also poses the question whether it would be more beneficial to integrate with another, geographically closer Centre, instead of the Lower Rhine core of the EU. The question comes, where are other centres nearby? In Europe, historically, there have been two more political-economic centres besides the Lower Rhine, notably Istanbul (Byzantium, Constantinople) and Moscow.

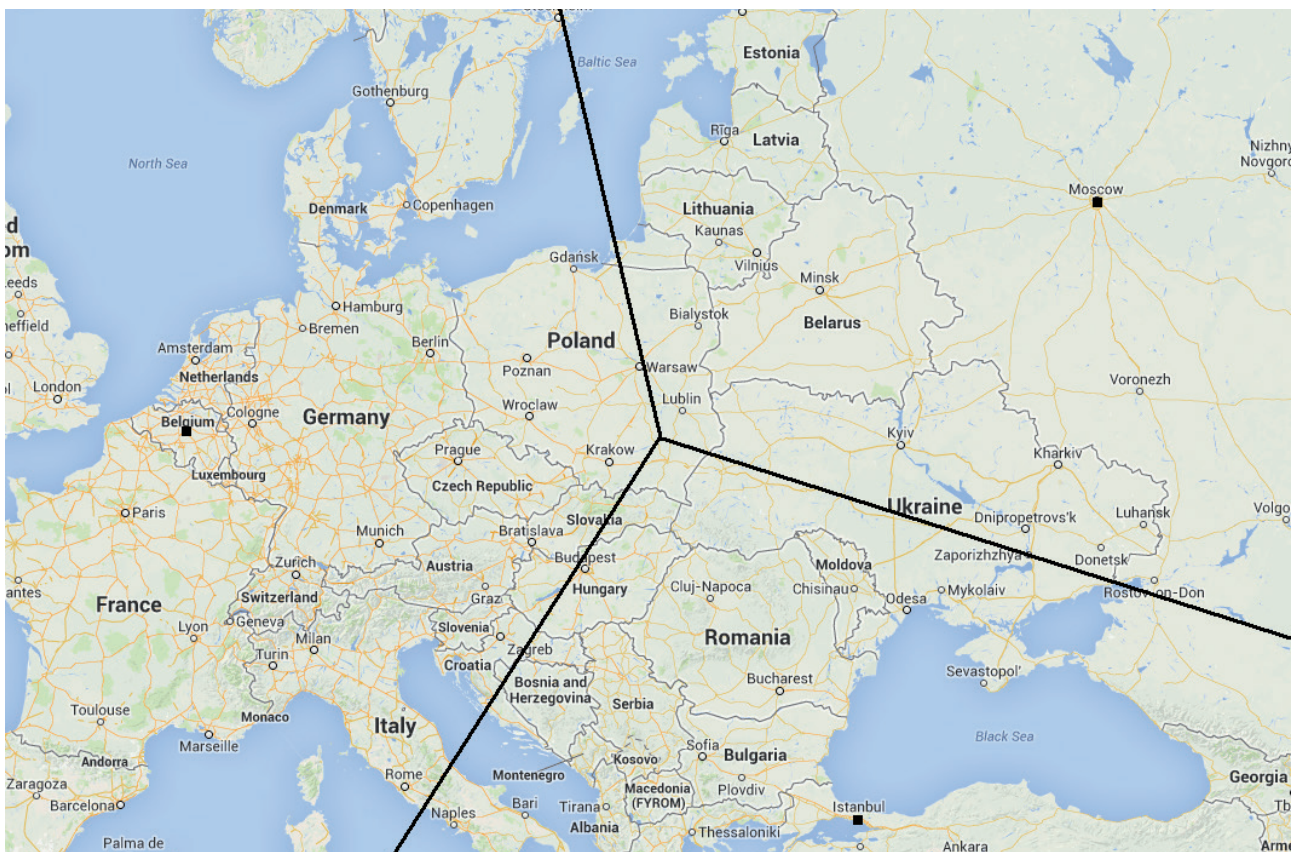
Byzantium has been the traditional centre of Anatolia, the Balkans, the Southern coast of the Black Sea and in specific periods, also Southern Italy. Moscow is different from the Lower Rhine and Istanbul – both of which benefited from the fall of the earlier centre, Rome – as historically it had not been relevant until at least the 15th century. It has developed into a significant European

political-economic centre only during the Soviet period when it regained the status of the imperial capital, lost to Petersburg in the early 18th century. After WWII, Moscow became the centre of a huge “Communist empire” containing several vassal states and a hub-spoke command-economy system (COMECON). After a brief downturn after the fall of the Soviet Union, Moscow is again becoming the dynamic centre of the Russian and CIS economy, with the clearly articulated goal of becoming the centre of the Eurasian Economic Union as opposed to Brussels-led European Union.

The distances Brussels-Istanbul, Brussels-Moscow and Moscow-Istanbul have had a more significant geopolitical impact throughout history than someone would think at first glance. The continental halfway between Brussels and Istanbul is on the Šibenik–Zagreb–Budapest–Rzeszów line, which is quite similar to the border of the Hapsburg and Ottoman empires during the 16-17th centuries. The same divide also fits the border between Southern Italy (Mezzogiorno) and North-Central Italy (Papal State + city states), but the Ottomans were prevented from utilizing the geographical advantage due to their defeat in the Battle of Lepanto in 1571. On the other hand, the Byzantine Empire was able to conquer Southern Italy in the early middle ages as opposed to the Frankish and Langobard-dominated North and Central Italy.

The Brussels-Moscow halfway is on the Stockholm–Kaliningrad–Warsaw–Rzeszów line, which is roughly corresponding to the border of the Russian Empire and later the Soviet Union in the 19th-20th centuries. The Moscow-Istanbul divide goes from Rzeszów through Lviv–Vinnitsa–Zaporizhia–Mariupol–Stavropol to Grozny. Several Russo-Turkish wars have been fought for the control of these areas from the 18th century onwards (Fig. 2).

Fig. 2: Half-way distance in a straight (bee-) line Brussels/Moscow/Istanbul. The actual intersection is closest to Tarnobrzeg near Rzeszów, Poland (Source: Author’s own work)



Understandably, straight-line distances not completely fit the realities on the ground. High mountain ranges historically increased, seas and navigable rivers decreased the real (time and effort-wise) distance, thus the actual Russo-Turkish line would be closer to the Carpathian and Caucasus mountain ranges, while the Baltic Sea connected the shore of Finland and the Baltic states to Scandinavia and North Germany. However, from the 19th century, the spread of railways and later road transportation made inland transportation cheaper and quicker, which increased the importance of direct land connection in national economies. The borderlines in modern times for an economic point of view are also affected by the relative power of the centres: as the Lower Rhine is much more powerful economically today than Istanbul and Moscow, the economic strength pushes the borderline to the East and South-East.

What conclusion can be drawn from the above phenomena? That historically dominant empires on the edge of Europe had expanded mostly only to a geographically “reasonable” border, to halfway between the Western European Centre and their own imperial centres. Thus, a Moscow-based empire was practically limited to the Finland-Sweden border – Baltic Sea – Vistula – Carpathians line and then along the Dniester to the Black Sea and the Caucasus. An Istanbul-based empire was limited to the Dalmatia/Croatia – Central Hungary – Eastern Slovakia line and then through the Dniester and the Black Sea to Transcaucasia. As we know, these empires surpassed their “natural extent” in certain historical periods at the height of their power (i.e. Ottomans in the 16-17th centuries and Russia/Soviet Union in the 19th-20th centuries) but these gains were only temporal. It is an interesting question whether the volunteer association of states (i.e. the EU) could surpass these boundaries and constantly anchor the eastern and southern peripheries to the Lower Rhine Centre.

POTENTIAL OTHER CENTRES TODAY

Today both alternative centres have a population of more than 10 million and produce a large part of GDP of Turkey and Russia, respectively. None of them can compete with the Lower Rhine area but are emerging consumer and industrial centres. Let’s have a short analysis whether these regions may pull the economic activity to themselves from the peripheral EU regions.

The core region of Central Russia (the 360-km radius around Moscow) produced 30,1% of the whole Russian GDP according to the Russian Federal Statistics Office.⁶ In current USD, it means 401,2 billion out of the Russian GDP of 1331,2 billion in 2015 (World Bank).⁷ The core EU-region in 2015 had a GDP of 3675 billion EUR,⁸ which equals 4075 billion USD, that is 10-times higher than the Moscow core area.

⁶ http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/accounts/# Валовой региональный продукт В текущих основных ценах - всего (1998-2015гг.)

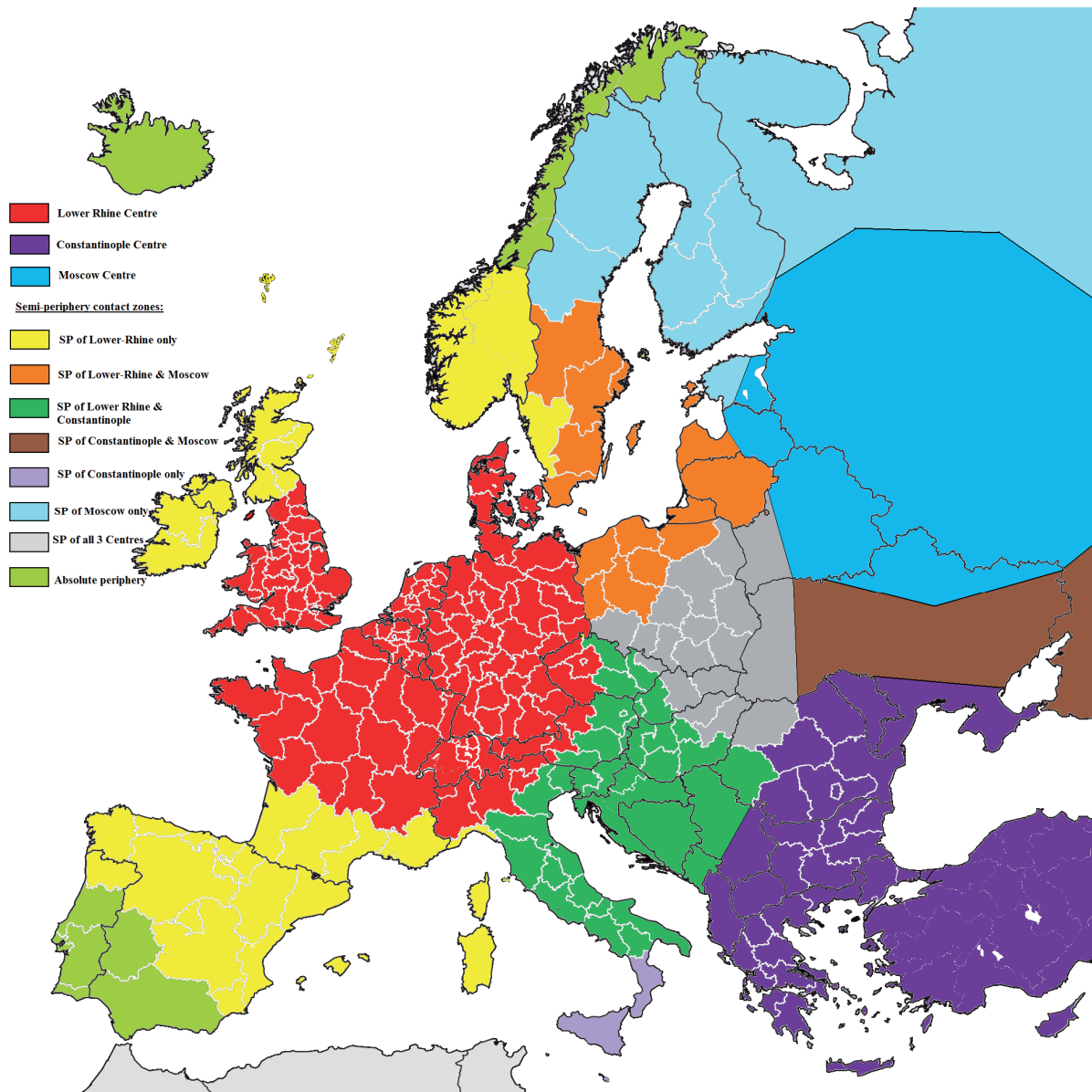
The following federal subjects were considered belonging to the Core Moscow region: Moscow, Tver, Yaroslavl, Ivanovo, Vladimir, Kostroma, Kaluga, Ryazan, Smolensk, Tula regions (oblasts) and Moscow city (nearly identical with Central Federal District). Their GDP was 19,6 trillion rubles out of 65 trillion rubles total.

⁷ <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=RU>

⁸ Eurostat Regional Statistics; Gross domestic product (GDP) at current market prices by NUTS 2 regions <http://ec.europa.eu/eurostat/web/regions/data/database>

Istanbul and the 360 km-wide core region around it in North-western Turkey⁹ was responsible for 44,2% of the Turkish GDP in 2014 according to official data (*regional data for 2015 is not available*). This is 353,2 billion USD out of 798,8 billion USD in 2014 (World Bank). Assuming a similar weight of Istanbul, the core Turkish GDP would be 317,5 billion USD in 2015. To the core region of Istanbul also belongs the South-East of Bulgaria with 6,1 billion USD in 2015, so the whole core area produced 323,6 billion USD compared to 3675 billion EUR of the core EU region, which equals 4075 billion USD. Thus, Core Istanbul produces 8,8% of Core Brussels or 11-times less.¹⁰

Fig. 3: Intersection of three geo-economic centres in Europe (Source: Author's own work)



⁹ <http://www.turkstat.gov.tr/UstMenu.do?metod=temelist> (National Accounts > Regional Accounts)

The following regions were considered belonging to the Core Istanbul region: Istanbul (TR10), Tekirdağ, Edirne, Kırklareli (TR21), Kocaeli, Sakarya, Düzce, Bolu, Yalova (TR42), Bursa, Eskişehir, Bilecik (TR41). Note that Zonguldak was not included as the other two provinces of TR81 statistical region are too far, but we assume that the outer parts of Eskişehir province compensate for the difference.

¹⁰ Note: The first (unpublished) version of this study was conducted in 2013 with 2010 regional data. From the dynamical perspective, it is interesting to note that at that time the EU core was 8 times larger than Moscow (10-times in 2015) and 12 times larger than Istanbul (11-times in 2015). Thus Moscow is on a weakening while Istanbul is on a strengthening track, while the 2010 3:2 advantage for Moscow over Istanbul is slowly diminishing.

Therefore, based on the above analysis, Moscow and Istanbul – while being economically dominant inside their own countries – can not yet compete with the Lower Rhine core region for the semi-peripheries. Unless we would see a significant economic growth in the core regions of these megacities, and a long-lasting stagnation or contraction in the EU’s core, Brussels would still remain the main economic gravity for border regions. However, it could be a topic for further analysis whether it would be economically reasonable to promote the “foundation” of a new economic centre in the “overlap triangle” (see grey area on Fig. 3) which could compete with the existing centres.

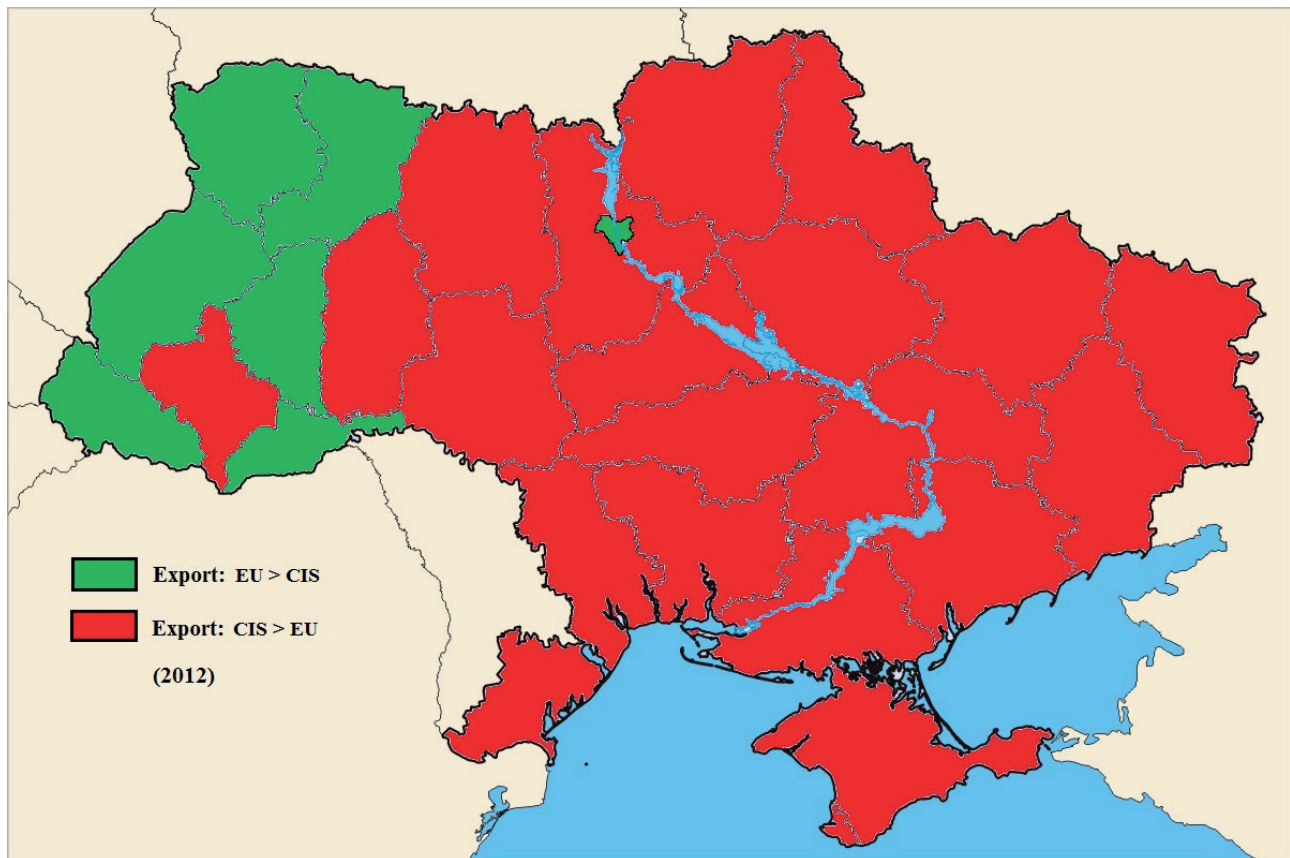
THE CHOICE: PERIPHERY IN RICHER VS. CENTRE IN POORER INTEGRATION?

Considering the comparative disadvantages faced by European peripheral producers on the EEA market, the question arises whether it would be more advantageous for them to pursue integration with one of the smaller economic centres or try to become a smaller peripheral economic centre, where they would be more likely to be competitive based on transportation costs. We may say that countries/regions have to calculate the opportunity cost between a large market with competitive disadvantage vs. a smaller market with competitive advantage. As semi-peripheral regions have relatively low disadvantage on transport costs, it is clear that they should pursue integration with the richer centre (according to the model, this applies for Ireland, Northern Spain, North and Central Italy, Slovenia, Croatia, Bosnia-Herzegovina, Montenegro, Hungary, Slovakia, Poland, Lithuania, Sweden, and Norway). Absolute peripheries lacking alternative centres like Portugal, Southern Spain or Iceland could follow suit, but probably without full monetary integration.

On the other hand, EU peripheries which fall into Istanbul’s orbit (Greece, Cyprus, Albania, Kosovo, Macedonia, Bulgaria, Moldova as well as large parts of Serbia, Romania and Ukraine) should analyse the economic advantages and disadvantages of their integration vector.

Economically “Contested areas” between the EU periphery and Moscow Centre include Finland, Estonia, Latvia, Belarus and Ukraine (all of which are in the geopolitical focus of Russia-EU/Russia-NATO relations). Ukraine is especially problematic as its Western areas would logically economically focus on the EU, the Northeast on Moscow and the South on Istanbul. The 2012 export structure of Ukraine (the last “normal year” before the Russian-Ukrainian trade and later military conflict started) shows that those regions export more into the EU that fall into the Lower Rhine semi-periphery while others to CIS (mostly Russia). Since 2012, Ukraine’s higher value-added exports (machinery, chemicals) have diminished as these product clusters were related to the Russian market, and cannot be integrated to the production chains of the EU core. Ukraine thus became a typically peripheral raw material (bulk agriculture, wood) exporter vis-à-vis the Lower Rhine centre with limited semi-manufactories (iron and steel), while before 2013 it was part of the higher value-added segment of the Moscow-centred CIS market (Fig. 4).

Fig. 4: Exports of Ukrainian regions in 2012 (Source: Ukrstat (<http://ukrstat.gov.ua/>))



These peripheral countries from an economic point of view should evaluate how high value added they can produce thereby decreasing their comparative disadvantages for transport costs. With high-tech production, the distant rich Lower Rhine market is favourable, but with low value-added production, the closer smaller market could be better. Economic Complexity Index¹¹ provides a good measurement of value-added production and hints which countries can manage to be “competitive peripheries: Finland (rank 8) and Ireland (16) have significantly higher scores than Latvia (35), Portugal (36), Bulgaria (38) or Greece (46), while Estonia (25) is in between the two groups. One should be of course aware that countries and nations do not always base their integration decisions on pure economic advantages; security policy, historical grievances etc. can overwrite those. The Russia-Baltic, Russia-Ukraine, Greece-Turkey and Cyprus-Turkey relations provide vivid examples.

GLOBAL OUTLOOK

Geopolitical/geo-economic theories would be considered relevant if they not only reflect realities in a particular region but have global relevance. With that purpose, I analysed other regions from a similar distance-trade-economic development aspect. The key numbers outlined in this paper are 360 km (220 miles/border of core), 720 km (440 miles/border of centre), and 1440 km (880 miles/border of semi-periphery).

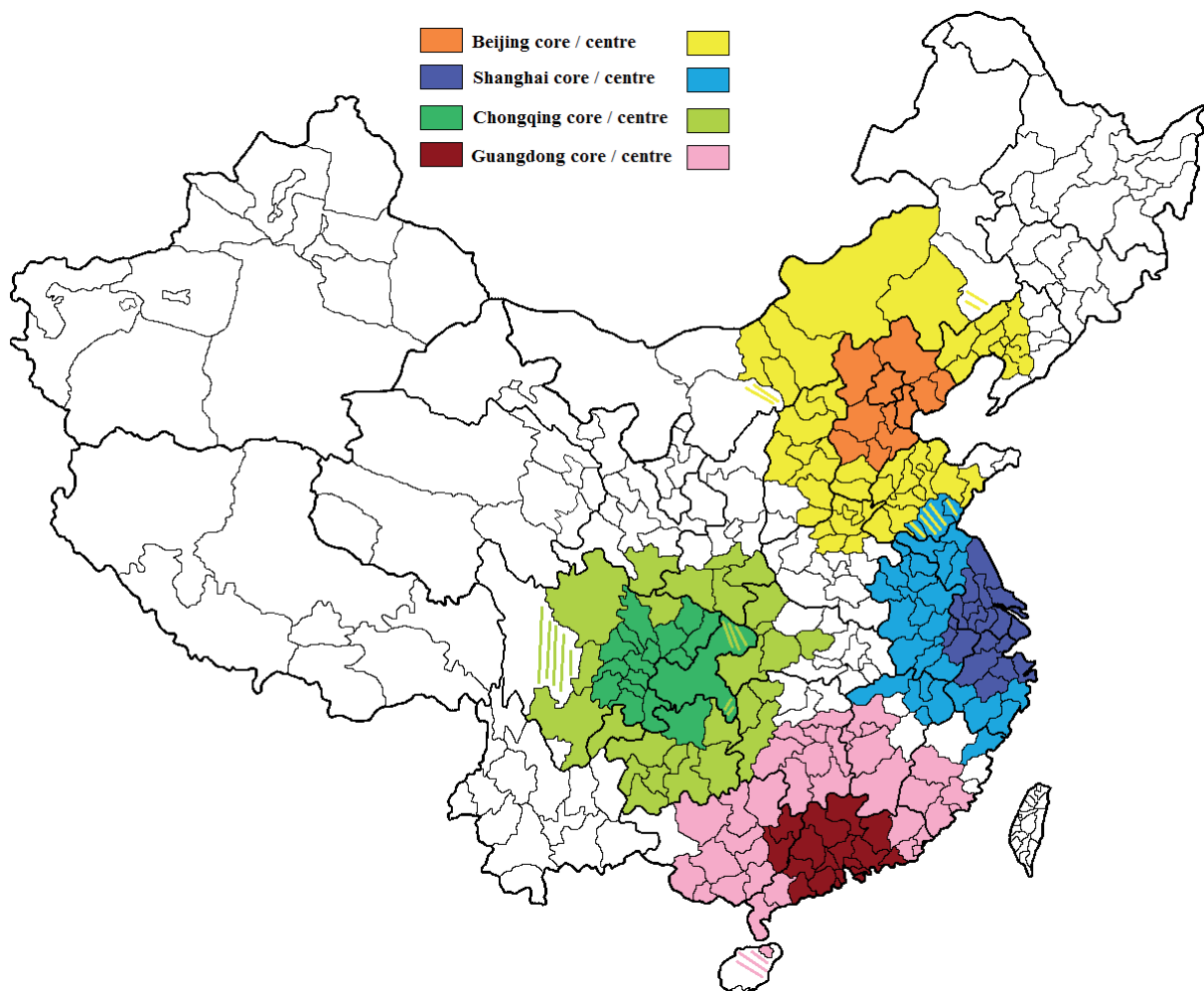
Japan has no periphery with Tokyo situated in the geographical middle of the country. The northernmost point of Hokkaido, Vakkanai is 1474 km from Tokyo, while the southern end,

¹¹ <http://atlas.cid.harvard.edu/rankings/>

Makurazaki (Kagoshima prefecture) is at 1404 km. Therefore, practically all of Japan's territory (except the Ryukyu Islands) falls within at least the semi-periphery of Tokyo. This underpins the unnecessary of the historical formation of an alternative economic/political centre in Japan.

In *China*, there are traditionally three economic-demographic centres: the so-called Bohai Economic Rim area in the North (Beijing-Tianjin, see yellow on Fig. 5); the Yangtze River Delta in the Centre (Shanghai-Nanjing, see blue on Fig. 5); and the Pearl River Delta in the South (Guangdong-Shenzhen-Hong Kong-Macau, see red on Fig. 5). While I could not find GDP data below provincial level¹², all of these three areas had somewhere between 1000-1500 billion USD GDP in 2016. A recently emerging fourth centre of growth is the so-called West Triangle in historical Sichuan (Chongqing-Chengdu, see green on map) with a GDP around 750 billion USD. Until 2015, five cities were considered National Central City in China, exactly these four core cities plus Tianjin in the Beijing metro area.

Fig. 5: The four economic centres of China (prefecture-level map) (Source: Author's own work)



As the map shows, the 720 km-radius described in this paper is relevant for Chinese economic geography, the borders of various centres near-perfectly fit; only Shanghai and Beijing have some overlap in Southern Shandong province and there are small gaps between Shanghai and Guangdong. Geo-economic analysis could be useful for selecting new growth centres in China in “coreless”

¹² Provincial GDP data available here: <http://data.stats.gov.cn/english/>

(white) areas to create the least possible overlaps, for example Harbin in Heilongjiang (Manchuria) or Lanzhou (Gansu province) in Northwest China.

The same method can be applied for *North America*. New York City is the undisputed economic hub of the Northeast United States, and one the two Alpha++ global cities besides London, UK (TAYLOR 2004). NYC is part of the larger Northeast Megalopolis (aka. BosWash) extending from Boston, Massachusetts to Washington D.C. Interestingly, this conurbation meets the presented criteria as NYC (Manhattan) is at 216 miles from Boston and 225 miles from Washington D.C., these two cities being at the edges of the NYC core region. This core region had a GDP of 3645 billion USD in 2015¹³, somewhat lower than the Lower Rhine core (4075 billion). The Northeast core GDP equalled 20,2% of the US GDP (18 037 billion USD according to World Bank), and the edges of the New York centre (720 km/440 miles) end around the Canadian Montreal-Ottawa-Toronto-Hamilton line.

California can be described as two contiguous cores around San Francisco (roughly 1000 billion USD) and Los Angeles (roughly 1450 billion USD) forming the “California Economic Centre”. The other two economic core regions in the US which surpass the 1000 billion USD GDP limit are the Texas Triangle (Dallas-Houston-San Antonio) and Chicago/Great Lakes. The New York City and Chicago centre meet around Youngstown, Ohio (being at 403 miles from Chicago and 398 miles from NYC), near the Ohio-Pennsylvania border. A comprehensive analysis of North American economic regions is not the purpose of this study; I only wanted to demonstrate that the seemingly arbitrary distance chosen to define the European economic centres also fit for China or North America.

The described geo-economic rules can be used in the future especially in non-industrialized developing countries to optimize the internal trade flows/investments and to create economically reasonable international economic organization. However, this is not an easy task. Many developing countries have realized the importance of relocating their capitals to a more central location in the country, but usually economic activity has not been relocated. Most notably stock exchanges stayed in big coastal cities regardless of moving the administrative capital (Lagos vs. Abuja in Nigeria; Karachi vs. Islamabad in Pakistan; Sao Paulo and Rio de Janeiro vs. Brasília in Brazil etc.), representing the real economic centres.

CONCLUSION

The most important conclusion for states/regions on the Periphery is that they will have a constant and significant drawback due to transportation costs in the main EU/EEA markets, which should be offset by high-tech, high value-added production / non-transport related services or specialization into a very specific segment of the European economy where the Core/Centre is non-competitive by objective reasons (Spain’s globally dominant olive industry can be such an example). If none of these could be achieved, integration with less prosperous but still important alternative centres (Moscow or Istanbul) could be considered as a more profitable alternative.

From a strictly geo-economic point of view, Brexit is an illogical move as London is part of the Lower Rhine core region, the whole England and Wales falls into the Centre, only Scotland and Ireland being semi-periphery. As for the common currency, also the ideal currency union (€) for the Lower

¹³ <https://www.bea.gov> see Supplementary Table

Rhine Centre would be Benelux, Germany, France, UK, Switzerland, Austria, Denmark and probably Czechia (potentially rivalling the global currency role of the USD) – while in reality, Switzerland, UK and Denmark are the main opponents of Euro. Somewhat counter-intuitively, semi-peripheral and peripheral countries adopted the Euro in large numbers, resulting in loss of competitiveness and debt crises (Greece, Cyprus, Spain, Portugal, Ireland, but also threats for the banking system in Italy). It is also important to note that the Lower Rhine core economic area has the largest GDP concentration in the World, even surpassing the New York core (BosWash) area, and nearly equalling the total Japanese GDP, regardless of comparatively slow economic growth in Europe in the recent years. Emerging core regions in China and California are still much behind. Therefore, the Lower Rhine core would keep being the most attractive market for other European countries in the semi-periphery. Geo-economic rules could be used in future industrial development plans in the developing world as well as in presently semi-peripheral and peripheral areas, but moving economic centres or founding new ones are a rather difficult task, as the recent history of developing countries shows.

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