Economic growth on the periphery: estimates of GDP per capita of the Congress Kingdom of Poland (for years 1870–1912)

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This paper presents the estimates of the gross domestic product (GDP) of the Congress Kingdom of Poland for the period 1870–1912. The authors used bottom-up methodology and calculated sectoral added values using historical economic, social, and demographic data. The presented results offer first ever insight into the structure of sectoral added values in the Congress Kingdom of Poland during the period of first globalization and first reliable estimates of GDP of the Congress Kingdom of Poland. All results are presented in Geary–Khamis dollars PPP1990 and are compatible with Maddison dataset.

1. Introduction

The Congress Kingdom of Poland was established in 1815 because of the Vienna Congress agreements.1 It was a country the size of one-third of contemporary Poland, with Warsaw as a capital city. The country was landlocked, and its neighbouring countries were Russia, Prussia, and the Habsburg Empire. From 1815 until 1830, this Kingdom enjoyed a considerable degree of autonomy in internal politics and differed from Russia in terms of legal and administrative institutions. However, after the November Uprising (1830–1831) the autonomy was reduced, and martial law was enacted for a few decades. The Russians also established a new customs border between the Russian Empire and the Congress Kingdom. This border was cancelled in 1851 and the next few years were a period of economic and political liberalization. After the January Uprising (1863–1864), Russia finally cancelled almost all the vestiges of Russian Poland’s autonomy (Koryś 2018).

Polish historians have a positive view of the economic development of the Congress Kingdom after the January Uprising. It is argued that its advantageous location between Russia and Western Europe, the remaining institutional and regulatory differences between Russia and the Congress Kingdom, and the emancipation of peasants led to rapid economic growth and industrialization. Furthermore, Russian Poland is considered as an example of a country that benefited from a customs union with an empire (Luxemburg 1898; Berend and Ränki 1982; Kochanowicz 2006; Berend 2012). However, these arguments lack of sound quantitative support. This paper aims to address this problem by providing the first estimates of the gross domestic product (GDP) of Russian Poland during its industrialisation between 1870 and 1912.

1 Hereafter, we will employ indistinctively their different names: Congress Kingdom or Russian Poland.
The paper is divided into eight sections. The first section is a literature review, and the second one discusses the previous research on Polish GDP. The third section presents the method and the sources used in our estimates. The subsequent section presents the new GDP estimates and compares them with estimates for Imperial Hungary. We have chosen Imperial Hungary for comparison because there are arguments that its economy belongs to the same group as that of the Congress Kingdom (Berend and Ránki 1982), and the socio-economic and political contexts of development were quite similar (Sosnowska 2019).2 The subsequent three sections are devoted to the development of the three main sectors of the economy: agriculture, industry, and services. We present a comparative analysis of GDP per capita in Russian Poland and selected European economies in the last section.

2. Literature review

Contrary to other Eastern European countries, Poland has received some attention in the ongoing “little divergence” debate. Malinowski (2016a, 2016b) and Malinowski and Van Zanden (2017) have estimated GDP per capita for Lesser Poland (the southern part of the Polish-Lithuanian Commonwealth) in the pre-modern period. Their new estimations expose the backwardness of the Polish economy characterized by second serfdom in agriculture and little importance of urban areas, and slow urbanization. The level of Poland’s economic development was not only far lower than that of the European core but also significantly lower than that of the less developed Western European economies such as Germany and Sweden.

Poland was also a backward country during most of the 19th century. Malinowski and Van Zanden (2017, 400–401) show that Poland experienced slow economic growth until the second half of the 19th century. Consequently, Polish income levels remained far behind the industrial newcomers: Belgium and Germany. Similarly, Maddison’s GDP data (Maddison Project 2013; Bolt and Van Zanden 2014; Maddison Project 2018) show that Polish sustained growth path only began in the late 19th century.

Polish historians agree that the Congress Kingdom’s economy was backward until the 1870s. Traditional inefficient agriculture dominated the economy, but some manufacturing development took place. In the 1820s and 1830s, the government in Warsaw introduced economic reforms and a policy of fiscal expansion to develop mining and the steel and textile industries. This government’s investments in mining and heavy industry were highly inefficient, and the politics of state-led industrialization spectacularly collapsed (Jedlicki 1964). Łódź area also experienced rapid development of a highly protected textile industry (Missalowa 1964). After the November Uprising (1830–31), Russian governments phased out public investments.

On a sharp contrast, Russian Poland’s economy experienced fast industrial growth and structural change during the last three decades of the 19th century, (Ihnatowicz 1965; Łukasiewicz 1988; Puś 2014). This rapid development put the Congress Kingdom among the most developed regions of the Russian Empire (Kochanowicz 2006). Three centres concentrated most of the industrial development: Łódź, Warsaw, and the Dąbrowa Basin on the border with Upper Silesia.

2 Until the mid-19th century, Hungary and Poland had similar socio-economic structures rooted in the preindustrial period, based on the serfdom of peasants and political domination of the nobility. Both countries belong to the “sleeping” peripheries with backward economic and social institutions (Berend 2012, 317–320). They were also politically subordinated to the neighbouring monarchies despite national uprisings against the foreign domination.
What are the causes behind this rapid economic development? Literature has pointed out that both home and external forces helped Polish economic growth. Russian Poland took advantage of its location, relatively easy access to foreign capital, and direct foreign investments. The development of infrastructure, particularly railways, removal of customs procedures, and enfranchisement of peasants in 1864 also contributed to rapid growth. Despite the loss of its autonomy, Russian Poland preserved some of its distinct legal and regulatory institutions (e.g., the Napoleonic code), which led to relatively more favourable conditions for entrepreneurs than those in other Russian territories. On the other hand, several authors (Berend and Ránki 1982; Berend 2012) following the seminal contribution of Rosa Luxemburg (1898) have linked rapid development and modernization of the Congress Kingdom with its incorporation into the Russian Empire. The Congress Kingdom benefited from the growing Russian demand for manufacturing products because of the peasants’ emancipation (Jezierski 1967), particularly between 1870 and 1890 (Łukasiewicz 1988).

3. The historical GDP estimates for Poland

This article is one of the first attempts to calculate the historical GDP of the Congress Kingdom. Until recently, there have been virtually no GDP estimates for Russian Poland and only a handful for the Polish lands during the period under analysis. Researchers computed production indicators (manufacturing and agricultural output and foreign trade) but not GDP estimates during the Socialist era (Łukasiewicz 1963, 1968; Puś 1997; Wyczański 2006).

In their paper on the regional growth of Austro-Hungary, Good and Ma (1999) estimated the GDP of the formerly Polish province Galicia and then extrapolated the results to the whole of modern Poland. Their method raises two main methodological caveats. First, Good and Ma calculated the GDP levels for the territories of modern East-Central European countries employing calibrated values obtained from a regression with data from the most developed European countries. Second, the reconstruction only used data for the Austro-Hungarian lands. However, the old Austro-Hungarian Polish lands were hardly representative of the whole of Poland. Finally, new direct estimates of the Galician GDP (Schulze 2007a) show a very different picture of the development of this region.

Wójtowicz (2006, see also Wójtowicz and Wójtowicz 2009) produced historical estimates of Poland’s GDP per capita since the year 1000. As Malinowski (2016a) pointed out, the methodology and data of this estimation are vague and largely undisclosed. More recently, Malinowski and Van Zanden (2017) have estimated the GDP per capita of the Cracow Voivodeship from the 15th century till the end of the 18th century. They have also extrapolated their results to the 19th century using econometric methods (Malinowski and Van Zanden 2017) with low-quality data (Bukowski et al. 2019). Finally, Bukowski et al. (2019) have produced a general view of the economic development of Polish lands (divided into three parts along the post-Vienna Congress borders) from 1790 until 1910.

3 Our early regional estimates for the Congress Kingdom covered only 2 years only, namely 1900 and 1910 (Bukowski et al. 2017). In these earlier estimates, we used the industrial production of Puś (2014) resulting in higher GDP levels than in this article.
4. Deriving GDP estimates for the Congress Kingdom

Instead of the top-down approach used by Bukowski et al. (2019) and the previous estimates, we employ the bottom-up approach like those employed by Schulze (2000) for Austro-Hungary. Specifically, we estimate the gross value added (GDP) from the producers’ side in six subsectors of the economy (agriculture, mining and manufacturing, construction, handicraft, trade and communications, public and private services, and housing). These new estimations are at 1913 prices. In mining, manufacturing, and handicraft, our source is available regional data (from the governorates). The data for agricultural output comprise evidence on six major crops, straw, hay and gardens’ production, forestry, and livestock. The available information for the tertiary sector of the economy (services) is sparse. Despite this, we can estimate the main branches of services, including trade, transport, communications, domestic and private services, banking, and housing. Value added is calculated as outputs’ share, as described in the Appendix in greater detail.

In our estimation, we use both information from statistical bureaus of the Congress Kingdom and Russia (Rosii 1906; Grabski 1914, 1915; Strasburger 1916; Janicki 1918; Obzory Gubernii 1870–1912) and statistical information already collected by Polish researchers (Lijewski 1959; Jezierski 1967; Łukasiewicz 1968; Żarnowska 1974). Polish historians often criticised the quality of official statistics (Kaczynska 1970; Puś 2014) but without any detailed analysis of these sources. Szulc (1920) provides our population data.

The major problem in our new estimation is the limited availability of data on outputs, labour force, prices, and wages of different sectors, especially in the services. Because of the lack of accurate data in some branches of the economy, we resort to proxies and interpolations to estimate the value added of several subsectors.

Our initial gross value added estimation is in roubles. However, to make the results international comparable, we convert this initial estimation to the Geary–Khamis dollars 1990 (GK$1990) using the Russian ratio of 12.4 dollars for one 1913 rouble (Markevich and Nafziger 2017). This ratio is problematic due to the substantial differences in price levels and income levels across Russian regions. Unfortunately, the available data on prices, and incomes, in Congress Poland are not enough to fully reconstruct the differences. This limitation of the data likely understates Congress Poland GDP. Sparse data indicate that the purchasing power of the rouble was slightly higher in Congress Poland than in the rest of the Russian Empire.

5. The new estimates of GDP and GDP per capita

We estimate sectoral added values in the economy of Russian Poland, and we compare them with estimates for Hungary. Therefore, we can trace the evolution of the structure of its economy, and the increasing role of manufacturing, mostly due to the development of modern industry in the late 19th and early 20th centuries. Table 1 presents the GDP structure in 1870, 1890, and 1910. The most important pattern is the declining share of agricultural production from more than 61 percent in 1870 to about 47 percent. Simultaneously, the share of modern industry grew from 6 percent to more than 17 percent.

Russian Poland developed slightly faster than Imperial Hungary. In the period 1870–1910, the GDP of Imperial Hungary grew 2.13 percent per year, while the GDP of the Congress Kingdom 2.84 percent per year. The sectoral structures of both economies and their changes also differed. Table 2 presents the comparison of the shares of their main sectors in three benchmark years, namely 1870, 1890, and 1910.
The Congress Kingdom and Imperial Hungary experienced divergent structural change during the period. Between 1870 and 1910, the share of the secondary sector is higher in Russian Poland than in Hungary. Instead, the share of its tertiary sector is minor. Furthermore, the share of the primary sector declined in the Congress Kingdom while remained stable, or even grew, in Hungary.

Contrary to absolute GDP growth rates where Russian Poland grew faster than Hungary, overall per capita GDP growth rates were practically identical. Furthermore, if one considers shorter periods, both economies showed no synchrony in their economic development (see tables 3 and 4). During the 1870s, the Congress Kingdom’s economy grew slightly faster than the Hungarian one, which experienced a slowdown (Komlos 1983). The agricultural crisis of the 1880s (Łukasiewicz 1968) led to a long period of economic stagnation in Russian Poland while Hungary maintained the fastest growth rates of the overall period. The situation changed during the 1890s when Russian Poland’s growth rates doubled those prevalent in...
Table 4. Average growth of GDP per capita, 1870–1912 (in percentage)

| Year       | Congress Kingdom | Imperial Hungary |
|------------|------------------|------------------|
| 1870–1880  | 1.76             | 1.36             |
| 1880–1890  | 0.00             | 1.61             |
| 1890–1900  | 2.28             | 1.11             |
| 1900–1910  | 0.85             | 1.42             |
| 1870–1912  | 1.32             | 1.37             |

Source: see the text, Schulze (2000).

Table 5. Sectoral productivity per worker (GK$1990)

| Sector | Congress Kingdom | Imperial Hungary |
|--------|------------------|------------------|
| VA per worker | 1870 | 1897 | 1910 | 1870 | 1910 |
| Primary | 1,229.0 | 1,277.1 | 1,864.3 | 1,128.2 | 2,209.8 |
| Secondary | 2,472.0 | 4,845.9 | 5,659.7 | 2,741.3 | 5,055.9 |
| Tertiary | 1,932.1 | 2,693.8 | 3,065.5 | 3,047.2 | 4,672.1 |

Source: see the text, Schulze (2007b).

Hungary. Finally, the first decade of the 20th century was another period of slow growth in the Congress Kingdom while the Hungarian economy progressed faster. The Russian Empire, including Russian Poland, faced a socio-economic crisis that resulted in the Revolution of 1905.

Population growth in the Congress Kingdom was faster than in Hungary, which explains why while absolute GDP grew faster in the former than in the latter, despite their GDP per capita grew at similar rates. A by-product of this demographic expansion was a rapid increase of Russian Poland’s labour force, which affected both levels and growth rates of productivity. Interestingly, labour productivity in its industry was like those prevalent in Hungary but was lower in the other two economic sectors (table 5).

This paradoxical situation was the consequence of different comparative advantages and institutional conditions of the Congress Kingdom and Hungary. These two structural factors were more decisive than the similarities resulting from their closer geographical location, similar initial levels of development, previous common history, and comparable social structure (Sosnowska 2019). In Russian Poland, the most relevant factor in industrial development was the location between Germany and Russia. The proximity to Russia enabled access to its large market, and the German closeness encouraged Western foreign investments (Ihnatowicz 1972; Pytals 1994). Conversely, the high population density, the dispersed agricultural ownership, and the relatively low-quality land constrained agricultural productivity (Łukasiewicz 1968). The development of services, in particular the development of public

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4 Our sources for the labour forces are the following. For 1897, census data is available, but we have introduced some further adjustments to this information. Zarnowska (1974) provides information for 1897 and 1913 on industry and services employment. Puś (2014) computed industry workforce for selected years, but his figures are not very reliable. Koszutski (1905) and Załęski (1900-1901) provide information on employment in industry and crafts before 1897. Finally, we estimate the agricultural workforce as a share of the population of villages and towns with less than 2000 inhabitants with the database of Bukowski et al. (2019).
Estimates of GDP per capita of the Congress Kingdom of Poland (for years 1870–1912)  

Table 6. GDP per capita for the Congress Kingdom/Russian Partition/Poland: alternative estimates

|                              | 1870  | 1890  | 1913  | Growth 1870–1913 |
|------------------------------|-------|-------|-------|------------------|
| Congress Kingdom (1990 GK$)  | 951   | 1,081 | 1,651 | 1.32             |
| Russian partition (Bukowski et al.) (1990 GK$)* | 896   | 1,236 | 1,769 | 1.59             |
| Poland                       |       |       |       |                  |
| Maddison Project 2013 (1990 GK$) | 946  | 1,739 | 1.43  |
| Maddison Project 2018 (2011 GK$) | 1,921 | 3,383 | 1.32  |
| Wójtowicz (2004 GK$)         | 1,610 | 2,950 | 1.42  |
| Malinowski and Van Zanden (1990 GK$) | 987  | 2,430 | 2.28  |

Sources: see the text, Bukowski et al. (2019), Maddison Project (2013, 2018), Wójtowicz (2006), Malinowski and Van Zanden (2017).

*We recalculated the results to GK$1990 for the sake of comparison. GDP is for 1910 instead of 1913.
‡1890 was the peak of an economic slowdown resulting from a collapse in agriculture. 3 years earlier and 3 years later the levels of GDP were over 1,200.
†Data for 1912.

services (except the army), was hampered by the Russian state’s policy. Russian strategic policies also hindered the development of its transport infrastructure (Lijewski 1959). In sharp contrast, Imperial Hungary enjoyed considerable political autonomy developing its independent administration, education system, and transport infrastructure.

An informative exercise is to compare our new GDP per capita calculations with previous top-down estimates for Poland. However, these comparisons should be treated with caution since the Congress Kingdom covered only about one-third of the current Polish territory. Bukowski et al. (2019), with a method based on urbanization rates for every 20 years, computed GDP per capita growth for the Russian Partition. Albeit the Congress Kingdom and the Russian Partition occupied practically the same territories, the latter was somewhat bigger. The Partition included the part of Grodno Governorate, which is within the current borders of Poland and was outside the Congress Kingdom, and excluded part of the Suwałki Governorate, which is currently within Lithuania. Despite these disparities in methodology and coverage, differences between these two estimations are within 5 percent (table 6). However, the estimations of Bukowski et al. (2019) do not reflect the short-term agricultural crisis in 1890. Surprisingly, our growth rates are like those of the Maddison Project (2013, 2018) and Wójtowicz (2006), despite both studies cover the territory of contemporary Poland. Unfortunately, due to the use of different exchange units, our GDP levels and Wójtowicz ones are impossible to compare. Finally, the recent estimates of Malinowski and van Zanden (2017) covering the territory of contemporary Poland are much higher than ours and, hence, the other estimations.

6. Primary sector

As we have shown in table 1, agriculture was the most important sector in the economy of the Congress Kingdom. Also, most of the labour force worked in this sector (Koryś and Tymiński, 2015). However, its relative importance declined from 63 percent of the GDP in 1870 to about 47 percent in 1912. Accordingly, agrarian growth rates were slower than overall GDP growth rates.
Table 7. Average annual growth of value added in the primary sector 1871–1912 (percentage)

|                  | Congress Kingdom | Imperial Hungary |
|------------------|------------------|------------------|
| 1871–1885        | 3.40             | 1871–1879        | 1.31             |
| 1885–1897        | −0.27            | 1879–1895        | 3.04             |
| 1897–1912        | 3.91             | 1895–1912        | 1.80             |
| 1871–1912        | 2.35             |                  | 2.08             |

Source: see text, Schulze (2000, 319). For the comparison, we chose the years that were the turning points in the agricultural development of both countries. In the case of Hungary, 1879 was the last year of stagnation in agriculture, and 1895 was the last year of the period of rapid growth. In the case of the Congress Kingdom, 1885 and 1897 were the beginning and the end of an agricultural crisis.

Overall agricultural growth rates in Russian Poland and Hungary were quite similar, but the Congress Kingdom agriculture grew slightly faster (table 7). However, for 1870–1912, the 2 percent annual growth rate of the main cereals was the same as in Imperial Hungary (Katus 1970; Komlos 1983). In the Russian Empire, cereals also grew at the same rate between 1860 and 1915 (Goldsmith 1961).

As happened in overall GDP growth rates (see table 1), Russian Poland and Hungary showed little short-term synchrony in agricultural development. During the 1870s, Russian Poland agriculture experienced robust growth rates because of the enfranchisement reform and land transfer to peasants after the January Uprising. These resulted in structural changes in agriculture, the increase in arable land, and changes in the structure of crops (Łukasiewicz 1968). Also, a growing rural–urban migration increased the demand for agricultural products. Conversely, Hungary faced the slowdown of its agricultural production (Komlos 1983), which also affected the Polish lands within the Habsburg Empire and Germany (Łukasiewicz 1968).

From 1880 until 1997, the Congress Kingdom suffered an agrarian crisis (Łukasiewicz 1967, 113–141) due to the influx of cheaper grain from Russia (Jezierski 1967, 183–184, Sobczak 1968, 39–41). Other Central European countries had experienced similar agrarian crisis few years before. This crisis led to changes in both: production methods, with the introduction of modern techniques, and in the structure of agricultural outputs (Łukasiewicz 1967, 81). There was a relative increase in the importance of potato and sugar beet, while the relative importance of cereal crops decreased (table 8). Rye remained the most important cereal, accounting for about one-third of output until the end of the period.

The climate partly explained crop specialization. Hungarian crops production was dominated by wheat, corn (which was not produced in Russian Poland at all), potatoes, and sugar beets, while the major crops in the Congress Kingdom were rye, oats, and potatoes. Sugar beets production was more important in Hungary due to the higher level of agrarian development. However, the evolution of crop specialization had some similarities due to the increasing importance in both countries of some new crops, as potatoes.

The size and structure of livestock output in Russian Poland between 1870 and 1912 are difficult to estimate because of the lack of reliable data. As Sobczak (1959, 1961) indicated, the structure of the livestock, breeds, and sizes of breeding animals changed during the period. Łukasiewicz (1968) pointed out that the overall importance of livestock production

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5 The same problem occurred in the estimation of livestock production for the whole Russian Empire (Goldsmith 1961).
Table 8. The main crops (percent)

| Crop       | Congress Kingdom |  | Imperial Hungary |  |
|------------|------------------|---|------------------|---|
|            | 1870  | 1912  | 1870  | 1912  |
| Wheat      | 13.9  | 11.6  | 24.8  | 20.2  |
| Rye        | 35.9  | 31.8  | 18.3  | 5.9   |
| Barley     | 9.3   | 8.6   | 19.8  | 6.5   |
| Oats       | 18.5  | 15.6  | 8.0   | 4.8   |
| Corn       | 0.0   | 0.0   | 18.7  | 24.4  |
| Potatoes   | 21.3  | 28.9  | 11.9  | 23.0  |
| Sugar beets| 1.2   | 3.4   | 3.9   | 20.5  |
| Total      | 100.0 | 100.0 | 100.0 | 100.0 |

Source: see text, Komlos (1983).

Table 9. Structure of main products of livestock production in the Congress Kingdom (percentage)

| Period       | Beef and milk | Pork | Mutton and wool | Horses |
|--------------|---------------|------|-----------------|--------|
| 1866–1869    | 41.3          | 36.4 | 7.4             | 14.9   |
| 1888–1890    | 54.9          | 27.4 | 3.5             | 14.2   |
| 1891–1895    | 59.1          | 23.8 | 3.1             | 14.0   |
| 1896–1900    | 57.5          | 24.4 | 2.9             | 15.2   |

Source: see text.

also increased during the agrarian crisis. Changes in the structure of consumer demand, particularly a general increase in meat and dairy consumption, caused these structural changes (Sobczak 1968). Since data on livestock after 1900 are less reliable (see Appendix), we restrict the structural analysis to the period 1870–1900 (table 9). During this period, the importance of sheep farming and pork production declined. In turn, the significance of the production of beef and milk grew.

7. Secondary sector

As noted above, the economic development of the Congress Kingdom is characterised by a rapid increase in the importance of the secondary sector, particularly the industry. Figure 1 shows the dynamics of industrial growth. From 1870 to 1912, the value of industrial output grew ten times at a pace of 7.3 percent per year. Growth rates were relatively stable, with a short period of decline in 1890–1891. Also, from 1899 to 1907, growth rates were only 2.0 percent per year. A similar slowdown occurred in the Russian industry (Goldsmith 1961). The remaining subsectors, construction, and handicrafts grew at a slower pace. Handicraft output multiplied less than six times, while construction output only four times. These growth rates differentials had a substantial impact on the sector’s structure (see table 11).

Table 10 compares Russian Poland secondary sector growth rates with those of Russia and Hungary. During the whole period, the Congress Kingdom grew faster than Hungary but slower than Russia. However, like in the agricultural sector, there were substantial differences in growth rates among successive decades. The fastest growth rates were in 1870s. The high
rate of labour migration from the rural to urban areas and the technological advancements in the Congress Kingdom’s industry (Łukasiewicz 1963) can explain this industrial growth spurt. The second phase in terms of growth took place in the 1890s. It was related to rapid development of modern industry in the main industrial centres of Kingdom, particularly in the Warsaw industrial area (Pruss 1977; Puś 2014).

At the beginning of the period, handicrafts were the most important subsector. By the end of the century, however, modern industry was responsible for more than half of secondary sector value added. Mining was also modernized and mechanized rapidly; so, its relative importance grew (table 11).
The textile industry was the engine of the Congress Kingdom’s industrialization (table 12). It contributed to more than one-third of industrial value added by 1910. The establishment and rapid development of a large production centre in the Łódź area in the second half of the 19th century were behind this process (Ihnatowicz 1965; Puś 1976, 2014). The cheap cotton production from the Łódź area was exported to the Russian market (Jezierski 1967, 173–179). Similar textile production centre did not exist in Hungary. Ironworking, metalworking, and engineering also grew fast (Puś 1997). Simultaneously, there was a gradual decline in the importance of the food industry, particularly the atomized production of alcohol. In Hungary, the food processing industry declined slower than in Russian Poland being the most important industrial subsector during the whole period. Hungarian food production was exported while the Congress Kingdom ones were consumed locally. Finally, the substantial development of construction materials industry in Hungary was probably related to its abundant mineral deposits.

Table 12. Shares of VA of industrial production (in percentage)

| Industry                      | Congress Kingdom | Imperial Hungary |
|-------------------------------|------------------|------------------|
| Iron and steel                | 8                | 3                |
| Engineering and metalworking | 6                | 5                |
| Textiles                      | 21               | 1                |
| Food                          | 52               | 49               |
| Construction materials        | 5                | 12               |
| Others (including chemical, wood, paper) | 9 | 30 |

Source: Schulze (2000); see the text.

Table 13. Domestic, private, and public services—share of GDP (in percentage)

| Year | Congress Kingdom | Imperial Hungary |
|------|------------------|------------------|
| 1870 | 9.3              | 20.1             |
| 1890 | 8.7              | 12.2             |
| 1910 | 6.7              | 10.8             |

Source: Schulze (2000, 2007b); see the text.

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8. Tertiary sector

The estimation of value added in the tertiary sector of Russian Poland is less reliable than the primary and secondary sectors’ estimates due both the limited amount of data and the scarce previous research. Average growth of services value added, about 3.03 percent per year, was faster than in Hungary, 1.42 percent per year (Schulze 2000).

This difference in growth rates was a direct consequence of the initial low level of the subsector “Domestic, Private and Public Services” in the Congress Kingdom. In 1870, this subsector represented less than 10 percent of the GDP in Russian Poland and more than 20 percent in Hungary. This difference between these two countries decreased until World War I but remained significant (table 13).
Table 14. Trade, transport, and financial services—share of GDP (in percentage)

|                   | Congress Kingdom | Imperial Hungary |
|-------------------|------------------|------------------|
| 1870              | 5.6              | 4.2              |
| 1890              | 7.6              | 6.4              |
| 1910              | 8.5              | 8.7              |

Source: Schulze (2000, 2007b); see the text.

The reasons for the small size of this subsector were complex. In the 1860s, after the January Uprising, the Congress Kingdom lost the remnants of its autonomy, becoming one of many parts of the Russian Empire. Many institutions were closed, and St. Petersburg directly controlled the local administration, which affected the scale and quality of public services (Chwalba 2001). This low level of public services resulted in slower development and poor quality of the educational system. Until World War I, schooling was not compulsory, and the school network (especially outside large urban centres) was weak. Population per elementary school ratio increased continuously from the 1880s onwards, from 1925 persons per school in 1882 to 2551 persons per school in 1908 (Moźdżeń 2006). Education quality was lower not only in comparison with the neighbouring countries (Germany, Austria) but also in comparison with the European governorates of the Russian Empire (Kmiecik 1963). Consequently, literacy levels were comparatively low.

This underdevelopment of the educational system had implications for the quality of the labour force. Modern factories suffered the most since they demanded a more educated workforce and hired workers with low or without education (Żarnowska 1974). This insufficient supply of educated workers affected industrial workforce productivity and slowed down the development of more sophisticated services subsectors depressing overall growth rates.

Unlike the previous subsector, trade and transport developed faster than overall GDP. The average share in GDP of trade, transport, and financial subsector was like Imperial Hungary over the entire period (table 14), and average value added growth was also similar, about 4 percent per year (Schulze 2000).

Rail transport grew fast despite its initial underdevelopment. Military reasons were behind the initial railways’ investments (Krzysica 1970). Initially, the rail network in Imperial Hungary was more developed than those of the Congress Kingdom (Katus 1970). The most relevant railway line for the Congress Kingdom’s economic development was the Warsaw–Vienna railway line built during the autonomy period in the 1840s and 1850s (Kołodziejczyk 1962). Other central connections constructed in the 1860s and 1870s linked the country with the economic and political centres of the Russian Empire. The development of industry and trade was linked with the export of industrial products from the Congress Kingdom to the rest of the Russian Empire, the import of Russian grain, and the exchange with German and Austrian markets through railway links. The growth of railway transport was also related to the transit role of the Congress Kingdom for the Russian imports and exports towards the Western markets. Warsaw was the central hub of this trade (Braun 1973). Outside of these major rail lines, the rest of the country participated less in this transport expansion.

Almost all major financial companies were in Warsaw and Łódź (Landau and Tomaszewski 1995; Kita 2015). The postal network was much sparser than in neighbouring countries. Before World War I, there was only one post office per 20,000 inhabitants in Russian Poland, one per 3,000 inhabitants in the Habsburg Empire, and one per 1,500 inhabitants in Germany. Telecommunications were also underdeveloped: in 1914, Russian Poland had one telephone...
per 288 people, the Habsburg Empire had one telephone per 233 people, and Germany one telephone per 49 people. Furthermore, the density of the telephone network differed strongly between the main cities and the rest of the country (Janicki 1918, 174–177).

The third subsector of services, housing, had a smaller share of GDP in the Congress Kingdom (8.5 percent) than in Imperial Hungary (16 percent). In the subsequent years, the relative importance of this subsector decreased in both countries but slower in Russian Poland. As a result, before World War I, the housing GDP share of both countries has converged: 8.0 percent in the Congress Kingdom and 9.3 percent in Imperial Hungary (Schulze 2000, 316). The difference in growth rates is due to faster demographic growth and urbanization due to the rural exodus towards industrial centres in Russian Poland (Jelonek 1967).

9. The economic development of the Congress Kingdom: a comparative account

According to our new figures, the Congress Kingdom was one of the economically European backward economies in 1870. According to Berend and Ránki (1982), Central and Eastern European countries (including the Congress Kingdom), the Baltic States, Finland, and Italy “had started on the road to thoroughgoing economic change,” while the Balkans and most Mediterranean countries “had hardly started on the road to change, or were bogged down at the very start” (1982, 159–160). Regarding the Central European region, in particular the Habsburg Empire, a similar opinion was formulated by Klein et al. (2017).

The Congress Kingdom’s growth rates were like in Imperial Hungary, but slower than in today’s Hungary and Finland. It grew faster than other southern European countries and the western regions of the Habsburg Empire, Austria, and Czechia. By contrast, the Congress Kingdom’s economic development was significantly slower than that of Sweden (see table 15). Comparison with Russian Empire is not straightforward due to the lack of estimations for the entire period. However, from 1885 to 1913, the Russian Empire grew faster at 1.9 percent per year (Allen 2003; Markevich and Nafziger 2017) than the Congress Kingdom, which grew at 1.1 percent per year.

One can expect that the economically backward Congress Kingdom should converge towards the most developed countries by adopting foreign technologies. However, this did not happen. Growth rates in the Congress Kingdom and other countries of the Central and Eastern European region were slower than that in the core European economies except for the UK. Specifically, Germany (1.61 percent) and the United States (1.82 percent) grew faster than these countries despite departing from the highest levels of per capita GDP. Consequently, these countries remained semi-peripheries of the West (Klein et al. 2017).

Our new estimations also confirm Williamson’s analysis on industrialisation (Williamson 2011), but not the optimistic views of Berend (2012). Industrial growth was slightly faster than in Imperial Hungary (see section 6) but slower than in Imperial Russia (Goldsmith 1961; Markevich and Nafziger 2017). These results undermined the hypothesis that industrialisation in Russian Poland benefited from a customs union with the Russian Empire (Luxemburg 1898; Berend and Ránki 1982; Kochanowicz 2006; Berend 2012). Contrary to Russia, it was little state financial support to the industry, and state infrastructure investments were less substantial. Furthermore, given the Russian policy, infrastructure did not develop enough, and the educational system was underdeveloped (Kmiecik 1963). Consequently, catching
Table 15. GDP per capita (GK$1990) and average annual growth 1870–1913

| Country              | 1870  | 1912/1913 | Growth (percentage) |
|----------------------|-------|-----------|---------------------|
| Congress Kingdom*    | 951   | 1,651     | 1.32                |
| Imperial Hungary     | 978   | 1,722     | 1.32                |
| Imperial Austria     | 1,421 | 2,222     | 1.05                |
| Modern Czechia‡      | 1,699 | 2,644     | 1.11                |
| Modern Hungary       | 1,110 | 2,021     | 1.40                |
| Finland              | 1,140 | 2,111     | 1.44                |
| Sweden               | 1,345 | 2,874     | 1.78                |
| Portugal             | 975   | 1,250     | 0.58                |
| Spain                | 1,207 | 2,056     | 1.25                |
| Greece*              | 1,216 | 1,967     | 1.15                |
| France               | 1,876 | 3,485     | 1.45                |
| Germany              | 1,839 | 3,648     | 1.61                |
| UK                   | 3,190 | 4,921     | 1.01                |
| USA                  | 2,445 | 5,301     | 1.82                |

Source: The Congress Kingdom—see the text, Imperial Hungary, Imperial Austria—Schulze (2007b), modern Czechia—Schulze (2007a), modern Hungary—Klein et al. (2017), other countries—Maddison Project (2013).

Notes:
*In the cases of the Congress Kingdom and Greece 1912 instead of 1913.
‡Czechia consists of the Bohemia and Moravia provinces and a half of Austrian Silesia; 1910 instead of 1913.

up with the developed economies did not occur, and the development of the economy was slightly slower than in other countries of the region.

10. Conclusions

Economic growth was similar across Central Europe from 1870 until World War I. The Congress Kingdom was neither the slowest nor the fastest growing country in the region. Like in other European peripheral countries, except Scandinavia, catching up did not take place.

The Congress Kingdom was in a customs union with Russia from 1851. It was incorporated into the Empire in the 1866, soon after the January Uprising (1863–1864). Increasing trade and business co-operation should have contributed to the synchronization of the economic cycles between the Congress Kingdom and Russia. However, the available data do not show this. Furthermore, the Russian policy towards the Congress Kingdom resulted in a shortage of public funds for infrastructure investment, education, and industrial development. Consequently, the less developed and industrialised Russia grew faster than Russian Poland.

Although the Hungarian economy was in a similar situation within the Habsburg Empire, some significant differences stand out. The level of economic and technological development of the Austrian lands, especially the provinces of Austria and Czechia, clearly exceeded that of Hungary, which meant that Hungary benefited from its customs union with Austria (Komlos 1983; Good 1984). In the Polish lands, the union with Russia, a poor and backward country, mainly brought benefits to a narrow group of entrepreneurs in the Congress Kingdom. This did not translate into a significant improvement in the overall quality of life (Kołodziejczycy 1979) and rapid convergence with the West. Moreover, the economic distance between the better developed Kingdom and the metropolis—Russia—was slowly shrinking.
Although our new estimates answer some important questions, there are many points that require further research and in-depth analysis. Two of these areas seem to be of the greatest importance. There is a lack of research on Russian Poland’s occupational structure in the 19th century. The other important area that seems to require in-depth analysis is the development of the service sector.

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Supplementary material

Supplementary material is available at European Review of Economic History online.

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