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MACIEJ BUKOWSKI
MICHAŁ KOWALSKI
MARCIN WROŃSKI

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The Economic Growth and Regional Convergence in Interwar Poland: Detailed Historical National Accounts

Maciej Bukowski[1*], *Michał Kowalski*[1], *Marcin Wroński*[2]

[1] *University of Warsaw, Faculty of Economic Sciences*
[2] *Warsaw School of Economics, Collegium of World Economy, Minda de Gunzburg Center for European Studies*
**Corresponding author: mbukowski@wne.uw.edu.pl*

Abstract: We provide the first estimate of the Polish national, regional and sectoral GDP in the interwar period. We find that the Polish economy's performance in the interwar period was much better than it was assumed before. In the years 1924 – 1938, the real GDP per capita increased by almost 40% or by 2.3% annually. As economic growth was stronger in the poorer regions significant regional convergence was achieved. Our results challenge the dominant narrative about the weak performance of the Polish economy in the interwar years.

Keywords: economic history, Poland, Great Depression, regional convergence, economic growth

JEL codes: N10, N14, N90, N94

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1. Introduction

The interwar period has often been perceived as a prolonged crisis (Carr 1939; Feinstein 2008). The Great Depression to a large extent removed the booming 1920s from popular memory. This includes the Central and Eastern European states whose economic performance before the Second World War is usually perceived critically, both in the popular discourse and the economic literature. At the same time, despite the recent progress on historical national accounts, the vast majority of Central and Eastern Europe still miss the detailed data on GDP or productivity development between 1920 and 1939.

Existing literature on the economic history of Central and Eastern Europe presents a bleak picture of its economic development in the interwar years. Region's economy is usually described as "*decades of crisis*" (Berend, 1998), and "*Europe's Third World*" (Aldercroft 2006). In particular, Berend (1996) depicts the trajectory of CEE economies in the twentieth century as a "*detour from the periphery to the periphery*" (Berend 1996). Similar views have been expressed regarding Poland. Landau & Tomaszewski (1967 – 1989), the authors of the classical Polish monography of the interwar economy doubt, whether Poland's output in 1938 was higher than in 1913. Also, Koryś states that "(various) *data and information* (…) *suggest rather sluggish economic growth of Poland during the interwar period*" (Koryś 2018, p. 244). Although Morys (2021) recently challenged the dominant view by showing that Central and Eastern Europe performed better than previously thought, achieving higher economic growth than Western Europe (contrary to the period from 1870 to 1913), his analysis does not include Poland.

In this paper, we reconstruct GDP, GDP per capita and labor productivity figures for interwar Poland both at national, regional and sectoral level. Our estimates provide – to our knowledge - the most advanced historical national accounts available for Central and Eastern

European countries in the interwar period. The paper is accompanied by a statistical database that presents these statistics together with population and employment for the use of other scholars. The estimated historical national accounts are coherent with the modern System of National Accounting. Due to the constraints on the data availability our estimates cover the years 1924 – 1938. However, we also compare the level of output against 1913. For the international comparability, we convert our estimates from złoty to 1990 GK$. We also present an approximate estimate for the current (post-WW II) borders.

We find that the economic performance of the Polish economy was much better than the existing qualitative consensus suggests. The real GDP per capita grew by 2.3% annually which is close to the European average of the period. All sectors of economies expanded, but the rate of their growth differed. It was highest for agriculture, which increased its yields due to the proliferation of modern agricultural production methods in laggard eastern regions. The industry suffered in the mid-1920s from price stabilization reforms introduced after the hyperinflation of the early 1920s and the tariff war with Germany. Moreover between 1930 and 1932 industry was substantially hit by the Great Depression before recovering fully until 1938. The service sector after 1929 experienced weak growth, mainly due to the recession of private services offset by the steady growth in public service employment and output. As the economic growth was higher in the laggard regions significant regional convergence was observed. The strong economic performance in Poland, driven primarily by the high growth rate of agricultural output, resembles the experience of some Southeastern European countries in the same period (Morys 2021). Bulgaria is a leading example of a country, that achieved strong economic growth due to the rapid increase in the productivity of agriculture (Ivanov and Tooze 2007; Ivanov 2012). Turkey also experienced rapid

economic growth in the 1920s and 1930s fueled mainly by the high growth of the value added in the primary sector (Pamuk, 2018).

Nevertheless, the interwar period was far from perfect. The reduction of Polish output during the Great Depression was among the largest in Europe. The unsuccessful result was attributed to the erroneous macroeconomic policy based on maintaining the gold standard for too long by the Sanacja governments (Drozdowski 1963; Knakiewicz 1967; Wolf 2007; Allen 2020; Don-Siemion 2021). At the same time the impact of the Great Depression varied strongly across the major sectors of the economy with agriculture hit the most, largely due to extraordinarily high relative prices of commodities in 1928 that subsequently collapsed during the Depression. Outside of agriculture initial economic recovery of the mid-1930s was largely jobless except for the public sector which gradually increased employment over the entire 1930s. In private services, higher output was achieved mainly by rising labor productivity with employment hardly growing till the end of the 1930s. In the industry demand for labor started to rise after 1932 but remained sluggish until 1936 when production accelerated. In consequence, the one million jobs in industry and private services that disappeared during the recession weren't recreated before the end of 1938 when the employment level was still slightly lower than in 1928 (4.0 million vs. 4.2 million). This was problematic from the social point of view as in the 1930s at least one million new urban workforce entered the workforce.

The impact of the Great Depression on individual incomes was therefore very diversified. In the private economy, those who kept their jobs experienced real gains as nominal salary cuts were lower than deflation. On the other hand unemployed were not that lucky. The unequal distribution of the costs of the Great Depression helps us to better understand the economic roots of the social upheaval of the 1930s. In this decade mass waves of peasants' protests and labor strikes

shook the country, politics radicalized and social tensions rose. That kind of phenomenon rarely has a monocausal interpretation, but in our view, the skewed distribution of economic growth in the 1930s was a major factor contributing to the social unrest. The public service sector, the safe harbor during the Great Depression employed mostly Poles, which increased the interethnic inequalities in the distribution of output. While in the 1920s, government employment, together with the developing private economy successfully accumulated the younger birth cohorts, the stagnation of labor demand after 1928 reduced the economic opportunities for the younger generation contributing to the social and political tensions of the era.

2. Literature review

The last comprehensive monograph on the interwar Polish economy was written half a century ago by Landau & Tomaszewski (1967 – 1989) in Polish and – in the much shorter version – in English (Landau and Tomaszewski 1985). The four volumes published over twenty years include a rich presentation of the statistical data on Poland and a discussion of contemporary publications on the interwar economy. The authors discuss the official statistics prepared by the Polish Statistical Office but generally do not supplement them with more detailed estimates. Despite the appreciation of some achievements of interwar Poland, especially in the area of market integration (confirmed empirically by Wolf, 2005 and Trenkler & Wolf, 2005) and the introduction of better agricultural production methods in the eastern regions of the country their general assessment of the economic development in the period is rather negative. They conclude that it is doubtful whether the national income in 1938 was higher than in 1913. The negative assessment of the Polish economy's performance in the interwar period is also present in seminal post-war publications (Taylor, 1952; Spulber, 1957; Kaser & Radice, 1985).

Koryś in his hovel monograph which is probably the best source on modern Polish economic history available in English to date, concludes that "*In the interwar period Poland did not manage to achieve developmental success*" (Koryś 2018, p. 245) but at the same time he indicates: the unfavorable environment that impacted these outcomes which he measures with diversified although unintegrated statistics. He points at many circumstances with which Polish governments had to struggle. This includes deep damage to the industrial capital during World War I and the Polish-Bolshevik War of 1920, the tariff war with Germany, the Great Depression of the 1930s, shortage of local capital and internal social tensions as factors that could negatively affect Polish economic performance during 1920s and 1930s despite reform efforts undertaken by the governments in the period.

Recent research on the standard of living "beyond GDP" challenges the grim picture presented by literature focused on narrowly defined economic performance. Improvements in public health, preventive medicine, sanitation, and infrastructure expansion contributed to rising anthropometric indicators of well-being (Ogórek, 2018; Kopczyński, 2019; Kopczyński & Rodak, 2021; Wroński, 2023a). The Augmented Human Development Index (AHDI) in Eastern Europe in 1938 was nearly 50% higher than in 1913, primarily due to improved education and life expectancy (de la Escouersa, 2022). In interwar Europe, HDI convergence was stronger than GDP per capita convergence (Broadberry & O'Rourke, 2010). However, this optimistic view of improving living conditions does not fully account for the high concentration of wealth (Wroński, 2023b), social tensions and the rise of authoritarianism.

Korys (2018, p. 244) confirms that available estimates of the Polish GDP are divergent and partial. Landau (1976) discusses some of them, mostly published during the first year of independence. He presents 15 estimates of national income in the years 1923 – 25 ranging from 8

to 25 billion zł. These estimates cover different sectors of the economy and are based on methods that are not easy to track and compare. Thus, this literature is not especially useful for modern scholars. The most important and advanced attempt to estimate national income was undertaken by Kalecki & Landau (1934, 1935), who published their GDP values for 1929 and 1933. They benefited from the earlier work on the estimation of the aggregate value of household income and its distribution (Derengowski 1933; Landau 1933, 1934; Wiśniewski, 1934). Kalecki & Landau combine a demand-based approach (estimating the total spending of various social groups) with an income-based methodology (in sectors of the economy, where data on wages was available). They estimate national income in 1929 equal at 26 billion zł, divided into market consumption: 17.8 billion zł, and natural consumption of peasants: 8.2 billion zł. For 1933 they estimate the value of market consumption at 8.9 billion and conclude that in the years 1929 – 1933, the national income declined by 51% in nominal terms and 25% in real terms. The natural consumption of peasants declined to 4.4 billion zł, so the total national income amounted to 13.3 billion (a decline of 49% in nominal terms). The second major attempt to estimate national income was undertaken by Klarner (1937), who extended the estimates of national income to the period 1929 – 1936.

The publications of Kalecki & Landau (1934, 1935) and Klarner (1937) were ambitious attempts. Their work increased our knowledge of the Polish economy in the 1920s and 1930s. While some later authors criticized their methodological approach based on the valuation of natural consumption at market prices (Marcus, 1983), this approach is coherent with modern national accounts. However, in the interwar period, the calculation of national income was still in its infancy. Therefore, the estimates published by Kalecki, Landau and Klarner are not comparable with the modern national accounts and as we show in this paper significantly underestimate the national income of Poland. The calculation does not cover the whole spectrum of public services, the

coverage of the private service sector is also less than perfect. In particular, the estimates of Kalecki & Landau imply a labor share in national income at 80% or 90% (depending on the interpretation) which is extremely high compared to the widely accepted range of 50%-70% presented in the literature for many historical and modern economies. The unreliable estimate of the labor share results from the limitation of the capital income to the taxed capital income. The taxed capital income is only a part of the true capital income. Moreover, their estimates do not cover indirect taxes, import duties and income of fiscal monopolies. All of these are a part of the GDP according to the modern system of national accounts (ESA 2010).

Quantitative estimates of Polish GDP by non-Polish authors are even scarcer. Bairoch (1976) published his estimates in 1960$. He does not, however, fully disclose his methodology and his research, although important 50 years ago, does not correspond with the modern standard of historical national accounting. Polish GDP in the interwar period has also been included in the Maddison database since the initial publications of Maddison (1995). However, the origin of the numbers presented there is not easy to trace. According to the published metadata, Łaski (1956) is a primary source. However, Łaski mainly discusses pre-war estimates of national income published by Kalecki, Landau and Klarner. Moreover, methods of the recalculation of the estimates to post-World War II borders were not disclosed. In our view, it is at least not clear how the Polish interwar GDP was recalculated and it is even doubtful whether this recalculation was undertaken. Here, it is also worthwhile to note that Łazor & Murgescu (2020) critically assess these estimates not only for Poland but also for the entire Central and Eastern Europe included in the database. Morys (2021) joins this line of criticism pointing out that some of the available estimates are over 50 years old. In particular, he discards the estimate for Poland from his analysis due to its limitations. Maddison himself acknowledged that the availability of historical statistics for Central and Eastern Europe is

lower than for Western Europe, which reduces the quality of the numbers he originally provided (Maddison 2000, p. 91).

Therefore, we conclude that we are the first to provide modern estimates of the national income in Poland in the interwar period. Our work complements previous studies devoted to Poland in the long 19th century and the short 20th century. Bukowski et al. (2017, 2019) presented estimates of national income in the Polish lands in the years 1790 – 1910 with a limited regional split based on the top-down approach. Koryś & Tymiński (2022) estimated the national income in the Congress Kingdom of Poland in the years 1870 – 1912 using the bottom-up approach. Moreover, Koryś & Tymiński (2018) and Wroński (2023c) provide regional estimates of national income in the Congress Kingdom of Poland whereas Bukowski et. al. (2025) estimate regional convergence in the communist era. These authors conclude that Polish lands achieved only a limited convergence towards Western Europe in the long 19th century and a widening gap after World War II. In this respect, the fate of Poland mimicked the fate of other CEE countries (Berend, 2003) which Koryś (2018) attributes largely to the interrupted development pattern, littered with many political and economic crises over the 200 years separating the third partition of 1794 from the fall of communism in 1989. At the same time, all of the mentioned authors underline some regional convergence within the Polish lands proving that for most of the modern history, Poland formed an integrated economic area. Both of these conclusions are largely supported by this research on interwar Poland.

We provide estimates based on a bottom-up approach for the entire 1924-1938 period. Variables are presented on national and regional level including GDP, GDP per capita, employment and productivity. Similarly detailed estimates, including both national and regional accounts, are available only for Latvia, a country which is not the best proxy for the region (Klimantas et al.

2024; Grytten at al. 2024). However, the estimates for Latvia are based on fully-fledged numbers for the benchmark year 1935 (Norkus et al. 2024), extrapolated using sectoral indices to cover the whole interwar period. Similarly, the recent national estimates for Lithuania (Klimantas and Zirgulis 2020) are based on the detailed 1937 estimate extrapolated using sectoral indices (Klimantas, 2023). The extrapolation approach used for the Baltic countries assumes that the structure of prices in the economy in the interwar period was the same as in 1935/1937. Our data and earlier research do not support this conclusion. The ratio of agricultural prices to industrial prices fluctuated, which profoundly affected the structure of value added. Estimates for Estonia are less detailed and highly reliant on estimates published during the interwar period and the assumptions regarding the performance of the economy used to fill the missing years (Klemsent 2010; Norkus 2016, 2023). Advanced GDP estimates are available for Bulgaria, but only at the national level (Ivanow and Tooze 2007; Ivanov 2012). In the case of Romania (Axenciuc, 2012), the estimates are less detailed (less detailed sectoral division, national level only) and were rejected by Morys (2021) due to the implausible conclusion that despite the border changes the GDP per capita in 1938 was lower than in 1913, while other accounts suggest positive development of the Romanian economy in the interwar period (Turnok 1986). The estimates for Czechoslovakia (Pryror et al. 1971) were published fifty years ago, the GDP of Yugoslavia was calculated sixty years ago (Vinsky 1961), while the estimates for Hungary are 70 years old (Eckstein 1955). All these numbers have not been revised since publication and are still included in the Maddison database. Although the authors invested significant effort in the investigation of the performance of these economies, their estimates reflect a different era of national accounting/economic history. The GDP figures for Albania are available only for 1929 and are based on proxy calculation (Goods and Ma 1999).

3. Data and method

3.1. General data and methods

This section provides the most important information on the calculation method. Detailed information is provided in the online methodological appendix. To make the interpretation and further use of our estimates easier we share the database with estimation results. This statistical appendix allows for a deeper analysis of our results, which cannot be fully presented in the paper.

The estimation was divided into several steps. First, we estimated the nominal GDP (Polish zlotys and current prices) at the national and regional level for three main sectors, i.e. (i) agriculture, forestry and fishing (primary sector), (ii) mining, metallurgy, manufacturing, crafts and construction (secondary sector) and (iii) private and public services (tertiary sector). Each of these sectors was divided into more detailed industries at the stage of bottom-up reconstruction of aggregate numbers, enabling better use of primary statistical data and obtaining more reliable estimates. Second, we converted the nominal GDP at the national and regional level to constant prices from 1924, selecting a deflator that best reflected price changes in the entire economy. Third, thanks to the regional population and employment numbers, it was possible to calculate the dynamics of GDP per capita, labor productivity and the pace of regional convergence in the pre-war period. Fourth, for international comparisons, we converted the obtained values into Geary–Khamis 1990 $. The decision to use the 1990 PPP instead of the 2011 PPP aligns with the recent conclusion of the Maddison Project Database, which found that switching from the 1990 to the 2011 benchmark does not improve historical estimates and has unexpected consequences for cross-country comparisons. Consequently, the MPD has opted to retain the 1990 benchmark for data up to 1990 (Bolt and Van Zanden 2024). Fifth, we conducted a qualitative and quantitative analysis of regional development in the Second Polish Republic, discussing a number of factors that may

explain the observed patterns of economic growth and convergence in this period. Finally, we also recalculate the estimated GDP to the current Polish borders.

The main challenge in the first of the above-mentioned steps was to estimate the level of GDP not only at the national level but also at the regional level. For this purpose, we used the bottom-up method, adapting it to the statistical specificity of each of the above-mentioned sectors separately. In the case of most sectors, except for agriculture and some branches of the service sector (finance and real estate rental), the basis for our calculations was data on labor input (employment or man-hours) and unit wages at the industry or regional level. This allowed us to estimate the wage bill in individual industries, which was then converted into GDP using data on the wage share in product available for market economies at the sectoral level in the post-war period (1960s) in the AMECO database. At the aggregate level, these data are consistent with Kaldor's stylized fact of economic growth, according to which the wages of capital and labor in product are – more or less – constant. At the same time, this assumption may lead to a certain underestimation of the depth of the recession in industry and private services during the Great Depression, due to the fact that the labor share in product is countercyclical. On the other hand, however, the change in capital income according to our estimates is consistent with the change of taxed capital income.

3.2. Sectoral data and methods

3.2.1. Primary sector

The value-added estimate in agriculture relies on detailed statistical data regarding the production levels of crops (wheat, rye, oats, barley, millet, buckwheat, potatoes, sugar beets, peas, flax, and hay) and livestock (cattle, pigs, horses, sheep, and goats) for the years 1924-1938. The production data is then paired with information on market prices of the various agricultural

products, meat, and dairy, allowing for an estimate of its value at the regional level, considering both market and non-market production, with the latter valued separately.

This value was then reduced by the material costs of production based on data regarding the intermediate consumption published by the National Institute of Agriculture in Puławy and based on the representative sample of farms. The resulting estimate of value-added in agriculture was complemented by an estimate of the value added in forestry, derived from information on revenues and operational costs of state-owned forests, and further disaggregated regionally based on the degree of forestation. Additionally, for the Pomeranian voivodeship, income from fishing was also calculated separately and included in the sector.

Overall, the quality of statistical data on agriculture is highest among all sectors of the economy. Therefore, we provide a detailed description of the development of this sector in the accompanying paper (Bukowski et al., 2024).

3.2.2. Secondary sector

We estimated the value added in industry separately for medium and large industry and small industry and crafts. In both cases, we had data with a different level of detail, and as a result, we had to use slightly different methods.

In the case of small industry and crafts, the available data is very sparse. They only include the number of enterprises grouped into size classes corresponding to the so-called Industrial Certificates, i.e. licenses compulsorily acquired by producers for a given year of activity. These certificates included eight categories dependent on the number of employees, of which the four highest (I-IV) corresponded to the enterprises with more than 26 employees, which we classified as medium and large companies. The remaining certificates (categories V-VIII) were purchased by

small companies (up to 25 employees), including craftsmen, who also had so-called craft cards. Based on the definition of individual categories, i.e. the ranges defining the minimum and maximum employment in a given category, we estimated the total number of employees in small industry and crafts as well as in medium and large industrial enterprises.

In the latter case the basis for calculations was detailed data obtained directly from the pre-war statistical sources (Statistical Yearbooks, Labor Statistics, Industry Yearbooks). These data included, among others: the number of employees, the number of man-hours (industrial workers) and hourly rates of workers' wages in medium and large companies, divided into mining, twelve branches of the processing industry (mineral, metal, electrical, chemical, textile, paper, leather, wood, food, clothing, metallurgy, and printing industries), construction and utilities. Additional information was provided for the years 1930-1937, when Statistics Poland published *Industrial Statistics* based on the financial reports of about 20-25 thousand surveyed companies corresponding, depending on the industry, to about 75%-100% of all medium and large industrial enterprises. This source provides detailed data on employment and the wage fund, distinguishing between blue and white-collar workers, as well as the size of the total turnover in individual industrial sectors.

These data allowed us to estimate the share of the wage fund in the turnover of companies also in earlier years and to convert data on employment, man-hours and hourly wages into the size of the total wage fund in medium and large industry in the full period of 1924-1938. Using the estimate of employment in small industry and crafts, assuming that each person employed in it worked the same number of hours in a year as a person in medium and large industry, while receiving 2/3 of the average hourly wage (which corresponds to the differences in productivity and wages between different categories of companies today), we were able to estimate the wage fund

in small industry and crafts category. Finally, we obtained the estimated value of industrial GDP by relating the macroeconomic relationship between value added and turnover in the industry known from the statistics of the post-war period from the AMECO database to our estimate of the turnover in the Polish pre-war secondary sector.

The last step was to disaggregate the obtained estimate into individual regions. For large and medium companies, we did it by using detailed data from industrial statistics for the years 1930-1937, which for medium and large companies provides statistics on the wage fund divided not only by the branch but also by region. Together with the data on the regional structure of industrial employment, we were able to interpolate the regional structure of the wage fund in the entire period 1924-1938, which we then related to the previously obtained estimate of industrial GDP in the whole country, obtaining its regional division. As the regional distribution of small industry and crats was different than the distribution of large and medium companies (industry was switched westwards) the production of small industry and crafts was regionally allocated based on the share of each region in the total number of tailors and shoemakers in the country.

3.2.3. Tertiary sector

The value of the product – both national and regional – in the service sector was estimated separately for public and private services. In the case of public services, we collected detailed data on the number of employees in eleven sub-sectors: administration and the judiciary, education, police and other law enforcement services, professional army, health public hygiene, social welfare, science, culture and art, religious institutions and postal services. Our estimate includes also the estimate of the incomes for the non-professional army. The conscription was compulsory, the conscripts were not entitled to wage, but their living costs (food, accommodation, etc.) were covered by the state. The clergy is included in the public service sector because in the interwar

period, priests were employed by the state. Secular employees (not paid by the state) are included in the private service sector. Statistics Poland published detailed information on the regional distribution of the state employment, thus the output can be easily allocated to the regions.

Private services were divided into: trade, transport, real estate, finance, domestic service, education, administration and justice, education, science, culture and art, and healthcare. The available statistical data varied across sectors. In the case of the trade sector, the calculation base was analogous to that for small industry and crafts, i.e. it was based on the number of certificates acquired compulsorily by trading companies employing different numbers of employees.Number of certificates was recalculated to employment in trade in a manner analogous to employment in industry. Assuming that the average hourly wage in trade corresponded to the average wage in the small industry and crafts and the number of man-hours per employee per year was similar to large and medium industry, we estimated the value of the wage fund in the trade sector. By adopting the macroeconomic assumption of a 70% share of wages in the value added in this sector, we were able to calculate the value of GDP in trade at the national level, which was subsequently distributed to individual regions based on the regional distribution of turnover tax. In the case of transport, we have detailed information on the regional employment and wages in state-owned railway. This data was supplemented by the structure of employment in the sector across its subsectors as indicated by the 1931 census.

In the case of rental income from real estate, we have regional statistics relating to the value-based real estate tax paid by the owners. The estimate of the value added in finance was based on the detailed data on the balance sheets of banks supplemented with the additional information for the insurance sector. The financial sector includes also the interest on the public debt paid to the citizens of Poland. The profits of large banks were allocated to the region based on the location of

headquarters (mostly Warsaw), for the rest of the financial sector as well as the interest on the public debt we disaggregated the value added in finance based on the regional distribution of rental income.

For domestic service, we have only an estimate of the employment in the years of the census (1921, 1931). The estimate was interpolated by the assumption that the employment evolves the same as the employment in trade. We assumed that the average wage of domestic servants was equal to 70% of wages in trade. This ratio was chosen based on the assumption that productivity in domestic services should be the lowest among all branches of services reflecting the dire living conditions of servants.

The last five subsectors (education, science, culture and art, healthcare, public hygiene, religious institutions, administration and justice) are the private sector companions of the subsectors of the public service. While Statistics Poland provided annual evidence on the number of state employees, the number of private sector employees is known only in 1931 based on the census. To estimate the value added in education we rely on the ratio between public and private schools. For the remaining subsectors, we rely on the ratio of employment in the private sector to the public sector, assuming that value added per employee should be similar in both (public and private) subsectors.

3.3. Population and prices

Statistics Poland provides information on the regional distribution of population only in the census years, 1921 and 1931. The data for other years were published in groups of voivodships. To calculate the regional population for each year we extrapolate the census years based on the aforementioned grouped data and additional data on the natural increase of population that was also published by Statistics Poland. The data on the population of cities was provided by censuses and supplemented by data published by the Polish Telegraphic Agency for other years. We also constructed a separate data series for urban and rural population.

We use the GDP deflator defined as an average of: the wholesale price index (a proxy for material and investment goods) and consumer price index (a proxy for consumption goods). Both indices were estimated by Statistics Poland. We opted for the average because both indices cover different sectors of the economy. Moreover, they diverged in the late 1930s.

4. Results

4.1. National estimates

4.1.1. *Output estimate on national level*

Our estimate of the Polish GDP and its sectoral division in the investigated period is presented in Table 1. The estimates of GDP per capita are presented in Table 2. The estimate of employment is given in Table 3. All monetary values are calculated in constant 1924 złoty (zł).

Table 1. Gross domestic product, constant prices (millions of 1924 zł).

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1 937	1 938
Agriculture	4 669	5 772	6 818	8 745	11 325	7 462	6 584	5 750	6 622	6 152	7 459	6 304	7 492	10 754	9 681
Industry	4 476	4 327	3 722	4 364	4 945	5 357	5 012	4 179	3 619	3 791	4 268	4 630	5 252	5 655	6 568
Services	5 270	4 816	3 858	4 325	4 863	5 506	6 459	6 366	6 663	6 632	6 740	6 798	6 971	6 764	7 483
Total	14 415	14 916	14 399	17 434	21 133	18 325	18 055	16 295	16 903	16 575	18 468	17 732	19 714	23 173	23 733

Source: own estimation.

Table 2. Gross domestic product per capita, constant prices (1924 zł).

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1 937	1 938
Agriculture	161	196	228	289	369	240	209	180	204	187	225	188	220	313	279
Industry	154	147	124	144	161	172	159	131	112	115	128	138	154	164	189
Services	182	163	129	143	158	177	205	199	206	202	203	202	205	197	216
Total	497	506	481	575	688	590	573	510	522	505	556	527	579	674	684

Source: own estimation.

The GDP increased in real terms from 14.4 billion zł in 1924 to 23.7 billion zł in 1938 or 64% more. This implies an annual growth rate of 3.6% or 2.3% in per capita terms as the Polish population expanded by 1.4% annually. Poland experienced its roaring twenties with the economy expanding rapidly in the years 1924 – 1928 with an annual growth rate of almost 10% or 8.5% in per capita terms. In 1928 the gross domestic product was 47% higher than in 1924. During the Great Depression (1933 vs. 1928) the economy contracted by 4.7% (6,0% in per capita terms) annually, and in 1933 Polish economy produced only 78% of its 1928 output but still 15% more than in 1924. In per capita terms depression shrunk product by 23% practically equalizing the 1924

and 1933 levels of output per capita. Economic revival started in 1934 and gained traction in the late 1930s. In the years 1933 – 1938 GDP increased by 7.4% annually and GDP per capita by 6.3% annually.

The economic boom of the years 1924 – 1928 reflects the return of the economy disorganized by war, hyperinflation, border disputes and the difficult and expensive process of the unification of a reborn state, combined with the exceptionally favorable economic conditions in agriculture. In these years the economic growth in the primary sector was very strong (24.8% annually), but this was largely offset by the weaker performance of secondary and tertiary sectors. It is worth underlining that industry and services were hit in 1925-27 by low demand caused by the trade war with Germany that impacted both the export and purchasing power of domestic consumers. Value added in the tertiary sector was also negatively affected by a decline in public service output, driven by a real decrease in salaries, which grew more slowly than inflation. Nevertheless, in 1927-1929 and the case of services even one year longer, both sectors expanded.

The exceptionally strong increase in the value added in agriculture in the late 1920s partially resulted from the low base, the yields in 1924 were 20-35% lower than normal due to the bad weather and pests and partially from the growing factor inputs (land and labor) into the agriculture production especially in the eastern regions of the country. Especially important was the simultaneous increase in crop prices and yields. The price of wheat per 100 kg increased from 19 zł in 1924 to 52 zł in 1928, and the index of prices of five major crops (four cereals and potatoes) increased from 1.00 in 1924 to 3.25 in 1928. At the same time, the price index increased only from 1.00 to 1.65. The total yield of wheat, rye, oats, and barley increased by 61%, and the total cultivated area increased by 5%.

Poland is traditionally presented as one of the economies badly hit by the Great Depression. Our results show that the decline in real terms of GDP was smaller than previously estimated (see comparison in the robustness section), but still higher than in most European countries. In the years 1929 - 1931, the GDP per capita in real terms declined by 14%. According to the Maddison database, in the same period, GDP declined by 17% in the USA, 10% in France and Germany and 7% in the UK. In other CEE countries, the GDP decline was significantly smaller or the economy continued to expand in real terms. In Lithuania, output in 1931 was 6% higher than in 1929 (Klimantas 2024), in Latvia it was 1% lower (Klimantas et al. 2024). Ivanov & Tooze (2007) do not provide annual results for Bulgaria, but according to the input in the Maddison database, the economy expanded by 5%. However, while in other countries (except for France) the output in 1929 continued to expand compared to 1928, in Poland output already contracted in 1929. In 1929 GDP per capita was 14% lower than in 1928 due to the lower commodity prices. Thus, in the years 1928 – 1931, the real per capita output declined by 25%. This decline was among the highest in the world, comparable to other economies based on agriculture/resource extraction such as Australia (-20%), Canada(-23%), Cuba (-23%) and Chile (-30%),

Although the dating of the Great Depression in Poland is complicated due to sectoral differences, the recession in Poland was not only comparable to the most affected European economies but also equally long. After the sharp fall between 1928 and 1931, the economy stagnated for two years before it started to grow again in 1934. In 1935 it briefly contracted due to the lower prices in agriculture, but the industry had already been on the ascending path since 1932, growing continuously till 1938. However, initially, the economic growth in this sector was not paired with the job creation. Employment in industry declined from 2.30 million in 1928 to 1.55 million in 1931 and stagnated at this level until 1934 when it started to grow again. The real output

of the service sector did not decline in real terms but stagnated from 1931 until 1937. This was however a mixed result of parallel recession in private services and expansion of the public sector. The real value added in public services continued to increase because the salary cuts were lower than overall deflation. Thus, the earnings of public servants rose in real terms during the Depression. The picture was less bright in private services, where employment was permanently reduced from 2.1 million in 1928 to 1.7 in 1934 and did not increase again until 1937. In consequence at the end of the interwar period, still fewer people were employed in private services than in 1928 (1.8 million vs. 2.1). Detailed subsectoral employment statistics show that employment decline was concentrated in trade as the Great Depression was especially painful for the smallest shopkeepers, who were pushed out of business due to the weak demand.

The interpretation of development in agriculture is challenging due to the weather dependence of the yields, which vary from year to year and the variability of the food prices. After the massive 35% drop in 1931, the value added in agriculture stagnated until 1936. 1932 and 1934 were the years of revival, but price decreases in 1933 and 1935 blocked the return to stable growth in the sector. While the real value of output in 1929 was reached again in 1936 and in 1937 in per capita terms, the 1928 output remained unmatched until the end of the interwar period. The decline of agricultural prices in 1938 as a consequence of the highest yields in the whole interwar period resulted in a decline in real output compared to 1937 when the prices increased due to the especially weak harvest. In the interwar period, agricultural exports remained small relative to the total yields (less than 5% of cereals output was exported), thus any changes in yields had to be accommodated by domestic prices.

The distributive consequences of the Great Depression were highly uneven. The agriculture workforce was hit the worst, especially in comparison to the pre-crisis boom. The prices of crops declined more than the prices of industrial goods. The cartelized industries succeeded in protecting the price level of their goods, whereas the agricultural sector operating according to the model of perfect competition could not do the same. When prices declined, the peasants tried to sell more at the cost of their consumption, which resulted in further price decline impoverishing small farmers and leading to a wave of protests (Koryś, 2018). In contrast, in the industry and services, those who kept their employment have seen their income growing in real terms even if they had to face nominal salary cuts. However, the total employment outside agriculture dropped from 5.2 million in 1928 to 4.0 million in 1933 and even after strong increases in 1937 and 1938 at the end of the investigated period it was still below the 1928 level (at 5.0 million) despite the visible larger population in the working age that increased by approx. 3 million. While increasing productivity per employee in industry and services is usually a positive phenomenon in this case it was at least partially achieved due to the selection effects and the transition of low-productivity employees to subsistence agriculture, unemployment, informal economy or inactivity.

Table 3. Employment (thousands).

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Agriculture	**7 490**	**7 595**	**7 688**	**7 764**	**7 846**	**7 924**	**8 009**	**8 106**	**8 196**	**8 278**	**8 350**	**8 423**	**8 497**	**8 558**	**8 639**
Industry	**1 761**	**2 196**	**2 133**	**2 214**	**2 305**	**2 246**	**1 935**	**1 554**	**1 413**	**1 461**	**1 541**	**1 642**	**1 873**	**2 175**	**2 320**
Services	**2 590**	**2 615**	**2 399**	**2 767**	**2 888**	**2 933**	**2 939**	**2 897**	**2 781**	**2 587**	**2 498**	**2 491**	**2 524**	**2 645**	**2 705**
Public	786	780	749	765	775	784	790	796	797	796	801	804	804	847	865
Private	1 803	1 836	1 650	2 002	2 113	2 149	2 149	2 101	1 984	1 791	1 698	1 687	1 720	1 799	1 841
Total	**11 841**	**12 407**	**12 220**	**12 744**	**13 040**	**13 103**	**12 883**	**12 557**	**12 390**	**12 326**	**12 390**	**12 556**	**12 894**	**13 378**	**13 664**
Private economy	3 564	4 032	3 783	4 216	4 418	4 395	4 084	3 654	3 397	3 252	3 239	3 329	3 593	3 973	4 160

Source: own estimation.

Note: private economy is defined as the sum of industry and private service sector.

Even if we do not count the young peasants who had to stay on the farm even though they were not needed there, the urban un(under)employment increased by more or less 2 million people. The entrance to professional life was blocked by a lack of opportunities both for highly educated graduates of the universities and for the working class of large industrial cities. The growing economy and mass un- or underemployment was a highly explosive combination, it provided the foundations for the increase in political radicalism of the 1930s which was met by the harsh and violent response from the government. In this period almost 1000 people were killed in social protests (Wyszczelski 2015).

The Great Depression was prolonged by the failed economically orthodox policy of the Polish government (Drozdowski 1963; Knakiewicz 1967; Wolf 2007; Allen 2020; Don-Siemion 2021). Poland was a member of the Gold bloc, and keeping the currency exchange and convertibility (both to foreign currencies and gold) were the priorities in the view of policy makers, who wanted to protect Poland's international position and access to foreign credit. However, the outflow of foreign capital during the crisis was nevertheless bigger than the inflow. Poland finally dropped out of the Gold Bloc in 1935 helping the economy to recover quickly after 1936. Furthermore, the economic expansion of the late 1930s was supported by the increase in aggregate demand caused by increased government consumption in the form of the construction of the Central Industrial District and increased military spending.

The last years of the interwar period were economically successful. In 1938 per capita GDP was 36% higher than in 1935. The economic growth was again coupled with the job creation. Employment in the secondary and tertiary sectors increased by 22%. However, due to job destruction during the recession and the jobless growth of the mid-1930s, employment outside

agriculture was at 5.0 million, still 170 thousand less than in 1929 despite a much larger working-age population.

Overall, Poland in the interwar period achieved a 2.3% annual growth rate of the GDP per capita. The macroeconomic outcomes were therefore much better than is usually assumed in the histography. A growth rate lower than 3% may be assessed as a bit less than it's expected from the developing economy. However, taking into account the fact that the investigated period includes the biggest crisis of modern capitalism it can not be assessed negatively. At the same time, the uneven distribution of economic benefits in the 1930s caused significant social tensions, which undoubtedly influenced the contemporary assessment of that period.

To convert złoty into 1990 GK$, we first estimate the PPP exchange rate of Polish *zloty* to German *Reichsmark*. Then, we apply the estimated PPP exchange rate to the exchange rate of 1938 RM to 1990 GK$ as implied by the Maddison database. We convert złoty to 1990 GK$ through the German Reichsmark because Germany was the most important trading partner of Poland in the investigated period. Our approach is thus similar to Klimantas & Zirgulis (2020) who converted Lithuanian litas to 1990 GK$ through the PPP exchange rate to the currency of Sweden, the main Lithuanian trading partner.

We compare the prices of twenty agricultural and industrial goods provided in Polish and German statistical yearbooks. Although the set of products for which prices are provided is bigger, the definitions and product quality probably differ. To simplify calculations we assumed that the weight of agricultural/industrial products in the basket is the same as the ratio of agricultural/industrial total output to the sum of agricultural and industrial output. For Poland, we use the sector shares resulting from our calculations. For interwar Germany Hoffmann (1965) provides an average sector shares. We leave the services outside the price comparison because they

are not tradable, moreover, the information on service prices is missing. We separately calculate Laspeyres, Pasche & Fisher indices for 1924 and 1938 to account for the changing structure of prices during the investigated period. The Laspayers index has the Polish product weights, while the Paasche index has the German product weight. The share of agricultural products is higher in the case of the Polish weights, and the share of industrial products is higher in the case of German weights. The Fisher index is an average of two indices. The estimated PPP exchange rates and currency exchange rate are provided in Table 4.

Table 4. PPP conversion rates (zlotys/Reichsmark) and the currency exchange rate

	Laspeyres (zł/RM)	Paasche (zł/RM)	Fisher (zł/RM)	Exchange rate (zł/RM)
1924	1.06	1.17	1.12	1.24
1938	1.31	1.45	1.38	2.12

Source: own based on Statistics Poland (1924, 1939), Statistischen Reichsamt (1925, 1938).

The German GDP per capita in 1990 GK$ is reported in the Maddison database at 3 199 GK$ in 1924 and 4 994 1990 GK$ in 1938. According to the metadata, the source for the German GDP is Hoffman (1965). Hoffman provides an estimate of the aggregate GDP, which divided by the population provided in the Maddison database results in GDP per capita at 973 RM in 1924 and 1 428 RM in 1928. Thus, the resulting average conversion rate of RM to 1990 is 3.29 in 1924 and 3.50 in 1938 (1990 GK$/RM).

The PPP exchange rate of zł to RM was 1.12zł in 1924 and 1.38 zł in 1938 and equaled 90% and 65% of the currency exchange rate respectively. The lower ratio of the PPP exchange rate to the currency exchange rate reflects the changing structure of both economies. In the interwar

period, agricultural products were cheaper in Poland, but many industrial goods (especially processed ones) were more expensive than in Germany. In both economies, the share of agriculture in the total output relative to the share of industry was higher in the 1930s than in the early 1920s. In Poland, this resulted from the weak yields in 1924, in Germany the recession was stronger in the industry than in agriculture (Hoffmann, 1965). An increase in the basket share of goods that were cheaper in Poland reduced the ratio of the PPP exchange rate to the currency exchange rate. The implied conversion rate of zł to 1990 GK$ should therefore equal to 2.94 in 1924 and 2.38 in 1938. We use the mean of both conversion rates assuming that 1 zł is equal to 2.66 in 1990 GK$ for the entire period 1924-1938.

4.1.2. Comparison against the Maddison database

The economic performance of Poland according to our estimates is compared in Table 5 with the estimates for the United Kingdom, Germany, France, and CEE countries included in the Maddison database. Our estimate for 1929 is 26% lower than the Maddison database estimate. However, the difference changes over time. The gap gradually declines in the early 1930s until 1936-7 when it reaches only 5%. However, as Maddison's estimates indicate 13% growth rate in 1938, while our estimates indicate only a 1.4% growth rate (expansion of the industry was crowded out by lower output of agriculture), in 1938 the gap is again 16%. In our view, the decline of the gap reflects that our estimates of nominal income for the late 1930s were higher than the interwar estimates of Klarner, which were used by Maddison for the estimation of the Polish GDP for the entire period. As our estimate of income in zł for 1929 is higher than the estimate of Kalecki & Landau (1934) and Klarner (1937), the difference must result from a lower (in our case) conversion rate of zł to 1990 GK$

Table 5. GDP per capita in 1990 GK$: international comparison.

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Poland our estime	1 322	1 346	1 280	1 531	1 831	1 568	1 525	1 356	1 387	1 343	1 479	1 403	1 541	1 793	1 820
Poland Maddison database						2 117	1 994	1 823	1 658	1 590	1 593	1 597	1 625	1 915	2 182
USA	11 127	11 150	11 648	11 532	11 451	11 954	10 695	9 931	8 381	8 048	8 667	9 681	10 568	11 295	10 526
UK	4 921	5 143	4 936	5 315	5 357	5 504	5 441	5 138	5 148	5 277	5 608	5 799	6 035	6 217	6 266
France	4 166	4 249	4 154	4 431	4 710	4 533	4 236	3 959	4 239	4 192	4 086	4 244	4 486	4 466	4 793
Germany	3 199	3 532	3 605	3 941	4 090	4 051	3 973	3 652	3 362	3 556	3 858	4 120	4 451	4 685	4 994
Czechoslovakia	2 353	2 606	2 575	2 752	2 977	3 042	2 926	2 808	2 680	2 552	2 443	2 410	2 599	2 882	
Hungary	1 912	2 279	2 162	2 237	2 415	2 477	2 404	2 268	2 192	2 374	2 370	2 471	2 618	2 543	2 655
Lithuania	1 648	1 627	1 489	1 503	1 496	1 577	1 665	1 675	1 702	1 722	1 792	1 900	1 931	2 019	2 057
Latvia	1 946	2 084	2 094	2 149	2 150	2 349	2 538	2 316	2 288	2 500	2 725	2 776	2 797	3 031	3 099
Romania	870	875	959	956	927	977	963	979	887	893	901	967	994	1 029	1 006
Bulgaria	1 026	1 223	1 241	1 182	1 213	1 227	1 274	1 285	1 219	1 303	1 177	1 250	1 386	1 512	1 499
Yugoslavia	1 066	1 103	1 163	1 128	1 210	1 256	1 214	1 161	1 038	1 056	1 080	1 049	1 169	1 172	1 249
Spain	2 331	2 451	2 417	2 600	2 584	2 739	2 620	2 529	2 559	2 486	2 556	2 583	1 989	1 808	1 790
Italy	2 765	2 921	2 926	2 838	3 016	3 093	2 918	2 877	2 948	2 906	2 894	3 148	3 130	3 319	3 316

Source: own estimation for Poland, Klimantas (2024) for Lithuania, Klimantas et al. (2024) for Latvia, Maddison Database for the rest of the countries.

As discussed in the literature review, theoretically the Maddison database includes the estimates within the current borders, but the details on the recalculation to the current borders were never provided. Our results show that the Polish GDP per capita in the interwar borders equaled around 40% of the German GDP per capita reported in the Maddison database. The recalculation of the GDP to the current borders should significantly increase the GDP per capita estimates as eastern regions of Germany were richer compared to eastern regions of interwar Poland. Thus, the swap of the regions should significantly increase the GDP per capita. Our estimates of GDP per capita within the current borders (presented below) are significantly higher than Maddison's.

Polish economy grew well in the interwar period (2.3% annually in per capita terms) but was not among the best performers in the CEE. The annual growth rate was higher in Latvia (3.4%) and Bulgaria (2.7%). In Hungary, the GDP per capita expanded at a similar rate of 2.4% annually, while in Lithuania and Czechoslovakia, the growth rate equaled 1.6% and in Romania and Yugoslavia, only 1.1%. Polish GDP per capita expanded faster than Italian (1.3%). Comparison with Spain is plagued by the Civil war, which after 1936 decreased per capita output by 30%. However, in the years 1924 – 1935, Spanish per capita GDP increased by 1.1% annually, which is less than the Polish average for 1924-1938 but more than then average for 1924-1935 (0.5%), as Polish recovery from the Great Depression was delayed by few years compared to Spain.

Thanks to the relatively high growth rate Poland managed to converge with France (from 32% to 38%), Italy (48% to 55%) and Czechoslovakia (from 56% to 62%) and kept its distance to UK (27%-29%) and Hungary (69-71%). The German expansion fueled by rearmament and expansive fiscal policy of the late 1930s remained unmatched reducing the relative level of Polish GDP per capita from 41% of Germany in 1924 to 36% in 1938.

4.1.3. Was the output higher than before WW I?

Our estimation starts in 1924 because the data for the early post-war years are not detailed and robust enough, especially for the regional level. However, both in the scientific literature and in the contemporary debates in the 1930s the level of living in the interwar period is and was compared not against the early 1920s, but against the time before WW I. According to the current consensus in the Polish historiography the per capita output in Poland in 1938 was more or less the same as in 1913. However, this conclusion was based not on the historical national accounts, but on the production of various goods expressed in the natural units (tons of steel, bushels of grain, etc.)

Such a comparison is challenging because, before the war, the country was divided between three empires. Fortunately, the previous work on the historical national accounts provides us with the estimates of GDP per capita for Polish partitions. The comparison is possible because the interwar administrative regions (voivodeships) largely overlapped with the borders of the partitions. The results of the comparison are presented in Table 6. To estimate the pre-war GDP of interwar Poland we rely on the population shares of each of four constituting regions in the total Polish population in 1924.

We compare the pre-war estimates of the Congress Kingdom of Poland (Koryś and Tymiński, 2022), the Russian partition outside the Congress Kingdom of Poland, the former Austrian partition (Schultze 2007) and the former Prussian partition (Bukowski et al. 2019) with our estimates for the same regions of the country. As we are not aware of any estimates of the GDP of tsarist Russia at the regional level for 1913, we assume that the GDP per capita in the Russian partition outside the Congress Kingdom was equal to the relatively poor, northeastern governorate of the Congress Kingdom (Suwałki). This assumption is justified because the economic structure

of both regions was relatively similar. Moreover, the assumed level of GDP aligns with the regional estimates of Russian GDP by Markevich (2019).

Table 6. GDP per capita in 1990 GK$: comparison against 1913.

	Population share	1913	1924	1938
Poland (interwar borders)	1	1 430	1 322	1 820
Congress Kingdom of Poland	0.42	1 651	1 494	2 098
Remaining former Russian partition	0.17	959	992	1 470
Former Austrian partition (Galicia)	0.27	1 205	984	1 381
Former Prussian partition	0.14	2 392	2 033	2 489

Source: our estimation for interwar borders and the remaining Russian partition, Koryś & Tymiński (2022) for the Congress Kingdom of Poland, Bukowski et al. (2019) for the former Prussian partitions, Schultze (2007) for the former Austrian partition.

The prewar level of GDP per capita was not exceeded until 1927. In particular, in 1924 it was still 7% lower than in 1913. At the same time, the situation in different parts of Poland looked different. Eastern regions of the country's constitution the former Russian partition outside of the Congress Kingdom already in 1924 exceeded the 1913 level by 3%. As the population of the region declined during WW I and the Polish-Soviet war, this result may reflect not the increase in the nominator (output), but the decrease in the denominator (population). At the same time, the GDP per capita in the former Congress Kingdom was 9% lower compared to 1913, reflecting large losses in physical capital during WW I and the Polish-Bolshevik war of 1920 as well as additional population increase resulting from the Poles escaping the Soviet Union. While the loss of the machinery and the Russian market negatively impacted the industry, this was partially compensated by the increased employment, especially in public services. In 1897 only 18% of the employed population in Warsaw worked in the public sector. In 1931, the census showed that this share stood at 33%. Our employment statistics indicate that this level was already achieved in the early 1920s when regained independence vastly increased the administrative role of Warsaw. Polish capital

benefited also from the rapid rise of the finance sector - the part of the service sector with the highest value added per employee. Employment in banking increased from a mere 0.3% before WW I to 1.3% after, reflecting the shifting position of Warsaw as an administrative and business center of the country.

The former Prussian and Austrian Partitions experienced a strong economic decline after WW I. The loss of the German market negatively impacted both the landowners from Greater Poland (Poznań) and Silesian heavy industry resulting in the drop of GDP per capita in these formerly Prussian voivodoships by 15% between 1913 and 1924. The situation looked even worse in formerly Austrian Galicia which, due to substantial material losses induced by WW I, lost 18% of its output per capita compared to 1913.

In 1938, at the country level, the GDP per capita was 27% higher than in 1913. However, the former Prussian partition experienced stagnation, with GDP per capita in 1938 only 6% higher than in 1924. This reflects substantial competitiveness problems of the regional agriculture that had to cope with the cheap grain from the eastern regions of the unified country. At the same time, Silesian mining and heavy industry suffered a lot from the loss of access to the German market due to the tariff war in the 1920s. In the former Austrian partition, the growth rate between 1913 and 1938 was better equaling 15% largely due to the improvements in the Galician agriculture. The industrial output of the former Austrian partition was negatively affected by the depletion of the oil fields. The largest beneficiaries of interwar Poland were however the provinces formerly included in the Russian empire. Congress Kingdom grew by 27% in terms of GDP per capita growth, whereas the former Russian partition outside the Congress Kingdom developed by 53% above the 1913 level. The eastern and central provinces benefited mostly from the developments in agriculture, accelerated urbanization and developments of industry.

4.1.4. The structure of the economy

The shares of primary, tertiary, and secondary in the total output are presented in Table 7. Division to the modern-day NACE codes (except for section R, which was included in M) are presented in Appendix Table A1. The monetary estimates in the constant 1924 prices are presented in the Statistical Appendix.

Table 7. GDP: sectoral composition (percentage points).

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Agriculture	**32**	**39**	**47**	**50**	**54**	**41**	**36**	**35**	**39**	**37**	**40**	**36**	**38**	**46**	**41**
Industry	**31**	**29**	**26**	**25**	**23**	**29**	**28**	**26**	**21**	**23**	**23**	**26**	**27**	**24**	**28**
Medium & large	17	16	14	13	11	13	12	11	10	11	10	12	13	12	13
Small & crafts	14	13	11	12	13	16	15	15	12	12	13	14	14	13	14
Services	**37**	**34**	**31**	**30**	**27**	**35**	**40**	**42**	**41**	**40**	**36**	**37**	**34**	**29**	**31**
Public	13	13	13	12	11	14	14	13	12	12	11	12	11	10	10
Private	24	21	18	17	16	22	26	29	28	28	24	25	23	19	21

Source: own estimation.

In 1924, the total output was produced in 32.4% in agriculture, in 31.0% in industry, and in 36.6% in services. The very low share of agricultural output - achieved again only in the 1950s after the start of centrally steered industrialization of communist Poland - was a result of very weak yields in 1924, On average, the share of agriculture in the interwar GDP oscillated around 40%, when the share of industry at 26% and the share of services at 34%.

In the investigated period, the structure of the Polish economy fluctuated without a clear direction. Only public services expressed a weak trend that gradually reduced their role in the total output creation from 12% in 1924 to 9% in 1938. As presented in Table 3, public employment was growing more slowly than in the industry or agriculture but faster than in private services. At the same time, large and medium industries lost compared to the small industry and crafts.

The detailed sectoral classification of the economy based on the modern-day NACE codes shows that financial and insurance activity was developing the fastest with a 114% higher share in the GDP in 1938 and 1924. The rapid growth of this section reflects the weak base in 1924 and a strong increase in domestic public debt (and thus the interest paid to domestic bondholders) in the 1930s. In the early 1920s, the financial sector in Poland was on the edge of bankruptcy, decimated by WWI and post-war hyperinflation. Public debt was mainly held by foreign entities, as foreign credit was preferred by the government due to the lower interest rate and the fear that the rise in domestic public debt could crowd out the credit available for private economy. However in the 1930s, when the access to foreign loans was highly limited the state placed large emissions of debt on the domestic market. Electricity, gas & steam (D) and water supply (E) share the second position with respect to sectoral dynamics with their share in GDP growing by 77% although from the low levels. The output of these branches expanded due to the electrification efforts of the country and improvements in the sanitation infrastructure in the major cities. Education (P) also expanded due to public policy focused on eradication of wide-spread illiteracy among the rural population (especially in the east). At the same time the importance of construction (F), trade (G) and public administration and defence clearly declined. These three sections reduced their share in the total output by more than 30%.

4.2. Regional estimates

Our national estimates are decomposed to the 16 administrative regions (voivodeships). The administrative division of the country is presented in Appendix Figure 1. This allows us to study economic development not only at a national level but also to study cross-regional convergence and growth. The evolution of regional GDP per capita is presented in Table 8. In the

Appendix Table A2 we additionally present the regional GDP per capita recalculated to 1990 GK. Regional economic structure and regional productivity across sectors are presented in Appendix.

Table 8. Regional GDP per capita, constant prices.

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
warszawskie	799	810	714	830	965	918	911	792	774	808	862	834	918	967	1 033
łódzkie	587	538	495	622	767	719	732	649	613	618	676	665	717	779	825
kieleckie	385	412	388	499	579	498	489	486	558	458	497	493	534	611	637
lubelskie	398	438	448	543	638	492	452	396	425	423	463	427	469	588	573
białostockie	431	442	456	537	654	513	475	425	423	414	464	414	466	555	542
wileńskie	417	392	414	446	561	469	417	402	431	394	462	425	473	586	568
nowogródzkie	346	387	414	457	621	453	399	380	405	355	422	383	438	582	542
poleskie	403	413	447	508	677	530	467	386	442	389	461	441	491	675	625
wołyńskie	299	329	340	409	498	387	351	329	359	338	393	360	410	546	517
poznańskie	730	732	737	871	1 022	855	821	706	719	699	795	649	770	879	883
pomorskie	637	681	621	775	902	744	730	639	640	630	728	643	692	839	846
śląskie	929	904	747	937	1 099	1 078	1 043	887	762	754	834	838	885	996	1 099
krakowskie	469	463	425	491	587	508	511	456	468	461	467	469	498	570	587
lwowskie	389	383	358	418	499	410	416	371	415	403	432	432	468	538	535
stanisławowskie	302	327	320	379	461	364	379	312	329	306	349	344	357	436	425
tarnopolskie	254	296	306	385	451	332	331	305	319	318	353	346	380	495	474

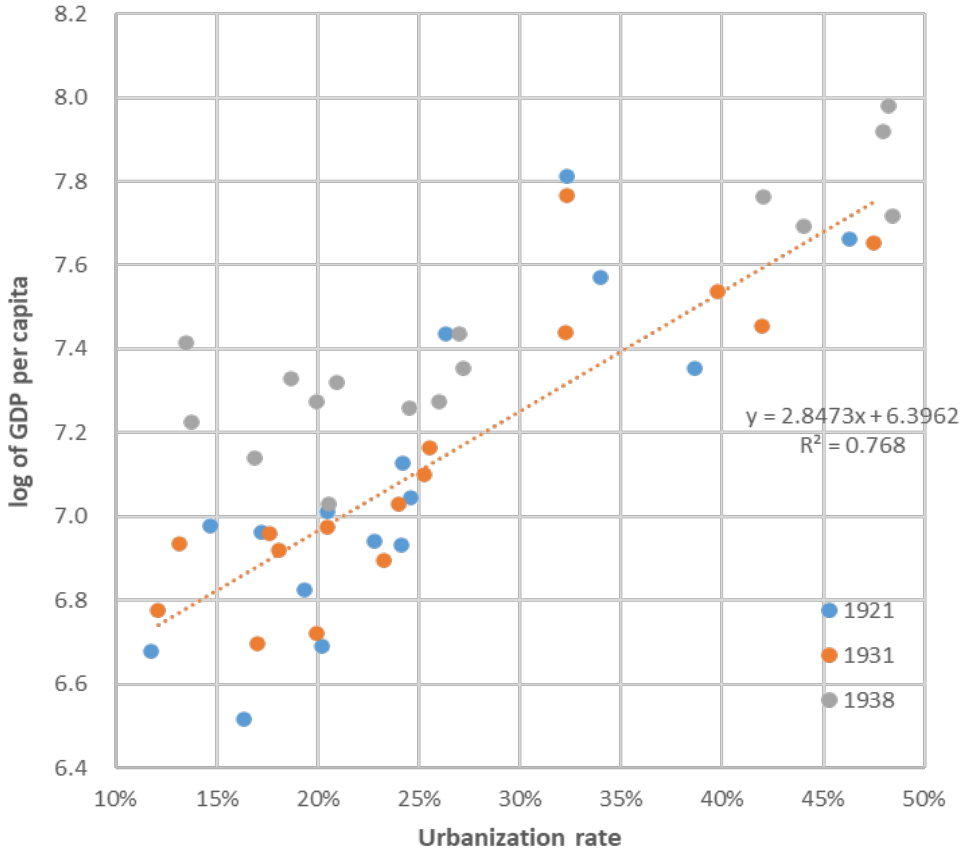
Source: own estimation.

Before WW I Poland was composed of territories governed by three different empires with very different levels of economic development. Thus, the regional differences in GDP per capita were extremely high. In 1924 it ranged from 254 zł in the rural Tarnopolskie to 923 zł in the industrial Silesia in the west. Conversion to GK$ indicates that in 1924, the level of economic development of Silesia was comparable to the German average, in Warsaw it was similar to Czechoslovakia, while in Kraków the output was slightly higher than in Romania and in the poorest Tarnopol was slightly higher than in Nigeria.

These differences stem mostly from the differences in industrialization and urbanization. A share of agricultural output in the GDP varied from 7% in Silesia to 67% in Polesie. Interestingly, the very weak level of GDP per capita in the southeast of the country was not entirely caused by

the especially high share of agriculture in the total output. What differentiates Tarnopol from the rest of the Austrian partition is the particularly low productivity of both agriculture and industry. The problem of rural overpopulation was likely the harshest there. At the same time, the small Tarnopolan industry had a very unfavorable structure. It was composed only of the branches with particularly low value added per employee, mainly timber, garment and food industries. While the industrial productivity in Lwów and Stanisławów was raised by oil extraction, Tarnopol had no such a lifeline.

Figure 1. GDP per capita vs. the urbanization rate (1924, 1931, 1938).



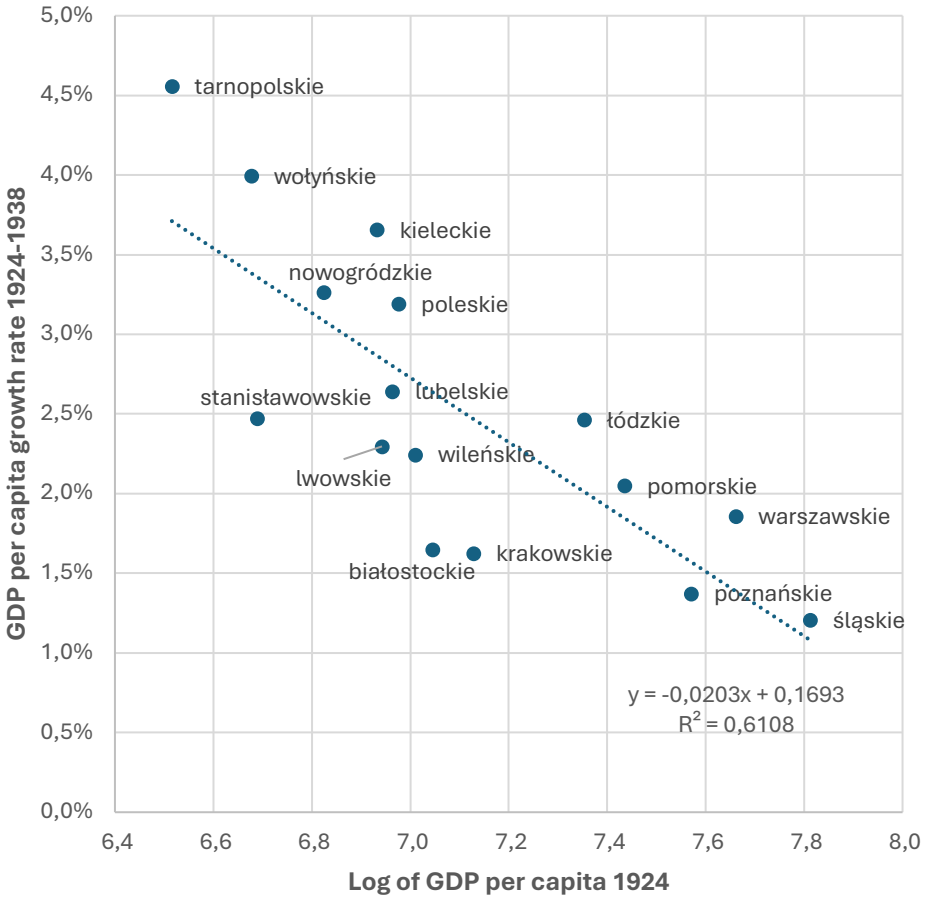
Source: own estimate

The level of economic development was strongly correlated with the regional urbanization rate. This relation is presented in Figure 1. The interwar years were a period of strong regional convergence, the poorer regions experienced stronger economic growth. Figure 2 presents the scale of regional convergence. The annual rate of growth in the poorest Tarnopolskie voivodeship was 4.6%, in Wołyńskie it was 4.0%. The laggard Kieleckie, situated in central Poland also experienced strong economic growth with 3.7% annual increase in GDP per capita. The economic progress was slowest in Poznańskie and Śląskie (Silesia) where the annual growth rate equaled 1.4% and 1.2%. Overall, the Polish economic center of gravity moved significantly eastwards during the investigated period and the entire country experienced strong beta-convergence with a slope -2.3% which exceeds the average level of 1.7-1.8% reported by Rosés and Wolf (2019) for Western Europe in the long run and for Polish People's Republic between 1950-1989 (1.2%) as estimated by Bukowski et. al. (2025).

Why were poorer, eastern regions catching up? Firstly, in the investigated period the productivity increase was highest in agriculture. During the interwar years yields not only significantly increased but also converged annually. In the late 1930s yields per hectare in western Poland were more or less the same as in the mid-1920s, while yields in eastern regions expanded significantly. Before WW I, the west (especially Poznańskie) produced for a German market and thus developed a very modern agriculture. After the regained independence, the German market was lost and the modern agriculture of the region was stuck in overproduction which negatively impacted investment in the sector. The mechanization and usage of artificial fertilizers in the former Prussian partition was lower in the late 1930s than in the mid-1920s and before WW I. On the other hand, however, eastern agriculture gradually implemented better production techniques

(Żarnowski, 1992). Fallowing of land, still significant before WW I was replaced by the crop rotation system. As a result not only the yields per hectare increased but also the cultivated area expanded stronger than in the rest of Poland. There was also some regional convergence in the prices of agricultural production, but the scope of the convergence was limited. The relative decline of agriculture in western Poland and the catching up of the east was also noted by contemporary observers (Landau & Tomaszewski, 1967 – 1989).

Figure 2. Regional convergence.



Source: own estimate.

The regional differences in industrial development also strongly contributed to the regional convergence. In the Kieleckie, the share of industry in the total output increased from 34% in 1924 to 45% in 1938. This increase continued over the whole interwar period but magnified in the late 1930s due to the construction of the Central Industrial District. Investment in central Poland was preferred, as the overpopulation guaranteed the supply of labour and the region was perceived by the government as strategically safe due to its distance from German and Soviet borders. At the same time Kieleckie region was relatively close to three large urban regions (Warszawskie, Śląskie, Krakowskie), but before WW I these three regions were in three different empires. Thus, after the independence, Kielce could finally realize the benefits of its centrality, which could not be done before due to the division of Poland across empires. On the other hand, in Warsaw, Silesia and Kraków the share of industry in total output declined. In Silesia, the share remained, however, very large, falling from 60% in the mid-1920s to only 53% in 1938. In Warszawskie and Krakowskie the decline was smaller, at 2-3 percentage points reflecting stronger development of services especially as the industry of these regions was connected to the imperial markets before WW I. These markets were however lost after the war. The southeastern Lwowskie and Stanisławowskie also had seen the share of industry in the total output declining, mainly due to the shrinking oil deposits and rise of agriculture. In 1938, the oil extraction was two times lower than in 1913 and four times lower than at the peak around 1908-1910 (Morawski, 2016). On the other hand, however, the poorest Tarnopolskie region despite the lack of the increase in the industrial share experienced some change in the structure of local industry towards the higher productivity branches and strong growth of the sector compared with the country average.

The service sector experienced the weakest growth. As presented in Table 2, on the country level the per capita output increased by 4.0% in agriculture, 1.5% in industry, and 1.2% in services.

The weak growth in services was mainly caused by the divergent developments of public and private services that largely offset each other over the entire period despite different contributions to growth in specific subperiods. The slow growth of output in the service sector resulted mainly from the stagnation of its employment. In consequence, the weak performance of the sector slowed the economic growth in regions, where the sector was relatively more important although in some cases the source of problems was rather in the public whereas in others in the private part of the sector. With respect to the former, a good example is Lwowskie with 25% share in the total output in 1924 being the clear outlier compared to 12% of the national level. The extremely high share of public service in total output in this region was the result of the dislocation of the military across the country with 36% of the military employment stationed in Lwów. Some of the best economic performers of the investigated period had significantly lower starting share of public services in the total output. For example, in Kieleckie and Poleskie, this share was at only 9%. Among the large industrial regions, the share of public services was lowest in Łódź (also 9%).

4.3. Recalculation to the current (post-WW II) borders

The main area of interest of this article is the–national, regional and sectoral – economic development of Poland in the interwar period. Therefore, in our calculations, we use values referring to the administrative borders of the Second Polish Republic. Nevertheless, the standard in international cliometrics, used among others in the Maddison database, is to refer to the current state borders. For this reason, in this section, we decided to present an approximate estimate of GDP, GDP per capita and population for the territory of Poland formed after World War II.

The GDP per capita in 1990 GK$ recalculated to the current borders is presented in Table 9. The estimated total output and population are presented in Appendix Tables A3 and A4. The recalculation was based on our estimates of output in regions annexed by the Soviet Union and

German regional historian accounts (Rosés & Wolf, 2019, 2021). The methodology of recalculation is described in the appendix.

The western regions of interwar Poland, which became part of the Polish People's Republic after 1945, were in 1924 about 70% richer than the eastern regions, incorporated into the USSR. However, thanks to regional convergence during the Second Polish Republic, this gap decreased to about 50% between 1924 and 1938. On the other hand – as we have shown – during the same period there was no convergence between GDP per capita in Poland and Germany. As a result, the eastern provinces of Germany, which were granted to Poland as and outcome of World War II, were 1924 and 1938 about 1.8-2.0 times richer than the western and central regions of the country and three times richer than the eastern territories ceded to the Soviet Union. They were however much more scarcely populated, contributing in the years 1924-1938 only about 25% to the combined population of the area that was to become the territory of Poland after 1945. For comparison, the population of the eastern territories, then incorporated into the USSR, was about 40%-50% higher.

Table 9. GDP per capita within current borders (1990 GK$).

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Poland (current)	**1 904**	**1 992**	**1 927**	**2 222**	**2 484**	**2 294**	**2 246**	**2 017**	**1 950**	**1 967**	**2 135**	**2 127**	**2 314**	**2 528**	**2 640**
Pre-WW2 German part	2 865	3 157	3 216	3 509	3 634	3 593	3 517	3 225	2 963	3 128	3 387	3 610	3 892	4 089	4 366
Pre-WW2 Polish part	1 538	1 551	1 442	1 740	2 056	1 813	1 778	1 575	1 581	1 548	1 685	1 596	1 751	1 973	2 045
Poland (interwar)	**1 322**	**1 346**	**1 280**	**1 531**	**1 831**	**1 568**	**1 525**	**1 356**	**1 387**	**1 343**	**1 479**	**1 403**	**1 541**	**1 793**	**1 820**
Post-WW2 Polish part	1 538	1 551	1 442	1 740	2 056	1 813	1 778	1 575	1 581	1 548	1 685	1 596	1 751	1 973	2 045
Post-WW2 Soviet part	909	953	971	1 132	1 404	1 101	1 042	939	1 018	954	1 087	1 035	1 143	1 449	1 390

Source: own estimate.

The estimated GDP per capita within Poland's current borders is 45% higher than within its interwar borders. This suggests that Poland largely benefited from the territorial changes following WWII. Our estimate of GDP within Poland's current borders is 10-15% higher than Maddison's estimate for the early 1930s and 30-40% higher for the late 1930s.

5. Robustness checks

5.1. Valuation of natural consumptions

We evaluate the natural consumption in agriculture at the market prices. Although our approach is fully coherent with the System of National Accounts it may be argued that it somehow virtually inflates the production of subsistence farming in times of prosperity and deflates it too much during the Great Depression. The price of cereals may change, but subsistence peasants still consume the same cereals. Higher food prices don't make them any tastier.

To assess the sensitivity of our results, we estimate the output in agriculture using the mixed approach. We use market prices to the market consumption and assign constant 1924 prices for the consumption of subsistence peasants. As we are missing the statistics on the share of natural consumption in total consumption, we assess the regional share of natural consumption mainly based on the urbanization and the centrality of the region, which we see as a proxy of market access. The share of natural consumption is lower in western Poland and increases towards the east. The national and regional estimates of the GDP per capita based on this approach are reported in Appendix Tables A5 and A6.

In the case of the mixed approach, the growth rate of per capita agricultural output is reduced from 4.0 % to 2.9% per annum. In consequence, the GDP growth rate is reduced from 2.3% to 1.9%. The reduction of growth rates is higher in the poorer regions, which limits regional convergence. Nevertheless, the economic growth of Poland and regional convergence are still strong. Although the mixed approach has some merit it is not coherent with SNA. Therefore, we perceive the estimates presented above only as a supplementary exercise to the numbers presented in the rest of the paper.

5.2. Agricultural crisis of 1924

Due to the data availability, our estimation starts in 1924. However, the agricultural production this year was badly affected by pests. The cereal yields declined by 25 – 30% compared to 1923. The crop production was responsible for approx. 40 – 45% of the agriculture's value added. The decrease in the agricultural output in 1924 was real. However, 1924 may provide a low base for the calculation of the GDP growth. Therefore, to check the sensitivity of our estimates, we recalculated the growth rates for the period 1925 – 1938. In this case, the annual growth rate remains at 2.3%, due to the contraction of industry and services in 1925 relative to 1924.

While yields in 1924 were significantly lower than in 1923 and 1925 it is doubtful whether they were lower than in the early 1920s, when agriculture was still disorganized by the war. Moreover, industrial production was strongly damaged by hyperinflation, thus its output in 1922 could be bigger than in 1924. Therefore, we keep 1924 as the base year of our exercise. Finally, the seasonal variation of output is natural in commodity-oriented and in particular agricultural economies. Poland in this case may be compared to modern oil countries whose GDP varies strongly across years depending on the oil prices and extraction. In particular, Rosés and Wolf (2019, 2021) database documents the jump of GDP in the Netherlands, particularly in the Groningen region, after the discovery of the large natural gas field in 1959.

5.3. Comparison with previous estimates

In Appendix Table A7, we compare our estimates of total output with estimates of Klarner (1937), who extended the previous work of Kalecki & Landau (1934, 1935) to cover the whole period 1929 – 1936, not only 1929 and 1933. Here, it should be noted that our estimates are mostly income-based, while Klarner relied mainly on the consumption data.

Our estimate for 1929 is 13.5% higher than previous estimates. In our view, this difference is driven mainly by the underestimation of capital income (implied labor share equal to 80-90%) by Kalecki & Landau (1934). The difference between both series increases to over 20% after 1932 with a maximum of 35% in 1934. Klarner's estimate of industrial output (it seems that Klarner includes also services under this term) is mainly based on the consumption of industrial goods. According to his estimates, the spending on industrial goods declined by 53%, from 11.0 billion zł in 1929 to 5.9 billion zł in 1936. Our estimate of industrial output (in current zł) is at 8.6 billion zł in 1929 and 5.6 billion zł in 1936, thus the decline is much lower at 35%.

Klarner divides the consumption into two parts: agricultural goods and industrial goods with a proportion of approximately 55%/45%. According to our estimates, the (average) sectoral structure of the economy in the years 1929 – 1936 was the following: agriculture – 37%, industry – 25%, services – 38%.

Overall, we find higher levels of income, lower share of agriculture, and milder recession than previous scholars. However, according to our findings the Great Depression in Poland is still higher than in most European nations.

6. Conclusions

The conventional assessment of the performance of the Polish economy in the interwar period is negative (Taylor, 1952; Spulber, 1957, Kaser & Radice, 1985, Aldrcroft, 2006). In this paper, we estimate national accounts of the Second Polish Republic coherent with modern standards of historical national accounts. We examine the development of the economy at a national level as well as regional convergence. Our results challenge the prevailing grim picture. The total output in 1938 was 65% higher than in 1924, while the per capita output expanded by 38%. The economy expanded by 2.3% annually. Contrary to the previous research, we document that GDP per capita in 1938 was on average 27% higher than before the Great War. Although this growth rate falls short of what might be expected from a developing economy, it must be viewed in the context of a period that included the worst economic crisis of the century. In the interwar period, Poland achieved a significant regional convergence, occurring at a faster pace than in Western Europe in the 20th century (Rosés & Wolf, 2019, 2021) or the Polish People's Republic in the post-war decades (Bukowski, 2025). While the output of the poorest, eastern regions expanded fast, the most-developed regions of the former Prussian partition experienced only limited economic growth due to the competitiveness problems. We find that the GDP per capita in the current borders was c. 45% higher than the GDP per capita in the interwar borders. This finding demonstrates that the change of Polish borders after World War Two was economically beneficial. Our research increases our knowledge of the performance of the Polish economy in the interwar period to a level similar to Western Europe. While economic development is a key area of interest in economic history, the GDP alone is not enough to assess the standard of living. Therefore, the investigation of living standards "beyond GDP" and the distributional consequences of economic growth are promising directions for future research.

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Appendix

Table A1. Sector composition of GDP: NACE codes, in percentage points.

		1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
A	Agriculture, forestry and fishing	32.4	38.7	47.3	50.1	53.6	40.7	36.4	35.3	39.2	37.1	40.4	35.5	38.0	46.4	40.8
B	Mining and quarrying	1.4	1.4	1.2	1.3	1.3	1.9	1.9	2.2	1.5	1.4	1.3	1.3	1.2	1.2	1.3
C	Manufacturing	28.5	26.7	23.9	22.9	21.2	26.0	24.8	22.6	19.3	20.8	21.1	24.0	24.6	22.5	25.5
D	Electricity, gas, steam and air conditioning supply	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3
E	Water supply; sewerage; waste management and remediation activities	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
F	Construction	0.9	0.8	0.7	0.7	0.8	1.0	0.8	0.6	0.3	0.3	0.3	0.4	0.4	0.4	0.6
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	10.7	10.2	8.1	9.0	8.6	11.4	13.7	15.0	13.9	11.9	9.9	9.5	8.6	7.6	8.4
H	Transporting and storage	6.2	4.9	4.2	3.2	3.0	3.7	4.3	5.3	5.7	6.2	5.9	6.4	5.8	4.7	5.0
I	Accommodation	1.2	1.1	0.9	1.0	1.0	1.3	1.5	1.7	1.5	1.3	1.1	1.1	1.0	0.8	0.9
J	Information and communication	0.6	0.6	0.5	0.4	0.3	0.4	0.5	0.7	0.7	0.8	0.7	0.8	0.8	0.5	0.7
F	Financial and insurance activities	0.4	0.5	0.5	0.5	0.4	0.7	0.9	0.8	0.7	0.8	0.9	1.1	1.1	0.8	1.0
M	Professional, scientific and technical activities	0.4	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.4	0.4
N	Administrative and support service activities	0.5	0.5	0.4	0.5	0.4	0.6	0.7	0.7	0.7	0.8	0.8	1.0	0.9	0.8	0.8
O	Public administration and defence; compulsory social security	8.2	7.1	5.8	5.1	4.3	5.3	6.2	6.5	6.9	7.5	7.4	8.1	7.4	6.0	6.1
P	Education	2.8	2.5	2.1	1.5	1.4	2.0	2.3	1.9	2.1	2.3	2.2	2.4	2.2	1.9	2.2
Q	Human health and social work activities	0.7	0.7	0.6	0.5	0.5	0.7	0.8	0.9	1.1	1.4	1.4	1.6	1.5	1.1	1.2
S	Other services activities	1.2	1.1	0.9	0.8	0.8	1.0	1.2	1.4	1.5	1.7	1.7	1.8	1.7	1.3	1.4
T	Activities of households as employers; undifferentiated goods - and services - producing activities of households for own use	3.4	2.8	2.7	2.3	2.1	2.7	3.3	4.0	4.0	4.7	4.0	4.0	3.9	3.1	3.3

Note: section R included into M, section U not covered by the estimates.

Source: own estimation.

Table A2. Regional GDP per capita in 1990 GK$.

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
warszawskie	2 157	2 188	1 927	2 242	2 605	2 479	2 461	2 139	2 089	2 182	2 326	2 251	2 478	2 610	2 790
łódzkie	1 585	1 452	1 338	1 679	2 071	1 942	1 977	1 751	1 656	1 669	1 824	1 795	1 937	2 105	2 229
kieleckie	1 041	1 112	1 048	1 346	1 563	1 346	1 321	1 312	1 505	1 238	1 341	1 332	1 442	1 651	1 721
lubelskie	1 073	1 183	1 209	1 467	1 724	1 329	1 220	1 070	1 147	1 143	1 251	1 152	1 268	1 587	1 546
białostockie	1 164	1 194	1 230	1 449	1 766	1 385	1 283	1 148	1 142	1 118	1 253	1 118	1 259	1 499	1 463
wileńskie	1 125	1 060	1 119	1 204	1 513	1 266	1 125	1 085	1 164	1 063	1 246	1 147	1 278	1 584	1 534
nowogródzkie	934	1 044	1 119	1 234	1 676	1 222	1 077	1 027	1 094	958	1 139	1 035	1 183	1 571	1 465
poleskie	1 087	1 114	1 206	1 372	1 827	1 430	1 262	1 041	1 193	1 050	1 244	1 190	1 324	1 821	1 687
wołyńskie	806	889	917	1 105	1 344	1 045	948	889	969	913	1 061	972	1 106	1 475	1 395
poznańskie	1 971	1 978	1 989	2 352	2 759	2 310	2 218	1 907	1 942	1 888	2 147	1 752	2 079	2 374	2 385
pomorskie	1 720	1 837	1 677	2 093	2 436	2 009	1 972	1 726	1 727	1 702	1 965	1 735	1 869	2 265	2 284
śląskie	2 508	2 442	2 018	2 531	2 968	2 910	2 815	2 394	2 057	2 036	2 251	2 262	2 389	2 690	2 966
krakowskie	1 266	1 249	1 148	1 326	1 584	1 372	1 380	1 231	1 263	1 244	1 260	1 265	1 346	1 538	1 586
lwowskie	1 051	1 033	967	1 129	1 348	1 106	1 122	1 002	1 120	1 088	1 167	1 166	1 265	1 452	1 444
stanisławowskie	816	883	863	1 023	1 244	982	1 025	842	889	826	942	929	963	1 178	1 148
tarnopolskie	686	798	826	1 039	1 219	897	893	823	863	859	954	933	1 026	1 336	1 280

Source: own estimation.

Table A3. GDP: current vs. interwar borders (million 1924 zł)

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Poland (current)	**50 104**	**53 116**	**52 010**	**60 631**	**68 579**	**64 066**	**63 468**	**57 726**	**56 475**	**57 634**	**63 238**	**63 701**	**70 035**	**77 286**	**80 739**
Pre-WW2 German part	20 808	23 103	23 714	26 074	27 212	27 108	26 736	24 709	22 877	24 335	26 554	28 514	30 979	32 794	34 222
Pre-WW2 Polish part	29 296	30 013	28 296	34 557	41 366	36 958	36 732	33 017	33 598	33 300	36 684	35 187	39 056	44 492	46 517
Poland (interwar)	**38 344**	**39 676**	**38 301**	**46 373**	**56 214**	**48 745**	**48 027**	**43 345**	**44 962**	**44 090**	**49 125**	**47 166**	**52 439**	**61 639**	**63 129**
Post-WW2 Polish part	29 296	30 013	28 296	34 557	41 366	36 958	36 732	33 017	33 598	33 300	36 684	35 187	39 056	44 492	46 517
Post-WW2 Soviet part	9 048	9 663	10 005	11 816	14 847	11 786	11 295	10 328	11 364	10 790	12 441	11 979	13 383	17 147	16 612

Source: own estimation

Table A4. Population: current vs. interwar borders.

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Poland (current)	**26 313**	**26 665**	**26 995**	**27 286**	**27 607**	**27 926**	**28 264**	**28 624**	**28 967**	**29 296**	**29 613**	**29 942**	**30 269**	**30 566**	**30 580**
Pre-WW2 German part	7 262	7 318	7 374	7 431	7 488	7 545	7 603	7 661	7 720	7 779	7 839	7 899	7 960	8 021	7 838
Pre-WW2 Polish part	19 050	19 347	19 621	19 855	20 119	20 381	20 661	20 963	21 247	21 516	21 774	22 043	22 310	22 545	22 742
Poland (interwar)	**29 004**	**29 487**	**29 922**	**30 294**	**30 696**	**31 083**	**31 498**	**31 957**	**32 407**	**32 831**	**33 221**	**33 620**	**34 022**	**34 378**	**34 692**
Post-WW2 Polish part	19 050	19 347	19 621	19 855	20 119	20 381	20 661	20 963	21 247	21 516	21 774	22 043	22 310	22 545	22 742
Post-WW2 Soviet part	9 953	10 140	10 301	10 439	10 576	10 702	10 837	10 994	11 160	11 315	11 447	11 577	11 712	11 832	11 949

Source: own estimation.

Table A5. GDP per capita "mixed" approach to agriculture (constant 1924 zł).

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Agriculture	161	188	213	266	318	230	201	163	187	185	207	192	220	260	239
Industry	154	147	124	144	161	172	159	131	112	115	128	138	154	164	189
Services	182	163	129	143	158	177	205	199	206	202	203	202	205	197	216
Total	497	498	467	553	637	579	565	493	504	503	538	532	579	621	645

Source: own estimation.

Table A6. Regional GDP per capita "mixed" approach to agriculture (constant 1924 zł).

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Warszawa	799	979	1 040	1 345	1 541	1 483	1 319	1 013	884	833	822	768	840	943	948
Łódź	587	644	709	985	1 184	1 147	1 050	824	696	636	646	613	660	753	708
Kielce	385	483	523	717	808	755	680	595	625	482	488	477	514	589	599
Lublin	398	492	561	714	805	684	587	456	441	431	435	406	435	513	512
Białystok	431	508	584	730	842	732	632	493	451	426	439	402	439	507	511
Wilno	417	500	590	674	755	678	605	500	519	456	492	486	513	593	596
Nowogródek	346	426	489	562	671	576	496	399	394	362	396	391	419	484	458
Polesie	403	540	597	699	783	697	599	425	452	440	460	499	562	606	576
Wołyń	299	371	406	511	573	494	440	361	360	340	352	343	374	450	435
Poznań	730	825	1 001	1 299	1 509	1 285	1 123	865	795	707	724	587	688	833	828
Pomorze	637	784	873	1 180	1 360	1 147	1 029	801	719	652	683	607	642	821	983
Śląsk	929	1 082	1 134	1 600	1 865	1 801	1 555	1 162	879	782	803	777	822	1 012	1 068
Kraków	469	547	593	755	874	795	724	575	534	500	460	448	486	573	565
Lwów	389	446	472	595	671	604	563	442	443	414	405	410	451	504	485
Stanisławów	302	355	388	491	545	491	463	350	337	305	307	313	329	368	365
Tarnopol	254	318	354	459	513	432	401	333	321	303	307	317	337	415	384

Source: own estimation.

Table A7. Comparison with previous estimates (current zł)

	1929	1930	1931	1932	1933	1934	1935	1936
Our estimate	29 531	25 789	20 436	18 819	16 541	17 208	15 793	17 574
Klarner (1937)	26 000	22 300	18 600	15 300	13 700	12 700	12 500	13 100
Our/Klarner	1.14	1.16	1.10	1.23	1.21	1.35	1.26	1.34

Source: own estimation and Klarner (1937).

Figure A1. The map of interwar Poland.

Note: Inside the Voivodship of Warsaw there is also a separate capital city of Warsaw, it is included into voivodship in our estimates.

Source: own.

Methodological Appendix

This appendix provides detailed information on the estimation method for each subsector. It also discusses the conversion of our subsectors (dictated by the data availability) to modern NACE codes. We share the detailed estimates in the statistical appendix (excel file) accompanying our paper.

1. Agriculture (primary sector)

The value added in agriculture is estimated based on the detailed regional statistics on the regional output and price. The statistics were firstly published in *Statistics Quarterly* and *Statistical Yearbooks*, then in *Agricultural Statistics* and *Price Statistics*. The information on intermediate consumption is provided by the National Institute of Agriculture in Puławy. The rich statistics on agriculture allowed us for the calculate of the value of output, however, we still needed the estimate of employment in order to calculate labor productivity (VA per employee). The cross-sector comparison of productivity is needed for the validation of our estimates. In other sectors of the economy, the public statistics differentiate between people employed in a given sector (pl. *czynni zawodowo*) and inactive (pl. *bierni*) who are supported by the income earned in a given sector. In practice, the second category includes family members, mostly women, children and the elderly. Such classification is provided only for agricultural laborers. For farmers themselves, public statistics do not differentiate between active and inactive. In the interwar period, such classification would be difficult to apply and highly theoretical. To estimate the employment, we rely on the 1931 census. The census provides information on the number of peasants (self-employed farmers) and their age distribution We subtract children 13 years old and younger and people 62 years old and older. To make our productivity estimates comparable with other sectors, in which the significant share of women is not counted among employees, we assume that males worked full-time, and females worked half-time. Thus, our estimate of employment includes all men and 50% of the women. The census provides national employment in 1931. Employment is allocated to the regions based on their share in the rural population in 1931. Employment in other years is extrapolated by the rate of growth of the rural population at the regional level.

Agriculture is divided into five subsections: 11 major crops, livestock, less important crops, forestry, fishery.

1.1. 11 major crops

Detailed yield and price statistics are available for 11 major crops (wheat, rye, oats, barley, millet, buckwheat, potatoes, sugar beets, peas, flax, and hay) on the regional level. The output is calculated at the regional level by the multiplication of yields by producer prices.

The valuation of output is based on the price level in August except for 1924 and 1925, where regional price statistics are available only for June (1924) and September (1924). *Agricultural Statistics* (pl. *Statystyka Rolnicza*) and *Price Statistics* (pl. *Statystyka Cen*) for year k were published late in the year k+1. Thus, the publications end in 1937. Statistical Yearbook 1939 (pl. *Mały Rocznik Statystyczny* 1939) reports only the national average price. For 1938 we use this source and assume the same ratio of each regional price to the national average as in 1937. We experimented with alternative sources of regional price data, but the reported price level does not match with the national average reported in the *Statistical Yearbook*.

1.2. Livestock

Statistics Poland provides information on the count of livestock, but not on the value of animal production. The estimates of production are reported only for the subsegments of the sector and only in the few years.

We rely on the detailed estimation of agricultural product in 1927/8 published by Ponikowski (1929). Wacław Ponikowski was a leading Polish agricultural economist in the interwar period. He estimates both the value of crops and animal production. We take the share of animal production in the production of 11 major crops as estimated by Ponikowski (59%) and apply it to our estimate of the 11 major crops to estimate the value added of animal production in 1928. We extrapolate the value added in the remaining years based on the livestock counts published by Statistics Poland (horses, cattle, pigs, sheep and goats).

As detailed prices of animal production are not available, we assume the constant ratio of prices of animal production to the prices of 11 major crops. This assumption is supported by the high correlation (0.8-0.9) of the subset of available prices of animal production with prices of 11 major crops.

1.3. Forestry

In the interwar period, 46% of the forest area belonged to the state and was governed by one state enterprise. We have detailed accounts of State Forests (pl. *Lasy Państwowe*) for the years: 1924 – 25 and 1932 – 1937. We use this data source to estimate the value added (sum of profits and personnel costs) in the forests belonging to the state. We did not find detailed accounts of State Forests for the years 1926 – 1932. However, information on the contribution of the company to the country's budget is available. We extrapolate the output in the missing years by the contribution.

As the accounting data for private forestry is missing, we estimate the value added in the whole subsector by multiplying the estimate for publicly owned forests by 2.17 (1/0.46). We allocate national estimates to regions based on the share of each region in total forest area.

Our estimate of value added is based on the production of the enterprise. We do not account for the natural growth of the forest, which may be seen as a change in the inventory stock. Thus, our estimate of value added is less advanced than the Forestry Sector Accounts currently estimated as a part of SNA, which combine both monetary and environmental production.

1.4 Less important crops

Statistics Poland provides detailed statistics for 11 major crops. However, agricultural production includes many less important crops. The 11 major crops occupied approx. 85% of the total cultivated land (crops, excluding orchards) in the country. The share of the area occupied by 11 crops varied across regions (from 76% in Pomerania to 90% in Wołyń) and exhibited small variation over time (lowest 82% in 1938, highest 87% in 1935).

To obtain a comprehensive estimate of the value added we need to account also for remaining, less important crops. The soil used for other crops was of worse quality than in the case of major crops. Therefore, we increase our estimate of the value added by half of the remaining area.

The statistical information on the production of orchards is extremely limited. To account for this subsector, we once again rely on Ponikowski (1928) who estimated the production share of orchards at 6.87% of the production of eleven major crops. We increase our estimate by the value added by the same proportion.

1.5. Fishing

The inland fisheries are included in livestock production. The statistics on sea fishery were published by Statistics Poland. The total output is allocated to Pomorze, the only region with sea access.

In 1938 the government changed the borders of voivodship trying to limit the legacy of partition by swiping border counties across partitions. To obtain comparable metrics of output, in this paper we assume that the regional distribution of output in 1938 was the same as in 1937. Unfortunately, we do not have detailed population data on the county level to properly adjust the 1938 population for the changing borders. The estimates of output in the 1938 borders are reported in our companion paper (Wroński et al., 2024)

2. Industry and crafts (secondary sectors)

The estimation of value added in the secondary sector is mainly based on the statistics of industrial certificates issued to collect the industrial (turnover) tax (pl. *podatek przemysłowy*). Firstly, the information was published in *Statistical Yearbooks* (pl. *Rocznik Statystyki Rzeczypospolitej Polskiej*, later *Mały Rocznik Statystyczny*), then in the 1930s in extended form in *Industrial Statistics* (pl. *Statystyka Przemysłowa*).

The medium and large companies (26 employees and more) faced higher reporting requirements. Thus much richer statistics is available for medium and large companies than for small companies and crafts. Therefore the sector was divided into two subsectors.

2.1. Large and medium industry

Detailed information on the number of working hours and salaries per hour in each industry subject to the industrial tax is available. Reflecting the data availability we separately estimate the value of production in:

i) Mining
ii) Metalurgy
iii) Process industry

a) Mineral industry

b) Metal industry
c) Electrotechnical industry
d) Chemical industry
e) Process industry
f) Paper industry
g) Food industry
h) Garment industry
i) Construction industry
j) Printing industry
iv) Powerplants and waterworks
v) Companies exempt from the industrial tax

To estimate the value added we follow the three-step procedure:

1) First, we calculate the wage bill based on the statistics of the number of working hours and salaries in each industry.
2) Second, based on the total labor cost and the relationship between labor cost and turnover in industry extracted from AMECO database, we estimate total turnover.
3) Third, we estimate the value added based on the industry-specific ratio of value added to turnover based on the averages for the comparable European countries extracted from the AMECO database.

Our estimates take into account the wage differences across industries. The statistics on the distribution of unique industries across regions are not detailed enough to use it to allocate the output to the region. Therefore, the regional allocation is based on the share of the region in the total wage bill of medium and large companies. This information was published in the *Industrial Statistics* for the years 1930 – 1937. For the years, 1924 – 1929 the regional wage share is calculated based on the employment statistics and the ratio of the wage share to employment share in 1930. The ratio of wage share to employment share is applied to preserve the regional wage differences (e.g. in Warsaw the wage share is 33% higher than the employment share, in Nowogródek it is 48% lower than the employment share).

In 1938 due to the border changes, we assume the same regional distribution of output as in 1937 except for Kieleckie, where the construction of the Central Industrial District started. We

increase the share of Kieleckie in national output by 0.5%, at the cost of Warszawskie, Łódzkie and Silesia. The full potential of the Central Industrial District was not yet realized in 1938, only the first industrial plants started the operation.

State enterprises, state monopolies and selected export companies were exempt from the industrial tax. The exact level of employment and value-added in these companies is difficult to estimate. Our indicative assessment of the share of exempt employment is at 5%. Thus, we increase our estimate of value added by 5%.

The majority of the value added in powerplants, and waterworks (2.1.4) is missing in the industrial tax statistics because powerplants and waterworks owned by the local government were exempt from taxation. Moreover, in the interwar period government granted many tax exemptions to newly built powerplants to support the electrification (Landau, 1963; Nowacki, 2023). The comparison of the electricity output in natural units (kWh) with the VA estimate based on the industrial certificates shows that we miss at least half of the production. Therefore, the output of the sector estimated based on the industrial statistics was multiplied by two.

The comparison of the labor share in Poland with the 18 countries included in the Historical Factor Database (Bengtsson & Waldenström, 2018; Bengtsson et al. 2020) is presented in Appendix Table MA1. As the estimation of labor share in agriculture is challenging and therefore this sector is not always covered by the research, we separately report labor share in industry and service and labor share in the total economy.

Table MA1. Labor share in Poland vs. labor share in 18 countries included in the Historical Factor Database.

	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	Average
Argentina	48.9	52.2	51.1	51.6	51.8	51.5	52.4	55.8	59.2	54.1	50.2	56.8	56.4	54.9	54.1	**53.4**
Australia	52.6	53.1	53.7	53.6	52.2	51.8	51.8	50.7	48.2	47.4	47.3	47.8	47.5	47.6	48.9	**50.3**
Austria	77.1	76.1	77.6	76.3	77.9	79.1	81.6	84.4	84.2	83.1	80.9	80.7	80.0	77.7		**79.8**
Belgium	62.8	61.3	60.5	62.2	63.1	64.4	62.7	61.5	61.0	61.0	60.0	61.1	61.9	63.7	64.8	**62.1**
Brazil	42.1	41.8	41.4	41.1	40.7	41.0	41.3	41.6	41.9	42.2	42.5	45.6	44.7	43.8	45.4	**42.5**
Canada			71.1	70.3	69.4	69.5	73.1	74.9	75.6	71.7	70.0	69.6	68.4	67.8	70.0	**70.9**
Denmark	59.7	66.0	65.7	65.2	64.1	60.5	62.5	66.3	67.0	62.4	60.8	60.2	59.2	57.9	58.6	**62.4**
Finland	67.0	66.7	64.7	62.8	61.9	62.0	62.5	63.0	62.0	62.4	62.6	63.3	63.1	61.5	62.8	**63.2**
France	67.1	67.2	66.8	66.3	67.1	67.5	68.7	69.4	71.6	70.4	70.3	69.5	71.0	71.2	70.5	**69.0**
Germany		62.1	60.8	62.1	63.6	63.8	64.6	65.7	64.3	64.2	63.1	61.8	61.1	58.7	58.3	**62.5**
Italy	61.1	56.8	56.1	60.1	55.3	54.7	58.7	58.6	59.3	63.5	62.2	58.0	59.3	55.4	55.8	**58.3**
Japan	75.5	75.9	77.3	77.4	77.2	74.7	73.8	74.7	74.1	74.3	73.5	73.1	73.0	71.8	70.9	**74.5**
Netherlands	63.5	62.1	61.2	60.4	60.1	60.5	63.7	67.3	68.3	69.1	68.4	67.0	65.4	63.7	64.0	**64.3**
Norway	55.1	55.4	58.0	57.5	56.8	55.7	54.8	56.2	56.1	55.7	54.9	54.5	54.0	53.1	55.1	**55.5**
Spain	55.9	50.7	53.2	53.0	59.5	57.5	58.3	61.0	66.1	75.1	72.1	76.8	82.8	76.5	79.5	**65.2**
Sweden	52.1	52.8	53.2	54.5	53.9	54.9	57.2	60.3	63.0	59.8	59.2	56.8	54.5	52.8	54.2	**55.9**
United Kingdom	68.1	67.7	67.3	66.8	67.2	66.9	67.0	68.0	68.9	70.0	70.0	69.3	68.8	68.0	67.6	**68.1**
United States	65.3	64.7	63.8	65.3	65.5	64.3	65.0	66.7	67.2	68.2	68.0	67.8	68.3	68.7	68.8	**66.5**
Poland (industry & services)	**60.0**	**59.0**	**57.4**	**55.3**	**53.8**	**52.9**	**52.7**	**53.6**	**54.2**	**54.6**	**55.6**	**55.9**	**56.2**	**56.8**	**56.2**	**55.6**
Poland (total)	**52.7**	**50.7**	**48.0**	**46.4**	**45.1**	**46.6**	**47.2**	**47.9**	**47.7**	**48.3**	**48.3**	**49.4**	**49.1**	**47.9**	**48.6**	**48.2**

Source: Historical Factor Shares Database (Bengtsson & Waldenström, 2018; Bengtsson et al., 2020).

The estimated labor share in industry and services averages 55.6%, comparable to Norway (55.5%), Sweden (55.9%), and Italy (58.3%). We estimate the output of agriculture based on the production approach and thus do not have any estimate of the labor income in this sector. For this calculation, based on publications from NIA Puławy, we assume a labor share in agriculture of 37.5%. Under this assumption, the labor share in the total economy is 48.2%, placing Poland at a level similar to Australia (50.3%) and Argentina (53.4%)—two countries where agriculture, like in Poland, was a major economic sector. This comparison supports the validity of our estimates.

2.2. Small industry and crafts

Data on small industry and crafts is less detailed than for large and medium companies. Therefore, the division into specific industries is not possible in this case.

Statistics Poland provides information on the number of industrial certificates sold to enterprises of different sizes. This information was published on the regional level in the *Yearbook of the Ministry of Treasury* (pl. Rocznik Statystyczny Ministerstwa Skarbu) for the years 1924-1928 and later on national level only in Statistical Yearbooks (pl. *Mały Rocznik Statystyczny*).

To obtain the initial estimate of employment, we multiplied the number of issued industrial certificates in classes V – VIII (small companies, 25 employees or less) by the average employment in each class (assumed based on the thresholds). As we are missing information on the number of working hours in small industries and crafts, we use the ratio of employment to input the number of working hours.

Currently, the wages in large enterprises are significantly higher than in small companies. This trend has been documented in many economies. There is clear qualitative evidence that also in the interwar period the working conditions in medium and large companies were much better than in small industries and crafts (Landau & Tomaszewski, 1971). As we miss precise information on wages, we take the current ratio of wages in small vs. medium and large industries and assume that the average wage in small industries and crafts equals 66% of the average wage in medium and large industry. This assumption aligns with contemporary observations. According to Arnekker (1934), wages in small industries and crafts ranged from 50% to 70% of those in larger industries.

In the case of this sector, the census indicates significantly higher employment than the statistics of industrial certificates. There is no such discrepancy in the case of other sectors or it is much smaller. The source of the discrepancy is the misfunctioning of the registration of crafts. Crafts were subject to two different registration systems. Firstly, craftsmen should purchase industrial certificates for tax reasons (collection of industrial tax). Secondly, they should be registered at the local Chamber of Crafts. The registration at the Chamber was confirmed by the issued Craft Licence (pl. *karta rzemieślnicza*). In practice, many registered only at the Chamber to evade taxes. In the 1930s the number of issued licenses was at approx.. 350 thous., while the employment in the lower classes of industrial certificates (classes VI-VIII, 10 or less employees) was at approx. 200 thous. Moreover, not every employee in the small enterprises was a craftsman. Moreover, some people even did not register at the Chamber (Landau, 1977). To correct for the imperfect registration of small businesses and crafts we increase the number of working hours estimated based on the industrial certificates by 75%.

To allocate the national output to regions of the country, we use the share of each region in the total population of tailors and shoemakers, the two largest occupations in crafts. The base for the estimation is the distribution in the year of the census (1931). For the remaining year the population is extrapolated based on the regional rates of population increase, the ratio of employment in crafts to the population is assumed to be stable. To preserve regional differences in productivity (VA per employee) we adjust the regional output by the ratio of employment share to wage share in large and medium companies. In theory, the regional differences in the productivity of small and large industry across regions should be more or less the same. If such an adjustment is missing, small industry and crafts would falsely equalize the output across regions.

3. Services (third sector)

Statistics Poland reported detailed annual statistics on state employment. Thus, the evidence on public services is much more detailed than the evidence on private services. Therefore, we divide the sector into two subsectors: public and private.

Our estimation of value added is based on the information on labor share provided in the AMECO database. For the vast majority of service branches, we assume the labor share at 70%. For the more capital-intensive post & communication, we assume the 50% labor share. Special rules are also used for domestic servants, housing and finance (described below).

In the case of public services in several branches, it is possible to compare the estimated value added to the total expenditure of a ministry (e.g. police was funded by the Ministry of Interior Affairs, while education was founded by both the Ministry of Education and local government). This comparison confirms our estimates.

3.1. Public services

The public services include 11 subsectors:

a) Public administration & justice
b) Education
c) Police
d) Other security (e.g. border guards, firefighters)
e) Military (professional)
f) Military (compulsory conscription)
g) Healthcare
h) Religious institutions (clergy)
i) Science and culture (culture)
j) Public hygiene (e.g. street cleaners, management of cemeteries)
k) Post

In each category, the main source for calculating the wage bill was the annual reports of Statistics Poland, which contain information about employment and salaries, as well as national censuses that provide detailed data on employment during census years. We will first discuss issues related to employment.

For education, the number of teachers reported in the annual reports was supplemented by the number of part-time employees, as suggested by *History of Poland in Numbers* (Jezierski A., et al., 2003). The category "Other security," which was not explicitly detailed in the annual reports, was based on aggregated data from national censuses, with the figures adjusted to reflect the evolution of the police (closest professional category) in non-census years.

In the case of the military, the numbers for the years 1937–1939 were extended to include the "National Defense Battalions" (Pindel K., 1979). The last two annual reports (1938 and 1939) do not include data about the military, but the battalions, consisting of around 50,000 troops, were the only addition to the army during those years.

The employment figures from the annual reports include only state-employed doctors and were supplemented with data from national censuses to account for other medical personnel while maintaining the employment trends noted in the annual reports. The evolution of employment in the "Healthcare" sector was also applied to "Public Hygiene," where data were derived from national censuses, as it is the closest professional category.

The employment of religious institutions and science and culture are interpolated between the national census years and then evolve at a rate close to the growth of the population.

The annual reports provide detailed data on the monthly salaries of employees in Public Administration & Justice, Education, Police, Military, Postal Services, and doctors within the Healthcare category. The wages are categorized based on several factors, such as position, marital status, experience, and location (e.g., whether in Warsaw or not). These factors are particularly numerous in the earlier versions of the annual reports, which could pose challenges since they do not specify how many employees fall into each category. However, the distributions of employees across these factors can be reconstructed based on data from later annual reports.

In other instances, for the "Other security" category, the same salaries as those for the police were applied. For Healthcare, Religious Institutions, Science and Culture, and Public Hygiene, salaries were fixed at 96%, 80%, 80%, and 90% of military salaries, respectively.

In most cases, the distribution of employment among voivodeships was based on their distribution as recorded in national censuses. For the military, employment was allocated according to troop deployment. In the case of the police, more detailed data were available for the period 1924–1930 in the annual reports. The assumed compensation of conscripts is equal to the cost of their subsistence (Morawski, W., 2015).

Regarding the distribution of salaries, as previously mentioned, the annual reports highlight differences between salaries in Warsaw and the rest of the country. For more detailed

distinctions between Warsaw and other regions, particularly in the case of bureaucrats and state enterprises, we utilized sources from the interwar period (Derengowski J., 1939).

3.2. Private services

The data for private services are less detailed than data for public services. Thus, the estimation to a large extent relies on the census data on employment. The only exception here is trade, which was subject to the industrial certification system and thus we can use the industrial certification statistics.

The sector includes subsectors.

3.2.1. Trade

The trade was subject to the industrial certification system and a turnover tax. The statistics differentiate between industrial and trade companies. The number of trade enterprises was reported on the regional level in the *Yearbooks of the Ministry of Treasury* (1924 – 1928) and later in the Statistical Yearbooks at the national level only. Similarly, as in the case of industry, we use this source to estimate the value added. As we miss the exact information on the number of working hours, we assume that the working hours average 90% of large and medium companies. The labor share in trade is assumed to equal 50%.

Contrary to the small industry and crafts, in this case, the employment estimate based on industrial certificates is coherent with an estimate based on census. Probably the tax was easier to enforce in the case of shopkeepers than in the case of tailors or shoemakers.

We allocate the national output to regions based on the region's share in the trade turnover tax (pl. *podatek przemysłowy*). The regional distribution of the turnover tax collected in trade enterprises is known for the years 1924 – 1928 (reported in *Statistical Yearbooks of the Ministry of Treasury*) and 1935 (*Statistics of Industrial Tax*). For the years 1929 – 1934, we assume the proportional change of the regional share needed to match the values of 1928 and 1934. For 1936 – 1938, we assume the constant regional shares of trade output. Our initial idea was extrapolation based on the population trends, but the population shares are an adequate proxy for the regional distribution of trade turnover. The turnover is highly skewed towards the regions including a large city, for example, the share of the capital region (Warsaw) is 2.3 times higher than its population share.

3.2.2. Transport

Statistics Poland provides detailed annual estimates on employment in state-owned railways. Employment in other segments of the sector—such as trams and buses, water transportation, and other categories—is extrapolated based on the 1921 and 1931 census data and then adjusted to follow trends similar to employment in administration. Salaries for state-owned railways are documented in the annual reports of Statistics Poland, while salaries for trams and buses are referenced in source material from the Interwar period (Derengowski J., 1939).

For water transportation, salaries were assumed to be equivalent to those for telegraph workers. The "Other" category includes five separate subcategories. For two of these (city and inter-city transport), salaries for state-owned railways and trams and buses were used. For the remaining subcategories (porters and messengers), the salary of a low-paid industrial worker was applied.

Following the AMECO database, the labor share in transport is assumed at 60%.

3.2.3. Domestic servants

The number of domestic servants is estimated based on the 1931 census. For the remaining years, the employment is extrapolated by the assumption that it follows the employment in trade. We exclude the servants employed in rural areas (approx. 25%) as the difference between servants and farm workers may be blurred in this case. We assume that the average wage of servants equaled 70% of the average wage in trade. The assumed labor share is 100%.

3.2.4. Housing

Our estimate of value added in housing is based on the statistics of real estate tax. The real estate tax is applied to the rental income from the property. Its rate was 7% or 12% depending on the income. As the distribution of rental income is unknown to us, we assume that the average tax rate was 10%. The real estate tax was not collected in Silesia. We assume that the per capita output in Silesia (a highly industrialized and urbanized region) was the same as in Warsaw.

The regional distribution of the tax is available for the years 1924 – 1928, 1931 – 1932 and 1938. The regional allocation for the remaining years was interpolated to match the first/last year, this assumes a proportional change over the missing years.

Currently, the share of utilities in rent in Warsaw is at approx. 30%. As we are missing any statistical information on the rental cost and its distribution, we assume the intermediate consumption at 20%. We assume lower intermediate consumption because many buildings did not have access to modern utilities.

3.2.5. Finance

The financial services are composed of two subsectors:

1) Banks and insurance
2) Interest on public debt paid to the residents of Poland

For banks and insurance companies, our estimate of VA is based on profits and personnel costs as indicated by the balance sheet. The output of the largest banks is allocated to the region of the headquarters (mostly Warsaw), and the remaining part is allocated across regions based on the regional allocation of real estate tax. The method of the allocation of the financial output may underestimate less developed regions as all employees of major state banks are accounted for in Warsaw.

The information on the paid interest on public debt is available only at the national level. The interest paid to the residents of Poland is allocated to the regions based on the regional distribution of real estate tax. The interests paid to foreign creditors are excluded.

3.2.6. Education

In interwar Poland, primary schooling was compulsory and available free of charge. In the 1920s, compulsory education was not fully enforced (problems existed mainly in the former Russian partition, especially in northeastern regions), but by the late 1930s, the enforcement was close to full. The secondary schools and universities were not compulsory and not free of charge. Similarly, higher education was not free for students. However, professors of public universities were employed by the state and are included in the public education sectors.

The private education output is estimated based on the public education output, for which we have much better statistical data.

The *Statistics of Education* provides information on the number of public and private schools/students across regions in the late 1930s. Based on this source supplemented with additional qualitative evidence we assume: the following multipliers for private education:

20% (of the public education output) in: Warsaw, Cracow and Silesia. The first two were major academic centers, the third one had a developed secondary education system.

15% in: Łódź, Vilnus and Lwów. The first one was an industrial region, the latter two were academic centers situated in the less developed regions of the country.

10% in the remaining central regions of the country

5% in the remaining eastern regions of the country.

Generally, the more educated the local population and the higher the share of secondary education students to primary education students, the higher the ratio of private education to public education.

3.2.7. Science, culture and art

The comparison of the outcomes of the 1931 census with the available statistics on public service employment shows that approximately one-third of the employees of this sector were employed by the state. Thus, we assume that the output of the private sector was two times higher than the output of the public sector.

3.2.8. Private hygiene

This sector is composed mainly of cleaners, hairdressers and the employment of baths (used by the people, who did not have access to the running water at home). The outcomes of 1931 census indicate that the employment of the sector was at approx. 4% of the employment in trade. The salaries in the sector were lower than in trade, we assume that the average wage in the sector was at 80% of the average wage in trade. Thus, we assume that the output of the sector equaled 3.2% of the trade output.

3.2.9. Administration and justice

This sector mainly includes various lawyers and advisors who were not employed of the state. As we miss the information on wages, the estimation of value added is based on the estates for the public sector.

During the interwar period due to the expansion of education, the number of lawyers significantly increased. However, the state employment remained more or less the same. In 1924 we assume the same shares of public state output as in the case of education (see 3.2.6) but to reflect the growing employment of the sector we assume that the share is increasing proportionally to reach two times the starting value in 1938 (e.g. 40% in Warsaw).

Such an adjustment is not needed for private education, because public employment in education rapidly increased in a consequence of the expansion of compulsory education.

3.2.10. Healthcare

The comparison of the outcomes of the 1931 census with the available statistics on public service employment shows that approximately one-half of the employees of this sector were employed by the state. To reflects the growing importance of the state in healthcare provision resulting from the expansion of the welfare state (see Wroński & Kondratowicz, 2024). the share of state output starts at 55% in 1924 and gradually decreases to 40% in 1938.

3.2.1. Religious institutions (secular workers)

In the interwar period, the clergy was employed by the state. However, the secular employees of the religious institutions were not public servants.

4. Conversion to NACE codes

The mapping of our sectors to NACE codes is presented in Table MA2. In most cases, the building blocks of our estimates could be directly assigned to NACE sections. In the few remaining cases, they were divided based on additional sources, such as census data. We were unable to reconstruct the output of section R (Arts, Entertainment, and Recreation) because interwar statistics reported its employment together with section M (Professional, Scientific, and Technical Activities) in a way that made any further division arbitrary. Additionally, as Statistics Poland did

not cover the activities of extraterritorial organizations and bodies, we do not reconstruct section U. However, even today, this section remains of marginal importance.

Table MA2. Mapping of NACE codes

NACE	Description	Interwar statistics:
A	Agriculture, forestry and fishing	Agriculture
B	Mining and quarrying	Mining and quarrying
C	Manufacturing	Industry – mining and quarrying – waterworks and powerplants - construction
D	Electricity, gas, steam and air conditioning supply	67% of waterworks and powerplants
E	Water supply; sewerage; waste management and remediation activities	33% of waterworks and powerplants
F	Construction	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	90% of trade
H	Transporting and storage	Transport
I	Accommodation	10% of trade
J	Information and communication	Post
F	Financial and insurance activities	Finance & insurance
M	Professional, scientific and technical activities	Science & culture
N	Administrative and support service activities	Social services
O	Public administration and defence; compulsory social security	Public services – post – science & culture – social services – religious institutions – utilities
P	Education	Education
Q	Human health and social work activities	Healthcare
R	Arts, entertainment and recreation	Included in section M
S	Other services activities	Religious institutions, utilities
T	Activities of households as employers; undifferentiated goods - and services - producing activities of households for own use	Domestic service
U	Activities of extraterritorial organisations and bodies	Not available

Source: own.

5. Population

Our population estimates are based on various materials provided by Statistics Poland, including the National Censuses from 1921 and 1931, annual reports, and the study Natural Population Movement in the Years 1895–1935. The National Censuses provide the most detailed

data on the population of each voivodeship, while the annual reports describe population figures for four "groups of voivodeships" (West, South, Center, and East). The Natural Population Movement study details births and deaths in each voivodeship.

To estimate population for specific years, we use census data as benchmarks for 1921 and 1931, then add population growth derived from the groups of voivodeships. This growth is allocated to individual voivodeships based on their share in the natural population movement. This approach, however, underestimates migration within groups of voivodeships, as such migrations are not captured in the natural population movement rates. For the period 1921–1931, this limitation is addressed using data from the 1931 National Census.

6. The discrepancies between our estimates and ESA 2010.

Dividends paid to foreign citizens

The dividends paid to foreign citizens are not included in Polish GDP. Our estimation procedure does not explicitly account for dividend income or assign it to any specific group; instead, it is treated as part of the capital share. Foreign capital played a significant role in the Polish industry (see Jaworek & Karaszewski, 2020, for discussion), with its share in the market capitalization of the Warsaw Stock Exchange reaching up to 33% in 1929. However, companies listed on the stock exchange did not distribute substantial dividends, with Statistics Poland reporting a peak payout of 118 million zł in 1928 (only 1.3% of the total assets). Even if 39 million zł were paid to foreign shareholders, this amount would not meaningfully affect our estimates. Moreover, the postwar border changes left some of the wealthiest German aristocrats as residents of Poland. As they have estates in both Poland and Germany, Polish citizens also received significant foreign dividend income. This further diminishes the impact of this discrepancy on our estimates.

Extraordinary wealth tax of 1923

In 1923, Poland introduced an extraordinary wealth tax (see Wroński, 2023, for discussion). According to ESA 2010, revenue from one-off wealth taxes should be included in GDP. However, in practice, this directive is often disregarded in historical national accounts. Nevertheless, the impact of this issue remains marginal.

In 1924, revenue from the one-off wealth tax amounted to 189 million zł. Including this in GDP would increase the estimate by 1.1%, from 14,414 million zł to 14,608 million zł. It would also

reduce the annual GDP per capita growth rate from 2.31% to 2.21%. However, in this case, we believe that deviating slightly from ESA 2010 improves the comparability of our results with historical national accounts estimates by other scholars.

7. The recalculation to the current (post-WW II) borders

To estimate GDP, GDP per capita, and population within the borders of contemporary Poland, we used several sources. The first was Bukowski et al.'s (2019) estimate of regional GDP in Poland in the long nineteenth century, the second was Wolf's (Rosés and Wolf 2019, 2021) estimates of regional development in Germany in the years 1895-2010, the third was the estimates of German GDP derived from the Maddison database, and the fourth was data on the population of the Weimar Republic from pre-war censuses.

Our procedure was as follows. In the first step, based on the values presented by Bukowski et al. (2019) and Wolf (Rosés and Wolf (2019), we estimated the relative GDP per capita in 1910 in those parts of Germany that were incorporated into Poland after World War II (Regierungsbezirks: Allenstein, Stettin, Koslin, Breslau, Liegnitz, Oppeln as well as the Free City of Gdańsk and Grenzmark Posen-Westpreußen) and in the eastern part of modern Germany (regions: Brandenburg, Mecklenburg-Vorpommern, Dresden, Chemnitz, Leipzig, Sachsen-Anhalt and Thuringen). We assumed that a similar GDP per capita relation as in 1910 was also valid in 1925 and 1938, for which Wolf made estimates of regional income. We translated this estimate to the entire period 1924-1938 using the dynamics of product per capita resulting from Maddison's data for Germany. In the next step, based on population data for 1925 and the regional level, as well as population dynamics for East Germany in the entire pre-war period provided Rosés and Wolf (2019, 2021) database we estimated the population growth path in the regions of interest. Together with the earlier estimate of income per capita, this allowed us to calculate the level of GDP in this area for the entire period 1924-1938. In the fourth step, we corrected the GDP, GDP per capita and population values calculated for the territory of the interwar Poland by deducing the part attributable to regions incorporated into the USSR after World War II. This concerned the entire Vilnius, Nowogródek, Polesie, Volhynia, Stanisławów and Tarnopol voivodeships, as well as about ¼ of the Białystok voivodeship and about 55% of the Lviv voivodeship. By taking into account the population data divided into urban and rural areas, in the last two cases we were able to disaggregate the regional GDP into the part attributable to post-war Poland and the USSR.

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Zagadnienia demograficzne Polski: ruch naturalny ludności w latach 1895-1935 (1936)

University of Warsaw
Faculty of Economic Sciences
44/50 Długa St.
00-241 Warsaw
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