ECONOMIC GROWTH IN THE BALTIC STATES SINCE 1913

From Capitalism to Socialism and Back



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Abstract

This thesis provides the first continuous GDP per capita estimates for Lithuania, Latvia, and Estonia for 1919–1995 and, by splicing the series with existing data, offers the first set of national accounts for the Baltic states covering 1913/1919–2024. By gathering and utilising extensive primary archival and published data as well as drawing on new and existing benchmark GDP figures, the study produces detailed output-side estimates which allow for sectoral analysis of Baltic economic growth. The figures are converted into international dollars, ensuring full comparability with existing Maddison Project Database data. By accounting for the occupied Baltic republics under Soviet rule, this research also constitutes the first attempt at long-run regional national accounting for individual republics within the USSR, offering a framework for other countries such as Ukraine or Belarus.

With the new data the thesis fills a long-standing gap in European historical national accounting and enriches the comparative study of peripheral economic catch-up across the capitalist–socialist divide. It contributes three new case studies that shed light on long-term growth dynamics in the European periphery.

The findings reveal severe economic devastation in Lithuania and Latvia following the First World War, placing them among Europe's hardest-hit regions. Recovery was slow, hampered by post-war independence struggles and the collapse of pre-war economic integration with imperial Russia. The 1920s proved disappointing: growth in Latvia and Estonia merely matched

that of advanced economies, while Lithuania entered a prolonged recession after the 1923 annexation of the Klaipėda region. By contrast, the 1930s brought resilience in the face of the Great Depression, likely due to continued reliance on primary rather than processed goods exports. During the last decade before 1940 all three republics experienced rapid, state-supported, industrialisation-driven growth fuelled by internal demand. As a result, while Lithuania remained firmly in the periphery, Latvia—and to some extent Estonia—retained their positions among the best-placed peripheral economies before the Second World War.

The war again brought demographic catastrophe and economic collapse. Under Soviet occupation, the 1950s and 1960s were marked by rapid industrial growth, mirroring the USSR's post-collectivisation boom and enabling the Baltic republics to narrow the gap with advanced economies. By the early 1970s, however, the European post-war boom had ended, and socialist economies—including the Baltics—slowed more sharply than their capitalist counterparts. Growth in occupied Latvia and Estonia weakened from 1968 onwards, never again outpacing the Western core until the mid-1990s. Lithuania maintained momentum until the mid-1970s before following a similar path of stagnation and relative decline.

A comparative sectoral analysis shows that the transition from agriculture to industry and services was faster during the interwar capitalist period than under Soviet rule. The socialist focus on heavy industry appears to have constrained consumer goods production and limited living standards. By 1989, Latvia and Estonia had lost their earlier relative positions within Europe; Lithuania had narrowed its historical gap in GDP per capita terms but still lagged far behind the West.

The post-1991 transition brought dramatic reversals. Latvia had already been in decline since 1987 and suffered perhaps the most severe post-Soviet contraction of all, erasing its historical income lead. Estonia endured a much milder recession and maintained its advantage until 2019, when Lithuania, having lagged behind its northern neighbours for more than a century, became the richest of the three Baltic economies following exceptional post-2010 growth. By 2024, Lithuania leads, followed by Estonia, with Latvia significantly behind.

The long-run perspective shows that, despite occasional periods of strong performance—notably in the late 1930s, the 1950s–1960s, and the post-1990 independence era—the Baltic states have remained within Europe's

economic periphery. Neither interwar capitalism nor post-war socialism and Soviet occupation succeeded in substantially closing the gap with advanced economies. Modern independence has brought notable catch-up progress, but in recent years Latvian and Estonian growth has stagnated, while Lithuania remains on a positive convergence track. By 2023, GDP per capita in all three countries still stood at only 63–77% of the Western core average and 55–67% of the Nordic level.

The thesis also examines the possible drivers and constraints of Baltic growth across political regimes. In the interwar years, growth was largely driven by automatic convergence stemming from Baltic 'advantages of backwardness', though institutional developments of the 1920s and 1930s potentially played a role as well. Under socialism, early gains stemmed from capital accumulation, labour reallocation, Soviet technology transfer, and exploitation of scale economies in the USSR's planned economy—enabled by inherited 'social capabilities' and largely coercive Soviet policies. By the 1970s, however, institutional rigidity, the absence of firm-level innovation incentives, and isolation from global technology flows severely constrained the capacity for productivity-enhancing change, leading to the USSR's—and thus the Baltics'—economic downfall.

Since regaining independence, the Baltic states have again leveraged their 'advantages of backwardness', attracting foreign direct investment, accelerating technology transfer, and integrating into European markets. Reforms were underpinned by strong political commitment to pro-market reform and Western alignment sustained through public willingness to accept short-term hardship. Yet convergence has slowed: Latvia and Estonia risk entering a middle-income trap, while Lithuania's continued progress—partly reliant on low-cost labour immigration—raises questions about the sustainability of its growth model.

Thus, in addition to closing a crucial data gap that has hitherto hindered the inclusion of the Baltic states in wider economic history scholarship, this thesis shows that neither interwar capitalism nor Soviet socialism allowed the three small economies to narrow the gap with Europe's wealthiest countries. Although the post-socialist era has brought more sustained progress, all three remain well below the income levels of the advanced European core. The findings underscore the critical interplay of initial conditions, institutional arrangements, and geopolitical context in shaping the long-term economic trajectories of small peripheral economies.

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List of Abbreviations

PPP ..... Purchasing power parity
**Int$**$_{1990}$ ..... 1990 international dollars
**Int$**$_{2011}$ ..... 2011 international dollars
MPD ..... Maddison project database
VA ..... Value-added
IC ..... Intermediate consumption
SSR ..... Soviet socialist republic
FSU ..... Former Soviet Union
EU$_{27}$ ..... Current 27 members of the European Union
ECE. East-Central Europe: Czechoslovakia, Hungary, Bulgaria, Yugoslavia, Poland, Romania
Western core Austria, Belgium, Denmark, France, Germany (West Germany, 1950–1997), the Netherlands, Norway, Sweden, Switzerland, and the UK
Western periphery ... Finland, Iceland, Ireland, Greece, Italy, Portugal and Spain
CSB .. Centralinis statistikos biuras (Lithuanian interwar statistical agency)
CSV ..... Centrinė statistikos valdyba (Lithuanian Soviet statistical agency)
CSP ..... Centrālā statistikas pārvalde (Latvian statistical agency)
RSK Riigi Statistika Keskbüroo (Estonian interwar Soviet statistical agency)
SKV ..... Statistika Keskvalitsus (Estonian Soviet statistical agency)

INTRODUCTION

> *When the Russians came, they bought out all the shoes and clothes, and now the stores here are empty too... They say Lithuania is like a little America, where everything is abundant and the people are well-dressed.*
>
> —A letter from Lithuania, 1940[1]

On the eve of World War I the future Baltic states were still part of the western outskirts of the underdeveloped Russian Empire. However, a visitor to Latvia or Estonia at that time would have been struck by a 'culturally Western' province, markedly distinct from its imperial overlord. Here, people spoke differently, worshipped in Protestant churches, actively traded with the West and enjoyed income levels closer to those of Europe than Russia.[2]

In 1913, the living standards among Latvians and Estonians were on par with those enjoyed by Finns or Italians.[3] The per capita income level in

[1] ''Laiškas iš Lietuvos'', *Vienybė* (New York), no. 192 (November 1940): 1.

[2] J. S. Corum, ''A View from Northeastern Europe: The Baltic States and the Russian Regime'', *South Central Review* (Baltimore) 35, no. 1 (2018): 129; D. Kupčiūnas, ''Baltic exceptionalism from Versailles to Belovezhskaya Puscha'', Understanding the Baltic states: Estonia, Latvia and Lithuania since 1991 (London: Hurst & Company, 2023), 118.

[3] MPD version 2023: Jutta Bolt and Jan Luiten van Zanden, *Maddison style estimates of the evolution of the world economy: A new 2023 update*, 2024 (hereafter cited as MPD version 2023) and this thesis

Lithuania, although markedly lower, still exceeded that of Greece or Portugal. Thus, all three future Baltic states were comparable to the group of peripheral countries that would eventually succeed in greatly reducing the income gap separating them from the mature Western economies.[4]

In 1918, as World War I drew to a close, Lithuania, Latvia, and Estonia declared independence. While Russia, their former overlord, embraced socialism, the Baltic states—though carrying out the most radical land reforms in Europe—retained their distinctly capitalist character.[5] In 1939, when Russian soldiers once again set foot on Baltic soil, they encountered, once more, a world apart from their own: 'I couldn't understand anything. The store is full of all sorts of fabrics, whatever the soul desires, and there is not a single person, not to mention a line. Whoever needs something goes in, buys it, and leaves,' a Red Army soldier wrote from Estonia in 1939.[6] 'We live here and see that in a capitalist country people live better than in the Soviet Union; they have everything, and everything is cheap,' another wrote a few months later in Lithuania.[7] While Soviet soldiers may have exaggerated in comparing the quality of life in Baltic cities to American levels, it was widely acknowledged that living standards in Latvia and Estonia during the 1930s were still comparable to those in Finland, Greece or Italy.[8]

In 1940, the Baltic states were invaded by the USSR and, after their reoccupation in 1944, were swiftly transformed from small, independent actors in the international economy into highly specialised regions within the autarkic Soviet Union. Despite promises of rapid growth in living standards under socialism, by 1990 per capita income in the Baltic states was only half that of Finland or other peripheral European economies. Thus, on the eve

[4]This group of countries, referred to as the Western periphery, includes Finland, Iceland, Ireland, Greece, Italy, Portugal and Spain—countries which were still underdeveloped before World War II, but would go on to converge towards the most advanced Western economies throughout the 20th century and beyond, see T. Vonyó, ''War and socialism: why eastern Europe fell behind between 1950 and 1989'', *The Economic history review* 70, no. 1 (2017): 8–9.

[5]M. Morys, *The economic history of Central, East and South-East Europe: 1800 to the present* (Abingdon: Routledge, 2021), 9; J. Reardon, ''An Assessment of the Transition to a Market Economy in the Baltic Republics'', *Journal of economic issues* (Knoxville) 30, no. 2 (1996): 630

[6]М. И. Мельтюхов, *Прибалтийский плацдарм (1939-1940): Возвращение Советского Союза на берега Балтийского моря* (Алгоритм, 2014), 279.

[7]Мельтюхов, 279.

[8]In 1938 Colin Clark estimated that around the year 1930 Latvia and Estonia stood at 93-95% of Finland, 87-89% of Greece and 99-102% of Italy in terms of national income per capita. See C. Clark, ''Internationaler Vergleich der Volkseinkommen'', *Weltwirtschaftliches Archiv* (Tübingen) 47 (1938): 60, Clark's national income estimates divided by population data from this study. Clark only provides a 1924/1928 average figure for Lithuania which is at 62% of Finland's 1930 level.

of the Communist bloc's collapse, the Baltic states were far less distinct from their overlord than they had been 77 years earlier (see Figure 1).

The end of Soviet rule presented the Baltic states with another opportunity to begin catching up with the West. All three nations swiftly embraced their aspiration to 'return to Europe', adopting democracy and market capitalism. Their post-communist transition, though initially devastating, was characterised by rapid and enduring reform.[9] Since surpassing their 1990 GDP per capita in 2002, the Baltics have been among the most dynamic regions in Europe, steadily converging towards Western income levels (see Figure 1) and earning the nickname 'Baltic Tigers', which—at least in the case of Lithuania—still resonates today.[10] Having joined the European Union and NATO in 2004, they subsequently gained admission to the OECD, distinguishing themselves as the only former Soviet republics to achieve these milestones.

Since the Great Recession, however, Latvian and Estonian growth trajectories have been relatively disappointing, and the massive exodus of local populations from all three republics since independence has complicated the overall success story. Although Ivan Berend recently hailed the three Baltic nations as 'the transformation and development stars of the former Soviet Bloc', the parallels between their growth rates and those witnessed during Europe's *golden age* of growth, as drawn by Crafts and Toniolo, now seem less apt than they did a decade ago.[11] Nevertheless, Lithuania's real GDP growth rates continue to impress, with a 3.1% figure in the first half of 2025—surpassed only by Ireland.[12]

The experiences of the Baltic states nevertheless make them profoundly interesting subjects of study.[13] Given the significant attention drawn by their recent developments and the economic regimes they have lived under dur-

[9] A. Åslund, ''Why Have the Baltic Tigers Been So Successful?'', *CESifo forum* (München) 16, no. 4 (2015): 3–7.

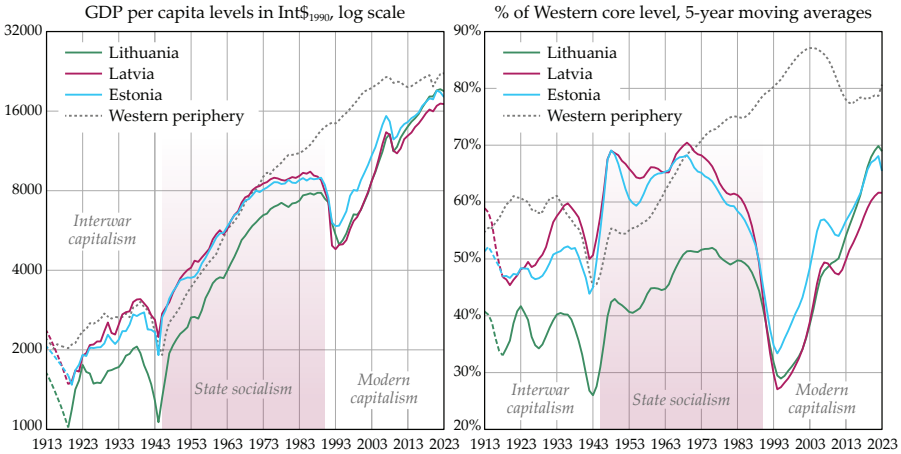
[10] M. Randveer and K. Staehr, ''Macroeconomic Trends in the Baltic States Before and After Accession to the EU'', in *Does EU membership facilitate convergence?: the experience of the EU's eastern enlargement. Volume I, Overall trends and country experiences*, ed. M. A. Landesmann and I. P. Székely, Studies in economic transition (Basingstoke: Palgrave Macmillan, 2021), 214–227; *OECD Economic Surveys: Lithuania 2022* (Paris: OECD Publishing, 2022), 15

[11] N. Crafts and G. Toniolo, ''Aggregate growth, 1950–2005'', ed. S. Broadberry and K. H. O'Rourke, vol. 2, The Cambridge Economic History of Modern Europe: 1870 to the Present (Cambridge: Cambridge University Press, 2010), 331; T. I. Berend, *Economic history of a divided Europe: four diverse regions in an integrating continent*, Routledge studies in the European economy (Abingdon: Routledge, 2020), 200

[12] *Eurostat Database*, Accessed on August 2, 2025, 2025.

[13] Randveer and Staehr, ''Macroeconomic Trends'', 212

Figure 1: GDP PER CAPITA, LEVELS AND % OF WESTERN CORE



Sources: This study, MPD version 2023 (data in Int$$_{2011}$ converted into Int$$_{1990}$ using the ratio of 1.594, see page 12 in the original MPD version 2023 paper) and The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024. 1914-1918 figures interpolated.

ing the transformative 20th century, it is reasonable to expect that their long-term growth dynamics would offer valuable insights.[14] These small agrarian economies, which gained sovereignty only in 1918–1919, subsequently navigated the interwar period with its crises and autarkic tendencies. Uniquely, they were the only formerly capitalist countries to be fully absorbed into the USSR in 1940–1945, enduring socialism as highly regionally specialised Soviet republics for 45 years before re-emerging as independent states in 1990. The experiences of Lithuania, Latvia, and Estonia thus provide important new evidence for analysing catch-up dynamics in Europe's periphery in light of the capitalist–socialist divide.

However, despite the potential insights to be gained, comprehensive long-run growth series for the Baltic states in the 20th century are notably absent. The Maddison Project Database (MPD), the preferred source of historical national accounts among economic historians, offers figures for Lithuania, Latvia, and Estonia only from 1973, with pre-1990 data of limited reliability.[15] Other reputable international sources, such as the World Bank or Eurostat, provide no data prior to the 1990s.[16] Consequently, the pre-1990

[14] A. Klimantas and A. Zirgulis, "A new estimate of Lithuanian GDP for 1937: How does interwar Lithuania compare?", *Cliometrica* 14, no. 2 (May 2020): 228.

[15] MPD version 2023

[16] See The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington,

experiences of the Baltic states have been largely omitted from most European economic history volumes.[17] Among the major works on the regional economic history of East-Central Europe, the only detailed discussion of Baltic interwar performance is found in Aldcroft's 2006 volume, albeit based on low-quality data.[18]

Beyond a few brief subchapters in general history works, the economic aspects of the Baltic past have been largely overlooked by local scholars as well.[19] As a result, there is a tendency to overly romanticise the interwar capitalist period while refusing to acknowledge any progress made during the Soviet era—a perspective that remains commonplace in the Baltic states.[20]

The absence of comprehensive Baltic economic growth statistics can be attributed to several factors. First, these countries did not exist in their modern form before 1918 and, as part of the Russian Empire, inherited the problem of limited statistical coverage.[21] Second, both World Wars brought severe regime changes to the region, leading to shifting borders and changes in statistical institutions and practices, with much of the data being lost in the pro-

D.C, 2024; *Eurostat Database*; for a more detailed review of existing data, see Chapter 2.

[17] For example: K. G. Persson and P. Sharp, *An economic history of Europe: knowledge, institutions and growth, 600 to the present*, Second edition (Cambridge: Cambridge University Press, 2015); T. I. Berend, *An economic history of twentieth-century Europe: economic regimes from laissez-faire to globalization*, 2nd edition (Cambridge, 2016); A. Di Vittorio, *An economic history of Europe: from expansion to development* (London: Routledge, 2006); The only two major works that incorporate some Baltic data are the 2010 study by Roses and Wolf (J. R. Roses and N. Wolf, ''Aggregate growth, 1913-1950'', ed. S. Broadberry and K. H. O'Rourke, vol. 2, The Cambridge Economic History of Modern Europe: 1870 to the Present (Cambridge: Cambridge University Press, 2010), 187–188) and Aldcroft and Morewood's 2013 volume (D. H. Aldcroft and S. Morewood, *The European economy since 1914*, 5th ed. (Abingdon: Routledge, 2013), 102)

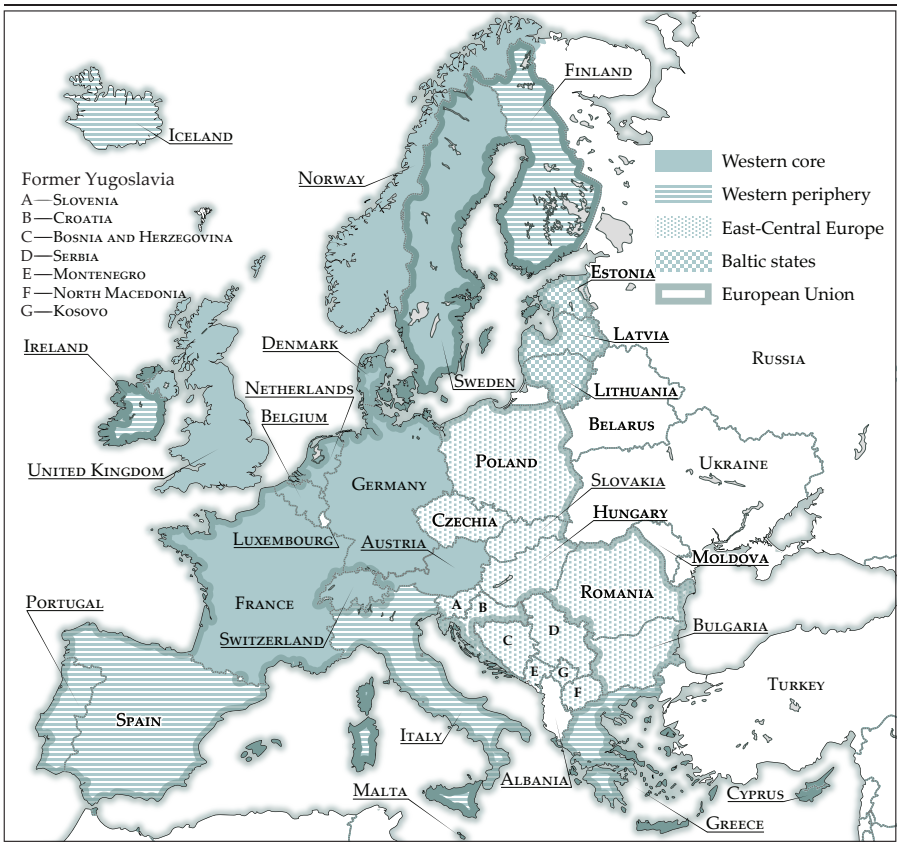
[18] D. H. Aldcroft, *Europe's third world: the European periphery in the interwar years* (Ashgate, 2006), 94–105, the other works being T. I. Berend, *Economic history of a divided Europe* and M. Morys, ''Economic growth and structural change in Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 161–187

[19] A. M. Köll, ''Reinterpretation of economic history in the Baltic countries, 30 years after independence'', *Scandinavian Economic History Review* 0, no. 0 (2024): 2.

[20] For example, Estonia's income level was claimed to haven been equal to Finland's in 1939 and 14 smaller than Finland's in 1987, see M. Laar, ''The Estonian Economic Miracle'', *Backgrounder* (Washington, D. C), no. 2060 (2007): 1; living standards in interwar Latvia or even Lithuania were hypothesised to have been higher than in Germany, see P. Judickas, ''Tikroji statistika ir skaičių ekvilibristika'', *Tiesa* (Vilnius), no. 6(13925) (January 1989); A. Lapinskas, *Lietuva tarpukariu nebuvo atsilikėlė*, 2013. Very recently, a heated discussion flared up during the presentation of the preliminary results of this thesis in Latvia between the Estonian ambassador and the author of this thesis. The ambassador could not believe that there was any growth during the Soviet period, see Vidzemes Augstskola, *Panel discussion. The economy of the Baltic States in 100 years: lessons and future challenges*, available on Youtube, Valmiera, 2024, 0:46:14.

[21] A. Gregg, ''Cliometrics, the Russian Empire, and the Soviet Union'', in *Handbook of Cliometrics*, ed. C. Diebolt and M. Haupert (Springer, 2024), 219–220.

Map 1: EUROPE IN 2024



Sources: Own work.

cess.[22] Third, Soviet authorities deliberately neglected the preservation and analysis of pre-1940 data.[23] Finally, scholars have been largely discouraged from attempting to compile the national accounts of the occupied Baltic states due to the difficulties inherent in reconstructing Soviet economic growth statistics.

The official Soviet estimates of national income are plagued by serious reliability issues.[24] To address this for the USSR as a whole, an entire CIA

[22] J. Dagys, ''Visuomeninio produkto ir nacionalinių pajamų apimties buržuazinėje Lietuvoje klausimu'', *Liaudies ūkis*, May 1959, 140.

[23] M. Morys and M. Ivanov, ''Population and living standards. Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 244

[24] T. Vonyó and A. Markevich, ''Economic growth and structural developments, 1945–1989'',

team was tasked during the Cold War with producing Western-style Soviet aggregate income statistics.[25] However, there was never sufficient interest, funding, or expertise in any former Soviet republic to undertake the arduous task of compiling national accounts for the 1940–1990 period for individual republics. The only exception is a recent, albeit incomplete, effort in Estonia.[26]

Fortunately, the past five years have seen growing interest in the historical national accounts of the Baltic region. Regrettably, however, these efforts have been largely confined to scattered estimates for the interwar period, none of which have been incorporated into international databases. Consequently, Lithuania, Latvia, and Estonia continue to represent significant blank spots in European economic historiography.

The central aim of this thesis is to help fill this gap by assembling historical national accounts for the three Baltic economies covering the years 1919 to 1995 and connecting them with existing 1913 and post-1990 data. The primary methodological approach employed in this study is output-side benchmark extrapolation, which comprises four key steps.

First, two robust and detailed benchmark GDP figures are assembled: one from the 1930s to cover the pre-1940 capitalist period and another from 1990 to account for 1940–1995. Such benchmark figures are available for all Baltic states except interwar Estonia, which is estimated in this thesis.

Second, and most demanding, sectoral volume indices are assembled for the two respective periods—1919–1940 and 1940–1995—for each country individually. These indices are primarily based on physical indicator series, which allow for the construction of constant-price sectoral indices, the most reliable method when dealing with Soviet-period data.[27]

Third, the sectoral indices are multiplied by their respective value-added weights from the benchmark figures to create two constant-price GDP series for each country.

Finally, these series are converted into international dollars and linked

ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 279–280.

[25] A. Maddison, ''Measuring the Performance of a Communist Command Economy: An Assessment of the CIA Estimates for the USSR'', *The Review of income and wealth* (Oxford) 44, no. 3 (1998): 307–323.

[26] M. Klesment et al., ''Childbearing and macro-economic trends in Estonia in the XX century'', *Rahvastiku-uuringud* (Tallinn) Seeria B, no. 63 (2010) compile GDP per capita series for 1950-1990 for Estonia, but solely using the 'productive sector' data, excluding most statistics on services.

[27] Vonyó and Markevich, ''Economic growth and structural'', 279–280.

with each other, as well as with existing 1913 and post-1990 data, to produce a complete and consistent set of real GDP and GDP per capita PPP series for Lithuania, Latvia, and Estonia from 1913/1919 to 2024.

By applying the physical volume index approach, this thesis aligns methodologically with the work of the CIA and Angus Maddison on the USSR as a whole.[28] Despite criticisms levelled against the CIA series, they remain the most widely used today.[29] The robustness of the new series is evidenced by the small margin of error when connecting the resulting Baltic 1940–1990 series to the pre-1940 data and existing post-1990 figures. While there are limitations to the estimates in this study, which are discussed in Chapter 3 of this thesis, the only viable improvements would involve assembling new expenditure-side accounts for several separate years for cross-checking—a task substantial enough to warrant one or more papers of its own.

The subsequent aim of this thesis is to address three research questions through the analysis of newly compiled data. The first asks: *what were the overall and sectoral growth trends in the Baltic states since 1913/1919?* The data reveals that, despite the devastation of the First World War and the disappointing 1920s, the independent capitalist Baltic states demonstrated robust growth throughout the 1930s, successfully navigating the Great Depression. This acceleration allowed Lithuania, Latvia, and Estonia to begin closing the gap with the West at a time when industrialised nations were being ravaged by the crisis. By 1938, Latvia—and, to a lesser extent, Estonia—appeared to be among the best-positioned peripheral countries in Europe.

Following the Soviet occupation in the 1940s, GDP per capita growth accelerated under socialist rule, surpassing East-Central European levels and mirroring Western Europe's golden age of economic growth during the 1950s and 1960s. Although Lithuania's remarkable performance extended well into the 1970s, the process of catching up with mature economies ended in 1968 for the more productive Latvian and Estonian Soviet Socialist Republics. The subsequent slowdown—characteristic across the Soviet bloc—eventually encompassed all three Soviet-occupied Baltic republics, contributing to the USSR's dissolution in 1991.

The new data also indicates that the post-socialist transition was less severe across the Baltic states than initially believed, with recovery to 1989

[28] A. Maddison, *Historical Statistics of the World Economy: 1-2008 AD*, 2010, 312.

[29] The CIA series remain the primary source for post-WWII Soviet GDP estimates in MPD version 2023

levels completed by the early 2000s. Since then, robust convergence towards the West has resumed. These catch-up trends diverged after the 2008 crisis: while Lithuania has maintained a positive convergence trajectory, Latvia and Estonia have performed less impressively. Closing the income gap with regional peers such as Finland and the Nordic countries has likewise been slow, with Lithuania the only one of the three to have reduced its distance from the Nordics since 1913. Today, the Baltic states remain part of Europe's periphery, with living standards still markedly below Western or Nordic levels.

Examining the sectoral drivers behind these trends reveals distinct patterns across different periods. In all three Baltic countries, the 1920s were characterised by an expansion in crop production, while the 1930s saw a shift towards state-promoted industrial growth. The first half of the state socialist era was overwhelmingly dominated by industrial and construction expansion across the three occupied Baltic republics. Growth was particularly rapid in heavy industries before 1969, closely followed by traditional food and textile branches.

Conversely, all three economies experienced poor results from collectivisation, with agricultural output declining by about 11% on average between 1949 and 1955. The 1970–1989 period was marked by slowdowns across all sectors, with services emerging as the primary growth driver in all three republics, although the importance of agriculture and the food industry saw a partial recovery during this time.

As expected, the early 1990s brought the steepest declines, with heavy industry and construction output falling by more than 20% between 1990 and 1994. However, Estonia—having drawn the smallest share of its GDP from heavy industries—experienced a much milder recession during this period.

The second research question addressed in this thesis asks: *what was the Baltic record of catching up with the mature Western and Nordic economies under each of the three economic regimes—interwar capitalism, post-war socialism, and modern capitalism?* The new datasets contribute to ongoing debates on the comparative regional performance of East-Central Europe and the Baltics, a region historically characterised by 'reproduced backwardness' during both the interwar capitalist and post-war socialist periods.[30]

Empirical data reveal that the Baltic states, alongside East-Central Europe, experienced stagnation relative to Western levels of GDP per capita during both 1913–1938 and 1938–1989. The Baltics endured particularly severe dis-

[30] T. I. Berend, *Economic history of a divided Europe*, 187.

ruption from the First World War and its aftermath, coupled with a complete breakdown of their pre-war social, economic, and political structures. Following the loss of the Russian market, the newly independent capitalist Baltic states demonstrated remarkable adaptability during the interwar period.[31] The new data indicate that from 1929 to 1938, the Baltic countries emerged as Europe's fastest-growing economies, outperforming their regional peers. Although unable to reduce their gap with the Western core in 1913–1938, Estonia and Latvia managed to keep pace and maintain income levels comparable to the Western periphery by the late 1930s. These new growth statistics support the notion that the two northern Baltic states were among the peripheral nations best positioned to eventually escape East-Central Europe's 'persistent lagging'.[32]

Empirical analysis of Baltic post-war GDP per capita aligns with the findings of Allen, Broadberry and Klein, and Vonyó and Markevich, indicating that the three republics—alongside the USSR and East-Central Europe—resumed convergence towards the Western core during the 1950s and 1960s.[33] However, Latvia and Estonia began falling behind the West again in 1969, with Lithuania joining this increasingly disappointing trend in 1976 (see Figure 1). By 1989, the gap between the Baltic states and the Western core had widened compared with both 1938 and 1950 levels. Similar to East-Central Europe, neither the pre-war capitalist nor the post-war socialist regimes appear to have succeeded in propelling these countries towards sustainable Western convergence.

The modern period since the collapse of socialism in Europe has been marked by divergent convergence trends across post-communist states. With several exceptions, the majority of East-Central Europe, including the Baltics, has been catching up with the income levels of richer economies. However, Latvia—increasingly joined by Estonia—has recorded growth rates below expectations.

The final research question in this thesis examines *the possible drivers be-*

[31] Aldcroft, *Europe's third world*, 105.

[32] J. Kofman, *Economic nationalism and development: Central and Eastern Europe between the two world wars* (Boulder: Westview, 1997), 202–205; Aldcroft, *Europe's third world*, 105, 171; D. H. Aldcroft and S. Morewood, *The European economy since 1914*, 5th ed. (Abingdon: Routledge, 2013), 120.

[33] R. C. Allen, *Farm to factory: a reinterpretation of the Soviet industrial revolution*, The Princeton Economic History of the Western World (Princeton: Princeton University Press, 2003), 110; S. N. Broadberry and A. Klein, ''When and why did eastern European economies begin to fail? Lessons from a Czechoslovak/UK productivity comparison'', *Explorations in Economic History* 48, no. 1 (2011): 44–45; Vonyó and Markevich, ''Economic growth and structural'', 281–283.

hind the periods of Baltic catching up with, and falling behind, the mature economies. Although a detailed quantitative analysis of the sources of growth would require reliable data on inputs—currently unavailable—this thesis identifies several key mechanisms likely responsible for the relatively strong Baltic performance in the 1930s, 1950s, 1960s, and 2000s, as well as the periods of disappointing growth, particularly in the 1970s and 1980s.

Following the recovery to pre–First World War levels by 1929, catch-up growth in the 1930s was largely driven by rapid industrialisation and relative insulation from the Great Depression. This thesis suggests that both mechanisms stemmed from Baltic 'advantages of backwardness', lending support to the unconditional convergence hypothesis. Nevertheless, the analysis leaves room for conditionality, which may be validated in future research.

By the late 1930s, Latvia, Estonia, and—albeit to a lesser extent—Lithuania appear to have cultivated substantial levels of 'social capability' required for catch-up growth, supported by high literacy rates, egalitarian institutions, secure property rights, export orientation, and active governments. From a growth theory standpoint, they were relatively well positioned among Europe's peripheries to take advantage of the post–Second World War capitalist European economic order that underpinned the continent's golden age of growth, as noted by Aldcroft and Kofman.[34]

Even though it was a socialist, rather than capitalist, future that unfolded, the strong post-war catch-up under Soviet occupation was accelerated by these 'social capabilities'. The Lithuanian, Latvian, and Estonian Soviet Socialist Republics emerged from the war with reduced yet still socially advanced workforces and relatively intact infrastructure—particularly in Latvia and Estonia. These attributes are thought to have attracted disproportionately large Soviet investments and to have driven growth through the utilisation of underused productive capacity. Mass-production technology, already established in the USSR, was swiftly transferred to the occupied Baltic republics, and structural modernisation began at a rapid pace.

However, while both mechanisms of technology transfer and structural labour shifts may have occurred automatically across the freely trading capitalist European countries, in the Soviet-occupied Baltics they were certainly accelerated by the specific conditions within the USSR. Structural modernisation was forcefully driven by coercive collectivisation, which moved ag-

[34] Aldcroft, *Europe's third world*, 105, 171; Kofman, *Economic nationalism*, 202–205.

ricultural populations into urban areas and thus towards industrial employment. Additionally, technology transfer accompanied Moscow's centralised industrialisation policies rather than arising through the automatic channels of investment and imitation. Finally, deep specialisation within the Soviet Union may have provided scale and division-of-labour advantages earlier than those achieved in Western European countries through the opening of international trade.

The slowdown in growth rates from the 1970s onward clearly stemmed from a classic failure of 'social capability' within the USSR. Once extensive, input-driven growth had been exhausted, the system's institutional flaws—coupled with international restrictions on technology transfer—prevented a shift from mass to flexible production and the adoption of information and communication technologies. With the Baltic states deeply integrated into the USSR and possessing little autonomy over economic decision-making, these factors were likely behind the stagnating growth rates in the three occupied republics as well.

In the years following the collapse of socialism in Europe, the newly independent countries across the former Communist bloc shared similar 'advantages of backwardness'. Yet only those that pursued aggressive and sustained policy-driven institutional reforms were able to achieve lasting catch-up growth. Newly independent Lithuania, Latvia, and Estonia were prime examples of such deliberate improvements in 'social capability' and 'technological congruence', which in turn fostered pro-market institutions, technologically advanced workforces, and modern infrastructure. These attributes have since facilitated foreign direct investment and export-driven growth. The Baltic case, therefore, supports the view that catch-up growth is ultimately highly conditional, even though automatic convergence may occur in the short run.

Beyond its academic significance, the results of this thesis may also inform contemporary responses to social and geopolitical tensions within the region. A 2016 survey revealed notable levels of support for a planned economy over market capitalism among Baltic populations: 34% in Latvia, 27% in Estonia, and 16% in Lithuania.[35] These preferences have implications for ongoing debates surrounding European integration and economic liberalisation.[36] A

[35] *Life in Transition Survey*, 2016, 91, 106, 109

[36] D. R. Henderson et al., ''The Hidden Inequality in Socialism'', *The independent review* 9, no. 3 (2005): 389.

lack of clear information about income developments during the Soviet occupation has also enabled Russia to exploit Soviet nostalgia in its information warfare against the West. Robust and accessible economic statistics can therefore play a vital role in helping policymakers mitigate the obstacles and risks associated with these knowledge gaps.

The remainder of this thesis is structured as follows. Chapter 1 establishes the historical context of the Baltic states. Chapter 2 reviews existing scholarship on economic growth in Lithuania, Latvia, and Estonia since 1913 and addresses literature relevant to the research questions. Chapter 3 details the methodology for estimating Baltic GDP per capita levels from 1919 to 1995, discussing key data issues, describing the estimation process, and presenting final datasets linked to existing figures from 1913 and 1990–2024, along with their limitations. Chapter 4 explores the implications of the new data by outlining the main points of the Baltic economic growth story. The final chapter concludes the study. The thesis also includes a list of abbreviations preceding the introduction and appendices containing summary tables of the main statistical aggregates as well as detailed information on the estimations.

1

THE BALTIC STATES

An overview and historical background

A visit to Lithuania, Latvia, and Estonia has convinced me that the Treaty of Versailles did well in bringing these States into being.

—A. C. Bossom, British M.P., 1933[1]

Lithuania, Latvia and Estonia, located in the north-eastern corner of Europe, are small open economies and thriving democracies today.[2] The Baltic states have been part of the European Union and NATO since 2004 and, as of 2025, all three are members of the OECD as well.

Often grouped together, the Baltic states are indeed relatively similar in terms of size, population, climate, linguistic distinctiveness, and their economic success among former Soviet Union members. For most of the past three decades, their business cycles have been synchronised, migration patterns nearly identical, trade openness similarly high, and economic policies

[1] A. C. Bossom, ''Three Baltic states'', *The Times* (London), no. 46345 (January 1933): 9.

[2] K. Staehr, ''Economic growth, current account dynamics, and growth regimes in the Baltic states'', *Journal of Baltic studies*, 2024, 2.

Table 1.1: THE BALTIC STATES IN 2023

	Lithuania	Latvia	Estonia
Size, thous. km^2	65.3	64.6	45.3
Population, million	2.88	1.88	1.42
Language & titular nation	Lithuanian	Latvian	Estonian
Titular nation's population share	82.6%	62.6%	67.8%
Religion[a]	Catholic	Protestant	Protestant
GDP per capita, % of EU_{27}[b]	86.0%	70.4%	81.2%
GDP per capita, % of Western core[c]	69.0%	61.6%	65.5%

Sources: J. H. Bater et al., *Lithuania*, in Encyclopedia Britannica, August 2024; A. Stranga et al., *Latvia*, in Encyclopedia Britannica, August 2024; M. S. Smogorzewski et al., *Estonia*, in Encyclopedia Britannica, August 2024; The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024; Statistics Lithuania, *Indicators database*, December 2024; Statistics Latvia, *Population by ethnicity at the beginning of year*, Riga, August 2024; Statistics Estonia, *Population, 1 January by Year, Sex, County and Ethnic nationality*, Tallinn, August 2024; MPD version 2023.

[a] there is a growing proportion non-religious populations in the Baltic countries. The group is particularly sizeable in Estonia. In the case of the latter, the table refers to traditional religious affiliation.

[b]in current international dollars; [c]in $Int\$_{1990}$

closely aligned—albeit with time lags that allowed followers to learn from best practices.[3] On the other hand, while growth patterns have only recently begun to diverge, there have always been marked differences between the three, as shown in Table 1.1. Historically, these differences played a significant role in their developmental divergences and became particularly pronounced during the interwar independence period.[4]

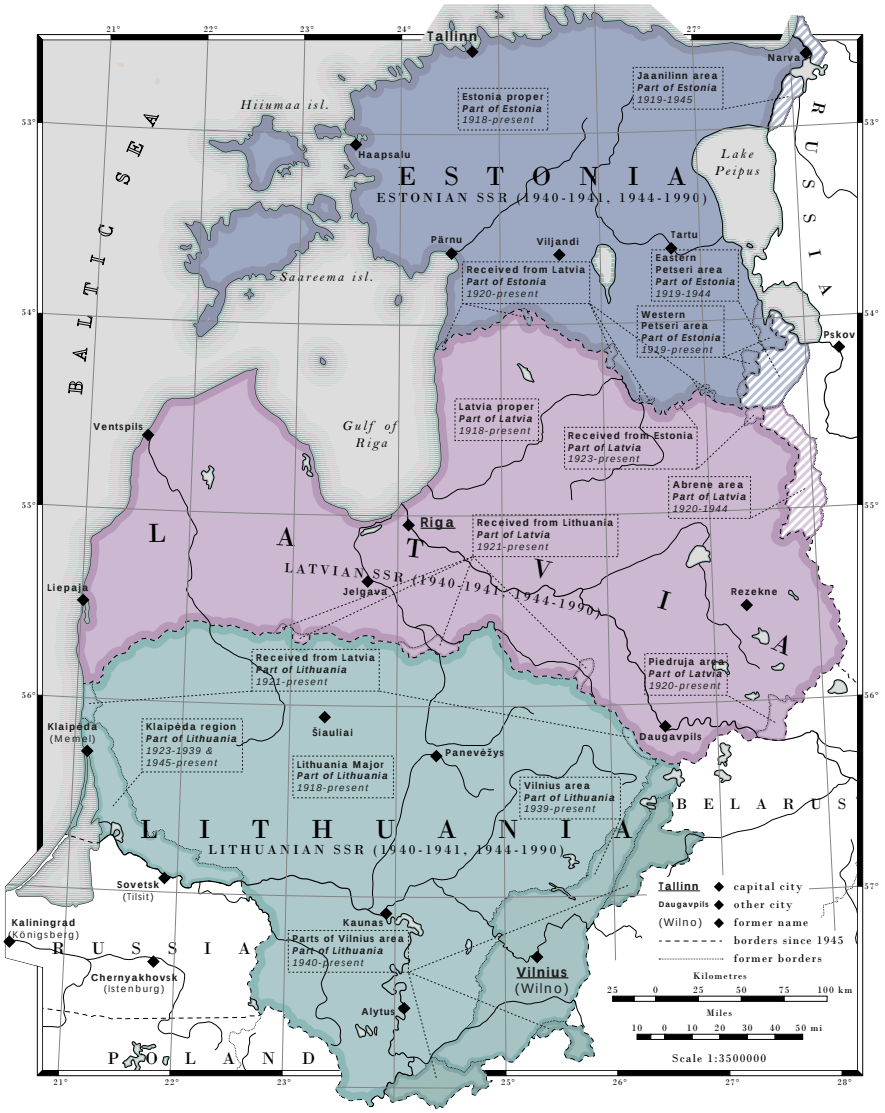
However, with Soviet occupation in the 1940s, they were transformed into a single economic region and remained relatively integrated even after the collapse of the USSR.[5] Moreover, since 1918 their political destinies have been nearly identical. Given the chronological boundaries of this thesis, it is reasonable to treat the three together for most of the regional trends analysed, except in cases of notable divergence.

[3]Staehr, ''Economic growth'', 2; A. Poissonnier, ''The Baltics: three countries, one economy'' (Luxembourg) 24, April 2017. (2017): 2–3

[4]Royal Institute of International Affairs Information Department, *The Baltic states* (Oxford University Press, 1938), 3.

[5]G. Vaskela, ''Lietuvos ūkis TSRS ir Rytų Pabaltijyje XX amžiaus 5-6 dešimtmečiais'', ed. R. Laukaitytė, Stalininis režimas Lietuvoje 1944-1953 m. (Vilnius: Lietuvos istorijos instituto leidykla, 2014), 225–248; R. Rubčinskaitė and L. Urbšienė, ''What matters for the economic synchronization of the Baltic States'', *Empirica* (New York) 51, no. 3 (2024): 667

Map 2: THE BALTIC STATES,
territorial changes since 1918



Sources: Own work, based on P. Gaučas et al., *Lietuvos istorijos atlasas* (Vilnius: Vaga, 2001).

Lithuanians, Latvians and Estonians before 1914

The Baltic peoples first appeared in Roman records in the 1st century AD, though detailed written histories emerged only in the 12th century. The region comprised four ethnic groups: Old Prussians (extinct by the 18th century), Lithuanians, Latvians, and Estonians. While the first three shared Baltic linguistic roots linked to Sanskrit, Estonians were of Fino-Ugric origin.[6] The 13th century brought German crusading knights to the lands inhabited by Baltic tribes, leading to divergent paths for these peoples. Latvia and Estonia fell quickly, falling under the crusader state of Livonia, while Lithuania successfully resisted, establishing its own state under King Mindaugas in 1253.[7]

By the 14th century Lithuania had become a major European power, it accepted Christianity in 1387 and formed an alliance with Poland which was to last until 1795. Meanwhile, Latvians and Estonians lived under German rule in the Livonian Confederation.[8] The 16th century brought significant changes as Livonia collapsed during the Reformation and Livonian wars. Lithuania, facing pressure from Muscovy, formed the Polish-Lithuanian Commonwealth in 1569.[9] As a result, whilst Latvians and Estonians converted to Protestantism, most Lithuanians remained Catholic.

The whole region witnessed continuing turmoil in the 17th and 18th centuries. While Sweden asserted control over Estonia and northern Latvia, bringing a degree of modernisation to the area, Lithuanian-Polish state declined, being increasingly pressured by Russia.[10] Following Swedish defeat by the Russians in the Great Northern War in 1721, Estonia and northern Latvia fell under Czarist rule, although German nobility's dominance there was maintained. In 1795 the Polish-Lithuanian Commonwealth collapsed and most of Lithuania together with the rest of Latvian lands was also absorbed by the Russian Empire. Although lagging behind Western Europe economically, these regions, particularly future Latvia and Estonia, were more modernised than the rest of Russia, earning the imperial nickname 'our little West'.[11]

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[6] A. Kasekamp, *A history of the Baltic states*, Second edition (London: Palgrave, 2017), 4–5.

[7] A. Plakans, *A concise history of the Baltic States* (Cambridge: Cambridge University Press, 2011), 33–47; Kasekamp, *A history*, 10–15

[8] Plakans, *A concise*, 67–76.

[9] Plakans, 90–97

[10] Plakans, 98–106; Kasekamp, *A history*, 45–50

[11] Kupčiūnas, "Baltic exceptionalism": 118; K. Kodres, ''The Soviet West? The Shifting

Map 3: EUROPE IN 1913



Sources: Own work.

Under Russian imperial rule, the Baltic nations' development diverged significantly along the modern Lithuanian-Latvian border. In 1816-1819 czar Alexander I compelled Baltic German nobles to emancipate their serfs in Latvia and Estonia, although land ownership was still in the hands of the German nobility. Most of Lithuania remained under stricter control and Lithuanian-Polish uprisings resulted in additional severe repercussions, including closure of Vilnius University and intensified Russification.[12] Serfdom in Lithuania was only abolished under the 1861 empire-wide emancip-

Bounderies of Estonian Culturescape'', ed. N. V. Zlidneva and J. Heteni, At the Crossroads of the West: the Problems of Borderzone in Russian and Central European Cultures (Moscow: Institute for Slavic Studies of the Russian Academy of Sciences, 2021), 427

[12]Plakans, *A concise*, 170–172; Kasekamp, *A history*, 65–68

ation act which notably included provisions for land transfer in Latvia and Estonia too.[13] As a result, agricultural modernisation, which had already begun in Latvia and Estonia by 1900, was delayed in Lithuania up to the start of WWI.[14]

By mid-1800s, Latvia and Estonia had experienced significant socio-economic advancement. Their Protestant faith facilitated native language development and national awakening, while Lithuania lagged approximately one generation behind.[15] Nevertheless, despite the pressure of Russification and lacking a functioning university, Lithuania developed a distinct national identity through clandestine schools and smuggled literature.[16] By 1897, Lithuanian-dominated governorates had achieved impressive literacy rates, surpassed only by Saint Petersburg, Finland, and the Latvian and Estonian governorates.[17] Thus, Lithuanians, while enjoying lower living standards than Latvians and Estonians, maintained more advanced human capital levels than in most of Russian empire.[18]

By 1914, Latvia and Estonia had developed into relatively industrialised societies, serving as textitentrepôts for Western trade with Russia.[19] Latvian and Estonian cities along the Baltic coast had become the industrial powerhouses of the Russian Empire, well integrated into its economic structure.[20] Lithuania, by contrast, retained its agrarian character, though all three regions surpassed Russia proper in literacy, income, and national consciousness. In particular, Latvia and Estonia were increasingly distancing themselves from the living standards of their overlord.[21]

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[13]Kasekamp, *A history*, 61–65; Plakans, *A concise*, 190–198, 217–223

[14]J. Kahk and E. Tarvel, eds., *An economic history of the Baltic countries*, Acta Universitatis Stockholmiensis. Studia Baltica Stockholmiensia, 20 (Stockholm: Almqvist & Wiksell, 1997), 101.

[15]Plakans, *A concise*, 206–214, 217–223

[16]Kasekamp, *A history*, 69–73

[17]Н. А. Тройницкаго, ed., *Первая Всеобщая Перепись Населения Российской Империи, 1897 г.* (Saint Petersburg: Центрального Статистического Комитета Министерства Внутренних Делъ, 1899-1905), page 1 of each Volume and *Suomen Tilastollinen Vuosikirja* (Helsinki: Tilastollinen päätoimisto, 1912), 7, 47.

[18]Plakans, *A concise*, 241–254

[19]V. P. Karnups, *The Little Country That Could: Latvian Economic Relations and Foreign Trade with Various Countries in the Interwar Period* (Riga: University of Latvia Press, 2022), 175; Corum, "A View": 129

[20]Kahk and Tarvel, *An economic*, 102.

[21]J. S. Corum, *The security concerns of the Baltic states as NATO allies*, The Letort papers (Carlisle: Strategic Studies Institute / U.S. Army War College Press, 2013), 8–9; Kupčiūnas, ''Baltic exceptionalism'', 118

World War One and interwar Independence

Pre-WWI Latvia was once dubbed the 'Belgium of the East' due to its compact size, industrial capacity, and high standard of living.[22] However, by 1919, it had come to resemble Belgium in a far more tragic sense: the utter devastation it endured relative to its small area.[23] The German army occupied Lithuania in 1915 and, after overrunning half of Latvia, entrenched for over two years, with the front line stretching through Latvia and its capital Riga. In the wake of the German advance, the imperial Russian government ordered the evacuation of Latvia's industrial capacity, much of which, together with countless refugees would never return.[24] In the wake of the October Revolution in Russia and facing the prospect of German occupation, Lithuanian, Latvian and Estonian non-Bolshevik activists set their sights on national independence with Lithuania being the first to declare it on 16 February 1918. While Bolshevism initially held strong sway in Latvia and Estonia, many activists fled to Russia in 1917 as the German army advanced. On the eve of Tallinn's occupation by Germany, declaration of Estonia's independence was issued on 24 February 1918.[25]

The German surrender in November 1918 created a window of opportunity for the Baltic peoples to assert their sovereignty, with Latvia being the last to declare independence on 18 November 1918. A period of independence wars followed, during which each of the new countries had to contend with at least two adversaries. All three nations grappled with both local and Russian Bolsheviks, crucially winning popular support by promising land to peasants who fought for national statehood.[26] They also faced a challenge from militant German elements lingering after the collapse of their empire. Latvia and Lithuania had the additional task of defending against Russian White armies, while Lithuania found itself embroiled in a protracted conflict with Poland over its capital, Vilnius. By the end of 1920, each nation

[22] J. Hiden and P. Salmon, *The Baltic nations and Europe: Estonia, Latvia and Lithuania in the twentieth century* (London: Longman, 1994), 77.
[23] Kasekamp, *A history*, 104
[24] Plakans, *A concise*, 287–293
[25] Kasekamp, *A history*, 88
[26] A. Kasekamp, ''Survival against the Odds: The Baltic States at 100'', *Slavic Review* 78, no. 3 (2019): 642.

had secured its independence, with Latvia and Estonia having united all of their ethnic lands. Lithuania was somewhat less fortunate. The price for sovereignty was the loss its capital Vilnius to Poland, along with a significant portion of ethnic Lithuanian territory. Nonetheless, after a daring military operation in 1923 that Lithuania managed to annex the mixed Lithuanian-German speaking Klaipėda (formerly Memel) region, which had, since the 13th century been under German rule, securing for itself a crucial Baltic sea port (see Map 2).[27] Since then all three Baltic states were poised to begin the process of state-building as independent countries. For Latvia and Estonia, this marked their first experience of sovereign nationhood in history. It was therefore crucial for their modern existence that these regimes pass the test of bringing economic prosperity to their peoples.

Starting out as idealistic democracies, all three Baltic states held elections in early 1920s with universal suffrage. Yet chaos and external threats soon led to disillusionment in democracy with Lithuania turning authoritarian in 1926, followed by Estonia and Latvia in 1934. All three were rather lenient 'velvet' dictatorships with some fascist elements, yet never reaching the levels of state control and corporatism implemented in Italy or Portugal.[28] These regimes maintained their westward orientation up until the Soviet occupation in 1940.

The newly independent Baltic states, having embraced capitalism, faced severe challenges in the aftermath of the First World War. Populations had shrunk dramatically in all three nations, with Latvia's capital, Riga, losing more than half its residents between 1914 and 1919.[29] Moreover, they confronted the daunting tasks of post-war reconstruction and of navigating the consequences of deindustrialisation following the loss of the Russian market (see Figure 2.4).

Latvia and Estonia in particular—owing to their greater modernisation and deeper integration into the former Russian Empire—experienced a prolonged recovery. Trade, financial, and industrial networks had been utterly disrupted, compounded by the loss of skilled workers and the evacuation of industrial capacity during the war.[30] Furthermore, agriculture, which re-

[27] Plakans, *A concise*, 300–307

[28] Kasekamp, *A history*, 96–102; A. Anušauskas, ed., *Lietuva 1940-1990: Okupuotos Lietuvos istorija* (Vilnius: Lietuvos gyventojų genocido ir rezistencijos centras, 2005), 31

[29] Kahk and Tarvel, *An economic*, 107.

[30] Aldcroft, *Europe's third world*, 95–96; R. J. Crampton, *Eastern Europe in the twentieth century* (Routledge, 1994), 103; Z. Norkus and J. Markevičiūtė, ''New estimation of the gross domestic product in Baltic countries in 1913–1938'', *Cliometrica* 15, no. 3 (September 2021): 616

Map 4: EUROPE IN 1938



Sources: Own work.

mained the dominant sector after the war, lost its principal market following the Bolshevik takeover in Russia. As a result, the agrarian Baltic republics now had to reorient their trade towards the competitive international market.[31]

The Baltic nations also witnessed a significant shift in their social order. Lithuanians, Latvians, and Estonians, as the dominant ethnic groups, ascended to become the ruling classes, displacing the old Polish and German nobility. This transformation was cemented through the implementation of far-reaching redistributive land reforms, fulfilling promises made during the independence wars. These land reforms, among the most successful in Eastern

[31] Kahk and Tarvel, *An economic*, 118.

Europe, gave rise to a new agricultural middle class dominated by the majority ethnic groups. Consequently, 'the Baltic states became among the *most egalitarian* societies in Europe.' Despite these changes, Germans in Latvia and Estonia, and Jews in Lithuania, largely maintained their commercial significance and enjoyed non-discriminatory status within the general population.[32]

Throughout the interwar period, the Baltic states remained predominantly agrarian, with 63%, 67%, and 74% of the workforce engaged in agriculture in Estonia, Latvia, and Lithuania, respectively, in the 1930s.[33] Given this agrarian character, the primary strategy for Baltic economic development centred on fostering agricultural exports to Western Europe. As early as 1918, Lithuania's first prime minister embraced export-led modernisation: 'We are a country of farmers. What does the whole world need now? Food and more food. For food, it will be possible to get anything—gold and, what is more valuable than gold, *all kinds of goods*.'[34] To achieve this, the Baltic governments encouraged—and, in Lithuania's case, initiated—the development of agricultural co-operatives, which enabled them to coordinate the export of produce to Western Europe.[35]

To foster efficient trade and curb post–First World War inflation, all three nations also introduced stable, gold-backed national currencies in the 1920s, thereby integrating into capitalist Europe's monetary system. However, the three republics diverged in their exchange rate regime decisions during the 1930s. Following severe gold outflows and deflation, Estonia and Latvia imposed exchange controls in 1931, followed by respective devaluations and pegs to the British pound in 1933 and 1936. Lithuania, however, remained committed to maintaining the gold standard until it finally imposed exchange controls in 1935.

Since the spread of the Depression in the 1930s, the Baltics followed general European tendencies towards greater role of the state in the economy.[36] Latvia and Estonia in particular, increasingly turned towards import-substitution industrialisation strategy. Their model, known in the area as 'denmarkisation', sought to repeat the Danish 19th century success by exporting foodstuffs and closing off to industrial imports, fostering in-

[32] Kasekamp, *A history*, 102–108; Plakans, *A concise*, 307–316

[33] *Statistikos biuletenis 1939 no. 3 (185)*, Kaunas, 1939, 91; *Ostland in Zahlen* (Riga: Reichskommissar für das Ostland, 1942), 2

[34] M. Drėmaitė, ''Pusryčiai Britanijai'', ed. N. Černiauskas et al., Įsivaizduoti Lietuvą (Baltos lankos, 2018), 52–53.

[35] Kahk and Tarvel, *An economic*, 110.

[36] Kahk and Tarvel, 118.

fant industries.[37] To mitigate the drawbacks of small farm sizes, co-operative networks were being centralised.[38] International trade was overseen by state-owned companies, reflecting a degree of state involvement in the economy. The level of state capitalism increased following the authoritarian takeovers, with Latvia reaching the highest levels of state intervention by 1940. While market capitalism continued to prevail among small-scale businesses, the populace of the Baltic states increasingly came to welcome the active and guiding role of the state in the economy during the 1930s.[39]

Nevertheless, autarky never became a state policy in any of the interwar Baltic republics. All three economies remained export-oriented throughout the period, and this, according to several authors, facilitated the transition from crop farming to animal husbandry while also serving as the main driver of overall development.[40]

The interwar period witnessed perhaps the greatest advancements in higher education across the Baltic states. All three countries founded local universities and significantly increased both secondary and tertiary education attainment levels.[41] Investment in human capital reached unprecedented heights in Latvia and Estonia boasting 4.3 and 3.1 university students per 1,000 people respectively in the 1930s, compared to just 2.3 in Europe's Western core countries. In Lithuania, however, the ratio was only 1.7. On the other hand, number of school pupils per 1000 people remained below Western average in all three Baltic states throughout the 1930s.[42]

After failed attempts at regional cooperation, by the late 1930s, the Baltic states found themselves pawns in the geopolitical machinations of Nazi Germany and the USSR.[43] The joint Nazi-Soviet invasion of Poland in 1939

[37] Köll, ''Reinterpretation'', 4; T. I. Berend, *An economic history of twentieth-century*, 31

[38] Kahk and Tarvel, *An economic*, 118.

[39] Plakans, *A concise*, 334

[40] Royal Institute of International Affairs Information Department, *The Baltic states*, 187; Aldcroft and Morewood, *The European economy*, 58, 119–120

[41] Kasekamp, *A history*, 102–108

[42] Weighted averages for 1930s, calculated with data from Palgrave Macmillan Ltd, *International Historical Statistics*, 1st ed. 2013. (London: Palgrave Macmillan UK, 2013); Z. Norkus et al., *Number of Students in Universities in Lithuania, 1919-1939*, 2022; Z. Norkus et al., *Number of Students in Universities in Latvia, 1919-1939*, 2022; Z. Norkus et al., *Number of Students in Universities in Estonia, 1919-1939*, 2022; Z. Norkus et al., *Number of Pupils in Primary Schools in Lithuania, 1919-1939*, 2022; Z. Norkus et al., *Number of Pupils in Primary Schools in Latvia, 1919-1939*, 2022; Z. Norkus et al., *Number of Pupils in Primary Schools in Estonia, 1919-1939*, 2022; Z. Norkus et al., *Number of Pupils in Secondary Schools in Lithuania, 1919-1939*, 2022; Z. Norkus et al., *Number of Pupils in Secondary Schools in Latvia, 1919-1939*, 2022; Z. Norkus et al., *Number of Pupils in Secondary Schools in Estonia, 1919-1939*, 2022

[43] Kasekamp, *A history*, 108–111

foreshadowed the looming downfall of the independent Baltic states.[44] The amended Molotov-Ribbentrop pact assigned Lithuania, Latvia, and Estonia to the Soviet sphere of influence and in autumn 1939, the USSR forced the Baltic states into mutual assistance pacts, installing large Red Army contingents within their borders. Unlike Finland, which refused a similar agreement and defended itself in the subsequent Winter War, all three Baltic republics complied. As part of its agreement with the USSR, Lithuania regained its capital Vilnius, which the Soviets had overrun during their invasion of Poland.[45] The pact also precipitated a semi-voluntary exodus of the centuries-old Baltic German populations from Latvia and Estonia in 1939, numbering around 65,000 people, followed by a further 66,000 in 1941, including the Lithuanian Germans.[46]

The Baltic leaders maintained an illusion of normalcy while the USSR patiently awaited an opportune moment to strike the final blow. A brief period of about six months followed, during which the still-independent capitalist republics interacted with the numerous Soviet soldiers already present. Archival documents reveal the astonishment of Russians at the quality of life and availability of consumer goods in the Baltic republics, which stood in sharp contrast to the impoverished capitalist lands portrayed in Soviet propaganda and the dismal reality inside the USSR itself.[47]

In June 1940, as the world watched France fall to the Germans, the USSR executed a brilliant manoeuvre to invade and fully annex the Baltic states without firing a shot. The invasion appeared as a peaceful transfer of power to new national governments, which promised free elections and continued independence, even as Red Army tanks rolled in unopposed.[48] During the first months of the occupation, to many 'the new Soviet regime was just another alien government' which simply replaced the disgraced right-wing dictators.[49] The true nature of this foreign occupation became apparent in 1941 when mass repressions and genocidal deportations to the Far East began,

[44] Anušauskas, *Lietuva 1940-1990*, 41.

[45] Plakans, *A concise*, 337–339

[46] D. Crowe, *The Baltic states and the great powers: foreign relations, 1938-1940* (Boulder: Westview, 1993), 121, 129, 130–131.

[47] See the Red Army soldier impressions quoted in the introduction and Plakans, *A concise*, 341; C. Merridale, *Ivan's war: the Red Army 1939-1945* (London: Faber, 2006), 65–66

[48] A. E. Senn, *Lithuania 1940: revolution from above* (Amsterdam: Rodopi, 2007); Plakans, *A concise*, 342–343

[49] Č. Laurinavičius, ''Laimėjimai ir atsilikimo apraiškos'', Lietuvos istorija. Nepriklausomybė (1918-1940 m.) (Vilnius: Lietuvos istorijos instituto leidykla, 2015), 336.

shattering any remaining illusions of autonomy or benign Soviet rule.[50]

The 22 years of independence marked the first time the majority of Baltic populations were truly in control of their lives, lands, and countries. The 1920s saw a surge of patriotism that kickstarted state-building efforts, focusing on defence, economic development, and educational-cultural advancement. The 1930s brought modernisation, coupled with an increasing tendency to entrust decision-making power to the state.[51] The overall achievements of this period were remarkable given the disastrous starting conditions.[52]

The Baltic states' ability to secure their independence in 1918 and maintain it until 1940, thus postponing Soviet occupation and communist rule for two decades, proved instrumental in shaping their modern political success.[53] While in the 1920s the area's geopolitical orientation was still uncertain, by 1939 its westward trajectory had become clear. The Western powers' refusal to recognise the Soviet annexation of the Baltic states ensured their legal continuity throughout the Cold War, ultimately facilitating their integration with the West after 1990.[54]

The memory of the interwar period remains potent and often romanticised in the Baltic consciousness. As Marko Lehti observes, for the Baltic populations 'the loss of nation-statehood through the 1940 Soviet annexation has remained a national trauma. National dignity was violated in a fundamental manner. This explains why ... the period of interwar statehood has been elevated to the status of a new *Golden Age* defining the present, too'.[55]

Occupation, 1940—1990

The arrival of Soviet tanks and red flags in 1940 marked the beginning of a catastrophic period for the Baltic states. The ensuing 50 years of foreign occupation, command economy, and massive repressions would profoundly

[50] Anušauskas, *Lietuva 1940-1990*, 34, 140–142; Plakans, *A concise*, 344–348

[51] Plakans, 333–334

[52] Aldcroft, *Europe's third world*, 105.

[53] C. de Chassiron, ''The re-emergence of national cultures following independence in the Baltic states'', ed. P. I. Barta, The fall of the iron curtain and the culture of Europe (Abingdon: Routledge, 2013), 71.

[54] ''Latvia Between Two Worlds'', *The Economist* (London) 106, no. 4421 (May 1928): 12; Plakans, *A concise*, 346

[55] M. Lehti, ''Estonia and Latvia: A "new" Europe challenges the "old"?'', ed. D. J. Smith, The Baltic States and their region: new Europe or old? (Amsterdam: Rodopi, 2005), 92.

shape these nations. The scale of this oppression was immediately apparent; in 1940-1941 alone, more Lithuanians were deported to Siberia and other parts of the USSR than during the entire 19th century of czarist rule.[56] When Nazi Germany occupied the Baltic states, their regime quickly proved to be no less oppressive. It denied any autonomy to the Baltic nations and, most horrifically, resulted in the extermination of the centuries-old Baltic Jewish community, which had numbered some 270,000 people.[57]

The German retreat in 1944 was marked by prolonged battles and the utter devastation of Estonian, Latvian, and Lithuanian lands. That year, only half of the agricultural land was under cultivation, and most major cities lay in partial ruin.[58] The Baltics became the scenes of some of the most brutal battles of the war, such as the Battle of Narva, which claimed more than half a million military casualties.[59] Civilian losses are more difficult to quantify, but existing population statistics indicate that 1.2 million people—about 20% of the Baltic population—perished between 1940 and 1945, a figure significantly higher than the 8% decline recorded across East-Central Europe during the same period.[60]

By 1945, the Red Army had overrun the entirety of East-Central Europe except for Yugoslavia and Albania. By the early 1950s, repressive single-party communist governments had taken power across the region,[61] while the Baltics faced the return of direct Soviet rule and the re-establishment of the Lithuanian, Latvian, and Estonian Soviet Socialist Republics. Stalinist repressions, which soon began across Eastern Europe, were pursued with particular intensity in the Baltics.

The year 1945 also brought territorial changes: the Latvian and Estonian SSRs lost small portions of their eastern areas to the Russian FSSR, while the Lithuanian SSR regained the Klaipėda (Memel) area, which had been annexed by Nazi Germany in 1939 (see Map 2). These borders were inherited by the modern independent Baltic states and remain intact to this day.

The war had left an indelible mark on the Baltic landscape and demo-

[56] Anušauskas, *Lietuva 1940-1990*, 132.

[57] Kasekamp, *A history*, 120–122

[58] Kahk and Tarvel, *An economic*, 120.

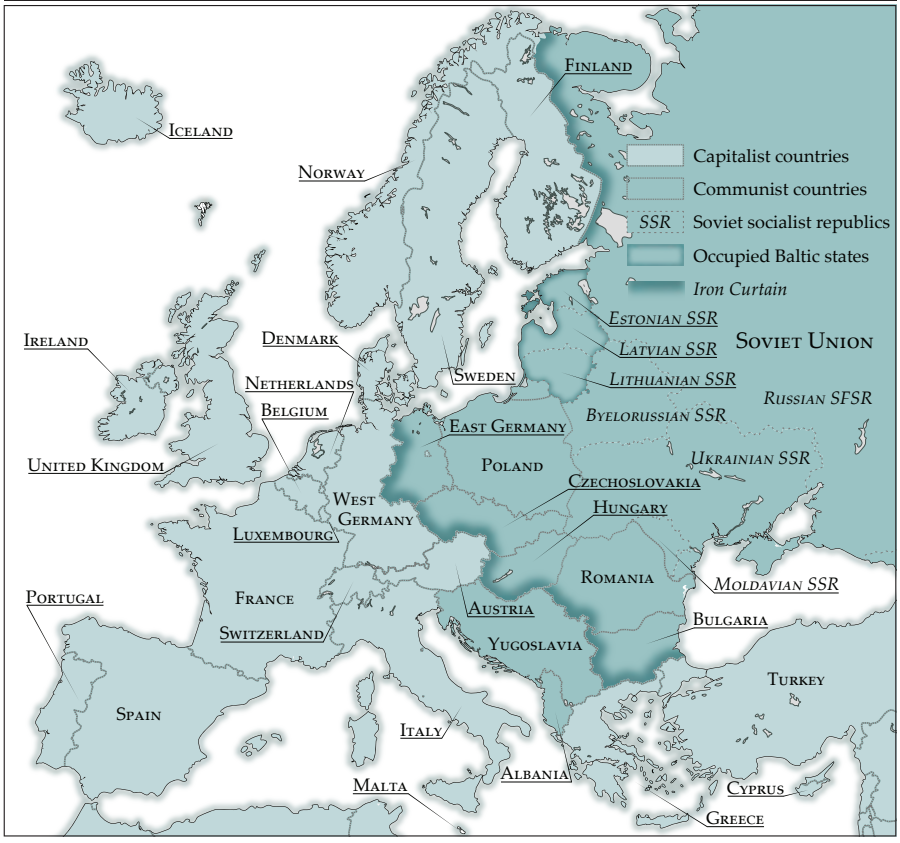
[59] P. Doyle, *World War II in numbers* (London: A & C Black, 2013), 105.

[60] Vidzemes Augstskola, *Baltic 100 Data Catalog*, 2024; R. J. Misiunas and R. Taagepera, *The Baltic states: years of dependence, 1940-1990*, Expanded and updated ed. (London: Hurst, 1993), 353; MPD version 2023

[61] I. T. Berend, *Central and Eastern Europe, 1944-1993: detour from the periphery to the periphery* (Cambridge: Cambridge University Press, 1996), 39.

graphy. With a significant portion of the Baltic population lost or displaced and many cities largely reduced to rubble, dramatic changes in urban and demographic composition began even before the collectivisation-induced urbanisation. Cities were rebuilt in the Soviet style, and Russian-speakers were imported from the Soviet hinterland to repopulate and reshape these urban centres as well as to fulfil the demand for industrial workforce.[62]

Map 5: EUROPE IN 1989



Sources: Own work.

The initial years of the second Soviet occupation were marked by active partisan resistance, fuelled by hopes of an imminent conflict between the USSR and the West. These resistance fighters, known as 'forest brothers', operated in significant numbers across the Baltic states: approximately 10,000

[62] Kasekamp, *A history*, 126–128

each in Latvia and Estonia, and a remarkable 40,000 in Lithuania. Supported by the rural populace, these partisans continued their struggle against Soviet rule generally until 1953, when an amnesty was promised following Stalin's death.[63]

In total, according to rough estimates, Baltic home-grown population losses between 1939 and 1955 amounted to about two million people, resulting from war, the Holocaust, repressions, deportations, and partisan resistance.[64]

The task of rebuilding the economies of the republics fell to the local communist parties. They soon realised that there was a significant shortage of manpower loyal to the new regime to accomplish this objective. This realisation precipitated an influx of Russian-speakers into the region, which had remained largely homogeneous until the 1950s. At the same time, local communist party membership began to grow, as affiliation with the party became a precondition for career advancement. This gradual increase in membership represented the beginnings of a pragmatic adaptation by Baltic residents to the new political realities.[65]

Like the rest of East-Central Europe, the occupied Baltics saw their economies completely reconstructed according to the state socialist model in the post–Second World War years. In the 1940s and 1950s, Lithuania, Latvia, and Estonia shifted from being independent economic actors competing in world trade to becoming integral parts of a vast, autarkic Soviet empire. However, rather than serving as entry gates for Western trade and foreign direct investment into Russia, as they had before the First World War, the post-war Baltic Soviet republics were transformed into highly specialised regions within the USSR, with most decision-making concentrated in Moscow.[66]

Similarly to the members of the Council for Mutual Economic Assistance (CMEA)—the economic organisation of socialist European countries—the occupied Baltic republics became specialised in advanced manufacturing.[67] The USSR reportedly tended to direct a disproportionate share of its investments towards the newly acquired Baltic republics, which provided fertile

[63]Plakans, *A concise*, 360–362

[64]Misiunas and Taagepera, *The Baltic states*, 358.

[65]Plakans, *A concise*, 362–364

[66]J. Å. Dellenbrant, ''The integration of the Baltic Republics into the Soviet Union'', *Journal of Baltic Studies* 18, no. 3 (1987): 249–251.

[67]S. Richter, ''Economic integration within COMECON and with the Western economies'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 331; Dellenbrant, ''The integration'', 249

ground for such injections due to their relatively high levels of human capital and developed infrastructure.[68]

Conditions for growth under such circumstances clearly differed from those of the interwar years, and thus these two dimensions—specialisation and investment—must be kept in mind when explaining Baltic economic growth under Soviet rule. Although both aspects were also present in the CMEA countries, which tended to profit from their relationship with the USSR, the level of Baltic integration with and dependence on the Soviet Union was complete. In the late 1980s, CMEA members conducted around 50% of their foreign trade with each other and the remainder with the outside world.[69] By comparison, approximately 86% of Baltic foreign trade was conducted with other republics of the USSR, and a further 7% with CMEA members, leaving just around 7% of their trade with countries outside the CMEA.[70]

The Soviet government swiftly implemented economic planning directed from Moscow, with the first five-year plan established in 1946. However, in a manner reminiscent of Lenin's New Economic Policy of the 1920s, the implementation of several core features of the command economy was initially postponed to facilitate recovery. The predominantly agricultural, small-farm based Baltic societies were permitted to retain up to medium-sized plots, provided they surrendered approximately one fifth of their produce to the state. These measures proved beneficial, as the personal efforts of the war-torn population to return to normalcy aided reconstruction more effectively than communist propaganda.[71]

In the immediate post-war years, the Soviet grip on the countryside remained tenuous. The majority of the population still resided in individual farmsteads, and partisan activity continued to harass Soviet officials. Consolidating Stalinist rule thus required the implementation of a crucial element: collectivisation. Under the *kolkhoz* (collective farm) and *sovkhoz* (state farm) system, land, inventory, and harvests were placed under collective and state ownership. This policy stood in stark opposition to the individualistic agrarian character of most Baltic peoples, who had fought hard for

[68]Kahk and Tarvel, *An economic*, 123.

[69]Richter, ''Economic integration'', 327–328.

[70]The World Bank, *Lithuania - The transition to a market economy*, Washington, D.C., 1993, 333–337; The World Bank, *Latvia - The transition to a market economy (English)*, Washington, D.C., 1993, 240; The World Bank, *Estonia - The transition to a market economy (English)*, Washington, D.C., 1993, 283;

[71]Plakans, *A concise*, 364–367

Table 1.2: COLLECTIVISATION OF AGRICULTURE IN THE BALTIC STATES

	Lithuania		Latvia		Estonia	
	Farms collectivised	Output, 1938=100	Farms collectivised	Output, 1938=100	Farms collectivised	Output, 1938=100
1947	<1%	82	<1%	59	0%	81
1948	<1%	86	2%	67	0%	90
1949	4%	94	10%	64	6%	86
1950	62%	91	85%	67	80%	85
1951	89%	82	97%	64	93%	83
1952	>90%	76	98%	65	97%	84
1953	94%	77	>98%	61	99%	80
1954	>94%	83	>98%	64	>99%	79
1955	>94%	78	>98%	60	>99%	77
People deported	132,000 (100,000) 5% of the population		58,000 (42,000) 3% of the population		45,000 (35,000) 4% of the population	

Sources: K. Girnius, ''The collectivisation of Lithuanian agriculture, 1944-1950'', *Soviet studies* (Abingdon) 40, no. 3 (1988): 471; V. Skebas and V. Spečiūnas, *Kolektyvizacija*, in Visuotinė lietuvių enciklopedija, July 2018; J. Riekstiņš, *„Kulaku kā šķiras likvidācija" – Latvijas turīgās zemniecības sagraušana* (Riga: Tieslietu ministrija, 2020), 69; A. Drizulis, *Latvijas PSR vēsture*, vol. 2 (Riga: Zinātne, 1986), 241–242; R. Taagepera, ''Soviet Collectivization Of Estonian Agriculture: The Taxation Phase'', *Journal of Baltic studies* (Brooklyn) 10, no. 3 (1979): 265; A. Bubnys, ''Damage caused by the soviet union in Lithuania - depopulation of 1940-1941 and 1944-1953'', ed. A. Abene et al., Damage caused by the Soviet Union in the Baltic States: international conference materials (Riga: E-forma, June 2011), 27; A. Anušauskas, *Lietuvos gyventojų trėmimai*, in Visuotinė lietuvių enciklopedija, 22 Mar, 2018; Museum of the Occupation of Latvia, *Soviet Mass Deportations from Latvia*, Briefing paper 4, 2006; O. Mertelsmann and A. Rahi-Tamm, ''Soviet mass violence in Estonia revisited'', *Journal of genocide research* 11, nos. 2-3 (2009): 310; L. Õispuu, *Name list of persons deported from Estonia 1945–1953* (Tallinn: Estonian Repressed Persons Records Bureau, 2014), 12 and this study.

[a]beginning of the year figures (mid-year data for Estonia in 1952-53).

Note: deported people include all Soviet deportations from 1940 to 1953; figures in brackets report deportations during the collectivisation phase since 1948.

their right to own personal land in 1919-1920. Consequently, as attempts at voluntary collectivisation yielded no results, even when coupled with exceedingly heavy taxation on individual farms, the year 1949 marked the onset of forced collectivisation. It was characterised by mass deportations of private landowners, labelled as *kulaks*. These measures served to 'incentivise' the reluctant peasants to join collective farms.[72] The impact was swift and dramatic: by 1951 collectivisation was complete at the expense of tens of thousands of innocent people deported (see Table 1.2).

The Soviet regime's emphasis on heavy industry, coupled with the disruptive effects of collectivisation, led to severe economic imbalances in the occupied Baltic states. The population faced chronic shortages of food and consumer goods. The deportation of the most productive farmers to Siberia resulted in agricultural underproduction (see Table 1.2), further exacerbating food scarcity. Housing shortages were also widespread, adding to the

[72]Plakans, *A concise*, 367–368

daily hardships faced by Baltic residents. Personal, religious, and cultural freedoms were heavily repressed, creating an atmosphere of pervasive fear that extended even to local communists. In this climate of scarcity and repression, Baltic societies began a process of reluctant adaptation to and collaboration with the alien regime that now appeared to be a permanent fixture. This shift represented a pragmatic response to the realities of Soviet rule, as people sought ways to navigate and survive within the new system.[73]

The level of terror and direct aggression decreased significantly after Stalin's death in 1953. By this time, 13 years had passed since the loss of independence, and partisan activity in the forests had ceased. Interestingly, Lithuanian, Latvian, and Estonian Communist party leaders, who just years prior had been perpetrators of mass deportations, gradually came to be accepted as quasi-defenders of national interests and consciousness against centralised Moscow's rule and Russification.[74]

The ascension of Khrushchev to power ushered in a period known as the 'thaw', lasting roughly from the mid-1950s to the mid-1960s. This era saw a softening of censorship and repression, the return of deportees, increased cultural freedom, and the introduction of some economic autonomy for individual republics. However, these changes were limited in scope. The USSR remained a centralised, single-party state, and Soviet rulers continued to view the 'reactionary' Baltic spirit with suspicion. This mistrust was exemplified by purges in the Estonian and Latvian Communist parties when Moscow felt they had overstepped in implementing their autonomous policies. Moreover, the influx of Russian-speakers continued, particularly altering the ethnic structures in Latvia and Estonia.[75] One of the last instances of the 'thaw' came in 1965 with the opening of a ferry service between Finland and Soviet Estonia. This represented the only link with the West ever allowed in the Baltics until the 1980s, aside from rare visits by émigré relatives and the clandestine reception of Western radio broadcasts.[76]

The limited reforms of the Khrushchev era were partially reversed after the mid-1960s. The removal of regional economic councils in 1965 centralised all economic decision-making in Moscow's hands, further diminishing local autonomy.[77] Khrushchev's replacement by Brezhnev in 1964 marked

[73] Plakans, 368–369; Kasekamp, *A history*, 131–133
[74] Kasekamp, 133–134
[75] Plakans, *A concise*, 370–375; Kasekamp, *A history*, 135
[76] Kasekamp, 137
[77] Kasekamp, 135

the Soviet Baltics' drift into the broader socialist 'stagnation' of the late 1960s. Repressions once more increased, and the pace of Russification accelerated. As memories of armed resistance faded, continuing Soviet repressions ignited a movement of non-armed 'dissidents' in the Baltic republics. These groups skilfully navigated the thin line between Soviet international obligations to respect human rights under the Helsinki Accords and the regime's harsh treatment of opposition. Their efforts successfully exposed Communist crimes to the world, although most dissidents ultimately ended up in prison. The 'stagnation' period was marked by multiple examples of Baltic nationals demonstrating both an overall desire to escape the Soviet system and the near-impossibility of doing so, highlighting the pervasive nature of Soviet control.[78]

The 'stagnation' era also brought increasing dramatic demographic shifts to the Baltic republics, albeit unevenly. While Lithuania largely avoided massive immigration of Russian-speakers, Latvians and Estonians were rapidly becoming minorities in their own republics by the 1980s. This influx of settlers, primarily factory workers, was driven by the need to replenish the labour supply in the fast-growing industries of Latvia and Estonia, both of which had low fertility rates. The growing industrial and urban populations required housing, which was provided in the form of dreadfully simplistic identical apartment blocks. These dwellings were often prioritised for Russian immigrants, leading to the formation of secluded Russian-speaking communities in Latvia and Estonia. Lithuania's experience diverged significantly. Its utterly agrarian character and history of large-scale partisan resistance made it less attractive to incoming industrial workers. Moreover, Lithuania's higher fertility rate meant there was no pressing need for additional labour, and local party bosses never encouraged such influx.[79]

Between 1945 and 1990, the Baltic Soviet republics had little real autonomy in economic policymaking. Although there were periods of decentralisation, most policies were directed from Moscow, with individual republics exercising only limited authority in their implementation.[80] By 1950, the Baltic economies were fully sovietised and incorporated into the unified planning system, with industry nationalised and agriculture collectivised.[81]

From the early post-war decades onward, rapid industrialisation was a

[78]Kasekamp, *A history*, 139–140
[79]Kasekamp, 140–141
[80]Dellenbrant, ''The integration'', 249.
[81]Misiunas and Taagepera, *The Baltic states*, 103–104, 108

key priority of the Soviet government in the Baltics. Heavy industry development was favoured in all three republics, with investments from the central budget reportedly exceeding those made in other Soviet republics.[82] However, due to its more agrarian character and possibly because of partisan resistance, Lithuania initially received lower levels of Soviet investment, and traditional food and light industries remained among its priorities throughout the occupation period.[83]

The Lithuanian, Latvian, and Estonian Soviet republics also developed substantial specialisation in specific industries, supplying a disproportionate share of the entire Soviet market, even though their product range was more diversified than that of most other republics.[84] Lithuania specialised in livestock products (leading the USSR per capita), light industries, and food processing, while also developing industries such as electric welding equipment, certain chemicals and fertilisers, oil refining, and power generation following the construction of a massive oil refinery and a nuclear plant in the 1980s.[85] By the late 1960s, Lithuania was producing more than half of all Soviet electric welding equipment, as well as 10% to 50% of Soviet lightbulbs, refrigeration equipment, and fish—despite its population accounting for just over 1% of the USSR's total.[86]

Latvia specialised in machine building (electric railway coaches, motorcycles, radios, communications technology, and space/military equipment), telephones, and textiles, and also served as a laboratory for agricultural experiments within the USSR.[87] Estonia became the Soviet supplier of oil shale, electricity, textiles, and precision instruments, and—similarly to the Latvian SSR—functioned as an experimental republic for testing new methods in production, planning, and management.[88]

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[82] Anušauskas, *Lietuva 1940-1990*, 269–276; Misiunas and Taagepera, *The Baltic states*, 120–125. This notion was successfully contested in Latvia but not in the other two Baltic republics, see G. Krūmiņš, ''Soviet Economic Gaslighting of Latvia and the Baltic States'', *Defence Strategic Communications* 4, no. 1 (2018): 49–78; V. Komičienė, ''SSRS finansų politika okupuotoje Lietuvoje 1940-1990 m.: mitai ir realybė'', *Genocidas ir rezistencija* 1, no. 49 (2021): 86–114

[83] Misiunas and Taagepera, *The Baltic states*, 120–125, 247–261.

[84] CIA, *Economic Development in the Soviet Republics, 1970-89* (Washington, D.C.: CIA Office of Soviet Analysis, July 1990), 4.

[85] Misiunas and Taagepera, *The Baltic states*, 120–125, 203–215, 247–261; Anušauskas, *Lietuva 1940-1990*, 269–276, 523–532

[86] Misiunas and Taagepera, *The Baltic states*, 203–215.

[87] G. Krūmiņš, *Latvijas tautsaimniecības vēsture* (Riga: Jumava, 2017), 229–355; Misiunas and Taagepera, *The Baltic states*, 120–125, 203–215, 247–261

[88] T. Parming and E. Järvesoo, *A Case study of a Soviet Republic : the Estonian SSR* (Boulder: Westview Press, 1978), 158–217; Misiunas and Taagepera, *The Baltic states*, 247–261

Despite all three republics producing significant portions of Soviet consumer goods, they were not immune to the shortages endemic to the Soviet Union as a whole. While incomes were generally adequate, populations faced long queues for better apartments, new telephones, or cars, with the only alternative often being recourse to petty corruption. The failure of the centrally planned system became increasingly evident in the 1970s and 1980s as Western products and ideas penetrated Soviet propaganda.[89]

The scarcity of adequate housing acutely contributed to the declining birth rates, as families tended to favour having one child or none at all rather than raising a large household in cramped living conditions. Life under these circumstances was often dull, a condition that only seemed to be alleviated by a dangerously increasing consumption of alcohol.[90]

Nevertheless, there were notable improvements in average well-being that deserve recognition. In addition to the overall rise in living standards—reflected in better housing with central heating and water supply, as well as the widespread ownership of cars and television sets—the Baltic SSRs enjoyed universal, free provision of education and healthcare. These services were largely absent in such equitable form in the West.[91]

The acute need for change in the Soviet system was addressed in the mid-1980s when Gorbachev assumed power. His policies of restructuring and openness (*perestroika* and *glasnost*), along with democratisation, were intended to reform the USSR but ultimately led to its dissolution. Crucially, these policies provided the Baltic nations with an opportunity to break free.[92] The first signs of transformation emerged with ecological protests against environmentally detrimental industrial activities, which was met with Moscow's indifference rather than repression. Increasingly encouraged by the lack of repressive action, Baltic nationals began mass demonstrations condemning the Molotov-Ribbentrop pact and Soviet deportations, with growing crowds brandishing national flags. This momentum led to the formation of political opposition organisations in 1988: the Estonian and Latvian Popular Fronts and the Lithuanian Movement for Restructuring. As local Communist parties recognised the winds of change and aligned with popular sentiment, Moscow largely stood aside, believing these expressions of freedom would be coupled with economic recovery. Baltic popular fronts were permitted to

[89] Plakans, *A concise*, 385, 402
[90] Kasekamp, *A history*, 141–144; Plakans, *A concise*, 384
[91] Kasekamp, *A history*, 141–144; Plakans, *A concise*, 384
[92] Plakans, 387–388

participate in the 1989 Soviet elections, resulting in their sweeping victories.

Subsequently, calls for national autonomy evolved into ambitions to restore full independence.[93] On March 11th, 1990, Lithuania became the first Soviet republic to declare the restoration of independence. While Latvia and Estonia opted for a more gradual transition, their trajectory towards sovereignty by now was unyielding.[94]

Indifference in Moscow towards these processes quickly turned to animosity. When economic pressure failed to compel the new Baltic parliaments to revoke their independence declarations, force was eventually employed by the Soviet side in early 1991, resulting in civilian casualties. Yet this violent turn did not alter the course of events. After the failed communist coup in Moscow in August 1991, Western governments swiftly recognised the independence of the Baltic states.

Fifty years of occupation had drastically transformed the three countries. Tens of thousands of the most educated and productive members of Baltic societies had either been deported or had fled repression, depleting these nations of human capital. Land—traditionally a powerful motivator for change—had been stripped away through collectivisation, fundamentally altering the economic and social outlook of these predominantly agrarian societies. Simultaneously, the dramatic shift in ethnic composition, particularly in Latvia and Estonia, raised the alarming prospect of native populations becoming minorities in their own republics. Yet the traumatised Baltic peoples retained their desire for independence, and once free again, Lithuania, Latvia, and Estonia embarked on a persistent, though often difficult, 'return to Europe'.[95]

[93] Plakans, 389–395
[94] Plakans, 396
[95] Plakans, 398–401

Independence, 1990—present

The process of reconstructing independent states and market capitalist economies in the post-Soviet era proved no less challenging as it had been in the post-World War I years. Removing Soviet legacies presented even greater difficulties than dismantling Imperial remnants in the 1920s, particularly given the tremendous ethnic shifts in Latvia and Estonia. Throughout the 1990s, Lithuania, Latvia, and Estonia wholeheartedly embraced the post-socialist European aspiration to 'return' to the West. From the outset, membership in the European Union and NATO were set as primary objectives, signifying a universal desire to both disassociate from and protect their newly sovereign countries against future Russian influence. Fortunately, the West stood ready to assist in this transition. Equally significant was Russia's weakened condition, which precluded any substantial interference in the Baltic nations' journey towards Western integration.[96]

In their transition process, all three republics established parliamentary democracies with liberal constitutions. Estonia generally led the way with the swiftest and most comprehensive reforms, while the process unfolded more gradually in Lithuania and Latvia. Lithuania saw former communists turned democrats returned to power through a protest vote against radical change, while Latvia's new president advocated for a slower-paced transition in 1993. Despite these variations, all three nations remained steadfastly committed to Western integration and market capitalism. This commitment persisted in the face of growing poverty, mass emigration, government instability, and economic crises.[97]

Comprehensive pro-market economic reforms began in 1991. In the Baltics, the process was generally faster and broader than in other post-Soviet states, though somewhat narrower than in East-Central Europe. It was often described as 'shock therapy', involving price and external account liberalisation, macroeconomic stabilisation, and privatisation.[98] By 1992, consumer

[96] Plakans, *A concise*, 402–403

[97] Kasekamp, *A history*, 156–160

[98] T. Grennes, ''The economic transition in the Baltic countries'', *Journal of Baltic studies* (Brooklyn) 28, no. 1 (1997): 11;Z. Norkus, *Post-Communist Transformations in Baltic Countries: A Restorations Approach in Comparative Historical Sociology* (Cham: Springer Nature, 2023), 118

prices had been liberalised, and by 1994 all restrictions on capital movement had been abolished in line with IMF requirements.[99]

To tackle inflation in the rouble zone, the independent Baltic republics also implemented radical currency reforms, with all three opting for fixed exchange rate regimes by 1994. Estonia (1992) and Lithuania (1994) adopted currency boards, pegging their currencies to the deutschemark and the US dollar, respectively, while Latvia fixed its new national currency to the Special Drawing Right in 1994.[100]

Privatisation in the Baltics began in mid-to-late 1991, two years later than in East-Central Europe. The privatisation of large enterprises progressed slowly, continuing into the late 1990s.[101]

Lithuania, Latvia, and Estonia—deeply integrated into the specialised socialist distribution system—had to reorient their trade and regional partnership priorities after the breakup of the Soviet bloc and the USSR.[102] As in the 1920s, the loss of massive Soviet demand for agricultural, industrial, and consumer goods meant that mass-produced, inferior-quality products could no longer find markets or access cheap raw materials.[103]

For example, Lithuania was an emerging producer of computers within the USSR. By 1990, annual output exceeded 500 units, but production fell to zero by 1994 and never recovered. In 1990, the manufacture of digital hardware constituted nearly 3% of Lithuania's total industrial output—just under 1% of the Lithuanian SSR's GDP—which subsequently disappeared. Similarly, Latvia's bus manufacturing sector, responsible for supplying 14,000 to 17,000 buses annually throughout the 1980s, had ceased to exist by 1998. The broader machine-building subsector, which in 1990 accounted for approximately 24% of Latvia's industrial value added and nearly 7% of its GDP, had shrunk to less than one-tenth of its former output by 1995.[104]

Estonia, where light industry had maintained a strong position from the interwar period through to 1990, experienced a 70% contraction in output by 1995. Linen fabric production, which consistently exceeded 10 million square

[99]I. Korhonen, ''Progress in Economic Transition in the Baltic States'', *Post-Soviet geography and economics* (Palm Beach) 42, no. 6 (2001): 443–444.

[100]Korhonen, 443–444.

[101]I. T. Berend, *From the Soviet Bloc to the European Union: The Economic and Social Transformation of Central and Eastern Europe since 1973* (Cambridge University Press, 2009), 62–63; Korhonen, ''Progress'', 445

[102]I. T. Berend, *Central and Eastern Europe*, 349.

[103]Norkus, *Post-Communist Transformations*, 165; Grennes, ''The economic'', 21

[104]See Appendix D for sources.

metres annually between 1983 and 1991, fell to fewer than 500 square metres by 1995. This collapse in industrial value added, along with that of numerous other sectors across the Baltic states, marked one of the most severe structural contractions of the 1990s.

Thus, the specialised and resource-dependent former Soviet republics were confronted with a structural crisis, deindustrialisation, and a shift towards services.[105] Latvia, which had hosted a relatively higher number of all-union enterprises as well as military industries during the occupation, suffered the most, while Estonia—owing to its smaller-scale industrial profile—fared better, with Lithuania falling in between. Estonia was also aided by its ability to attract foreign investment early in the transition period.[106]

Additionally, the loss of the Soviet market and raw materials, coupled with the desire to reduce dependence on Russia, led the Baltics to open their economies and seek new international partners. Foreign trade with the Nordic and Western countries expanded rapidly, although integration between the Baltic republics progressed slowly until all three joined the EU in 2004.[107] Estonia enjoyed a somewhat privileged position from the early transition years due to its geographical and cultural proximity to Finland. This regional integration with its northern and relatively modernised neighbour also helped Estonia's redundant workforce find employment without emigrating farther west.[108]

Nevertheless, economic ties with the former USSR were not fully severed. Direct and transit trade became a major priority for the Baltic countries in the late 1990s and early 2000s.[109] As Figure 1.1 shows, the CIS and Russia remained important trade partners for the Baltics even after EU accession in 2004—until Russia's full-scale invasion of Ukraine in 2022.

In implementing economic transition policies, Estonia consistently led the way, pursuing the boldest reforms. Lithuania occasionally lagged in certain areas or opted for alternative approaches, while Latvia struggled in particular with overhauling its industrial base.[110]

Despite these differences, the post-socialist downturn was severe, with approximately half of the Baltic populations living below the poverty line by

[105]Grennes, ''The economic'', 21; Norkus, *Post-Communist Transformations*, 165

[106]Norkus, 164–166; Grennes, ''The economic'', 9

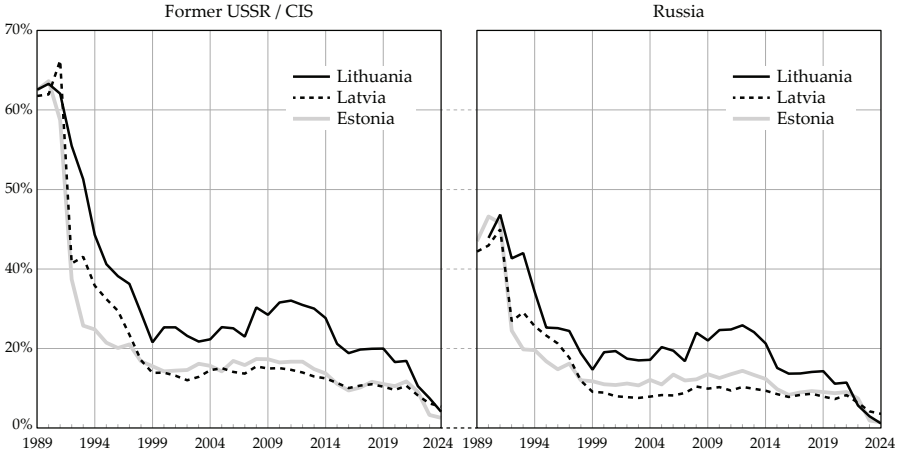
[107]I. T. Berend, *From the Soviet Bloc*, 51; Norkus, *Post-Communist Transformations*, 163; Grennes, ''The economic'', 21

[108]Norkus, *Post-Communist Transformations*, 11, 176.

[109]Norkus, 163

[110]Korhonen, ''Progress'', 440

Figure 1.1: FSU/CIS AND RUSSIA'S SHARES OF BALTIC FOREIGN TRADE IN GOODS



Sources: The World Bank, *World Integrated Trade Solution*, Accessed on May 7, 2025, Washington, D.C, 2024; 1989-1994 data from The World Bank, *Lithuania - The transition to a market economy*, Washington, D.C., 1993, 332; The World Bank, *Latvia - The transition to a market economy (English)*, Washington, D.C., 1993, 240; The World Bank, *Estonia - The transition to a market economy (English)*, Washington, D.C., 1993, 283; *Lietuvos statistikos metraštis 1991 m.* (Vilnius: Lietuvos statistikos departamentas, 1992), 205–210; *Lietuvos statistikos metraštis 1992 m.* (Vilnius: Lietuvos statistikos departamentas, 1993), 229; *Statistika aastaraamat 1996* (Tallinn: Eesti Statistikaamet, 1997), 235–239; *Eesti statistika aastaraamat 1994* (Tallinn: Eesti Statistikaamet, 1995), 222–224; *Statistika aastaraamat 1993* (Tallinn: Eesti Statistikaamet, 1993), 107, 225–227; The World Bank, *Statistical handbook 1996: states of the former USSR (English)*, 21, Washington, D.C., 1996, T34B.
Former USSR / CIS total includes all 15 Soviet republics until 1991 and only members of the Commonwealth of Independent States since 1992.

the mid-1990s. Inflation eroded wages, while state effort for economic stimulation diminished. The transitional turmoil also saw the emergence of new elites who amassed wealth through controversial means during the chaos. This led to dashed illusions of rapid convergence with Western standard of living and somewhat increased dissatisfaction among the general populace.[111]

Nevertheless, the persistent Western orientation of the Baltic states ultimately proved fruitful. All three nations gained membership in the United Nations in late 1991 and successfully negotiated the peaceful withdrawal of Russian army contingents from their territories by 1994.[112] Despite some reservations—primarily from Soviet-period immigrants—Lithuania, Latvia, and Estonia applied for European Union membership in 1995. By this time,

[111] Plakans, *A concise*, 405–410
[112] Plakans, 426–427

Table 1.3: DECLINE OF BALTIC POPULATIONS SINCE 1989

	Lithuania	Latvia	Estonia
1989-2021	-905.7 (-24%)	-782.9 (-29%)	-237.2 (-15%)
1989-2009	-543.6 (-15%)	-525.7 (-20%)	-233.6 (-15%)
2009-2021	-362.1 (-11%)	-257.2 (-12%)	-3.6 (0%)

Source: Table F.1. Figures in brackets indicate percentage declines since the beginning of the period.

they were also taking steps towards NATO integration. A decade of rigorous reforms culminated in full EU membership in 2004, a move endorsed by referendums in all three Baltic states. In the same year, the Baltics also became members of NATO, and by 2018 all three had adopted the euro and joined the OECD.[113]

Post-2004, the Baltic states experienced remarkable economic growth, with some referring to them as the 'Baltic tigers'.[114] This progress, however, has been overshadowed in large part by the mass voluntary outflow of populations from the Baltic republics since the restoration of independence. As Table 1.3 shows, two phases of this process—divided by the 2008 crisis—can be distinguished. After a steep population decline in the early 1990s, largely but not entirely driven by the emigration of mostly Russian-speaking Soviet-era immigrants, a steady process of economic migration to the West in search of better income opportunities began.

While EU accession in 2004 did not significantly increase the pace of emigration, unemployment and falling living standards during the 2008 crisis triggered another wave of population outflow, facilitated by migrant networks and open borders within the EU.[115] Interestingly, both trends were less pronounced in Estonia, largely because its workers were able to commute to or temporarily relocate to nearby Finland.[116] With rising income levels, these movements were finally reversed in Estonia in 2016, in Lithuania in 2020, and in Latvia in 2023.

After a decade of relative calm following the 2008 crisis, Covid-19 and Russia's full-scale invasion of Ukraine in 2022 deeply unsettled the Baltic

[113] Plakans, *A concise*, 428–435; Kasekamp, *A history*, 167–170

[114] Åslund, ''Why Have''.

[115] Korhonen, ''Progress'', 460; OECD, ''Coping with Emigration in Baltic and East European Countries'' (2014), 48

[116] Norkus, *Post-Communist Transformations*, 176.

political and economic landscapes. Confronted with fears of renewed aggression from Moscow, Lithuania, Latvia, and Estonia have remained unified in their support for Ukraine and in strengthening military preparedness.[117] Their economic trajectories, however, have diverged significantly since 2019: Lithuania has advanced to the leading position in per capita income, Latvia's living standards have seen only modest improvement, and Estonia's income levels have continued to decline.[118] The reasons for this divergence will be discussed in Chapter 4 of this thesis.

This chapter's overview of the Baltic region's general and economic history yields several concluding insights. First, the dramatic transformations since 1913 underscore the pressing need to quantify changes in income levels against the backdrop of these historical shifts. Second, while surface-level similarities unite Lithuania, Latvia, and Estonia, deeper differences among them have likely contributed to their divergent income trajectories over time. Finally, despite recent political achievements, the region continues to face significant social, demographic, and economic challenges—suggesting that the era of upheaval and transformation in the Baltic states is far from over.

[117] Kasekamp, *A history*, 177–180
[118] *Eurostat Database*.

2

LITERATURE REVIEW

[In Soviet statistics] there was often a rush to 'complete' certain tasks. Admit it – the press would eagerly do this too: they didn't use words like 'failed to meet' or 'decreased' ... Five-year plans were not fulfilled but we showed that they were. We did this because there were strict instructions...

—P. Adlys, Deputy chief of Lithuanian SSR's State Committee for Statistics, 1988[1]

With the aim of reviewing the most important scholarly works relevant to the research conducted in this thesis and to the implications of its results, this chapter is divided into two major subchapters. The shorter first subchapter surveys the existing knowledge about economic growth in the Baltic states, which remained fragmented and highly limited until the 1980s.

The more comprehensive second subchapter provides the background for analysing the dynamics of catching up and falling behind in the Baltics under three distinct systems: interwar capitalism, post-war socialism, and modern

[1] ''Statistika: ar viską ji žino? Į klausimus atsako Lietuvos TSR valstybinio statistikos komiteto pirmininko pavaduotojas Petras Adlys'', *Tiesa* (Vilnius), no. 194(13813) (August 1988): 2.

capitalism. It begins by reviewing the principal growth theories and empirical studies relating to these dynamics within Europe. It then introduces the literature on the convergence trajectories of East-Central European countries relative to the West, covering both the interwar and socialist periods. Finally, the last section of the subchapter examines the economic, structural, political, and institutional conditions that characterised the Baltic republics during the interwar years, the period of Soviet occupation, and modern independence. These contextual factors are considered insofar as they may have influenced Baltic growth dynamics across the respective eras.

Growth in the Baltic states since 1913: previous knowledge

In recent decades, numerous studies have re-examined the growth performance of European post-war state socialist regimes.[2] Growth in East-Central Europe during the interwar period—previously a relatively neglected subject—has also recently been brought into focus.[3] However, major gaps in the region's interwar growth record remain. Lithuania, Latvia, Estonia, and Albania, which emerged as independent countries in the 1920s and 1930s, as well as Ukraine, Belarus, and Moldova, which remained parts of other states until 1990, have been excluded from most studies on pre–Second World War growth. This omission can largely be explained by the absence of national income statistics.[4]

Furthermore, while the USSR as a whole has received considerable scholarly attention, its regional development policies and growth disparities have been almost entirely neglected.[5] With their borders largely unchanged since 1923,[6] the Baltic states not only offer the first regional growth insights into the USSR but can also provide valuable perspectives on economic growth in peripheral Europe under two fundamentally different systems: capitalism and state socialism.

The lack of attention paid to the Baltic states in economic growth studies stems from the absence of reliable long-run aggregate growth indicators, such as GDP or national income. Contemporary data sources, such as Euro-

[2]See Broadberry and Klein, ''When and why''; L. Kukić, ''Origins of regional divergence: economic growth in socialist Yugoslavia'', *The Economic history review* (Hoboken) 73, no. 4 (2020): 1097–1127; T. Vonyó and A. Klein, ''Why did socialist economies fail? The role of factor inputs reconsidered'', *The Economic history review* (Oxford) 72, no. 1 (2019): 317–345; Vonyó and Markevich, ''Economic growth and structural''; Vonyó, ''War and socialism''

[3]Earlier studies are reviewed in L. Prados de la Escosura et al., ''Accounting for growth in history'', *Journal of economic surveys* (Hoboken) 35, no. 3 (2021): 656, while modern ones include A. Klein et al., ''How Peripheral was the Periphery? Industrialization in East Central Europe since 1870'', ed. K. H. O'Rourke and J. Gale, The spread of modern industry to the periphery since 1871 (Oxford: Oxford University Press, 2017), 63–90 and (Morys, *The economic history*)

[4]Morys, ''Economic growth'', 162.

[5]L. Kukić, ''Technical change and the postwar slowdown in Soviet economic growth in a long run perspective, 1885–2019'', *The Economic history review* (Oxford) 77, no. 2 (2024): 670.

[6]Lithuania is an exception, its territory only stabilising in 1945, although by 1940 it already controlled 91% of its modern lands. For these and some smaller changes in Latvia and Estonia in 1945, see Map 2

stat or the World Bank's World Development Indicators (WDI), only begin reporting figures from 1995 onwards, although the World Bank has recently extended its series back to 1990. Rightfully distrustful of Soviet official measures and doubtful of the reliability of recalculations of socialist 'national income', Baltic statistical agencies have also not published any pre-1995 GDP or similar data.

The Maddison Project Database, the preferred source for pre-1990 GDP data among economic historians, includes figures for the Baltic states and other former Soviet republics from 1980 onwards, with additional single-year data points for 1973.[7] The Total Economy Database, for reasons undisclosed, has ceased reporting pre-1990 real GDP data, although previous versions did contain such information covering 1970s and 1980s.[8] Consequently, no comparable data on Baltic income levels is available for periods before 1973/1980.

As a result, discussions about Baltic living standards have been fraught with emotion. The Soviet regime tended to downplay the achievements of the interwar capitalist republics, whilst émigrés to the West and modern Baltic societies often romanticised the pre-WWII years.[9] This emotional approach has led to some questionable claims. For instance, a 2005 study asserted that the Baltic republics only recovered to their pre-WWII living standards in the 1960s.[10] In 2007, another study 'guestimated' that in 1987, Estonian GDP per capita was seven times lower than that of Finland.[11] Thus, in the absence of robust statistics, the interwar period remains the glorified 'golden age' for many, while a sizeable Baltic minority still look back positively to life under the planned economy.[12] This divergence in perspectives underscores the need for more rigorous, data-driven analyses of Baltic economic history.

The emotion-loaded Baltic picture stands in stark contrast to Western Europe, where statistical reporting has been more extensive and, crucially, more consistent due to state continuity. For instance, historical national accounts for Britain, France, and Spain have recently been extended back to the

[7] MPD version 2023

[8] Conference Board, *The Conference Board Total Economy Database*, April 2023.

[9] Anušauskas, *Lietuva 1940-1990*, 496; V. S. Vardys, ''Modernization and Baltic Nationalism'', *Problems of communism* (Washington) 24, no. 5 (1975): 36; Z. Norkus, ''A Comparison of the Economic Growth of the Baltic States between the Two World Wars'', *World political science* (Berlin) 12, no. 1 (2016): 3.

[10] T. Tannberg et al., *Eesti ajalugu VI* (Tartu: Ilmamaa, 2005), 300.

[11] Laar, ''The Estonian'', 1.

[12] Lehti, ''Estonia and Latvia'', 92; 34% of Latvians, 27% of Estonians, and 16% of Lithuanians surveyed in 2016 preferred a planned economy over a market one, see *Life in Transition*, 91, 106, 109

13th century.[13] The Maddison Project Database provides GDP series for most Western core and Western periphery nations from at least 1870, with Ireland being an exception, where continuous data begins in 1921.[14]

Nordic efforts in this field are particularly noteworthy. Swedish historical national accounts, which are regularly updated, are considered among the most robust worldwide.[15] In recent years, Ola Grytten has extended and updated Norwegian GDP series using the double-deflation technique for production-side accounts, while also providing estimates from the expenditure side.[16]

Of particular relevance to this study are the comprehensive GDP estimates for Finland—a country that, like the Baltics, emerged after the First World War, but which remained independent and capitalist after 1940. Finland boasts some of the best GDP series in Europe by the production, income, and expenditure approaches, thanks to the work of Rita Hjerppe and the relatively wide availability of data.[17] Having robust Finnish series is particularly fortunate, as the country is perhaps the most natural comparator for the Baltic states geographically, historically, and—at least for Latvia and Estonia—culturally (see page 86).

Several factors precluded similar efforts in the Baltic states. First, standardised national accounting procedures only became commonplace in the West after 1953, when the System of National Accounts (SNA) was adopted by most capitalist economies. The Baltic states, however, only joined other UN members in such statistical reporting in the 1990s, following their breakaway from the USSR. As a result, pre-1990s data series would have to be estimated retrospectively, without possession of datasets specifically prepared for GDP compilation purposes.

Second, the feasibility of such retrospective estimation depends on the

[13] S. N. Broadberry et al., *British economic growth, 1270-1870* (Cambridge: Cambridge University Press, 2015); C. Alvarez-Nogal and L. P. de la Escosura, ''The rise and fall of Spain (1270-1850)'', *The Economic history review* (Oxford) 66, no. 1 (2013): 1–37; L. Ridolfi and A. Nuvolari, ''L'histoire immobile? A reappraisal of French economic growth using the demand-side approach, 1280-1850'', *European review of economic history* (Oxford) 25, no. 3 (2021): 405–428.

[14] MPD version 2023

[15] O. Krantz, ''New estimates of Swedish historical gdp since the beginning of the nineteenth century'', *Review of Income and Wealth* 34, no. 2 (1988): 165–181; R. Edvinsson, ''New annual estimates of Swedish GDP, 1800-2010'', *Economic History Review* 66, no. 4 (2013); O. Krantz, ''Swedish GDP 1300-1560: A Tentative Estimate'', *Lund Papers in Economic History*, no. 152 (February 2017).

[16] O. H. Grytten, ''Revising growth history: new estimates of GDP for Norway, 1816–2019'', *The Economic history review* 75, no. 1 (2021): 181–202.

[17] R. Hjerppe, *The Finnish economy 1860-1985: growth and structural change* (Helsinki: Bank of Finland, 1989).

availability and suitability of historical statistics and neither of these factors can be used to describe Baltic data. 20th-century Lithuanian, Latvian and Estonian statistics can be divided into two distinct groups: one covering the pre-1940 capitalist period, and the other encompassing occupation years from 1940 to 1990.

Statistical data coverage in the Baltic states has historically been sparse and inconsistent, even predating their 1918-1940 independence. Unlike most Western countries, Latvia and Estonia have a remarkably brief record of state continuity, which meant there was little impetus for maintaining consistent statistical records for state-building purposes before 1918. Although Lithuania existed as a state since the 13th century, all three future Baltic republics were incorporated into the Russian Empire in the 18th century, a country known for its weak statistical coverage even at the national level.[18]

While regular statistical publications emerged during the interwar years of independence, the period from 1940 to 1945 saw the Baltic countries occupied thrice by the warring USSR and Germany. This turbulent era led to changes in borders, economic regimes and statistical practices, as well to physical destruction of archival data records.[19] Furthermore, in the post-war years, the communist USSR deliberately avoided and discouraged study of the Baltic capitalist pre-1940 period.[20] Consequently, there is a scarcity of usable data from the interwar period, with almost no sectoral production indices, consumption series, or income data available.

The state socialist period presents even greater challenges for researchers, since communist countries did not follow practices of national accounting akin to those in the West. In the 1950s, Soviet officials began constructing 'national income' statistics for the union republics.[21] This measure is more commonly known in the West as the 'net material product' (NMP), as it does not precisely correspond to the 'national income' term used in capitalist economies. The NMP statistic warrants particular attention, as questions naturally arise regarding why this figure cannot be modified and used as a basis for GDP growth estimations.

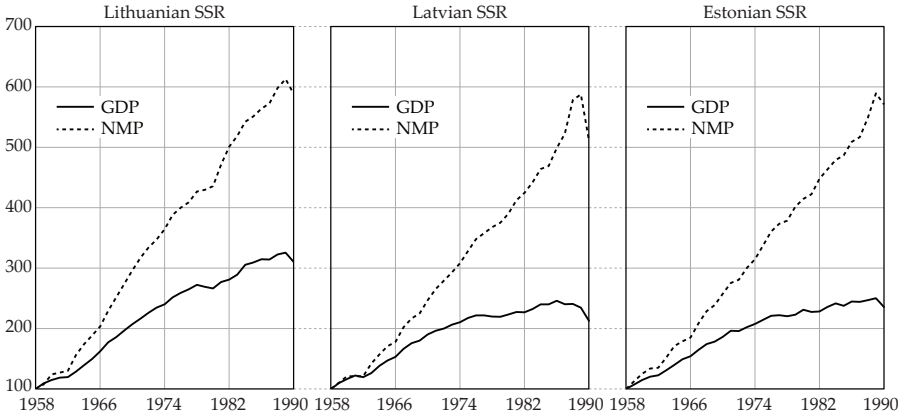
The Material Product System (MPS) was developed as a Soviet alternative to the Western System of National Accounts (SNA). Hence, NMP served

[18] Gregg, ''Cliometrics'', 219–220.
[19] Dagys, ''Visuomeninio'', 140.
[20] Morys and Ivanov, ''Population and living'', 244
[21] P. Kiuberis, *Lietuvos TSR visuomeninio produkto ir nacionalinių pajamų dinamika ir struktūra. Analitinė apžvalga* (Vilnius: LIMTI, 1973), 29

as the counterpart to the Western gross national product and gross domestic product. The fundamental difference between these two systems lies in their treatment of the non-material sphere of production. The socialist approach did not consider services that do not directly add value to the creation of goods as productive, and thus consistently excluded large parts of the economy from their aggregate measures.[22] Furthermore, MPS aggregates are presented net of capital consumption and depreciation, in contrast to Western GDP measures.

Although it has been suggested that NMP could be converted into GDP, this practice has been discouraged due to the significant fluctuations in NMP-to-GDP ratios across years and countries, even though year-to-year ratio differences are relatively small.[23] However, the most significant flaws of the Material Product System, NMP, and indeed the vast majority of socialist monetary growth indicators, are artificial pricing, double counting, and statistical manipulation.

Figure 2.1: NEW GDP AND SOVIET OFFICIAL NMP FIGURES, indices at constant prices, 1958=100



Sources: This study and P. Kiuberis, *Lietuvos TSR visuomeninis produktas ir nacionalinės pajamos* (Vilnius: Valstybinė politinės ir mokslinės literatūros leidykla, 1963), 30; *Tarybų Lietuvai 25 metai: statistikos duomenų rinkinys* (Vilnius: CSV, 1965), 24; *Народное хозяйство СССР* year 1962, 484; year 1964, 576; year 1968, 570; year 1970, 534; year 1972, 531; year 1974, 574; year 1979, 405; year 1984, 425; year 1990, 12; and *Народное хозяйство СССР за 70 лет*, 123.

[22]J. Češka, ''Comparison of Gross Domestic Product and Net Material Product'', ed. W. Krelle, The Future of the World Economy: Economic Growth and Structural Change (New York: Springer-Verlag, 1989), 581–596, 581, 587.

[23]Češka, 593; R. Campbell, ''The conversion of national income data of the U.S.S.R. to concepts of the system of national accounts in dollars and estimation of growth rate'' (Washington, D.C.), Staff working papers, no. SWP 777 (1985)

These issues have typically led to understated inflation and overstated growth records.[24] This discrepancy is empirically demonstrated in Figure 2.1. According to the NMP statistics, all three Baltic economies experienced a six-fold growth between 1958 and 1989, while the newly estimated figures suggest increases of only half that magnitude.

The tendency for statistical manipulation, deeply ingrained in the Soviet system, is best exemplified by an interview with the Deputy Chief of the Lithuanian SSR's State Committee for Statistics conducted in 1988. At that point the Soviet Union was still intact but Gorbachev's openness policy already allowed officials to give sincere commentary:

> *There was often a rush to 'complete' certain tasks. Admit it – the press would eagerly do this too: they didn't use words like 'failed to meet' or 'decreased' ... 10th and 11th five-year plans were not fulfilled but we showed that they were. We did this because there were strict instructions – to quote the adjusted (reduced after seeing that the plan would not be fulfilled) plan target, rather than the approved five-year plan figure (which was usually larger).*[25]

Consequently, official Soviet estimates of national income and most other monetary or index series are plagued by severe reliability issues, rendering them unusable.[26] To estimate the real levels of GNP or GDP in the USSR and other socialist economies, extraordinary research effort was undertaken in the United States during the Cold War.[27]

This initiative was pioneered by Abram Bergson, who in his works from the 1950s and 1960s re-priced 1937 and 1928–1948 Soviet output at factor cost, built implicit rouble–dollar PPP ratios, imputed missing service sectors, and deflated physical output series to constant prices.[28] This methodology—par-

[24] Maddison, ''Measuring the Performance'', 307–308

[25] ''Statistika: ar viską ji žino?''

[26] Vonyó and Markevich, ''Economic growth and structural'', 279–280; Maddison, ''Measuring the Performance'', 307–308. Perhaps the only instance of adjusted NMP being used to approximate GDP was in A. Maddison, *The World Economy: Volume 1: A Millennial Perspective and Volume 2: Historical Statistics* (Paris: OECD Publishing, 2006), 182, where Maddison applied a GDP-to-NMP growth rate deflator from the USSR as a whole to deflate NMP series for individual republics. Applying this constant ratio to Baltic data yielded highly inaccurate results relative to the new GDP estimates.

[27] Maddison, ''Measuring the Performance'', 307–308

[28] See A. Bergson, ''Soviet National Income and Product in 1937'', *The Quarterly journal of economics* 64, no. 2 (1950): 208–241; A. Bergson, *The real national income of Soviet Russia since 1928*, Rand Corporation research study ; R-367 (Cambridge, Mass: Harvard University Press, 1961)

ticularly pricing at factor cost and using physical indicator growth—became a template for most Western work on socialist national accounts. The US government, spearheaded by the CIA, undertook a long-term effort to quantify Soviet economic growth, culminating in the 1950–1987 series of the USSR's real GNP published by the Joint Economic Committee.[29]

The CIA figures have not been without criticism. In the 1980s and 1990s, they came under attack from both Western and Soviet/Russian scholars. Most critics argued that the series overstated Soviet growth by disregarding the deteriorating quality of Soviet products, overreporting of output, and hidden inflation. Even the physical output figures were criticised for being derived from Soviet 'open' statistics—designed for external consumption—rather than from the closed data used by actual planners.[30] On the other hand, a minority of mostly American scholars contended that the series underestimated the USSR's growth rates, arguing that military output, housing, and other services had been inadequately measured, and that reliance on physical output precluded accounting for the impact of important technological advancements.[31]

Despite these criticisms, the CIA figures for the USSR are today almost universally accepted as the best available estimates and form the basis for the Soviet series in the Maddison Project datasets.[32] The CIA methodology, specifically developed to estimate the growth of the Soviet economy, will serve as the foundation for estimating the GDPs of the Baltic Soviet republics, as discussed in detail in Chapter 3.

In estimating post–Second World War national accounts for East-Central Europe, comparable efforts were made by Thad Alton and the Research Project on National Income in East Central Europe. These scholars applied Bergson's methodology to estimate income levels in communist Bulgaria, Czechoslovakia, East Germany, Poland, Romania, and Yugoslavia.[33] Their

[29]See Joint Economic Committee, *USSR: Measures of Economic Growth and Development, 1950-1980* (Washington, D.C.: Congress of the United States, December 1982) and Joint Economic Committee, *Measures of Soviet gross national product in 1982 prices* (Washington, D.C.: Congress of the United States, November 1990)

[30]L. Navrozov, ''Assessing the CIA's 'Soviet economic indices'', Soviet Economy Brink of Reform: Essays in Honor of Alec Nove (2014), 112–152.

[31]See A. C. Becker, ''Intelligence Fiasco or Reasoned Accounting?: CIA Estimates of Soviet GNP'', *Post-Soviet affairs* (Columbia) 10, no. 4 (1994): 291–329; G. E. Schroeder, ''Reflections on Economic Sovietology'', *Post-Soviet affairs* (Abingdon) 11, no. 3 (1995): 197–234 for a full summary of the early criticisms.

[32]Vonyó, "War and socialism": 253; Vonyó and Markevich, ''Economic growth and structural'', 280

[33]A. Maddison, *Monitoring the world economy 1820-1992*, Development Centre studies (Paris:

figures were regularly published in the Occasional Papers of Statistics on Eastern European Structure and Growth and, just like the CIA series for the USSR, remain the basis for the most widely used GDP per capita figures for all these economies except East Germany.[34]

Existing international estimates of Baltic income levels

Unfortunately, neither the CIA, Rand, nor any other international initiative ever ventured to separate USSR republics in their analyses. Thus, until the collapse of the Soviet bloc, little was known about the comparative income levels of either the pre-WWII independent Baltic states or the occupied post-war Soviet republics. The only exceptions were educated guesses by Bairoch and questionable studies by authors such as Koropeckyj who equated Latvian and Estonian incomes to British and Australian levels.[35]

Nevertheless, former socialist states received renewed interest in the 1990s after the regime's collapse in Europe. State socialism was 'one of the greatest economic experiments in the history of the human species' and quantifying its growth record became crucial to understanding it.[36] National statistical offices across the newly independent Baltic states attempted to retrospectively estimate 1980s GDP levels. Additionally, the World Bank dispatched missions to former Soviet Union countries in the early 1990s and set off to compile crucial statistics needed to analyse their transitions to market economies. These efforts included estimates of GDP levels for 1980-1991.[37] However, reporting of these figures was discontinued, likely due to reliability issues, and no pre-1990 figures are currently published.[38]

The work of the United Nations Economic Commission for Europe (UNECE) is also noteworthy. During the 1990s, the Commission endeavoured to provide growth statistics for all post-socialist European countries, publishing

Organisation for Economic Co-operation / Development, 1995), 139.

[34]The latest MPD issue leads to Alton's works as underlying sources for Cold War era HNA of East-Central Europe, see MPD version 2023. For a comment on East Germany, refer to Vonyó and Markevich, ''Economic growth and structural'', 280

[35]P. Bairoch, ''Europe's Gross National Product: 1800-1975'', *The Journal of European economic history* (Rome) 5, no. 2 (1976): 297; I. S. Koropeckyj, ''National income of the Baltic Republics in 1970'', *Journal of Baltic studies* (Brooklyn) 7, no. 1 (1976): 72.

[36]L. Kukić, ''The nature of technological failure: patterns of biased technical change in socialist Europe'', *Journal of economic surveys* (Hoboken) 35, no. 3 (2021): 1.

[37]The World Bank, *Lithuania – The transition*; The World Bank, *Latvia – The transition*; The World Bank, *Estonia – The transition*.

[38]The World Bank, *World tables 1995 (English)*, Washington, D.C., 1995, 32–33; also see The World Bank, *WDI Archives*, March 2022; The World Bank, *World Development Indicators 2024*

'real GDP' indices for 1980-1990. However, the data for the FSU, including the Baltic states, was directly taken from NMP growth indices, rendering the UNECE figures unreliable as well.[39]

Perhaps the only reliable estimates of 1990-1991 GDP levels for the post-Soviet republics were produced by B. M. Bolotin of the Memo 3 project. In contrast to the World Bank or UN, Bolotin undertook a purchasing power parity analysis and provided a sectoral disaggregation of GDP figures, along with GDP per capita totals in Int$_{1990}$.[40] Consequently, his estimates, which already indirectly serve as the basis for FSU series in the Maddison Project, will be used as benchmarks for 1940-1995 GDP calculations in this study.

In recent years, two historical GDP PPP database projects have emerged as the primary sources for economic historians requiring GDP data. The first is the Maddison Project Database (MPD), which continues the work of Angus Maddison, whose efforts in the 1990s provided the much-desired comparability to historical income statistics.[41] The MPD has been consistently updated, with the latest version released in 2023.[42] The second is the Total Economy Database, earlier versions of which contained historical GDP figures dating back to 1970. However, current issues only provide data from 1990 onwards. Unfortunately, Baltic national income figures in the earlier versions were nearly perfectly correlated with the NMP-based UNECE series, limiting their usefulness.[43] There have been no other noteworthy independent international efforts to estimate pre-1990 Baltic figures.[44]

Lithuanian, Latvian, and Estonian GDP figures in the Maddison Project Database (MPD) warrant particular attention, as they are frequently used

[39]United Nations Economic Commission for Europe, *Economic survey of Europe in 1994-1995*, New York, 1995, 249; United Nations Economic Commission for Europe, *Economic survey of Europe 1998 no. 1*, New York, 1998, 199

[40]B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 181–192.

[41]Maddison, *Monitoring*.

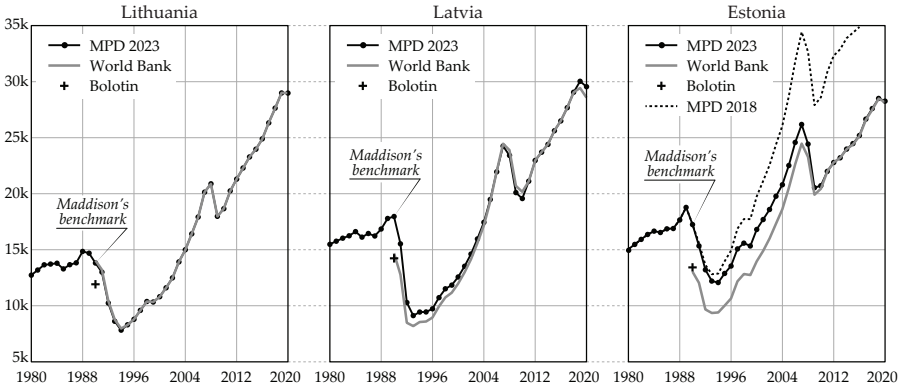
[42]MPD version 2023

[43]Conference Board, *Total Economy Database: Output, Labor, and Labor Productivity, 1950-2021*, August 2021

[44]Other series include those by the U.S. Department of Agriculture, which are almost perfectly linear or correlated to the old World Bank figures, see Economic Research Service of the U.S. Department of Agriculture, *Historical Gross Domestic Product Per Capita for Baseline Countries/Regions (in 2010 dollars) 1969-2014*, September 2015; or the recent 1850-2009 figures by T. Geiger, ''Continuous national gross domestic product (GDP) time series for 195 countries: past observations (1850–2005) harmonized with future projections according to the Shared Socioeconomic Pathways (2006–2100)'', *Earth system science data* (Katlenburg-Lindau) 10, no. 2 (2018): 847–856 which, up to 1990, are simply extrapolated from Russian series.

when analysing long-run income trends in the Baltic states.[45] These series, along with post-1990 World Bank data and 1990 Bolotin figures, are presented in Figure 2.2. This visual representation suggests several important observations. Firstly, the 1973-1990 GDP per capita levels from MPD appear suspiciously high, implying that all three Baltic economies were the wealthiest parts of the communist bloc, a claim that requires careful scrutiny. Secondly, whilst Lithuanian and Latvian figures from 1992 onwards correlate almost perfectly with World Bank data, Estonian figures from MPD seem to diverge significantly from World Bank levels, linking up only in 2011. Thirdly, MPD figures suggest that in 1988-1989, all three Baltic Soviet republics experienced impressive 5-7% increases in GDP per capita, which has no historical basis and stands in sharp contrast to the stagnating USSR as a whole. Finally, the independent benchmark GDPs from Bolotin consistently suggest lower estimates for 1990 than MPD. Notably, Bolotin's figures almost perfectly align with World Bank's 1990 endpoints for Latvia and Estonia.

Figure 2.2: COMPARISON OF EXISTING BALTIC GDP FIGURES in Int$$_{2011}$$



Sources: MPD version 2023; MPD version 2018: Jutta Bolt and Robert Inklaar and Herman de Jong and Jan Luiten van Zanden, *MPD version 2018: 1990$ benchmark*, 01 Oct, 2020; B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 186; The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024. *Note:* Bolotin's and MPD version 2018 figures converted into Int$$_{2011}$$ using the Int$$_{1990}$$ to Int$$_{2011}$$ ratio of 1.594, see page 12 in the original MPD version 2023 paper. World bank series were compiled by extrapolating 1990-2020 movement from MPD's 2011 benchmark figures using World Bank GDP per capita PPP indices. MPD version 2018 data for Lithuania and Latvia not shown because it matches the latest MPD figures.

[45]For example, Klimantas and Zirgulis, ''A new estimate'', 249 utilises the 1973 and 1990 Lithuanian figures from MPD

Suspiciously high pre-1990 Baltic GDP figures have been criticised for overstating the severity of the post-1990 transformational crisis.[46] Maddison's 1990 GDP per capita estimates for the former Soviet Union republics are based on bilateral republic-to-USSR ratios from Bolotin's GDP PPP study.[47] His figure for the USSR itself in Int$_{1990}$ was obtained using a bilateral Austria-to-USSR GDP PPP ratio rather than direct PPPs.[48] Consequently, the Baltic GDP per capita levels for 1990 were derived using two sets of arbitrary bilateral ratios, rather than direct purchasing power parity comparisons. In addition, for unknown reasons Maddison chose to apply 1991 republic-to-USSR ratios for his 1990 estimates rather than those from 1990 available in Bolotin's study. The 1991 republic-to-USSR ratios are much higher than those of the preceding year, likely due to distortions by the transition to processes. As a result, the post-Soviet 1990 benchmark figures in Maddison's datasets are almost certainly upward-biased.

This potentially inflated figure, converted to Int$_{2011}$ using the standard pre-1991 ratio of 1.594, remains unchanged in the MPD version 2023.[49] Since GDP per capita growth rates in MPD and World Bank datasets only converge in 2011, this study rejects the Baltic 1973-2011 figures in the Maddison Project Database as upward-biased. Instead, this thesis advocates for the use of the directly estimated 1990 benchmark GDP per capita PPP figure from Bolotin's study. It is already calculated in Int$_{1990}$ and requires no additional adjustments (see Table 2.1). As Figure 2.2 demonstrates, MPD data from 2011 onwards correlates perfectly with World Bank figures and is therefore accepted as reliable.

[46] M. De Broeck and V. Koen, *The Great Contractions in Russia, the Baltics and the Other Countries of the Former Soviet Union: A View From the Supply Side.*, IMF Working Papers (Washington, D.C: International Monetary Fund, 2000), 3–4; I. Voskoboynikov, ''Economic growth and sectoral developments during the transition period, 1990–2008'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 385–386.

[47] Maddison, *The World Economy*, 181

[48] Maddison, ''Measuring the Performance'', 318.

[49] See page 12 in the MPD version 2023 paper.

Table 2.1: 1990 BENCHMARK GDP LEVELS BY SECTOR OF ORIGIN AT CURRENT PRICES

	Lithuania		Latvia		Estonia	
	Million roubles	Weight in total	Million roubles	Weight in total	Million roubles	Weight in total
Agriculture, forestry & fishing	3500.0	22.0%	2000.0	17.6%	1250.0	16.9%
Industry	4196.1	26.4%	3190.8	28.0%	2203.4	29.8%
Construction	1454.5	9.2%	818.2	7.2%	818.2	11.1%
Transport & communications	785.7	4.9%	964.3	8.5%	535.7	7.3%
Trade, finance, housing & other commercial services	3289.4	20.7%	2371.6	20.8%	1322.3	17.9%
Public administration, defence, education & health	2086.5	13.1%	1679.0	14.7%	1064.4	14.4%
Other services	571.9	3.6%	367.3	3.2%	190.1	2.6%
GDP at market prices	15884.1	100.0%	11391.3	100.0%	7384.1	100.0%
GDP in Int$$_{1990}$$	7475.0		7965.0		8425.0	

Sources: B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 184–186, converted back to roubles using sectoral PPP exchange rates from page 184.
Note: disaggregation of services (except for trade and transport and communications) is based on value-added shares in D. Steinberg, *Economies of the former Soviet Union: an input-output approach to the 1987 national accounts*, Policy, Research working papers, WPS 1060 (Washington, D.C.: World Bank Group, 1992).

Income estimates by scholars in the Baltic states

Even before the establishment of the SNA or the concept of GDP, individual economists in the interwar Baltic states attempted to produce national income estimates. Whilst many of these early attempts in Lithuania, Latvia, and Estonia are noteworthy, most suffer from methodological and source issues. Since they have already been comprehensively reviewed by Norkus and Markevičiūtė, this thesis does not venture beyond modern works with direct relevance to the study.[50]

In recent years, Estonian and Lithuanian scholars have made notable progress in estimating Baltic interwar period GDP figures. Estonians took the lead in 2003 when Jaak Valge published GDP per capita time series using the production approach for 1923-1938.[51] He then converted these estimates into Int$$_{1990}$$, making internationally comparable. These figures were slightly revised by Martin Klesment in 2008.[52] Valge did well in extensively covering the primary and secondary sectors but his approach to the tertiary sector was

[50]Norkus and Markevičiūtė, "New estimation": 568-584

[51]J. Valge, ''Uue majanduse lätteil. Eesti sisemajanduse kogutoodang aastatel 1923–1938'', *Akadeemia*, nos. 10-12 (2003): 2202–2735.

[52]M. Klesment, ''Eesti majandusarengu dünaamika näitajaid sõdadevahelisel perioodil'', *Tuna* (Tallinn) 38, no. 1 (2008): 25–37.

highly simplistic. He did not differentiate his figure into service subsectors and assumed value-added per capita in services was constant throughout the entire 1923-1938 period. Another limitation of Valge's research lies in his method of obtaining constant-price GDP series. He deflated current price GDPs using the cost of living index, which is problematic since it only reflects movement in consumer goods and can differ severely from the GDP deflator. For example, Valge's data suggests there was a 29% rise in GDP per capita in 1924, even though physical output increased no more than 4% even in the best performing sectors. Furthermore, to convert his figures to Int$$_{1990}$$, Valge relied on Colin Clark's largely outdated international comparison, which placed Estonia at 90% of Finland's level.[53] Consequently, Valge's 1923-1938 GDP data should be considered a very approximate measure that requires updating.

On the Lithuanian side, a highly detailed output-side estimate of the 1937 GDP was published in 2020 by Klimantas and Zirgulis.[54] The authors adhered to SNA procedures, estimating the gross value-added of 22 economic sectors at basic prices using both published and archival data. They then added back the taxes less subsidies on production to arrive at the total GDP at market prices. By performing a bilateral price basket comparison with Sweden, the authors were able to convert the 1937 Lithuanian GDP per capita into Int$$_{1990}$$. However, their approach also has limitations which this study aims to address and improve upon.[55] The revised 1937 estimate will serve as the benchmark figure in this thesis to extrapolate the entire 1919-1940 Lithuanian GDP time series.

Klimantas and Zirgulis's effort was followed in 2021 by Norkus and Markevičiūtė's indirect income-side estimations for years 1913, 1922, 1929, and 1938 for all three Baltic states.[56] Notably, all these figures are available in Int$$_{1990}$$, making them suitable for both international and inter-period comparisons. Whilst direct estimates are generally preferred over shortcut methods, this study will utilise the 1913 figures from Norkus and Markevičiūtė

[53] Clark, "Internationaler"

[54] Klimantas and Zirgulis, ''A new estimate''.

[55] These include improvements to housing and household income figures, recalculation of the value-added of non-market sectors (primarily public administration and defence; compulsory social security and education), and inclusion of certain previously omitted tariffs in the final figure.

[56] Norkus and Markevičiūtė, "New estimation". The authors employed the indirect estimation procedure used in the 2018 Maddison Project issue (see J. Bolt et al., ''Rebasing 'Maddison': new income comparisons and the shape of long-run economic development'', *Maddison Project Working paper 10*, January 2018,).

as the only available pre-WWI Baltic GDP measure. The remainder of their calculations will serve as cross-checks for the new estimates presented in this paper.

In 2022, a collaborative effort by Lithuanian, Latvian, and Norwegian scholars resulted in the publication of a Latvian output-side estimate of 1935 GDP per capita.[57] This study adhered to methodological principles similar to those employed in the Klimantas and Zirgulis paper, albeit with minor improvements. Sectoral coverage in this paper was also similar to the Lithuanian 2020 effort, and the authors followed an analogous procedure to convert their GDP per capita estimate into Int$_{1990}$. Thus, this benchmark estimate will also serve as the foundation for extrapolating Latvian GDP series for the entire interwar period. It is worth noting that so far there have been no attempts to construct continuous GDP time-series for interwar Lithuania and Latvia.

The only modern attempt at compiling Soviet-era GDP figures for the Baltic states by local scholars was published by Estonians. In 2010 Klesment, Puur, and Valge calculated an uninterrupted GDP per capita series for the Estonian SSR from 1950 to 1990 and successfully linked these series to modern data.[58] Aware of the issues inherent in the socialist pricing system, the authors relied on physical indicator series which they had compiled themselves a few years earlier.[59] The sectors covered included agriculture, industry, construction, and transport. The authors aggregated individual product indices into sectoral series using geometric averages, and then obtained the overall index using sectoral weights derived from NMP figures.

This pioneering effort has several notable limitations. Firstly, the figures commence in 1950, leaving a significant gap between 1938 and 1950. Moreover, education, public administration, and other non-material service production sectors are excluded from the weighted index. The use of geometric averages instead of prices also leaves room for improvement. Thus, much like Valge's interwar series, Klesment et al.'s figures require recalculation and extension in both sectoral and period coverage.

The overall picture of pre-1995 Baltic national income availability therefore remains highly incomplete. Furthermore, the entire 1918-1995 period

[57] Z. Norkus et al., ''Benchmarking Latvia's economy: a new estimate of gross domestic product in the 1930s'', *Cliometrica*, 2022,

[58] Klesment et al., ''Childbearing''.

[59] M. Klesment and J. Valge, ''Eesti rahvastiku majandustegevuse näitarve XX sajandil'', *Rahvastiku-uuringud* (Tallinn) Seeria D, no. 6 (2007).

suffers from a lack of sectoral volume index data necessary for GDP estimation, with most indices needing to be calculated from scratch. Nevertheless, there are sufficient robust single-year estimates available as benchmarks for calculating these indices and compiling the GDP per capita series from 1919 to 1995. The only exception is interwar Estonia which lacks such benchmark estimate. To maintain methodological consistency, this thesis produces a new Estonian 1938 benchmark for these purposes.

Table 2.2: 1930s BENCHMARK GDP LEVELS BY SECTOR OF ORIGIN AT CURRENT PRICES

	Lithuania, 1937		Latvia, 1935		Estonia, 1938	
	Million LTL	Weight in total	Million LVL	Weight in total	Million EEK	Weight in total
Agriculture, forestry & fishing	823.0	44.1%	383.4	36.1%	250.1	38.3%
Industry	279.7	15.0%	216.5	20.4%	132.1	20.2%
Construction	68.2	3.7%	23.6	2.2%	14.0	2.1%
Transport & communications	51.9	2.8%	53.2	5.0%	32.2	4.9%
Trade, finance, housing & other commercial services	451.0	24.2%	233.6	22.0%	120.5	18.4%
Public administration, defence, education & health	142.4	7.6%	103.5	9.7%	99.3	15.2%
Other services	51.1	2.7%	48.0	4.5%	5.5	0.8%
Total gross value-added at basic prices	1867.2	100.0%	1061.8	100.0%	653.7	100.0%
Taxes less subsidies on products	68.3		77.8		17.3	
GDP at market prices	1935.5		1139.6		671.0	
GDP in Int$$_{1990}$	2018.70		2776.05		2684.88	

Sources: A. Klimantas and A. Zirgulis, ''A new estimate of Lithuanian GDP for 1937: How does interwar Lithuania compare?'', *Cliometrica* 14, no. 2 (May 2020): 239–241 with revisions in Appendix B; Z. Norkus et al., ''Benchmarking Latvia's economy: a new estimate of gross domestic product in the 1930s'', *Cliometrica*, 2022, 263–266, 287, 312 and Estonian GDP recalculations in Appendix A.

Europe's eastern periphery: catching up and falling behind

The Baltics, together with East-Central Europe, had lagged behind the advanced Western core of the continent since at least 1500, reflecting Europe's 'Little Divergence'.[60] In the wake of the First World War, East-Central Europe's GDP per capita was less than 40% of Western Europe's level, while in the future Baltic states the ratio stood at 41% for Lithuania, 59% for Latvia, and 51% for Estonia.[61] Hence, there was significant room for catching up across Eastern Europe throughout the 20th century. In the 110 years since 1913, however, Lithuania—and particularly Latvia and Estonia—have achieved only limited success in closing this gap with Western income levels. By estimating the national accounts of a previously neglected part of this region, this thesis provides a detailed quantification of the Baltic catch-up record during the different phases of economic governance in the Baltic states.

Current possibilities for thoroughly explaining the drivers behind catching up and falling behind in the Baltics are limited by the lack of data on factor inputs required for growth accounting analyses. Nevertheless, this thesis aims to offer the first suggestive Baltic growth narrative, primarily through the lens of automatic and conditional catch-up mechanisms.

To provide background for this analysis, this subchapter first reviews the major theoretical and empirical literature on the sources of catch-up growth in 20th-century Europe. It then examines the catch-up record and its drivers in Europe's eastern periphery, and finally discusses the catch-up potential that Lithuania, Latvia, and Estonia possessed under the three regimes in their economic history since 1918: interwar capitalism, post-war socialism, and post-1990 capitalism.

[60] S. N. Broadberry and M. Malinowski, ''Living standards in the very long run'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 33.

[61] MPD version 2023; Norkus and Markevičiūtė, ''New estimation''

Peripheral catching up: growth theory perspective

Economic development theory has long grappled with the question of how poorer nations can eventually catch up to richer ones. The convergence hypothesis suggests that, under the right circumstances, lagging countries can grow faster than early leaders precisely because they are behind. In a 'productivity race,' starting from a lower level can confer an advantage.[62] The catch-up convergence literature can be broadly divided into two strands: one arguing that catching up is largely automatic, and the other maintaining that the process is primarily conditional.

Automatic catch-up theory

The idea of automatic catch-up growth rests on the assumption that countries are similar in their fundamental economic characteristics—such as savings behaviour and institutions—and differ mainly in their starting levels of capital, technology, and output.[63] If that assumption holds, a poorer economy has considerable scope for rapid growth by exploiting the gap separating it from the leader. In their critique of the hypothesis of unconditional convergence, Abramovitz and David identified four mechanisms which, *ceteris paribus*, should enable a backward country to catch up with a richer one automatically.

The first key advantage that poor countries possess is the ability to absorb existing technologies from more advanced nations, rather than having to reinvent them. As Alexander Gerschenkron (1962) observed in his historical analysis, 'industrialisation always seemed the more promising the greater the backlog of technological innovations which the backward country could take over from the more advanced country.'[64] In his view, 'borrowed technology … was one of the primary factors assuring a high speed of development in a backward country.' In practical terms, a latecomer can import or imitate cutting-edge production techniques and equipment, leaping ahead faster than pioneers who had to develop those innovations in the first place.

[62] M. Abramovitz and P. A. David, ''Convergence and Deferred Catch-up: Productivity Leadership and the Waning of American Exceptionalism'', in *The mosaic of economic growth*, ed. R. Landau et al. (Stanford: Stanford University Press, 1996), 21.

[63] M. P. Todaro and S. C. Smith, *Economic Development*, 13th ed. (London: Pearson Education, 2020), 70, 136–137.

[64] A. Gerschenkron, ''Economic backwardness in historical perspective'', in *Economic backwardness in historical perspective: a book of essays*, ed. A. Gerschenkron (Cambridge: Belknap Press of Harvard University Press, 1962), 8.

This allows for more substantial gains in the average efficiency of its production systems than the leader can achieve by improving already state-of-the-art technology. The same logic applies to non-physical aspects of production, including the adoption of best organisational procedures, management practices, and similar innovations.[65]

The second mechanism is embodied in neoclassical growth models. According to Solow (1956), diminishing returns to capital imply that economies tend toward an equilibrium income level; thus, a country with a lower initial capital per worker will naturally grow faster as it accumulates capital. In other words, capital deepening in the poorer economy outpaces that of the richer one, narrowing the income gap.[66] Backward countries therefore offer higher marginal returns on investment, encouraging faster capital accumulation from both domestic and foreign sources.

The third advantage stems from the employment structure in poor countries, as described in Lewis's (1957) model.[67] In an underdeveloped economy, the workforce is usually concentrated in low-productivity sectors such as subsistence agriculture or small-scale crafts and services. By moving surplus labour into more productive non-agricultural sectors and larger firms—even accounting for the additional capital required—overall productivity can improve significantly.[68]

Finally, the cumulative effect of these three mechanisms leads to rapid overall output growth, which in turn expands market size. Larger markets facilitate the adoption of technologies that rely on economies of scale, thereby fostering further productivity gains.[69]

Conditional catch-up theory

In contrast to the body of literature advocating automatic catch-up mechanisms stands a more recent scholarship that argues convergence is conditional. These scholars do not deny the potential 'advantages of backwardness' but contend that realising this potential depends on crucial enabling conditions such as institutional quality, human capital, and deliberate innovation efforts.

[65] Abramovitz and David, ''Convergence'', 22.

[66] R. M. Solow, ''A contribution to the theory of economic growth'', *The Quarterly journal of economics* 70, no. 1 (1956): 70–71.

[67] W. A. Lewis, ''Economic development with unlimited supplies of labour'', *Manchester school of economic and social studies* 22, no. 2 (1954): 139–191.

[68] Abramovitz and David, ''Convergence'', 22.

[69] Abramovitz and David, 22.

Abramovitz and David, while outlining the advantages of being behind, famously cautioned against the core assumption of the automatic catch-up argument—namely, that there 'are no persistent differences in national characteristics that would inhibit a laggard country from exploiting the advantages that being behind would otherwise present.'[70] In their broader argument, they incorporated elements from other major growth theories, including the pivotal role of institutions (North, 1990) and R&D (Romer, 1990; Aghion and Howitt, 1992), the constraints of tradition (Rostow, 1959), and scale dependency (Denison, 1967).[71]

Discussing each of these contributions in detail would require more space than this thesis can allow. Therefore, it is assumed that by thoroughly reviewing the arguments presented by Abramovitz and David, the theoretical perspective of conditional catching up is sufficiently addressed.

In their analysis, the authors examine the reasons behind the American advance to productivity leadership and outline the forces that later eroded those advantages in favour of laggard Western economies. They argue that between 1870 and 1914, the United States advanced faster than other Western countries because progress at the time was driven by the use of natural resources and non-human capital, with the scale advantages of mass production finding their best application in the American market. Although resource endowments played an important role initially, in the 20th century 'the course of innovation became less biased towards the ever more intense application of tangible capital and natural resource inputs and, instead, came to favour greater emphasis on intangible capital formation through investments in education and R&D.' After the setbacks of the Great Depression and the Second World War, this shift removed the obstacles preventing Western Europe from realising its catch-up potential.[72]

Nonetheless, even in the 19th century there were other countries rich in natural resources and possessing relatively large markets—such as Britain and France with their vast colonial empires. Moreover, not all countries were

[70] Abramovitz and David, 23.

[71] D. C. North, *Institutions, institutional change and economic performance* (Cambridge: Cambridge University Press, 1990); P. M. Romer, ''Endogenous Technological Change'', *The Journal of political economy* (Chicago) 98, no. 5 (1990): S71–S102; P. Aghion and P. Howitt, ''A Model of Growth Through Creative Destruction'', *Econometrica* (Hoboken) 60, no. 2 (1992): 323–351; W. W. Rostow, ''The stages of economic growth'', *The Economic history review* (Oxford) 12 (1959): 1–16; E. F. Denison, *Why growth rates differ: postwar experience in nine western countries* (Washington, D.C: Brookings Institution, 1967)

[72] Abramovitz and David, ''Convergence'', 25–26.

able to catch up even in the post–Second World War decades, particularly after the end of the post-war boom, as will be explored in the case of socialist economies. Abramovitz and David therefore distinguish between two underlying sets of 'special conditions': the first influencing the potential for catching up, and the second determining the extent to which that potential can be realised.

The factors influencing the potential for catching up can be further subdivided into the limits of a country's *technological congruence* and its *social capability* to absorb the best technologies and practices.

'Technological congruence' refers to the degree to which a country's economic structure aligns with the characteristics of prevailing frontier technologies. For a country to benefit from global technological advances, its factor endowments—such as capital intensity or labour skills—must match the requirements of those technologies. For example, mass production systems require large domestic markets, abundant semi-skilled labour, and supporting infrastructure—conditions that were present in the United States during its rise. A mismatch between a country's structure and the nature of available technologies reduces its ability to adopt them effectively. Such a mismatch 'may render it extremely difficult, if not prohibitively costly, for firms, industries, and economies to switch quickly from an already established regime'.[73]

'Social capability' refers to the institutional and human resource foundations necessary for absorbing and implementing advanced technologies. These include education levels, security of property rights, innovation incentives, managerial competence, financial systems, legal frameworks, and the overall organisation of the economy. Even when a country has access to modern technology, as well as to the requisite markets, infrastructure, and labour resources, it must also possess these capabilities to use that technology productively and adapt it to local conditions. Differences in 'social capability' help explain why countries with similar access to technology can experience very different growth outcomes. The authors emphasise that without sufficient 'social capability', the potential gains from catching up are unlikely to be realised: 'for laggards, the constraints imposed by entrenched social structures may long circumscribe the opportunities for any sustained catch-up movement'.[74]

Yet even a lagging but technologically congruent and socially capable

[73] Abramovitz and David, ''Convergence'', 32.
[74] Abramovitz and David, 32.

society may be unable to realise its catch-up potential for a variety of reasons. First, if there are significant restrictions on accessing the latest technologies, the country will face difficulties in both adopting and imitating the most advanced methods of production and management. Second, catching up requires a shift from agricultural to industrial and service employment, which in turn demands labour mobility that may be constrained. Third, external—and, most importantly, often controllable internal—macroeconomic factors influence investment, resource use, and R&D, all of which affect the advancement and exploitation of technologies at the firm level.[75]

According to the opponents of automatic convergence, therefore, whether a country is able to exploit its 'advantages of backwardness' is highly conditional. As will be explored, there have been periods when the Baltic growth story appeared to follow an automatic pattern. Yet, in most cases, the phases of successful catching up were almost certainly conditional, and the conditions suggested by Abramovitz and David provide compelling explanations for the trends observed in Lithuania, Latvia, and Estonia over the past century.

[75] Abramovitz and David, 34–35.

Peripheral catching up: empirical studies on Europe

The period 1950–1973 across Europe witnessed unparalleled economic growth and substantial catching up with the United States during the golden age of growth. For the first time, both the industrialised European core and its periphery were closing the gap in income levels with the world's richest economies. This pattern of convergence was virtually universal and remarkably strong.[76] These developments have inspired a wealth of empirical literature which, much like the theoretical debate discussed above, is divided—some studies finding evidence for automatic catching up, and others strongly arguing for conditionality.

Automatic catch-up from empirical standpoint

Unconditional convergence finds its strongest evidence in analyses of catching up among industrialised nations. Early findings come from Baumol (1986), who showed that productivity levels among industrialised nations have steadily converged since 1870, largely through knowledge spillovers from leading economies to their followers.[77] Such advancements spread via competition, technology transfer, and investment flowing from the United States to Europe, where marginal returns were higher—functioning, in effect, as a 'public good'. At first glance, this echoes both the Gerschenkronian and Solow growth narratives. However, and crucially for this thesis, Baumol stresses that this convergence 'club' excludes agrarian low-income nations. He attributes this exclusion to differences in industrial structure and educational attainment—without relevant industries or suitably skilled workforces, these countries struggle to adopt advanced technologies, revealing a lack of 'technological congruence'.[78] Baumol's analysis therefore holds that automatic catch-up is common only among countries that have already moved beyond the initial agrarian stage.

In partial agreement with the Lewis thesis, Temin (2002) attributes Europe's post-war growth surge to the disequilibrium created by the two world wars and the Great Depression, which had stalled industrialisation

[76] M. Abramovitz, ''Catching Up, Forging Ahead, and Falling Behind'', *The Journal of economic history* (New York) 46, no. 2 (1986): 385, W. J. Baumol, ''Productivity Growth, Convergence, and Welfare: What the Long-Run Data Show'', *The American economic review* (Menasha) 76, no. 5 (1986): 1073

[77] Baumol.

[78] Baumol, 1077–1081.

and structural modernisation.[79] As nations resumed the process of reallocating labour from agriculture to industry and services, growth rates accelerated. His empirical analysis underscores the presence of surplus agricultural labour as the principal long-term driver of convergence growth in the 1950s and 1960s.[80] Yet, while strongly arguing that countries 'grew at different rates during the golden age because of their initial position,' he leaves room for conditionality. Institutions help create demand for labour reallocation, and government policies play a role in influencing growth rates. For peripheral countries, Temin further highlights Sachs and Warner's argument that the benefits of resource reallocation are magnified by trade openness.[81]

Perhaps the most prominent study finding evidence in favour of automatic mechanisms is Vonyó's (2008) panel-data econometric investigation of the sources of growth during the golden age. He finds that much of the exceptional early post-war acceleration—particularly in core Western Europe—was due to post-war reconstruction, essentially a return to pre-war capital–labour ratios. In line with Solow's theoretical conclusions, the low capital-to-labour ratios in post-war Western Europe, caused by the destruction of physical capital but coupled with relatively intact, socially advanced populations and a growing labour supply, made investments highly profitable in the 1950s and 1960s.[82]

Crucially, Vonyó also finds that peripheral capitalist European economies experienced an even more straightforward form of automatic catch-up growth, driven primarily by structural modernisation.[83] Nevertheless, his econometric analysis reveals that long-run growth potential depended on human capital and institutional settings—country-fixed effects reflect these differences. Thus, while early growth exhibited clear elements of unconditionality, sustained performance depended on conditional factors such as education and institutional quality.[84]

[79] P. Temin, ''The Golden Age of European growth reconsidered'', *European review of economic history* (Cambridge) 6, no. 1 (2002): 3, 11.

[80] Temin, 13–15, 19.

[81] Temin, 10.

[82] T. Vonyó, ''Post-war reconstruction and the Golden Age of economic growth'', *European review of economic history* (Cambridge) 12, no. 2 (2008): 223, 239.

[83] Vonyó, 239.

[84] Vonyó, 239.

Conditional catch-up from empirical standpoint

A wealth of empirical evidence suggests that post–Second World War catch-up was largely conditional rather than automatic. In their 1996 analysis of European convergence with the United States, Abramovitz and David emphasise that even Western Europe—despite possessing broadly similar institutional, social, and human capital conditions conducive to American technology adoption—only met the necessary conditions for convergence in the post-war period.[85]

Several critical shifts underpin this timing. First, the markets and scale economies necessary for efficient mass production expanded significantly only after the 1950s. Second, investment returns increasingly favoured intangible assets over physical capital during this era, which was advantageous for resource-scarce Europe. Third, the cultural ethos that prized hard work, thrift, and commercial enterprise—deeply embedded in American society—was far less prevalent in Europe, where class-based hierarchies persisted. As Abramovitz and David note, 'in all the European countries, a traditional class structure ... survived into the twentieth century. Social distinction rested more on birth and the class status it conveyed than on wealth.'[86] This pre-industrial social structure is a prime example of a lack of 'social capability', which hindered the pursuit of wealth and practical education and encouraged conservative approaches to production, enterprise, and finance.[87] Broad institutional and societal changes needed for sustained convergence in Western Europe materialised only in the latter half of the 20th century, aided by both domestic reforms and international policy dynamics.

More recently, Crafts and Toniolo (2010) have provided one of the most comprehensive analyses, engaging with numerous empirical studies that appear to support unconditional convergence.[88] Drawing on endogenous growth theory and Abramovitz's (1986) catch-up framework,[89] they interpret European post-war growth through the lens of shifting investment and innovation frontiers. For lagging countries to catch up, closing gaps in capital intensity and technology required not only market openness but also 'social capability' and 'technological congruence'.[90] These concepts—originally ar-

[85] Abramovitz and David, ''Convergence'', 44–46.
[86] Abramovitz and David, 52–53.
[87] Abramovitz and David, 54–55.
[88] Crafts and Toniolo, ''Aggregate growth''.
[89] Abramovitz, ''Catching Up''.
[90] Crafts and Toniolo, ''Aggregate growth'', 297–298.

ticulated by Abramovitz and David—form the theoretical backbone of their interpretation of post-war European growth.

Their growth accounting evidence attributes labour productivity improvements to both capital deepening and total factor productivity (TFP) growth. Importantly, TFP—often the larger contributor—was driven less by domestic R&D and more by technology imports, better resource allocation, fuller capacity utilisation, and structural transformation. This phase of growth, while seemingly automatic, was in fact crucially conditioned on the presence of enabling institutions and macroeconomic policies that fostered investment, facilitated technology transfer, and improved factor use—echoing earlier work by Crafts (1995).[91]

Crafts and Toniolo provide compelling evidence for this proposition through examples of catch-up failures in post–Second World War Western Europe. The UK and Ireland, hampered by fragmented industrial relations and inward-looking policies that persisted into the 1960s, experienced slower growth. Ireland's example is particularly relevant to the Baltic experience given its similarly backward pre-war economic structure (see Figure 2.3). Its post-war adherence to import substitution, delayed trade liberalisation, and inadequate investment in education inhibited convergence until a significant policy overhaul in the late 1980s. In Abramovitz's terms, Ireland exemplified a failure to build adequate 'social capabilities'—cutting itself off from trade and competition, and underinvesting in the skills and institutions needed to absorb productivity-enhancing technologies.[92]

European integration also played a pivotal conditional role in convergence, especially for peripheral economies. By fostering trade liberalisation, encouraging competition, and expanding market size, integration accelerated technology transfer and increased investment returns. Structural transformation followed, as labour shifted from low-productivity agriculture into higher-productivity industry and services. This was particularly impactful in countries such as Italy and Spain, where agriculture initially dominated.[93]

Crafts and Toniolo extend their analysis into the post-1970s period, attributing the slowdown in catch-up largely to the waning effects of post-war reconstruction and diminishing returns to capital. However, they place particular emphasis on institutional rigidity and suboptimal welfare policies as

[91] Crafts and Toniolo, 305–307; N. F. R. Crafts, ''The golden age of economic growth in Western Europe, 1950-1973'', *The Economic history review* (Oxford) 48, no. 3 (1995): 441

[92] Abramovitz, ''Catching Up'', 388–389, 393.

[93] Crafts and Toniolo, ''Aggregate growth'', 310–312.

critical inhibitors of the transition to flexible production technologies.[94] By the 1990s, this rigidity—manifested in strong employment protection and restrictive product market regulation—significantly impeded ICT investment and productivity spillovers.[95]

The Soviet Union offers an even starker example of failed catch-up. Even during its high-growth decades prior to the 1970s, output gains were driven primarily by factor accumulation rather than efficiency improvements. Unlike Western Europe, the Soviet bloc remained insulated from global markets that facilitated technology transfer and lacked the institutional flexibility and incentives needed to sustain productivity-driven growth. For Crafts and Toniolo, this represents a failure of 'social capability' to exploit efficiency-enhancing technologies. Consequently, by the 1970s, diminishing returns to factor accumulation and rising inefficiencies had set in, leading to stagnation.[96]

Notably, empirical studies focused on the golden age do not single out market institutions or democratic governance as essential to enhancing 'social capability' for catch-up growth. Toniolo (1998) instead highlights the importance of a high human-to-physical capital ratio and a European demand–supply environment—common to both capitalist and socialist economies—that facilitated the adoption of mass-production technology.[97] In capitalist economies, this scale was achieved through international trade, while socialist countries likely found similar scope through integration within the Communist bloc. Rather than pluralistic governance, it was relative political stability and social harmony that proved important in sustaining growth.[98]

A more central role for market institutions emerged after the Soviet collapse. By the late 1990s, some—though not all—formerly planned economies began to converge rapidly with the West in terms of productivity levels. These successes were closely linked to institutional modernisation and liberalisation, often spurred by the conditionality of EU accession. Such reforms enhanced 'social capability' and drove TFP-led growth, in contrast to the stagnation that persisted in countries with weaker institutions and en-

[94]Crafts and Toniolo, ''Aggregate growth'', 315, 320, 323.
[95]Crafts and Toniolo, 325–326.
[96]Crafts and Toniolo, 314–315, 323.
[97]G. Toniolo, ''Europe's Golden Age, 1950-1973: Speculations from a Long-run Perspective'', *The Economic history review* (Oxford) 51, no. 2 (1998): 256–259.
[98]Toniolo, 264–265.

trenched inefficiencies inherited from the communist era.[99]

In sum, while short episodes of unconditional convergence were possible—driven by knowledge spillovers, capital deepening, and labour reallocation—these were mostly confined to a specific historical window (1950s–1970s) and to nations that were already industrialised. Sustained, long-run convergence required the fulfilment of key conditions: 'technological congruence' and 'social capability'. These entailed having relevant industries, skilled workforces, and—most crucially—effective institutions, flexible governance, and policies that promoted investment, human capital development, technology transfer, competitive markets, and efficient resource allocation.

[99]Crafts and Toniolo, ''Aggregate growth'', 328–330.

Catching up or falling behind? Interwar Eastern Europe

Economic growth record during the interwar period is generally considered exceptionally dismal in the whole European continent.[100] Two world wars, the Great Depression, and regional economic disparities reduced Europe from a world leader to a recipient of aid from the United States.[101] For East-Central Europe and the Baltics, having lagged behind the West for over 400 years, national independence and stagnation in industrialised Europe offered opportunities for catching up.

An early perspective on this issue was presented in the volume *Economic development in East-Central Europe in the 19th and 20th centuries* by Berend and Ránki, first published in communist Hungary in 1969. This work, filled with praise for the socialist system and an almost demonising portrayal of interwar regimes, concluded that there was no improvement in living standards in East-Central Europe during the interwar period, in contrast to the pre-WWI era.[102]

In his 2016 volume, Berend reiterates his Cold War era thesis, arguing that East-Central Europe fell from 42% of Western Europe's level in 1913 to 37% in 1950, concluding that there was a further relative deterioration of ECE's position.[103] However, unlike his earlier works, praise for both the pre-WWI era and the socialist period is replaced by an overall bleak outlook for East-Central Europe throughout the entire 20th century. In his subsequent 2020 study *Economic history of a divided Europe*, Berend confirms a similar argument: Central Europe stood at 50% of the Western level in 1913, falling to 48% by 1950. He concludes that in 1913-1950 'relative backwardness' in Central Europe increased.[104]

This view is shared in Aldcroft's 2006 volume *Europe's third world*, where he uses outdated Bairoch's GNP figures to conclude that there was no catch-up trend in East-Central Europe.[105] However, new data from the Maddison Project Database version 2023 challenges this view. It reveals that GDP per capita in the region actually increased at a slow, yet positive annual rate of

[100]Morys, ''Economic growth'', 161; Roses and Wolf, ''Aggregate growth'', 182

[101]T. I. Berend, *An economic history of twentieth-century*, 87.

[102]I. T. Berend and G. Ránki, *Economic development in East-Central Europe in the 19th and 20th centuries* (New York: Columbia University Press, 1974), 318, for praise of the socialist system see pages 342-343 and 362-363.

[103]T. I. Berend, *An economic history of twentieth-century*, 85.

[104]Berend, *Economic history of a divided Europe*: 186

[105]Aldcroft, *Europe's third world*, 175.

0.8% in both the periods 1913-1938 and 1913-1950.[106]

Scholarly work has advanced in the recent decades, painting a more positive outlook of the period in the region and rendering the previous conclusions largely outdated. The new research has been synthesised by Morys in the pivotal 2021 volume *The Economic History of Central, East and South-East Europe*. Morys argues that the dismal outlook of the interwar period is based on the very disappointing performance of large industrialised economies, which were more severely impacted by the Great Depression, while regions with agrarian character need reinterpretation.[107] He believes that previous negative assessment of interwar performance was biased to justify the extreme regime shift to state socialism after World War II[108] and argues that these justifications were based on simplistic analyses of unrepresentative indicators, as GDP statistics were not available for ECE countries at that time. He also highlights an additional detail regarding these previous works: the authors themselves hail from East-Central Europe, with Berend and Ránki's volume without doubt published under calculated consent of the Hungarian Communist party.

Utilising available GDP statistics, including the latest series for the Soviet Union and Bulgaria, Morys constructs a new picture of interwar performance in Europe's East. Crucially, he includes Greece in his broader region of Central, East and South-Eastern Europe (CESEE) and excludes Poland and Romania due to their subprime GDP estimates. Comparing 1913 and 1938 GDP levels, Morys first finds that, contrary to Cold War era claims by Berend and Ránki, interwar growth rates in CESEE were substantial and exceeded those achieved in the region during the pre-WWI years.[109]

Morys' positive assessment of the interwar catch-up record is based on the experiences of countries with robust data and reflects the modern mainstream view. However, there is room for improvement. His decision to include Greece while excluding Poland and Romania from the analysis is debatable. Greece traditionally belongs to the Southern or Mediterranean group, itself a subgroup of the Western periphery.[110] Morys himself acknowledges that Greece performed by far the best of all European countries in

[106] Using ECE's weighted average GDP per capita with data from MPD version 2023

[107] Morys, ''Economic growth'', 161–162.

[108] See W. Brus, ''Postwar Reconstruction and Socio-Economic Transformation'', ed. M. C. Kaser and E. A. Radice, vol. 2, The Economic History of Eastern Europe 1919–1975 (Oxford: Clarendon Press, 1986), 566 and Berend and Ránki, *Economic development*, 318.

[109] Morys, ''Economic growth'', 170–171.

[110] Vonyó and Markevich, ''Economic growth and structural''.

1913–1938, which naturally removes it from the pool of countries that might have felt compelled to adopt a more radical shift to state socialism due to poor interwar growth records.

Moreover, Poland and Romania together accounted for a substantial 46% of the population of CSEE (excluding the USSR). When combined with the missing Baltic states, the omitted parts of the region represent roughly 50% of its interwar population. Without these missing pieces, any verdict on the pre–Second World War performance of East-Central Europe cannot be considered definitive.[111]

This thesis prefers to use both Western core and East-Central Europe country compositions suggested by Vonyó, albeit excluding the USSR and East Germany from ECE (see the List of Abbreviations at the beginning of this thesis). This composition implies there was a decline, even if a very slight one, in East-Central Europe relative to the Western core during the interwar. Considering all alternative regional sets of countries, a picture of relative stagnation emerges, rather than a 'fiasco' suggested by Berend.[112]

While few growth-accounting studies of the interwar peripheries exist, economic historians have provided qualitative explanations for Eastern Europe's persistent backwardness before the Second World War. In the 16th–18th centuries, the Protestant Reformation and the Enlightenment failed to take root in the region, impeding the erosion of traditionalist mindsets and the emergence of scientific innovation.[113] At a time when Western Europe was expanding its markets through increasing trade, serfdom re-emerged in Eastern Europe, reinforcing archaic social structures, hindering growth, and fostering exploitative trade relationships with the West. Inefficient institutions further undermined domestic market development, curtailed the effective division of labour, and inhibited both growth and structural transformation away from agrarian dominance.[114]

These deficient 'social capabilities' persisted into the First World War, which inflicted widespread devastation on Eastern Europe and fractured the

[111]Interestingly, both Berend (2020) and Morys (2021) used identical data, merely selecting different reference years and sets of countries to define their respective 'East-Central Europe'. Reproduction of weighted averages of GDP per capita in these regions using the latest MPD version 2023 data reveals that in both cases convergence record in Eastern Europe was either stagnation or slight progress. It appears that Berend either made serious mistakes in calculating his ratios or his use of outdated figures from Maddison's 1995 work is responsible for these discrepancies. See Berend, *Economic history of a divided Europe*: 206

[112]Berend, *Economic history of a divided Europe*: 183

[113]T. I. Berend, *Economic history of a divided Europe*, 42.

[114]Broadberry and Malinowski, ''Living standards'', 33.

economic networks that had developed by 1913. The following two decades were characterised by heightened protectionism, unfavourable international capital flows, and the ravages of the Great Depression. Price volatility and the withdrawal of foreign investment were particularly harmful for agricultural peripheries, while restrictive monetary policies exacerbated capital shortages.[115]

Historical and institutional legacies also contributed to a substantial human-capital gap with the West, reflected in low educational attainment and high illiteracy rates.[116] Despite some advances, Eastern Europe's average educational level remained only 55% of that in Western Europe by the late 1930s, underscoring a persistent human-capital deficit.[117] Consequently, these deficiencies in 'social capability'—combined with an unfavourable external environment, institutional weaknesses, and cultural constraints—impeded technology transfer and adoption, stalling structural and technological modernisation in pre–Second World War Eastern Europe.[118] Catch-up potential in the region before 1940 was therefore low, and it clearly remained unrealised.

[115]T. Dennison and A. Klein, ''The Socialist Experiment and Beyond: The Economic Development of Eastern Europe'', ed. S. Broadberry and K. Fukao, The Cambridge Economic History of the Modern World (Cambridge: Pearson Education, 2021), 83–86; J. Eloranta et al., ''Between disintegration and convergence, 1918-1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 231

[116]Berend, *Economic history of a divided Europe*: 87; Morys and Ivanov, ''Population and living'', 265; M. Kopsidis and M. Schulze, ''Economic growth and sectoral developments, 1800–1914'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 58

[117]B. van Leeuwen and P. Foldvari, ''Population, living standards and well-being, 1949-1989'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 366.

[118]Morys, *The economic history*: 8; Broadberry and Malinowski, ''Living standards'', 14; Dennison and Klein, ''The Socialist'', 97; Berend, *Economic history of a divided Europe*: 91

Catching up or falling behind? Post-war Eastern Europe

After decades of stagnation, the communist takeover in Eastern Europe offered a vision of rapid modernisation and economic advancement, with the promise not only to catch up with but even to surpass Western living standards.[119] However, the available national accounts for communist East-Central Europe and the USSR as a whole leave little doubt that socialist convergence remained elusive. Modern scholarship—greatly expanded since the 1970s—has therefore focused on explaining why socialist economies failed and identifying when that failure became evident.

Since its first application in the early 20th century, the state socialist model emerged as an alternative for extremely backward countries. First demonstrated—brutally yet effectively—in the USSR during the 1920s and 1930s, the model proved most effective for countries with a distinctly agrarian character.[120] The command system enabled agricultural economies to industrialise much more rapidly by using forced collectivisation as a driver of urbanisation, thereby shifting labour from unproductive agriculture to more productive industry.[121] Indeed, Bulgaria and Yugoslavia, which had the lowest shares of industrial employment in the 1930s, industrialised rapidly and became top performers within the Soviet bloc during the three post-war decades.[122]

In the early 1970s, however, economic growth began to stall in both the West and the socialist East. The new technological revolution, characterised by flexible production systems in Japan and West Germany, was eventually adopted by most Western capitalist countries, leading to renewed growth. Command economies, in contrast, entrenched in mass production technology, were unable to keep pace and increasingly fell behind.[123] GDP per capita growth in East-Central Europe was already slightly slower than in the West during the 1970s. The situation deteriorated further in the 1980s, with the average growth rate in ECE dropping to less than half that of Western core countries.[124] By 1989 ECE's GDP per capita had fallen to just 35% of the

[119] Leeuwen and Foldvari, ''Population, living standards'', 352.

[120] T. I. Berend, *Economic history of a divided Europe*, 187.

[121] S. Houpt et al., ''Sectoral developments, 1945-2000'', ed. S. Broadberry and K. H. O'Rourke, vol. 2, The Cambridge Economic History of Modern Europe: 1870 to the Present (Cambridge: Cambridge University Press, 2010), 344.

[122] Palgrave Macmillan Ltd, *International Historical Statistics*; I. T. Berend, *Central and Eastern Europe*, 191; Vonyó and Markevich, ''Economic growth and structural'', 281–283

[123] Broadberry and Klein, ''When and why'', 44–45.

[124] Vonyó and Markevich, ''Economic growth and structural'', 282.

Western core's level. This represented a decline from 37% in 1938 and 38% in 1950.[125]

Why did Eastern European economies again fail to exploit their catch-up opportunities, this time under socialism? Balassa and Bertrand were the first to show that rapid growth in Eastern Europe, driven by exceptional capital deepening and labour mobilisation, masked weak TFP performance.[126] Bergson's analysis of the 1975 ICP-benchmarks confirms that labour productivity was already falling short of Western European economies by that year.[127] Brada's frontier estimates for four CMEA economies[128] and Ofer's synthesis for the USSR[129] demonstrated that the post-1973 slowdown reflected falling technical efficiency and diminishing returns, a conclusion reinforced by van Ark's reassessment of Czechoslovakia and East Germany[130] and Sleifer's long-run series for the GDR.[131]

In their summary of existing explanations of socialist relative decline, Vonyó and Klein state that most of these studies blame inefficient Soviet-type institutions which made the switch to technological progress and productivity driven growth impossible.[132] Among these institutions are artificial pricing, which precluded rational economic analysis in decision-making by planners; lack of business incentives for innovation; a tendency towards wasteful and inefficient practices; and insufficient flexibility required to adapt to the demands of the new technological revolution.[133]

A new perspective was offered in 2003 by Robert Allen's revisionist *Farm to Factory*. He argued that central planning was optimal for a capital-scarce agrarian economy and that the subsequent slowdown was due to policy mak-

[125]Weighted averages, calculated using data from MPD version 2023.

[126]B. Balassa and T. J. Bertrand, ''Growth Performance of Eastern European Economies and Comparable Western European Countries'', *The American economic review* (Nashville) 60, no. 2 (1970): 318–320.

[127]A. Bergson, ''Comparative productivity: The USSR, Eastern Europe, and the West'', *The American economic review* (Menasha) 77, no. 3 (1987): 348–349.

[128]J. C. Brada, ''Technological Progress and Factor Utilization in Eastern European Economic Growth'', *Economica* (London) 56, no. 224 (1989): 433–436, 441–443.

[129]G. Ofer, ''Soviet Economic Growth: 1928-1985'', *Journal of economic literature* (Nashville) 25, no. 4 (1987): 1817–1820.

[130]B. van Ark, ''Convergence and divergence in the European periphery: productivity in Eastern and Southern Europe in retrospect'', ed. B. van Ark and N. Crafts, Quantitative Aspects of Post-War European Economic Growth (1997), 312–321.

[131]J. Sleifer, *Planning Ahead and Falling Behind: The East German Economy in Comparison with West Germany 1936-2002* (Berlin: Akademie Verlag, 2014), 150–152.

[132]Vonyó and Klein, ''Why did socialist'', 24–26.

[133]Kukić, ''The nature'', 3; Klimantas and Zirgulis, ''A new estimate'', 230–231; Houpt et al., ''Sectoral developments'', 345.

ing errors rather than systemic flaws.[134] Yet his reliance on official investment series sits uneasily with the pre-existing literature that had already flagged plan-price distortions in both output and capital stock.[135]

The most recent works by Vonyó, Broadberry, Klein, and Markevich have made important strides toward a consensus on the timing and nature of socialist decline. In 2011, examining Czechoslovakia, Broadberry and Klein demonstrated that the years prior to 1970 were marked by impressive catch-up growth.[136] This partial success occurred in a phase when post-war expansion required little diversification in manufacturing, and mass production technology—under the command economy—could still deliver positive outcomes.[137] A similar pre-1970 catch-up dynamic is evident in Lithuania as well, albeit when using Maddison's Soviet-period data, which contain known flaws.[138]

This insight was broadened to the entire East-Central European region by Vonyó (2017) and Vonyó and Markevich (2021), who equate the 1950s and 1960s in socialist Europe to Western Europe's own 'golden age' of economic growth. They demonstrated that, during these two decades, East-Central Europe was able to exceed the annual growth rates of the Western core nations.[139]

However, with the advent of the new information and communications technology (ICT) revolution, and the shift from mass production to flexible production practices in the 1970s, socialist Europe's productivity began to fall drastically behind that of Western economies.[140] As Crafts and Toniolo note, by 1970 R&D expenditure in the USSR remained substantial, yet very few of the resulting innovations were implemented at the firm level—largely due to pervasive incentive structures within the system.[141] These deficiencies in 'social capability' to absorb new technologies were likely common across centrally planned economies, which were further constrained by the Coordinating Committee for Multilateral Export Controls (CoCom) ban on importing the latest technologies.[142]

[134] Allen, *Farm to factory*, 211.
[135] For example, Ofer, ''Soviet''; Ark, ''Convergence and divergence''.
[136] Broadberry and Klein, ''When and why'', 44–45.
[137] Broadberry and Klein, 44–45.
[138] Klimantas and Zirgulis, ''A new estimate'', 254.
[139] Vonyó, "War and socialism"; Vonyó and Markevich, ''Economic growth and structural'', 281–282
[140] Broadberry and Klein, ''When and why''.
[141] Crafts and Toniolo, "Aggregate growth": 315
[142] Broadberry and Klein, ''When and why'', 49; I. T. Berend, *From the Soviet Bloc*, 29

Productivity decline was compounded by a shortage of inputs. New archival investment series for Czechoslovakia, Hungary, and Poland, compiled by Vonyó and Klein, reveal that post-1970 capital accumulation was far lower than official statistics suggested. Once corrected, these figures indicate that vanishing factor inputs account for roughly half of the 1980s growth slowdown.[143] Total factor productivity (TFP) never turned sharply negative; rather, both productivity and capital accumulation drifted downward in tandem. This evidence suggests that the failure of socialist economies was not solely the result of central planning's inefficiencies in adopting innovation-driven growth strategies. It also stemmed from their inability to sustain high levels of capital formation.

The prevailing modern consensus is therefore that, until the 1970s, communist countries in Europe—driven by 'extensive growth'—expanded at rates comparable to, or even exceeding, those of mature Western economies. However, growth subsequently slowed due to the combined effects of declining productivity and reduced capital inputs. In the long run, the socialist economic model failed to bring peripheral countries meaningfully closer to Western living standards, as inefficient institutional and policy environments ultimately limited the 'social capabilities' required for sustained catch-up growth.

Nevertheless, there are proponents of a more nuanced view. Berend argues that it is 'superficial' to blame state socialist regimes for ECE's continued lag behind the West. On the contrary, he suggests that the Soviet model presented an opportunity for ECE to escape its backwardness loop, which had been programmed by centuries of pre-industrial institutional dominance.[144] This subtly echoes earlier apologetics for the socialist regimes, who contended that the command economy and central planning were the only options left for East-Central Europe to overcome its underdevelopment.[145]

Some have noted long-term positive aspects of the state socialist experience. In 2018, Piatkowski argued that Poland has, since 1989, embarked on the best possible growth trajectory precisely because communist rule had destroyed the ancient feudal system and created an egalitarian society.[146] In

[143] Vonyó and Klein, ''Why did socialist''.

[144] T. I. Berend, *Economic history of a divided Europe*, 7, 187.

[145] For earlier statements, see Berend and Ránki, *Economic development*, 318; Brus, ''Postwar Reconstruction'', 566 and Allen, *Farm to factory*, 51.

[146] M. Piatkowski, *Europe's growth champion: insights from the economic rise of Poland*, 1st edition (Oxford: Oxford University Press, 2018), 113.

this view, socialism could be regarded as a genuine transitional stage to build 'social capabilities' for later take-off, even though it failed to produce sustainable growth within the system.

Potential for catching-up in the Baltic states

As the preceding review has demonstrated, East–Central Europe encountered a combination of institutional weakness, human capital deficits, and external shocks that hindered its catch-up during both the interwar and socialist periods. Although Lithuania, Latvia, and Estonia faced many of these same challenges, their distinct social, institutional, and policy environments, shaped by historical legacies, may have given them greater potential for catch-up.

Interwar conditions

Since gaining independence in 1918, the interwar Baltic republics displayed social and institutional characteristics that diverged significantly from much of Eastern Europe.

Firstly, Latvia and Estonia, in particular, did not inherit social structures as antiquated as those in East–Central Europe. In many respects, they resembled Finland or even the Nordic countries: all three had experienced the Protestant Reformation and the abolition of serfdom between 1816 and 1819, well before Austria–Hungary, Bulgaria, Romania, or Russia.[147] Furthermore, Western legal and social institutions had prevailed in Latvia and Estonia since their period under Swedish rule in the seventeenth century.[148] Lithuania, by contrast, only saw the emancipation of serfs alongside the rest of the Russian Empire in 1861, although approximately 20% of its interwar territory had had serfdom abolished in 1807 while under Prussian control.[149]

Secondly, by the 1930s, all three Baltic states—though still economically underdeveloped—had arguably attained the 'social capabilities' required to absorb the leading technologies of the time. Among their most transformative achievements were the sweeping land reforms of the 1920s, which resulted in some of the most egalitarian societies in Europe.[150] These non-violent redistributions dismantled the power of the old landed elites and elevated the economic role of independent smallholders. In doing so, they fostered a societal value system centred on earned wealth, personal effort, and property ownership—mirroring a key element of 'social capability' identified in

[147] Corum, *The security concerns*, 129.
[148] T. I. Berend, *Economic history of a divided Europe*, 260.
[149] R. Zagreckas, *Baudžiava*, in Visuotinė lietuvių enciklopedija, 2018.
[150] Kasekamp, *A history*, 102–108.

American productivity success.[151]

Moreover, liberal constitutions, land reforms, and other policy measures of the 1920s also established secure private property rights, which remained intact until the Soviet occupation in 1940.[152] The 'social capabilities' of the Baltic nations were further enhanced by comparatively high literacy rates, particularly in Latvia and Estonia. As illustrated in Figure 2.3, the interwar Baltic states and Finland led in literacy among countries where over 60% of the workforce remained in agriculture, suggesting relatively high levels of human capital.

Thirdly, by the late 1930s, Latvia and Estonia, in particular, had achieved essential levels of 'technological congruence' that made these republics highly attractive for Soviet industrialisation investments even after the devastation of the Second World War. These included well-developed infrastructures, factories, and, most importantly, skilled workforces.[153]

Fourthly, although state intervention in the economy was substantial, the extent of protectionism remained moderate (see page 25). A 1938 report by the Royal Institute of International Affairs highlighted that Lithuania, Latvia, and Estonia were not only open to, but also heavily reliant on, trade with Western Europe.[154] This openness could have facilitated the kind of technology transfer that catch-up theories emphasise.

Finally, as Figure 2.3 further shows, the Baltics retained substantial surplus labour in agriculture during the 1930s, creating potential for structural transformation, which was actively promoted by the governments through support for industrial development during this period (see page 25).

However, these promising conditions were potentially offset by several limiting factors. As discussed on pages 68–73, successful post-war catch-up depended not only on 'social capabilities', 'technological congruence', openness to trade, and investment-promoting policies, but also on favourable external conditions, political stability, and the presence of relevant industries exposed to competitive pressures. The interwar period, however, was gen-

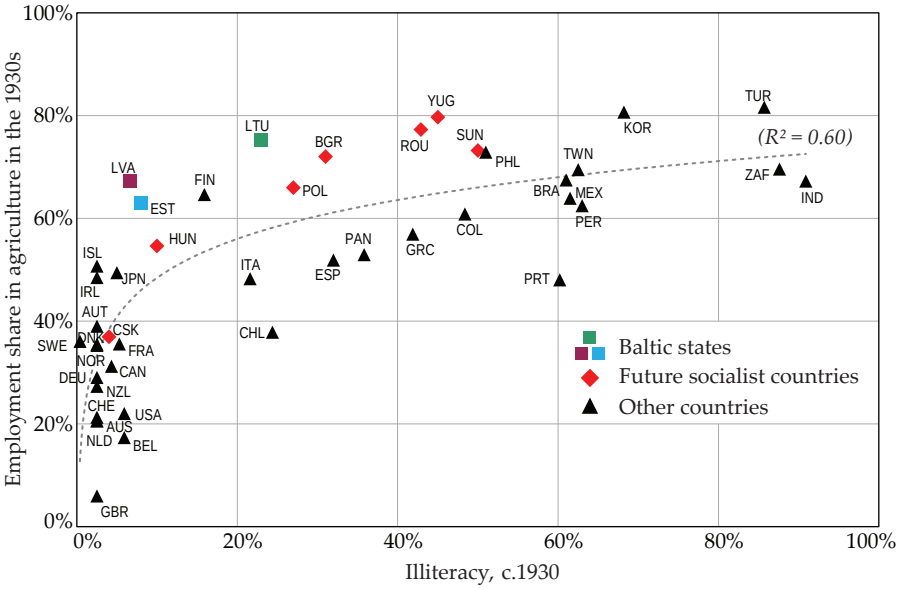
[151] Abramovitz and David, ''Convergence'', 52–53.

[152] Aldcroft, *Europe's third world*, 98; M. Maksimaitis, ''Lithuania's constitutions adopted in 1918-1940'', ed. D. Žalimas, Lithuanian constitutionalism: the past and the present (Vilnius: Constitutional Court of the Republic of Lithuania, 2017), 86; M. Luts-Sootak et al., ''Equal (Re-)Distribution of Land as Promotor of Social Justice and Political Loyalty in the Republic of Estonia After WW I'', *Právněhistorické studie* 55, no. 1 (2025): 87; J. Pleps, ''Fundamental Rights and Latvian Constitution (1918–1934)'', *Miscellanea historico-iuridica* 8, no. 2 (2009): 17; Anušauskas, *Lietuva 1940-1990*, 275

[153] Misiunas and Taagepera, *The Baltic states*, 108.

[154] Royal Institute of International Affairs Information Department, *The Baltic states*, 189.

Figure 2.3: ILLITERACY AND EMPLOYMENT IN AGRICULTURE IN THE 1930S



The graph displays all countries in the world for which 1930s sectoral employment data was available. *Sources for literacy data:* J. Cronin, *Literacy rates*, 5/7/13, 2013; D. Kirk, *Europe's population in the interwar years* (Geneva: League of Nations, 1946), 246–277; M. Krikščiūnas, ''Raštingumas'', vol. XXIV, Lietuvių enciklopedija (Boston: Lietuvių enciklopedijos leidykla, 1961), 528. In cases where circa 1930 data was unavailable, middle point between surrounding years was estimated or data was extrapolated from nearest available data point using other country figures to account for the change; *Sources for employment data:* M. Morys, ''Economic growth and structural change in Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 181; Palgrave Macmillan Ltd, *International Historical Statistics*, 1st ed. 2013. (London: Palgrave Macmillan UK, 2013); *Statistikos biuletenis 1939 no. 3 (185)*, Kaunas, 1939, 91; *Ostland in Zahlen* (Riga: Reichskommissar für das Ostland, 1942), 2; G. Jonsson, *The state and the Icelandic economy, 1870-1930*, 1992, 24 and W. W. Eason, ''Labor Force Materials for the Study of Unemployment in the Soviet Union'', The Measurement and Behavior of Unemployment (Princeton: National Bureau Committee for Economic Research, 1957), 395, 409, 418. Employment share in agriculture represents each country's data point closest to 1935, which in most cases was between 1930 and 1940. Exceptions are Lithuania (average between 1923/5 and 1939) Greece (1928), Former Soviet Union (average between 1926 and 1938) and South Africa (1921). Dashed regression line is fitted against all countries shown.

erally marked by increasing protectionism, fragmented policymaking, and political instability, which affected the Baltic republics considerably.[155]

However, these promising conditions were potentially offset by several limiting factors. As discussed on pages 68–73, successful post-WWII catch-up

[155]Roses and Wolf, ''Aggregate growth'', 182–183.

depended not only on 'social capabilities', 'technological congruence', openness to trade and investment-promoting policies, but also on favourable external conditions, political stability, and the presence of relevant industries exposed to competitive pressures. The interwar period, however, was generally marked by increasing protectionism, fragmented policymaking, and political instability, which affected the Baltic republics considerably.[156]

Lithuania experienced a coup d'état in 1926, while authoritarian regimes also took hold in Latvia and Estonia in the 1930s after years of democratic instability. Meanwhile, infant industry protection policies introduced from the late 1920s limited exposure to international competition.[157] Additionally, the slow pace of labour reallocation from agriculture to industry (see Figure 2.4) likely curbed catch-up potential.

Many growth constraints that beset interwar East–Central Europe during this period (page 76) were also evident in the Baltic context. These included wartime destruction, the collapse of economic ties with the Russian market, an overconcentration of productivity gains in agriculture, narrow domestic markets, and limited access to capital. Indeed, these challenges may have affected the small Baltic republics even more severely. Although they arguably possessed stronger preconditions for convergence than other Eastern European countries, as noted by Aldcroft,[158] the interwar environment may have fallen short of enabling a full take-off. Such a transformation would only become feasible under the post-war Western European institutional and geopolitical framework.

An important insight emerging from the above analysis is the close resemblance between pre-1940 Latvia, Estonia, and Finland. Finland has often served as a counterfactual case for the Baltics—an example of the development trajectory that might have occurred had there been no Soviet annexation.[159] Accordingly, Finland will be often included as a comparator in Chapter 4.

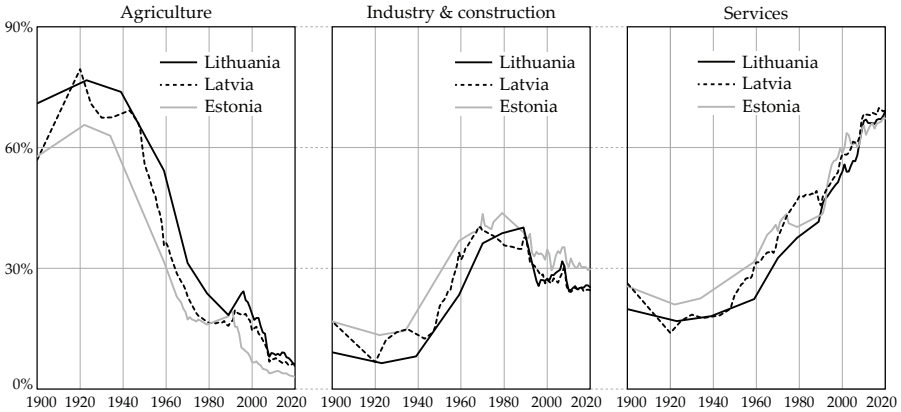
[156] Roses and Wolf, ''Aggregate growth'', 182–183.

[157] Köll, ''Reinterpretation'', 4; T. I. Berend, *An economic history of twentieth-century*, 31.

[158] Aldcroft, *Europe's third world*, 105, 171; Aldcroft and Morewood, *The European economy*, 120.

[159] E.g. J. Kalniņš and G. Piņķe, ''Determining the damage of occupation: hypothetical evaluation of the development path of Latvia, had it not been occupied'', ed. A. Abene et al., Damage caused by the Soviet Union in the Baltic States: international conference materials (Riga: E-forma, June 2011), 59–64; K. Kukk, ''Economic damage caused by soviet occupation to the national economy of Estonia'', ed. A. Abene et al., Damage caused by the Soviet Union in the Baltic States: international conference materials (Riga: E-forma, June 2011), 31–35.

Figure 2.4: EMPLOYMENT SHARES IN THE BALTIC REPUBLICS



Sources: Vidzemes Augstskola, *Baltic 100 Data Catalog*, 2024; The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024; M. Skujenieks, *Latvija 1918.-1928. gados* (Riga: Valsts statistiskās pārvalde, 1928), 10; *Statistikos biuletenis 1939 no. 3 (185)*, Kaunas, 1939, 91; *Итоги всесоюзной переписи населения Литовской ССР 1979 г. II том, часть I* (Vilnius: CSV, 1980), 94, 106; *Lietuvos TSR liaudies ūkis per 40 metų* (Vilnius: CSV, 1980), 158; H. A. Тройницкаго, ed., *Первая Всеобщая Перепись Населения Российской Империи, 1897 г.* (Saint Petersburg: Центральнаго Статистическаго Комитета Министерства Внутренних Делъ, 1899-1905); *Die berufliche und soziale Gliederung des deutschen Volkes: nach der Berufszählung vom 14. Juni 1895* (Berlin: Puttkammer & Mühlbrecht, 1899), 342; *Gemeindelexikon für das Königreich Preußen: auf Grund der Materialien der Volkszählung vom 2. Dezember 1895 und anderer amtlicher Quellen* (Berlin: Verlag des Königlichen Statistischen Bureaus, 1898), 392–396. 1900 figures are based on Russian 1897 and German 1895 censuses and represent rough approximations due to inconsistent borders.

Conditions under socialism

State socialism in the Baltic states collapsed alongside the Soviet Union, yet indications suggest that the catch-up potential of occupied Lithuania, Latvia, and Estonia may have exceeded that of most self-governing countries within the Soviet sphere.

Firstly, the 'social capabilities' and 'technological congruence' developed during the interwar years—such as educated populations, skilled workforces, and relatively advanced infrastructure and factories (particularly in Estonia and Latvia)—remained largely intact after the war. These factors reportedly made the Baltic Soviet Socialist Republics attractive destinations for central investment from Moscow, with disproportionately high capital inflows recorded.[160] As late as the stagnation of the 1980s, large-scale investment projects funded from the central budget, such as Lithuania's oil refinery

[160]Kahk and Tarvel, *An economic*, 123; Misiunas and Taagepera, *The Baltic states*, 108–109, 112, 184.

(1980) and what became Europe's largest nuclear power station (1984), suggested active efforts by Moscow to stimulate renewed growth.[161]

These investments may have found particularly fertile ground in the occupied Baltic republics due to their low initial capital intensity. In general, marginal returns to capital were higher in post-war Eastern European economies, which were relatively capital-poor.[162] For instance, by the late 1930s, levels of agricultural mechanisation in Britain, and even in the USSR, far exceeded those of the predominantly agrarian Baltics, indicating severe capital scarcity in a critical sector (see Figure 2.5). The destruction of equipment during the war likely further reduced the capital-to-labour ratio, and, when combined with relatively high human capital and labour migration from other parts of the USSR, the region may have mirrored the post-war, reconstruction-fuelled growth observed in Western Europe by Vonyó (2008).[163]

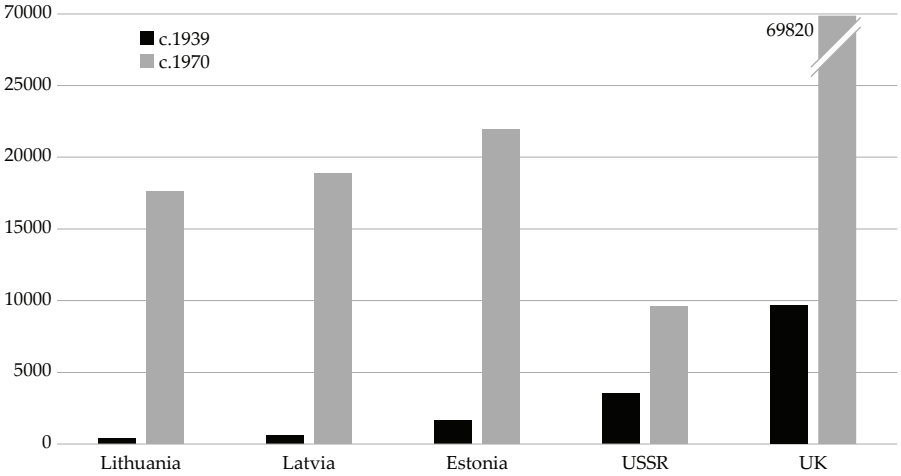
Secondly, integration into the Soviet economic system introduced extensive regional specialisation (page 35), potentially enabling scale economies that had been constrained during the trade contractions of the interwar era.

Thirdly, the Soviet strategy of collectivisation and rapid industrialisation was enforced with particular vigour in the Baltic republics. Urbanisation surged by over ten percentage points within three to six years following 1948, rapidly reallocating labour from agriculture to industry (see Table F.2 in Appendix F and Figure 2.4). Given the earlier success of similar Soviet campaigns in the 1930s,[164] a comparable growth outcome might have been expected in the Baltics. Figure 2.4 shows that Lithuania's agricultural labour pool remained substantial even into the late 1980s, suggesting plentiful remaining inputs for socialist 'extensive growth'. In this context, the findings of Vonyó and Klein (2019)[165] are particularly relevant: in settings with abundant labour inputs and preferential investment from Moscow, socialist growth could have substantially raised output—potentially benefitting Lithuania in particular.

However, the structural problems that eventually afflicted all of socialist Europe also constrained the Baltic Soviet republics. The mass-production model, which had powered earlier growth, remained dominant in Estonia,

[161] Orlen Lietuva, *Fakelas* (Mažeikiai), April 2010, 14–21; Misiunas and Taagepera, *The Baltic states*, 290.
[162] Bergson, ''Comparative productivity'', 343, 352.
[163] Vonyó, ''Post-war reconstruction'', 223, 239.
[164] Allen, *Farm to factory*, 99, 190, 211.
[165] Vonyó and Klein, ''Why did socialist''.

Figure 2.5: NUMBER OF TRACTORS PER MILLION HECTARES



Sources: K. Giedra, *Traktorius*, in Visuotinė lietuvių enciklopedija, September 2018; V. P. Karnups, ''Kārļa Ulmaņa autoritārā režīma valdīšanas laiks (1934–1940)'', ed. G. Krūmiņš, Latvijas tautsaimniecības vēsture (Riga: Jumava, 2017), 137; F. Klupšas, ''Lietuvos žemės ūkis'', vol. XII, Visuotinė lietuvių enciklopedija (Vilnius: Mokslo ir enciklopedijų leidybos centras, 2008); *Lauksaimniecības skaitīšana Latvijā 1929* (Riga: Valsts statistiskā pārvalde, 1930), 16; Государственный комитет по статистике, *Народное хозяйство СССР 1922-1972 гг.* (Moscow: Финансы и статистика, 1973), 235–239, 597–598, 621–622; Центральное статистическое управление при Совете Министров СССР, *Сельское хозяйство СССР* (Moscow: Госстатиздат ЦСУ СССР, 1960), 128; *Ostland in Zahlen* (Riga: Reichskommissar für das Ostland, 1942), 22, 32, 86, 93, 121; B. Bell, *Seventy Years of Farm Tractors 1930-2000* (London: Old Pond Books, 2020); *Agriculture: historical statistics* (London: House of Commons Library, 2015), 14; United Nations, *1970 World Census of Agriculture: Analysis and International Comparison of the Results* (Food / Agriculture Organization of the United Nations, 1981), 73–75, 243–244; A. Wailes-Fairburn, ''How did Britain tackle the food shortages in World War II and what changes had to be made to agriculture?'', Accessed: 2025-07-29, n.d.

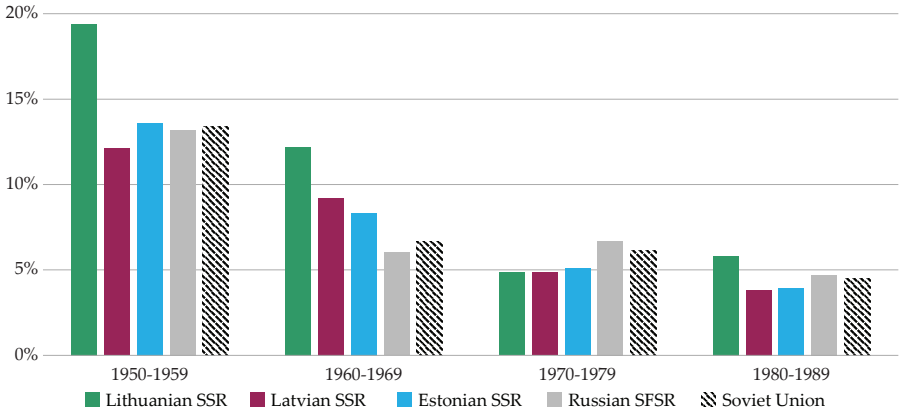
Latvia, and Lithuania after the 1970s, despite their industries being more diversified than those in many other Soviet republics.[166] As elsewhere in the Eastern Bloc, growth faltered under the weight of declining technical efficiency, inflexible and inefficient institutions (discussed on page 79), and the failure to transition towards more adaptable, post-mass production modes of industrial organisation.

Moreover, the narrative of preferential Soviet investment in the Baltics has recently been challenged. Krūminš (2018) argues that Latvia was a net contributor to the USSR, rather than a recipient of fiscal transfers.[167] A comparable study for Lithuania by Komičienė (2021) supports this notion, although

[166]CIA, *Economic Development*, 4.
[167]Krūmiņš, ''Soviet Economic''.

a similar analysis for Estonia remains lacking.[168] Figure 2.6, based on Soviet official (and likely inflated) data at 'comparable prices', suggests that investment in Lithuania accelerated faster than elsewhere—except during 1970–1979, when Soviet resources were directed primarily towards resource-rich Russian regions.[169] Conversely, Latvia and Estonia appear to have lost their relative advantage during this period, with investment rates slowing further in the 1980s and falling below the Soviet average. Nonetheless, these Soviet official measures should be treated with considerable caution, even when used solely for constructing ratios.

Figure 2.6: SOVIET OFFICIAL MEASURES OF AVERAGE ANNUAL GROWTH OF CAPITAL INVESTED



Sources: Народное хозяйство СССР year 1959-1990 issues, pages on capital construction; *Tarybų Lietuvos dvidešimtmetis: statistinių duomenų rinkinys* (Vilnius: Valstybinė statistikos leidykla, 1960), 227; *Padomju Latvijas tautas saimniecība 20 gados* (Riga: Valsts statistikas izdevniecības Latvijas nodaļa, 1960), 177; *Eesti NSV rahvamajandus* (Tallinn: Eesti NSV SKV, 1957), 153

Another major constraint was technological isolation. Like the rest of the Communist bloc, the Baltic SSRs were largely cut off from Western technology and innovation.[170] As manufacturing matured and returns on physical capital declined, the inability to import transformative information and communication technologies prevented further productivity gains.

Finally, while Western Europe benefited from genuine political and social harmony following the Second World War—key conditions for successful long-run convergence—such cohesion was superficial in the totalitarian

[168]See Komičienė, ''SSRS finansų''.
[169]CIA, *Economic Development*, 2.
[170]Broadberry and Klein, ''When and why'', 49; I. T. Berend, *From the Soviet Bloc*, 29

USSR. Beneath the imposed stability lay deep popular discontent within the Baltic republics, which ultimately contributed to the Soviet Union's disintegration (see pages 36, 72). Reportedly low income inequality figures in the USSR have also been challenged for understating the true levels, due to the exclusion of illegal income from the second economy.[171]

In sum, while the post-war growth conditions in the Baltic republics were arguably more favourable than in much of East–Central Europe, the long-term prospects for convergence under socialism likely remained similarly constrained.

Growth accounting has become a widely adopted method for examining the drivers of socialist performance, with the possibility of conducting such analysis greatly enhancing research into the sources of growth. A major contribution in this area comes from Vonyó and Klein (2019), who constructed investment series corrected for distortions caused by socialist price systems and hidden inflation for several economies in East–Central Europe.[172] However, the creation of similarly robust investment data for the occupied Baltic republics remains a task for future research and lies beyond the scope of this thesis.

Modern conditions

Since 1995, the modern independent Baltic republics have experienced substantial convergence towards Western European income levels. This trajectory, however, followed a sharp post-socialist contraction, widely regarded as more severe in Lithuania and Latvia than in most other parts of Eastern Europe.[173] Due to the unreliability of national income data from the 1980s and early 1990s (see page 57), the full scope of this transformational crisis has so far been difficult to quantify, limiting the ability to assess precisely the modern catch-up performance of the Baltics. While a more robust pre-transition GDP per capita series will be introduced in the following chapter, preliminary insights can be drawn from the 1990 and 2023 data points summarised in Table 2.3.

[171] M. V. Alexeev and C. G. Gaddy, ''Income distribution in the U.S.S.R. in the 1980s'', *The Review of income and wealth* (Oxford) 39, no. 1 (1993): 32–33.

[172] Vonyó and Klein, ''Why did socialist''.

[173] A. Åslund, *How capitalism was built: the transformation of Central and Eastern Europe, Russia, the Caucasus, and Central Asia*, 2nd ed. (Cambridge: Cambridge University Press, 2013), 68; Korhonen, ''Progress'', 453

Table 2.3: GDP AND GDP PER CAPITA, % OF WESTERN CORE AND NORDIC LEVELS
PPP in current international dollars

	Lithuania		Latvia		Estonia	
	1990	2023	1990	2023	1990	2023
GDP/cap. % of Western Core	42%	**77%**	45%	**63%**	48%	**73%**
GDP % of Western Core	0.7%	**0.8%**	0.5%	0.4%	0.3%	0.3%
GDP/cap. % of Nordic countries	42%	**67%**	45%	**55%**	47%	**63%**
GDP % of Nordic countries	6.7%	**6.9%**	5.1%	3.7%	3.2%	3.1%

Sources: Western core and Nordic 1990 figures aggregated from MPD version 2023 converted back to 1990 dollars using a standard 1.594 conversion ratio (see page 12 in the MPD version 2023 paper), Baltic data from B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 184–186; 2023 data from The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024. Regional figures are population-weighted averages. Nordic average includes Denmark, Finland, Iceland, Norway and Sweden. Figures in bold represent catch-up progress.

This comparison reveals a narrowing of the income gap between the Baltic states and Western Europe by 18 to 35 percentage points over the three-decade period, and by 10 to 25 percentage points relative to the Nordic countries. These figures indicate a meaningful catch-up record. The Baltic transition and post-transition growth story has been well documented, with ample data available from the mid-1990s onwards. Nonetheless, given that this thesis provides revised GDP estimates covering the early 1990s, a review of the prevailing interpretations of the Baltics' convergence performance since independence is warranted.

Despite the immense challenges posed by transition (see page 38), the political leadership in all three Baltic countries—backed by a broad societal consensus—was resolute in pursuing reforms aimed at dismantling Soviet-era structures and consolidating national sovereignty.[174] Geographical proximity to Western Europe and the tangible prospect of European Union accession played key roles, incentivising rapid liberalisation and attracting foreign direct investment.[175] The region's high-quality yet comparatively low-cost labour force further enhanced its appeal to foreign investors.[176]

Moreover, following the dissolution of the USSR, the Baltics began their

[174]S. Avlijaš, ''Beyond Neoliberalism? Revisiting the Welfare State in the Baltic States'', *Europe-Asia studies* (Abingdon) 72, no. 4 (2020): 6; Korhonen, ''Progress'', 458, 461

[175]Reardon, ''An Assessment'', 631; Avlijaš, ''Beyond Neoliberalism?'', 2; Korhonen, ''Progress'', 440, 454

[176]P. Hanson, ''The Baltic states'', ed. P. Artisien-Maksimenko and Y. Adjubei, Foreign investment in Russia and other Soviet successor states (Basingstoke: Macmillan, 1996), 246

transition with comparatively favourable fiscal conditions, aided by early reform efforts and the Russian Federation's assumption of Soviet debt obligations.[177] Additionally, the adoption of a liberal, low-cost welfare model facilitated flexibility in labour and product markets.[178]

Strategic investments in education, early adoption of information and communication technologies, and an emphasis on developing a knowledge-based economy—particularly in Estonia—have enabled a gradual shift towards higher value-added production.[179]

In broad terms, the post-socialist Baltic states succeeded in establishing these conditions, enabling them to harness the advantages of economic backwardness. However, the liberal reform path came at a substantial social cost. Income inequality and poverty rates during the transition exceeded those in much of East–Central Europe.[180] While poverty rates have since declined—with all three countries now slightly above the EU median—income inequality remains among the highest in the Union.[181] The high price paid by the Baltic populace did not stall pro-market and West-oriented reform, the persistence of which will be highlighted in the Implications chapter as the crucial factor making the Baltic states more successful than other former republics of the USSR.

Crucially, inequality and the prevalence of poverty contributed to a major limiting factor in the post-transition growth narrative: emigration. As shown in Table 2.3, a notable share of per capita income convergence is attributable to population decline. While Lithuania recorded growth in total GDP relative to the West and Nordics, both Latvia and Estonia experienced a relative contraction in total output compared with 1990 levels. Hence, while modern growth may resemble a 'golden Age', this prosperity has largely been confined to those who remained after the substantial outflows of the 1990s and 2000s.

Ultimately, it is only in the post-1990 period that sufficient quantitative evidence exists to analyse Baltic convergence empirically. Earlier hypotheses about the region's growth potential—whether optimistic or pessim-

[177] T. O. Saavalainen, ''Stabilization in the Baltic Countries: Early Experience'', ed. B. Banerjee, Road maps of the transition: the Baltics, the Czech Republic, Hungary, and Russia (Washington D.C.: International Monetary Fund, 1995), 5; I. T. Berend, *From the Soviet Bloc*, 52

[178] Åslund, *How capitalism*, 232.

[179] Avlijaš, ''Beyond Neoliberalism?'', 1–6, 26

[180] Avlijaš, 6; Korhonen, ''Progress'', 453

[181] The World Bank, *Poverty and Inequality Platform*, processed by Our World in Data, 2024; *Eurostat Database*

istic—could not be tested due to inadequate data. With the introduction of new GDP estimates in the following chapters, it will finally become possible to assess the convergence performance of Lithuania, Latvia, and Estonia from 1913 onwards in a robust, data-driven manner.

3

ESTIMATING GDP PER CAPITA OF THE BALTIC STATES

> *I don't understand... In Lithuania, the amount of industrial production made in a single day equals what used to be produced in an entire year before 1940. The fields are more fertile, and the livestock is of better breed... One would think we should have an abundance of everything, yet sometimes we cannot even purchase essential items. How can this be? Are our statistics truly accurate and reliable?*
>
> —A reader's question to P. Judickas, Chief of Lithuanian SSR's planning department, 1989[1]

As evidenced by the literature review and underscored by the previous quote, few reliable 20th-century economic growth aggregates are available in the Baltic states. As a result, national income estimates for Lithuania, Latvia and Estonia throughout the interwar and Soviet occupation periods need to

[1] Judickas, ''Tikroji statistika''.

be constructed from scratch using meticulously collected data as well as consistent methodology. Gross domestic product, the most commonly used indicator of aggregate output, is thus the primary target of this thesis.[2] The study aims to produce continuous and reliable series of GDP and GDP per capita for Lithuania, Latvia and Estonia from 1919 to 2024. These newly produced figures can then be integrated with existing data from 1913 and post-1990, resulting in seamless GDP per capita time series for the Baltic states spanning from 1913/1919 to 2024.

This chapter is structured as follows: The first section reviews the three methodologies used for estimating gross domestic product and discusses the selection of output approach in this thesis. The second section delineates the estimation procedures for calculating Baltic sectoral value-added series, covering both the interwar and occupation periods. The third section presents the final GDP per capita series, accompanied by cross-checks. The chapter concludes with an evaluation of the estimates' robustness and an examination of their limitations.

It is important to note that although this thesis estimates and reports GDP and other data within *actual* borders, the figures qualify as representative of *constant* border estimates according to MPD criteria too. Maddison Project Database assumes that per capita incomes remain unaffected if population changes are less than one-third in magnitude.[3] Due to territorial changes Baltic population fluctuated by no more than 2-6% in Latvia and Estonia, and up to 23% in Lithuania between 1919 and the present day.[4]

Nonetheless, it must be acknowledged that 1923 and 1939 changes in Lithuania are associated with annexation and loss of disproportionately industrialised Klaipėda area. Although the region constituted merely 6% of Lithuania's population, it was significantly more developed, with a per capita incomes 55% higher than in the rest of the country (see Map 2).[5]

[2]Morys, ''Economic growth'', 162.

[3]J. Bolt and J. L. van Zanden, ''The Maddison Project: collaborative research on historical national accounts'', *The Economic history review* (Oxford) 67, no. 3 (2014): 629.

[4]See Map 2 and Misiunas and Taagepera, *The Baltic states*, 74; K. Meškauskas, *Lietuvos ūkis, 1940-1990* (Vilnius: Ekonomistas, 1994), 252

[5]G. Vaskela, *Tautiniai aspektai Lietuvos ūkio politikoje 1919-1940 metais* (Vilnius: Lietuvos istorijos instituto leidykla, 2014), 98.

Methodology

Three alternative methods exist for estimating a country's gross domestic product: the production-side (also known as output or supply) approach, which aggregates value-added across all economic sectors; the expenditure-side (also termed consumption or demand) approach, which sums the expenditures of all economic subjects; and the income-side approach, which aggregates the incomes of all economic subjects. Ideally, these three methods should yield identical totals.

This thesis adopts the direct *production-side* or *output* approach for several compelling reasons. Firstly, this method is most frequently employed in historical national accounting due to relative abundance of sectoral data for historical periods, the Baltics being no exceptions, and the resultant ability to provide sectoral growth breakdowns, which are instrumental in explaining economic growth.[6] Moreover, direct income or expenditure-side calculations are unfeasible given the current availability of Baltic data. The aim is to construct time series, yet income and expenditure statistics are limited to single-year approximations for the 1930s at best. This issue is not unique to the Baltics, which inherited rudimentary statistical reporting practices from the Russian Empire, but is widespread across peripheral nations, making the output approach the only viable option.[7]

Secondly, the output-side benchmark-extrapolation method emerges as the sole reliable option for accounting for growth in Soviet-type economies. Both expenditure and income approaches necessitate the use of monetary growth data, which was subject to irreconcilable price distortions, coupled with statistical manipulation and double counting.[8] Conversely, physical output indicators, such as kilograms of cheese or litres of milk produced, are considered sufficiently trustworthy and can be utilised to construct product and sector volume indices. This methodology was employed by the CIA to estimate GNP series for the USSR. Although not without criticism, these estimates are now regarded as the most reliable and continue to serve as the

[6]Broadberry and Malinowski, ''Living standards'', 22.

[7]E.g. the latest Irish interwar GDP study encountered the same issue S. Kenny, ''Irish GDP since Independence'', *The Economic history review*, 2024, 5

[8]Maddison, ''Measuring the Performance'', 307–308; Vonyó and Markevich, ''Economic growth and structural'', 279–280

foundation for Soviet GDP per capita series in the MPD version 2023 database.[9]

Thirdly, five of the six benchmark GDP figures required for extrapolating the output-side GDP time series for the Baltic states are already available and have been converted into international dollars. These include robust estimates for interwar Lithuania (1937) and Latvia (1935) and 1990 estimates for all three Baltic states which can be used to extrapolate occupation period GDP series (see Tables 2.2 and 2.1). Consequently, the output approach emerges as the preferred, if not the only feasible, method to estimate Baltic 20th century GDP series in a proven, reliable and consistent manner. Whilst there has been some debate regarding the reliability of using single-year benchmarks to cover extended time periods via sectoral extrapolations, this controversy has gradually lost traction.[10] It is worth noting that the CIA employed a single benchmark from 1982 to construct Soviet series for the 1950-1990 period.[11]

In addition to direct methods, indirect or 'short-cut' approaches are available and have been utilised across economies with more limited data availability.[12] However, this thesis, having amassed an extensive collection of primary output data—including series of over 200 individual industrial products for each of the Baltic economies—employs the direct approach to GDP estimation. The resulting 1913-1995 series will therefore be superior to any indirect estimates.

Output approach for benchmark-extrapolation

The output approach can be summarised by the following formula:

$$GDP = \sum_{i=1}^{n} GVA_{i/basic\ prices} + T_{product} - S_{product},$$

where GVA_i represents the *gross value-added* (or simply *value-added*) at ba-

[9] Vonyó and Markevich, ''Economic growth and structural'', 279–280; MPD version 2023

[10] See S. N. Broadberry and C. Burhop, ''Comparative Productivity in British and German Manufacturing Before World War II: Reconciling Direct Benchmark Estimates and Time Series Projections'', *The Journal of Economic History* 67, no. 2 (2007): 315–349; S. N. Broadberry and C. Burhop, ''Resolving the Anglo-German Industrial Productivity Puzzle, 1895–1935: A Response to Professor Ritschl'', *Journal of Economic History* 68, no. 3 (2008): 930–934; S. N. Broadberry and C. Burhop, ''Real Wages and Labour Productivity in Britain and Germany, 1871-1938: A Unified Approach to the International Comparison of Living Standards'', *SSRN Electronic Journal*, 2009,

[11] Maddison, ''Measuring the Performance'', 312.

[12] Broadberry and Malinowski, ''Living standards'', 22. An example of such a method is the recent Baltic study by Norkus and Markevičiūtė, "New estimation"

sic prices generated by sector *i*, whilst $T_{product}$ and $S_{product}$ denote *taxes* and *subsidies* on *products* originally excluded from value-added to arrive at estimates at basic prices. The *GVA* of each economic sector, from agriculture to industry and services, constitutes the most significant component of the equation, with taxes less subsidies typically accounting for a minor difference. When estimating trends in real (constant-price) GDP, movements in real *GVA* quite accurately approximate changes in real GDP.[13] GVA_i itself is calculated as follows:

$$GVA_{i/basic\ prices} = GVO_{i/basic\ prices} - IC_{i/purchase\ prices},$$

where GVO_i represents the *gross value of output* (or simply *output*) at basic prices generated in sector *i*, and IC_i denotes the *intermediate consumption* at actual purchaser prices used by sector *i* to produce its *output*. A simplistic example would be the cheese sector, where the total production of cheese in kilograms represents the *physical* output, and the volume of milk used to produce that cheese constitutes the *physical* intermediate consumption. The value-added of the cheese sector is obtained by subtracting the cost of milk (valued at actual prices paid by the cheese factory) from the value of cheese produced (priced without transport, marketing, and any changes due to taxes paid or subsidies received—i.e., at *basic prices*).

This approach was employed by Klimantas and Zirgulis (2020) and Norkus et al. (2022) to estimate the 1937 and 1935 figures for interwar Lithuania and Latvia, respectively.[14] Similarly, Bolotin's 1990 GDP estimates for all three Baltic states were produced using the same methodology (see Table 2.1). Furthermore, all three studies conducted purchasing power parity (PPP) analyses and constructed 'real' exchange rates to convert their single-year figures into international 1990 dollars (Int$$_{1990}$$).

The interwar conversions were conducted using bilateral price basket and GDP comparisons with interwar Sweden, whilst the 1990 study offers direct conversion based on 'real' rouble-dollar exchange rates prevalent in the USSR as a whole. These estimates will serve as *benchmarks* and sources of value-added weights to calculate constant-price GDP series for both interwar and occupation periods, as well as to convert these figures into international dollars (Int$$_{1990}$$ and Int$$_{2011}$$). Crucially, to maintain consistency across all

[13] European Central Bank, ''What is behind discrepancies between growth in GDP and gross value added?'', *ECB Monthly bulletin* (Frankfurt), December 2003, 42–43.

[14] Klimantas and Zirgulis, ''A new estimate''; Norkus et al., ''Benchmarking Latvia's''.

estimation procedures, this thesis also produces a new estimate of 1938 Estonian GDP using the output approach and conducts an analogous bilateral PPP comparison with interwar Sweden. The sectoral breakdowns of these 1930s and 1990 benchmarks are presented in Tables 2.2 and 2.1.

The methodological foundation for estimating the entire GDP per capita series for both 1919-1940 and 1940-1990 periods is as follows:

$$GDP_t = GDP_{benchmark} \times indexGDP_t,$$

where GDP_t represents the level of GDP in any given year between 1919 and 1990, and $GDP_{benchmark}$ denotes either the 1937, 1935, 1938 or 1990 estimate, depending on the period and country under consideration. $indexGDP_t$ signifies the real GDP index value in year t, i.e., the change in real GDP from the benchmark year to year t. Besides constructing a new interwar benchmark GDP for Estonia and improving the existing ones, the primary objective of this study is to estimate the constant-price GDP indices ($indexGDP_t$) for the Baltic states for 1919-1940 and 1937-1995. These are obtained as follows:

$$indexGDP_t = \sum_{i=1}^{n} W_{i/benchmark\ year} \times indexSector_{it},$$

where $indexGDP_t$ is the GDP index value in year t, W_i represents the percentage weight of the i-th sector in total GDP at the benchmark year, and $indexSector_{it}$ denotes the value-added index figure of the i-th sector in year t. Once $indexGDP_t$ is calculated, it can be multiplied by the actual GDP value in the benchmark year to generate the complete series.

This thesis holds to the common assumption that changes in constant-price value-added (GVA) reasonably approximate movement in GDP.[15] Thus, the major task in this thesis is to estimate constant-price value-added indices for each economic sector and integrate them into a comprehensive GDP series using the GDP_t formula outlined above. This approach ensures a consistent and robust methodology for analysing economic growth across the Baltic states throughout the periods under study.

[15] European Central Bank, ''What is behind''.

Single versus double deflation

The central assumption employed in this paper is that of unchanging constant-price *value-added-to-output* ratios (*single deflation*)—one ratio for the interwar period and another for the occupation period. Double deflation—where both output and intermediate consumption (IC) values have separate annual change indices—is the preferred method for more recent periods. Whilst gaining popularity in Nordic countries due to their exceptional historical data coverage, double deflation remains highly uncommon in historical national accounting more broadly.[16] Indeed, single deflation is the prevailing method for periods prior to 1913 in many industrialising and advanced economies.[17] Even in the 1970s, most OECD economies employed double deflation only in accounting for agriculture, whilst value-added in other sectors was predominantly single-deflated.[18] Single deflation using gross physical output indices, aggregated with value-added weights (as done in this thesis), is accepted as the best possible approach when data for double deflation is insufficient.[19]

The Baltic states were far from industrialised during the interwar period. With reliable input (intermediate consumption) data limited to the late 1930s, the current availability of Baltic interwar data precludes the possibility of employing double deflation. Such procedure is also unfeasible for the occupation period, as Soviet yearbooks, although containing relatively abundant physical output data, avoided reporting material consumption figures. The entire CIA team, in their tremendous effort to estimate the 1950-1990 Soviet GNP, was only able to employ double deflation in their agricultural series.[20] Given that the abundance of all-USSR statistics is greater than that of individual republics, this thesis resorts to single deflation throughout the 1940-1990 period as well, maintaining consistency with most of the CIA efforts and with the Baltic interwar data. Additionally, double deflation adds another dimension where price data is needed.[21] With artificial pricing being a pivotal

[16] See O. Krantz and L. Schön, *Swedish Historical National Accounts 1800–2000* (Lund: Almqvist / Wiksell International, 2007), 25; Grytten, ''Revising growth'', 194; H. Lobell et al., ''Swedish Historical National Accounts, 1800-2000: Principles and Implications of a New Generation'', *The Scandinavian economic history review* 56, no. 2 (2008): 151.

[17] M. Thomas and C. Feinstein, ''The value-added approach to the measurement of economic growth'', ed. T. W Guinnane et al., History Matters: Essays on Economic Growth, Technology, and Demographic Change (Stanford: Stanford University Press, 1990), 427–428, 440.

[18] Joint Economic Committee, *USSR: Measures*, 45.

[19] Thomas and Feinstein, ''The value-added'', 427.

[20] Joint Economic Committee, *USSR: Measures*, 45.

[21] Lobell et al., ''Swedish Historical National'', 151.

issue in Soviet monetary statistics, avoiding its use is wholly justified.

Empirical findings from Swedish historical national accounts studies reveal that single deflation is more likely to affect figures in the short run rather than the long run.[22] Thus, due to the long-run character of this study, the Baltic figures are less likely to be affected. Furthermore, the technique is also more likely to affect individual sectors than the aggregate, which tends to be counterbalanced by compensatory trends where outputs from one sector become inputs in another. In the Swedish case, single-deflated series tended to underestimate the GDP deflator by 4% during the 75-year pre-industrial period and by 17% during the 75 years since 1875.[23] Given that the Baltic states were still not industrialised during the interwar period, it is reasonable to expect a milder difference in their case. Moreover, the furthest year from the benchmark in this study is 50 years apart (during the occupation period). Given that the Soviet Union largely adhered to its old mass production methods throughout its existence, it is likely that the input-output ratio in the USSR was somewhat more constant than in Sweden.[24]

Single deflation introduces additional index number problems when current-price series require deflating, and the base year is either early or late in the period.[25] It has been argued that selecting a late benchmark year might lead to an overestimation of growth. However, given that the interwar growth rates generated in this study are quite modest, it is assumed that the choice of the later 1930s as the interwar base years does not artificially inflate the growth rates. To address this issue, this thesis employs deflation in as few cases as possible, primarily utilising physical volume indices that do not require deflating, thus eliminating many potential index number problems.

However, bias arising from not adjusting for relative changes in inputs consumed in production processes remains. To assess whether this risk materialises, the interwar figures, extrapolated from late 1930s benchmarks, are extended to 1940 in this study, whilst the occupation period GDPs are extended to cover 1937-1940 as well. As will be demonstrated, the overlap of both 1930s-based and 1990-based time series in 1937-1940 is very precise, qualifying the series as 'firm figures' according to Feinstein's classification.[26] This

[22] Lobell et al., ''Swedish Historical National'', 148–153.
[23] Lobell et al., 152.
[24] I. T. Berend, *Central and Eastern Europe*, 195–197.
[25] Thomas and Feinstein, ''The value-added'', 433.
[26] C. H. Feinstein, *National income, expenditure and output of the United Kingdom, 1855-1965* (Cambridge: Cambridge University Press, 1972), 21.

implies that the overall impact of using single instead of double deflation in a command system is likely quite limited. Nevertheless, the possible bias due to using single deflation is outlined in the limitations section.

In cases where the direct production-side approach to estimating output indices is not feasible, this thesis employs income-side (wage) data or 'short-cut' methods as advised by Broadberry and Malinowski.[27] As the final outcome, this thesis produces two sets of GDP per capita series in Int$$_{1990}$ for each of the Baltic economies. The first set covers 1919 to 1940, and the second covers 1940 to 1990, with extensions to 1937 and 1995. These figures are then spliced together and linked with existing post-1990 estimates at 1940 and between 1991/1993 for which the difference between new and existing series is smallest. This procedure, based on the best available and fully consistent methodologies across the two periods and across the three Baltic states, yields the first GDP per capita PPP time series for Lithuania, Latvia, and Estonia from 1919 to 2024.

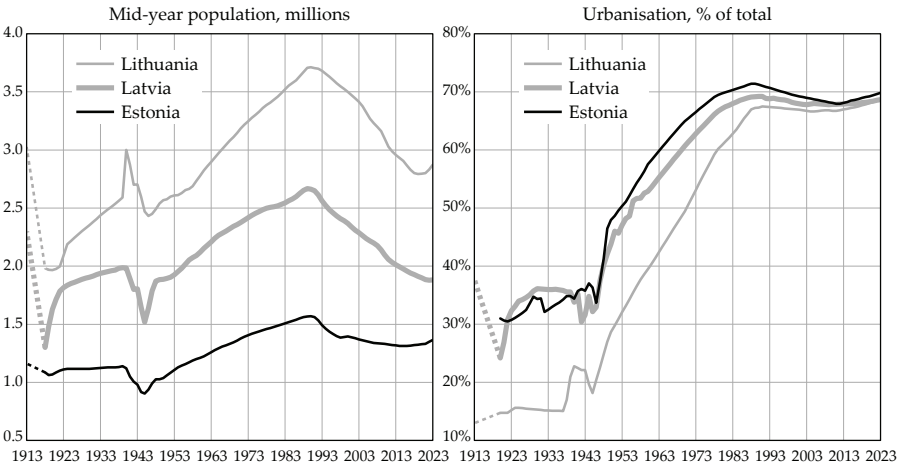
[27] Broadberry and Malinowski, ''Living standards'', 22.

Baltic population

Before turning to sectoral output and value-added estimations, Baltic population figures and trends require a comprehensive overview. Most year-end population estimates for Latvia and Estonia were sourced from existing databases, while Lithuanian figures necessitated gathering from multiple primary sources, including interwar statistical yearbooks, Soviet Lithuanian yearbooks, and all-USSR publications. Lithuanian data presented a particularly complex case due to shifting borders, with most significant changes occurring in 1939 (as illustrated in Map 2).

Accounting for population losses resulting from the Holocaust and post-war deportations proved challenging. Secondary studies on these historical events were employed to fill methodological gaps. A comprehensive population dataset with detailed sources is provided in Table F.1 in Appendix F. Furthermore, Table F.2 there presents urbanisation levels across the Baltic states since 1913, incorporating interpolated estimates for years not directly covered by census data.

Figure 3.1: BALTIC POPULATION AND URBANISATION since 1913



Sources: See Table F.1 in Appendix F.

Several demographic trends emerge from the analysis of Figure 3.1,

revealing common patterns across the Baltic countries while highlighting unique national experiences. During the First World War, population dynamics varied significantly. Lithuania and Latvia experienced drastic population declines, whereas Estonia—less directly impacted by major war actions—saw more minimal changes. The interwar period then witnessed steady population growth, with Lithuania demonstrating the most rapid expansion.

The Second World War precipitated massive population losses across all three states. Subsequently, the period between 1945 and 1990 paradoxically exhibited unprecedented population growth. Urbanisation, which remained relatively stagnant during the interwar years, accelerated dramatically during the occupation period. Since 1990, population trends reversed, with negative growth and stagnant urbanisation becoming prevalent. Only in the most recent years has this depopulation trend begun to stabilise.

Distinctive national variations are particularly noteworthy. Latvia managed to recover around half of its World War I population losses. Lithuania's population and urbanisation trajectories were uniquely influenced by territorial changes, notably its inability to secure the capital Vilnius area in the 1920s and its ultimate annexation in 1939.

Baltic sectoral output indices

This section provides an overview of the key methodological considerations for estimating output and value-added indices for Lithuania, Latvia, and Estonia from 1919 to 1995. The primary objective is to aggregate sectoral indices into GDP series, which requires establishing benchmark GDP weights for two distinct periods: 1919-1940 and 1937-1995.

Existing benchmark GDP data varies across the Baltic states. While Latvia and Lithuania have benchmark figures which can be used to cover the interwar (1935 and 1937 respectively) and occupation (1990) periods, Estonia presents a unique challenge with only a 1990 benchmark available. Consequently, a critical prerequisite for this research is developing a 1930s benchmark estimate for Estonia. This thesis addresses this gap by producing an output-side GDP figure for 1938, with sectoral breakdowns for all three interwar benchmarks detailed in Table 2.2.

The estimation methodology is comprehensively documented in the appendices. Appendix A outlines the procedure for estimating Estonia's 1938 benchmark GDP and its conversion to international dollars (Int$$_{1990}$). Appendix B provides improvements to the 1937 Lithuanian GDP estimate from Klimantas and Zirgulis' 2020 study, while Appendix B offers a detailed description of estimation procedures and data sources.

The procedure for estimating Estonia's 1938 benchmark GDP and its conversion into Int$$_{1990}$ is detailed in Appendix A. Appendix B describes the improvements made to the 1937 Lithuanian GDP estimate from Klimantas and Zirgulis' 2020 study.

The 1990 benchmark, presented in Table 2.1, originates from a source study providing sectoral and aggregate figures for Soviet republics. However, the data limits service sector disaggregation to trade, transport & communications.Bolotin, ''Former Soviet Union'' To address this limitation, additional service sector breakdowns are derived from the World Bank's 1987 input-output study.[28]

[28] D. Steinberg, *Economies of the former Soviet Union: an input-output approach to the 1987 national accounts*, Policy, Research working papers, WPS 1060 (Washington, D.C.: World Bank Group, 1992).

While using a 1990 benchmark is not ideal for covering the 1937-1995 period due to being very close to the end of the period examined, it represents the most viable option for the Soviet Baltic republics for several reasons. First, the CIA's 1982 benchmark for USSR estimation is not applicable to the Baltic states since it only covers the Soviet Union as a whole. Second, the 1987 input-output table significantly understates the service sector's size, limiting its usefulness.[29] Third, the 1990 study offers several advantages. It provides direct Purchasing Power Parity (PPP) conversions to Int$$_{1990}$ for each Soviet republic, aligning with the standard currency used by economic historians.[30] Furthermore, 1990 marked the peak of Gorbachev's openness reforms, which enabled more reliable statistical coverage and allowed for a more comprehensive inclusion of service value-added.[31]

Despite some disruptive changes already under way by 1990, the economic transition to capitalism in the Baltic states is generally considered to have begun in 1991.[32] Accordingly, this thesis argues that 1990 represents the optimal pre-transition year for establishing a benchmark to extrapolate GDP series for the entire 1937-1995 period.

Finally, the year 1944 proved particularly challenging due to data limitations. While Lithuanian data was partially available, no figures could be obtained for Latvia and Estonia. To address this, sector movements for Latvia and Estonia were estimated using average ratios from Lithuania for 1943-1944 and 1944-1945. Comprehensive details on estimation procedures, data sources, and full value-added indices are provided in Appendices C and D.

Baltic agriculture, forestry and fishing

To estimate the volume indices of value-added in agriculture, this study employs physical output figures from a comprehensive range of agricultural products. As pre-1990 Baltic agricultural indices have never been estimated

[29] Steinberg.

[30] Major volumes using Int$$_{1990}$ include Morys, *The economic history*; Persson and Sharp, *An economic history*; S. Broadberry and K. H. O'Rourke, eds., *The Cambridge Economic History of Modern Europe: 1870 to the Present*, vol. 2 (Cambridge: Cambridge University Press, 2010)

[31] An example is provided by the 1988 commentary from the Deputy chief of Lithuanian SSR's Goskomstat, where he admits to manipulative activities prevalent in the past, see ''Statistika: ar viską ji žino?''

[32] Korhonen, ''Progress'', 457. In 1990 price inflation already ranged between 8-23%, and the USSR imposed an ineffective economic blockade on Lithuania for 2.5 months (V. Mačiekus, *Ekonominė blokada*, in Visuotinė lietuvių enciklopedija, April 2018)

before, the research collected data on each individual product using published and archival sources.

Product categories were aggregated into crop and livestock indices using gross output composition data from interwar agricultural surveys (see details in Appendix C). For the occupation period, 1990 weights for aggregating crop and livestock categories were derived from World Bank's *The transition to a market economy* and *Statistical handbook* studies, further expanded using 1995 Eurostat's *Economic accounts for agriculture* sub-weights. The analysis encompasses 9-10 crop categories and 7-16 animal product categories.

Beyond crop and livestock production, the study incorporates forestry and fishing indices to provide a complete primary sector picture. The forestry index was compiled using data on forestry products sold, while the fishing index was based on fish catch weight.

In constructing joint agricultural volume indices, major weights for aggregating crops, livestock, and forestry were taken from interwar benchmark studies (1919-1940) and World Bank studies (1937-1995), utilising Net Material Product (NMP) or GDP weights.[33] The fishing sector's share, previously unseparated in Soviet accounts, is estimated using the 1995 fishing to crops and livestock ratio from Eurostat.[34]

Lithuanian agriculture, forestry and fishing

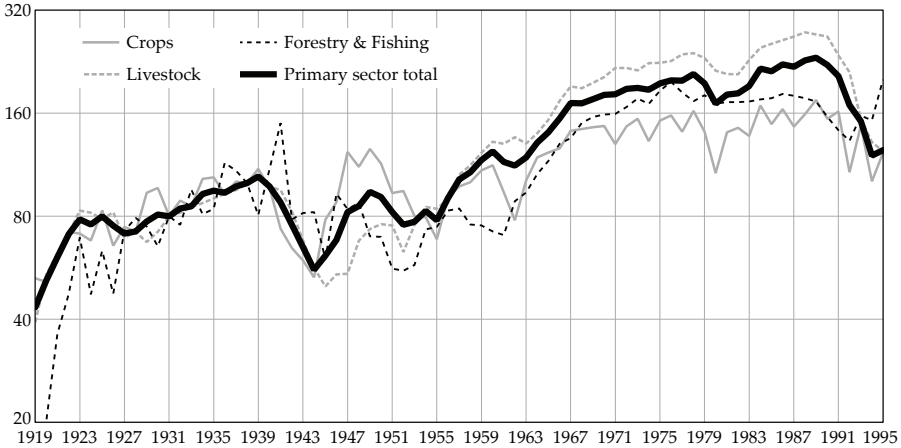
Most data from 1923-1940 originates from statistical yearbooks, monthly bulletins, and other published sources, with pre-1923 figures primarily collected from archival materials. Missing fishing data for 1919-1922 was assumed equivalent to 1933-1939 output, adjusted for territorial changes.[35] Physical outputs for early occupation years were gathered from unpublished statistical collections, while post-1950 data mostly came from Soviet Lithuanian statistical yearbooks and other publications. For further details on data and estimation procedures regarding this and all other sectors and polities, refer to Appendices C and D.

[33]Crop and livestock weights from The World Bank, *Lithuania – The transition*, 367; The World Bank, *Latvia – The transition*, 286; The World Bank, *Estonia – The transition*, 319, forestry ratios to crops and livestock from The World Bank, *Statistical handbook 1994: states of the former USSR (English)*, 14, Washington, D.C., 1994, 169, 358, 405.

[34]National accounts aggregates by industry, *Eurostat Database*

[35]Lithuania had no sea access until 1921 and in 1921-1922 it enjoyed only a tiny strip of coast on the Baltic sea.

Figure 3.2: LITHUANIA: PRIMARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Primary sector total includes crops, livestock, forestry and fishing.

Figure 3.2 illustrates Lithuanian primary sector dynamics in the 20th century. During the interwar years, livestock output grew faster than crops post-1929, reflecting the shifting focus towards animal products. Immediate post-WWII years showed an opposite trend. Forced collectivisation from 1949 dramatically reduced crop and livestock output. Despite 94% of agricultural land being collectivised by 1953, the sector only reached 1938 output levels in 1957.

The collective farm system's inefficiency is evident from slow growth since 1967 and the fact that in 1989, while only 9% of land was privately owned, it produced 31% of agricultural output. After recovering to 1938 levels, Soviet authorities focused on intensifying livestock farming, with production consistently increasing until 1989 despite two setbacks in 1960s and in 1979-1983.[36]

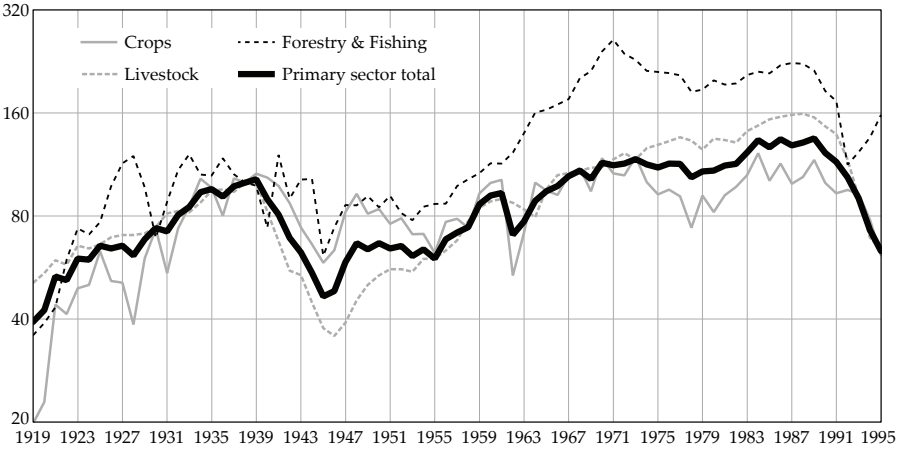
Forestry and fishing trends reveal three notable observations: dramatic output shocks in 1921-1923 and 1939 due to territorial changes, a massive deforestation drive in 1941, and a five-fold expansion of the fishing sector between the early 1960s and mid-1970s, followed by decline and stagnation until the USSR's collapse.

[36]Calculated from *Lietuvos žemės ūkis 1989 m.* (Vilnius: Lietuvos statistikos departamentas, 1990).

Latvian agriculture, forestry and fishing

The vast majority of Latvian interwar physical output data was collected from published statistical yearbooks or online databases. Occupation period sources were similarly drawn from published statistical yearbooks or bulletins, though early post-WWII period (pre-1955) data came from unpublished records on sown areas in Latvia. Fishing data which was missing for 1919-1923 was extrapolated from primary sector movement trends.

Figure 3.3: LATVIA: PRIMARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Primary sector total includes crops, livestock, forestry and fishing.

Figure 3.3 reveals that Latvia experienced opposing trends to Lithuania during the interwar years. Crop output, though uneven, grew more rapidly than livestock throughout the pre-1940 period, with this pattern only definitively reversing in the 1970s. The implementation of forced collectivisation in 1949 precipitated significant declines in crop production and stagnation in livestock output. Agricultural recovery faced further setbacks with the crop failures of 1962-1963, and subsequent growth remained sluggish. Notably, agricultural production did not surpass interwar levels until 1967. The collective farm system's inefficiency is particularly evident in that between 1968 and 1991, production never exceeded 139% of late interwar levels, despite mechanisation and increased fertiliser usage.

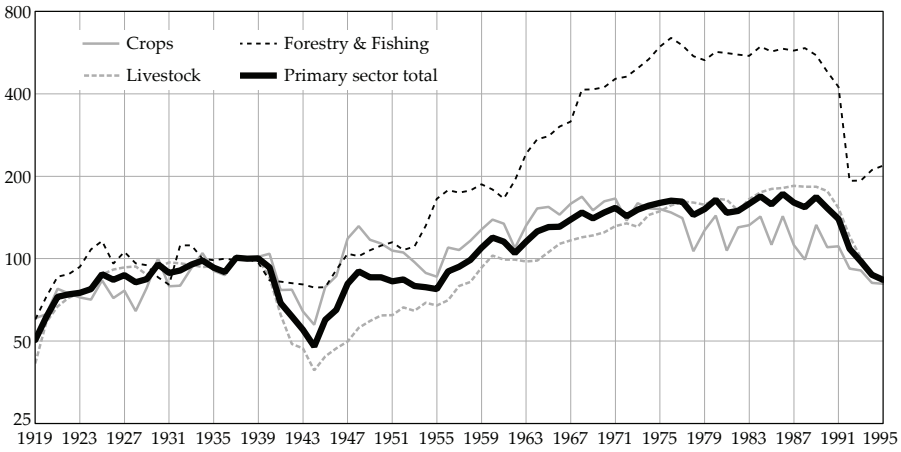
The data also highlights a distinctive long-term depression in Latvian harvests between 1974 and 1982. The absence of similar trends in Lithuanian

or Estonian data suggests institutional rather than climatic causes. As with Lithuania, Soviet-occupied Latvia experienced substantial growth in its fishing sector between the early 1960s and 1973, expanding more than five-fold before entering a period of stagnation.

Estonian agriculture, forestry and fishing

As with Latvia, Estonia's interwar data on crop, animal and forestry product outputs was collected from published sources, primarily interwar agricultural and statistical publications. A significant portion of yield data derives from Klesment's modern statistical study.[37] Forestry and fishing output figures for 1919-1921 and 1919-1927 respectively were missing and thus extrapolated from movements in the crops and livestock joint index. Whilst occupation period data largely came from published sources, some early post-WWII statistics were gathered from Estonian State Archives. Physical output data for oats, root crops and maize during 1945-1965 was only available quinquennially, necessitating linear interpolation.

Figure 3.4: ESTONIA: PRIMARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Primary sector total includes crops, livestock, forestry and fishing.

Figure 3.4 depicts a largely stagnant pattern in Estonian primary sector development throughout the 20th century. The interwar years showed no

[37] Klesment and Valge, ''Eesti rahvastiku''.

decisive transition towards animal product farming, with both livestock and crop production advancing gradually. Following WWII, however, livestock farming demonstrated continuous advancement until 1960, partly compensating for the poor collectivisation results in crop harvests. Soviet-occupied Estonia maintained a clear orientation towards livestock farming, which consistently outpaced crop growth throughout the 1945-1990 period. The combined impact of WWII and collectivisation meant Estonian agricultural output only exceeded its 1938 peak in 1959.

Mirroring trends in the southern Baltic states, the 1960s and early 1970s witnessed remarkable growth in Soviet Estonia's fishing sector, which expanded approximately six-fold before entering stagnation from 1976 onwards.

Baltic industry & construction

Baltic industry

Interwar Baltic industrial statistics present varying levels of completeness relative to agricultural data. Lithuanian monetary industrial output figures, available only from 1929, are notably unreliable.[38] Latvia's position is more favourable, with monetary data from 1925 and robust aggregated volume indices of industrial production for 1930-1939. Estonia represents an intermediate case: whilst Valge provides monetary current-price figures for 1922-1939, volume indices are absent. The use of deflated current-price data proves problematic without highly disaggregated sectoral price indices.

Given the imperfect price data for deflating monetary output, this study adopts a uniform procedure across all three Baltic states, constructing industrial employment indices adjusted by real wage data. This 'short-cut' method is widely accepted in historical national accounting when data is scarce.[39] Furthermore, given industry's relatively modest role in the interwar Baltic economies compared to Western counterparts (see Table 2.2), this indirect approach is unlikely to significantly compromise final GDP figures. Employ-

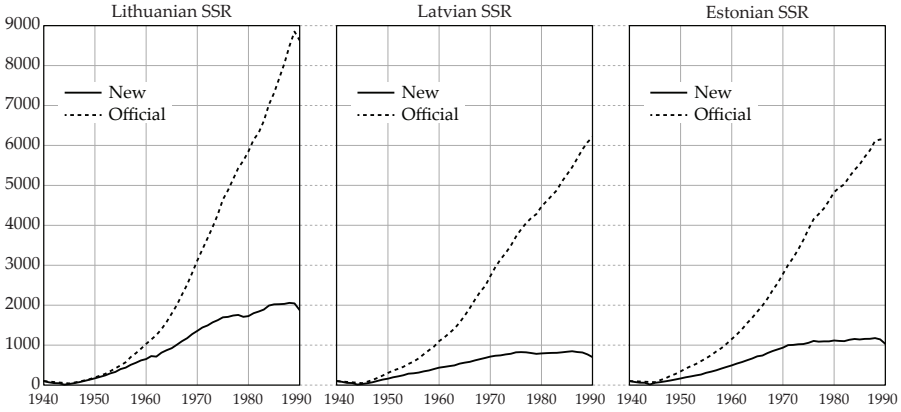
[38] Reporting was inconsistent and provided a false sense of immense growth due to gradual expansion of the number of enterprises which provided data for the Statistical office. Consequently, the industrial production index compiled by the House of Commerce, Industry and Crafts using this data is misleading, see *Lietuvos ūkio paskutinis dešimtmetis* (Kaunas: Prekybos, pramonės ir amatų rūmai, 1938). Following Broadberry and Korchmina, this thesis rejects such indices, see S. N. Broadberry and E. Korchmina, ''Catching-Up and Falling Behind: Russian Economic Growth, 1690s–1880s'', Pre-print version, *The Journal of Economic History* 84, no. 4 (2024): 1014.

[39] Broadberry and Malinowski, ''Living standards'', 22.

ment statistics are largely available, though Lithuania's early 1920s data required using enterprise numbers by workforce size as a proxy.

For the occupation period, productivity-adjusted employment data proves unsuitable due to artificially set prices. Following CIA methodology, this thesis employs industrial branch indices constructed by aggregating physical product categories, using 1986-1987 minor output weights from archival sources.[40] Major weights for consolidated industrial indices derive from the 1990 benchmark *Memo* study.[41] Where archival detail was insufficient, averages were used for sub-branch aggregation.

Figure 3.5: SOVIET OFFICIAL AND NEW INDUSTRIAL OUTPUT FIGURES, 1940=100



Sources: this thesis and *Промышленность Литовской ССР: Статистический сборник*, Archival material in Statistics Lithuania library (Vilnius: Центральное статистическое управление при Совете Министров Литовской ССР, 1973), 22–23, 95; *Lietuvos statistikos metraštis 1990 m.* (Vilnius: Lietuvos statistikos departamentas, 1991), 135; *Lietuvos TSR Liaudies ūkis 1985 m.* (Vilnius: CSV, 1986), 27; *Lietuvos TSR Liaudies ūkis 1980 m.* (Vilnius: CSV, 1981), 41; *Lietuvos TSR ekonomika ir kultūra 1975 m.* (Vilnius: CSV, 1976), 56; *Latvijas Tautas saimnieciba, Latvijas PSR Tautas saimnieciba, Народное хозяйство Латвийской ССР*, 1968-1990 versions, pages on industrial production; *Padomju Latvijas ekonomika un kultūra* (Riga: Latvijas PSR CSP, 1966), 50, 69; *Советская Латвия за 25 лет* (Riga: Latvijas PSR CSP, 1965), 3, 458; *Padomju Latvijas tautas saimniecība* (Riga: Latvijas PSR CSP, 1968), 59, 72; *Латвия за годы советской власти* (Riga: Latvijas PSR CSP, 1967); The World Bank, *Latvia - The transition to a market economy (English)*, Washington, D.C., 1993, 289 *Eesti statistika aastaraamat 1990* (Tallinn: Eesti Statistikaamet, 1991), 96; *Eesti NSV rahvamajandus 1988. aastal* (Tallinn: Eesti NSV SKV, 1989), 60; *Eesti NSV rahvamajandus 1985. aastal* (Tallinn: Eesti NSV SKV, 1986), 47; *Eesti NSV rahvamajandus 1980. aastal* (Tallinn: Eesti NSV SKV, 1981), 79;.

[40]Joint Economic Committee, *USSR: Measures*, 48.

[41]Bolotin, ''Former Soviet Union''; detailed minor weights for Latvia were absent in the archives. Therefore, this thesis employs the most detailed available disaggregation from *The transition to a market economy* study by World Bank, with the rest of the individual products aggregated into branches and sub-branches using averages.

The study constructs 10-11 major industrial branch indices for each Baltic state, encompassing electricity, petroleum-gas, other fuels, metals, chemicals, MBMW (machine-building and metal-working), wood and paper, construction materials, light industry, food industry, and other industry. This resulted in 143 individual product indices for Lithuania, 129 for Latvia, and 101 for Estonia, covering 1937-1995. Notably, only Estonian products were previously available for most years, with data gaps filled using correlated products as proxies.

Figure 3.5 underscores this methodology's importance, revealing that the Soviet official constant-price output index suggests a seven-fold greater increase in 1940-1990 than the physical output index compiled herein.

Baltic construction

The quality of interwar construction sector statistics varies markedly across the Baltic states, necessitating distinct methodologies for each country. For Lithuania, this study employs physical quantities (number of buildings or cubic space) of newly constructed objects, including residential and non-residential buildings and infrastructure projects, where feasible. Where such data is unavailable, monetary values of capital invested, deflated by the construction price index from Table G.1 in Appendix F, are utilised. For 1919-1921 and 1940, where housing construction data is absent, index values are extrapolated from rural and urban population changes.

Interwar Latvian construction data is unexpectedly limited. Monetary values of investments within the construction sector are missing even for the benchmark year 1935, preventing their use as weights. Consequently, a new index is constructed based on newly built urban apartments, extended by urban population movement for 1920-1925, which otherwise lack coverage. An alternative series, based on construction sector worker numbers from industrial statistics, proves unreliable. This alternative would suggest negligible construction levels before 1934, followed by an implausible spike resulting in more than a five-fold increase in construction workers, whilst annual urban apartment construction increased by merely 25% between 1934 and 1938.

For interwar Estonia, this thesis follows Valge's procedure, calculating cement production complemented by net import figures to create a domestic

cement use index.[42] Early period gaps are filled using population growth data.

For the occupation period, this thesis adopts the CIA methodology, employing an average of inputs into construction output from other branches of the economy across all three Baltic states. These inputs are weighted according to the 1987 input weights derived from the World Bank input-output study.[43]

Lithuanian industry

To estimate total worker numbers in interwar Lithuania, incomplete 1920s employment statistics were augmented using industrial certificate data that categorised firms by employment numbers. Worker and enterprise figures were collected from multiple published sources, whilst real wage data for adjusting the workforce index is drawn from the Norkus and Markevičiūtė study.[44]

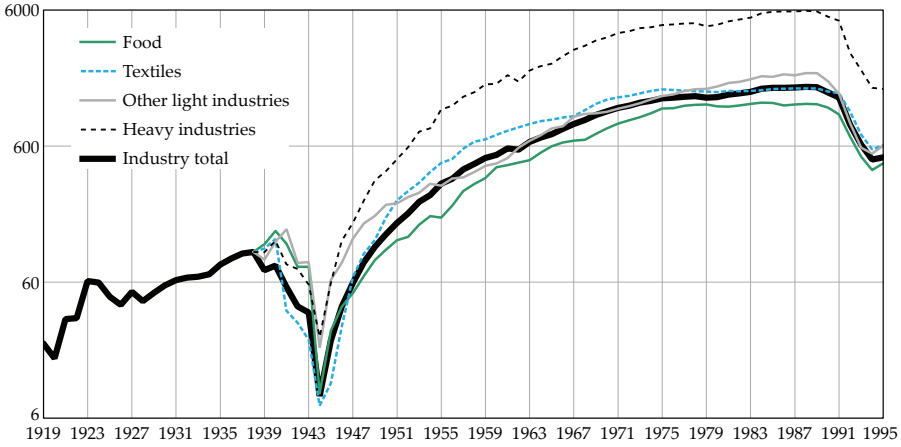
Soviet-period physical output data for industrial products was gathered from published Soviet-era statistics and archival materials from Lithuanian Central State Archives and Statistics Lithuania library. A particularly crucial document provided 1987 monetary output weights for over 200 industrial product categories, enabling confident aggregation of individual products. The study compiled series of 143 separate products for such aggregation.

Figure 3.6 reveals two noteworthy trends in Lithuanian interwar industrial development. Firstly, a sudden production rise in 1923 following the annexation of the relatively industrialised Klaipėda area, followed by 'deindustrialisation'. Whilst lacking historical explanation, this might relate to structural adjustment in Klaipėda after joining the underdeveloped Lithuanian core. Secondly, the 1930s witnessed exceptionally rapid industrialisation, with 9% annual growth between 1929 and 1938. The low industrial base undoubtedly contributed to this, whilst the absence of decline during the Great Depression suggests growth was likely driven by increasing internal demand.

Under Soviet rule, industrial output regained pre-war levels in 1949 and subsequently grew remarkably rapidly (10% annually) until 1975, with only a temporary growth halt in 1962. Between 1975 and 1980, the sector stagnated

[42] Valge, ''Uue majanduse'', Table 35 and Klesment and Valge, ''Eesti rahvastiku'', 76–78
[43] Joint Economic Committee, *USSR: Measures*, 48; Steinberg, *Economies of*, 66–69, 82–85, 86–89
[44] Norkus and Markevičiūtė, "New estimation"

Figure 3.6: LITHUANIA: INDUSTRIAL OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Industry total includes heavy industries (power, fuels, metals, chemicals, machine-building & metal-working and construction materials (incl. mining)), food industry, textile industry and other light industries (wood, paper and other undifferentiated).

(<1% annual growth), briefly recovered to 3% yearly growth in 1980-1985, before declining in 1989, two years before the transition to market capitalism began.

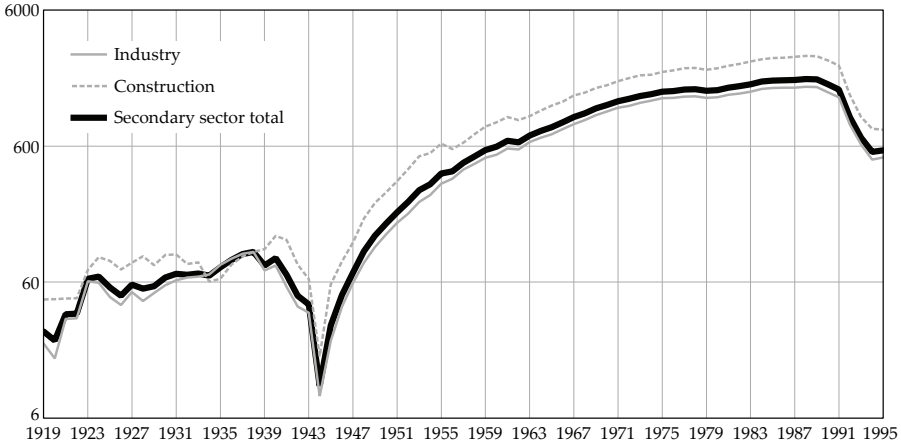
Regarding industrial branch composition, heavy industries demonstrated the greatest advancement during the Soviet era, expanding nearly 60-fold between 1938 and 1989, whilst output in all types of light industries increased 11-20 times during the same period.

Lithuanian construction

Lithuanian interwar construction data was sourced from pre-1940 statistical yearbooks, state budget studies and additional published sources. For the occupation period, where data is calculated as a weighted average of inputs into construction from other sectors.

As shown in Figure 3.7, Lithuanian interwar construction remained largely stagnant until 1930, followed by a downward trend until 1934. The trend reversed in 1935, with remarkably rapid growth of nearly 14% per annum continuing until 1940. Under Soviet occupation, construction surpassed the 1940 level in 1948 and expanded approximately 20-fold over the next 40 years. Despite three short-term shocks (in 1956, 1962 and 1979), construction

Figure 3.7: LITHUANIA: SECONDARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Secondary sector total includes industrial and construction sectors.

in Lithuania continued to expand even through the 1980s.

Latvian industry

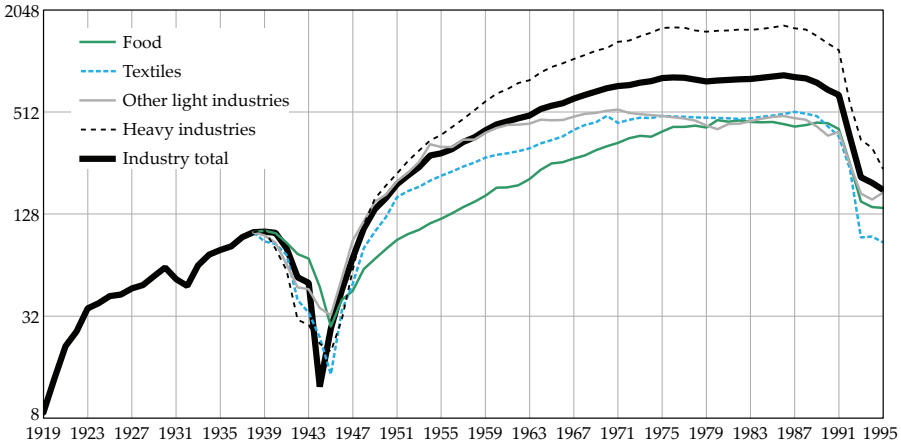
Latvia stands unique among the Baltic states in possessing a robust interwar industrial production index for 1930-1939, published by the Nazi authorities in 1942.[45] Additional worker statistics were gathered from various Latvian statistical yearbooks, whilst real wages data shares the same source as Lithuania.

During the occupation period, Soviet Latvian authorities published comprehensive industrial statistics, including extensive coverage of early post-WWII years. This enabled the collection of physical output data for 129 industrial product categories spanning 1940-1995 from published sources. However, unlike Lithuania, archival documents detailing late 1980s monetary output disaggregation into specific product categories proved unobtainable. Consequently, the 129 product categories were consolidated into 22 minor branches using index averages.

As Figure 3.8 demonstrates, Latvia experienced steady industrialisation both before WWII and under Soviet occupation until 1975. During the interwar years, the industrial sector grew at 7% per annum between 1929 and

[45] *Ostland in Zahlen*, 39.

Figure 3.8: LATVIA: INDUSTRIAL OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Industry total includes heavy industries (power, fuels, metals, chemicals, machine-building & metal-working and construction materials (incl. mining)), food industry, textile industry and other light industries (wood, paper and other undifferentiated).

1938, briefly interrupted only by the Great Depression in 1931-1932. Post-WWII, the sector regained 1938 levels by 1948 and subsequently grew at an impressive 8% annual rate until 1975. After 1975, a prolonged stagnation ensued, with Latvia's industrial sector declining from 1987 onwards.

Disaggregated data reveals patterns similar to Lithuania: heavy industries outpaced other branches in the pre-1975 period, which generally aligned, particularly during the 1980s. Notably, during 1975-1980, whilst all industrial branches declined or stagnated, the food industry briefly regained momentum before entering stagnation from 1980. Overall branch expansion proved more modest than in Lithuania: heavy industries' output increased 13.4-fold during 1938-1989, whilst other branches showed less than 4-fold increases.

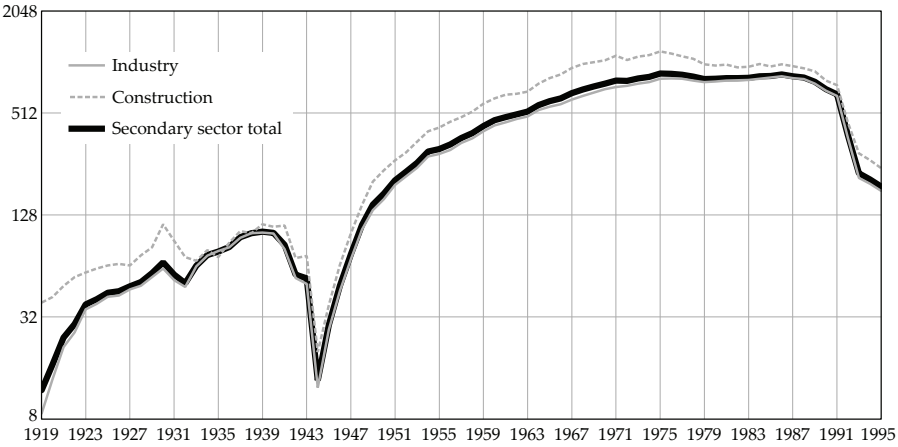
Latvian construction

For Latvia's construction sector, interwar data on new apartments built derives from a single source published by Nazi authorities in 1942.[46] As this covered only 1926-1939, the remaining interwar years were extrapolated using urban population data from Tables F.1 and F.2 in Appendix F. Occupation

[46] *Ostland in Zahlen*.

period dynamics were estimated using the same methodology as Lithuania.

Figure 3.9: LATVIA: SECONDARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Secondary sector total includes industrial and construction sectors.

Figure 3.9 shows that Latvia's construction sector exhibited similar trends to Lithuania in the post-Great Depression period, with 12% annual growth between 1935 and 1939. Substantial growth occurred in the late 1920s before the Great Depression. The key difference from Lithuania lies in the post-war pattern: having recovered to 1938 levels by 1947, the sector grew almost continuously until 1975 at nearly 10% annually before entering a long-term recession lasting until 1980. Growth briefly resumed before another decline began in 1985, resulting in a further 10-year downturn.

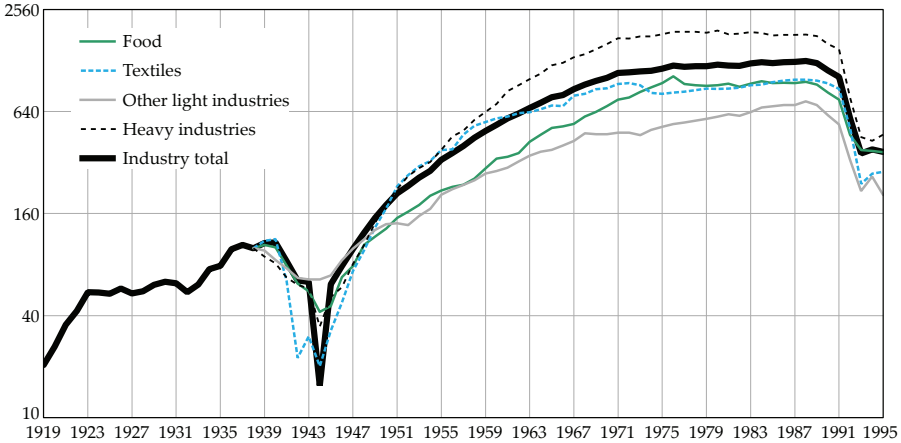
Estonian industry

Although interwar Estonian industrial employment figures predominantly come from published sources, they were gathered from monthly periodicals rather than yearbooks, which curiously were not issued in interwar Estonia. The real wage data sources mirror those used for Lithuania and Latvia.

During the Soviet occupation era, it was possible to compile product indices for 101 product categories, primarily from published Soviet Estonian statistical yearbooks, though early post-WWII years required archival data from Estonian State Archives. Additionally, as with Lithuania, an archival document containing detailed 1986 monetary output data for several hun-

dred industrial product categories was obtained. This data facilitated the aggregation of individual product series into broader industrial branches.

Figure 3.10: ESTONIA: INDUSTRIAL OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Industry total includes heavy industries (power, fuels, metals, chemicals, machine-building & metal-working and construction materials (incl. mining)), food industry, textile industry and other light industries (wood, paper and other undifferentiated).

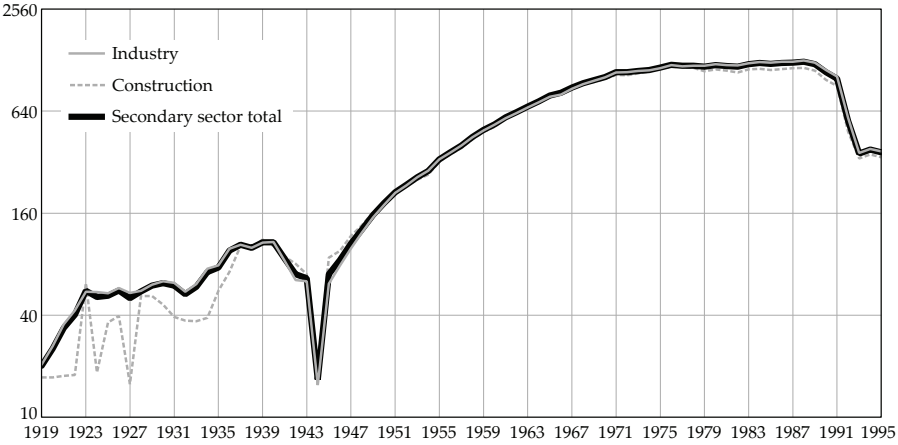
Figure 3.10 presents a distinctly different pattern of industrial development in interwar Estonia compared to its southern neighbours. The early interwar years saw largely stagnant industry, with significant improvements beginning only in 1933 and accelerating under authoritarian rule, which maintained industrialisation momentum until 1939, achieving 6% annual growth between 1929 and 1939. After surpassing peak interwar industrialisation levels in 1948, Soviet Estonia grew at an annual rate of 8.4% until 1976, when it followed Lithuania and Latvia into the stagnation era with a one-year delay. From 1989, Estonian industry entered increasing decline.

Estonia's somewhat faster industrialisation compared to Latvia is reflected in its industrial branch development, with all branches showing stronger growth during 1938-1989. Notably, textiles kept pace with heavy industries until 1957, after which heavy industries took an increasing lead. Surprisingly, while food and heavy industries stagnated from the 1970s, textiles and other light industries maintained positive growth until the late 1980s. Nevertheless, across the entire 1938-1989 period, heavy industries demonstrated the strongest expansion with a 17-fold increase in output levels, followed by light industry branches with 6-9 fold increases.

Estonian construction

Most of the interwar data derives from 2003-2007 studies by Valge and Klesment.[47] Missing 1919-1921 data was extrapolated from population movement, whilst Soviet period data was estimated using the same methodology as for Lithuania and Latvia.

Figure 3.11: ESTONIA: SECONDARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Secondary sector total includes industrial and construction sectors.

Estonian interwar construction experienced a volatile decade until 1934, though the extreme fluctuations of the 1920s might ultimately be moderated by more comprehensive construction output data incorporating wooden buildings. The 1930s witnessed a similar recovery and expansion to Lithuania and Latvia, with growth rates of nearly 24% annually between 1934 and 1939. As in Latvia, after regaining 1938 levels by 1947, Soviet Estonian construction sector experienced almost continuous expansion at 8.5% per year until 1975, when growth abruptly halted, leading to a 14-year stagnation period followed by a deepening recession beginning in 1989.

[47] Valge, ''Uue majanduse''; Klesment and Valge, ''Eesti rahvastiku''.

Baltic market services

Baltic transportation & communications

For all three Baltic states, interwar railway transportation series are derived from changes in passenger-kilometres and tonne-kilometres as physical indicators. Land transportation index construction was feasible only for Lithuania, based on changes in bus passenger-kilometres.[48] In the early interwar period, goods transport volume serves as a proxy for tonne-kilometres and passenger-kilometres. Revenue composition data is used to aggregate railway and land transportation series.

Interwar water transportation series for Lithuania and Latvia are estimated using physical weight turnover of goods transported via marine and inland waterways. For Estonia, merchant fleet gross tonnage was used, supplemented by net tonnage where necessary.

For the occupation period, transport freight indices are estimated using total freight turnover in tonne-kilometres and passenger transport in passenger-kilometres across all transport types.

Lithuanian interwar postal service activity is approximated through employment figures. For Latvia and Estonia, postal activity is assumed to follow total parcel volumes. Telegraph series derive from annual outbound telegram numbers across all three countries. Telephone services are estimated from user numbers for Lithuania and Latvia, and call volumes for Estonia. Radio subscriber data, which forms Lithuanian and Latvian series, is unavailable for Estonia.

Soviet period communications indices comprise three weighted components: postal and telegraph services, telephone services, and radio and television services. Postal and telegraph indices include total items sent, encompassing letters, newspapers, magazines, parcels, money transfers, pension payments, and telegrams. Telephone services indices use long-distance call numbers, whilst radio and television indices utilise total radio and TV sets or broadcasting points.

Communications services across all three countries are aggregated using 1937 Lithuanian weights, as alternatives for Latvia and Estonia are unavailable. Major weights for aggregating freight, passenger transport, and communications indices derive from the 1987 World Bank input-output study,

[48] Land freight was negligible and is considered to be 0. See K. Meškauskas, *Tarybų Lietuvos industralizavimas* (Vilnius: Valstybinė politinės ir mokslinės literatūros leidykla, 1960), 237.

reflecting the economic structure most relevant to the occupation period.[49]

Data gaps are filled using transport volumes or sector worker numbers. The Nazi occupation period (1941-1944) presents a particular challenge due to minimal data availability; consequently, this sector is assumed to have moved in line with the broader economy.

Baltic trade and accommodation & food service activities

For the interwar period, this thesis adopts the principle that changes in value-added (VA) of trade can be approximated by the combined movement of VA in marketed agricultural and industrial goods, along with deflated import values.[50] For agricultural goods, the marketed production proportion derives from Agricultural accounting survey results, excepting forest and fishing products, assumed to be fully marketed. Industrial and imported goods are assumed to have been entirely market-traded. Import values are deflated using general price indices from Tables G.1, G.2, and G.3 in Appendix F.

For interwar Lithuania and Latvia, accommodation and food services development is assumed to align with urban population movements (Tables F.1 and F.2 in Appendix F). Estonia presents a different case, as benchmark figures in Table A.2 only provide aggregated commercial activities data. Consequently, all commercial activities, including trade, accommodation and food, financial and insurance activities (*commerce*), are assumed to follow the marketed goods index.

The Soviet-era trade and commercial services sector presents significant challenges. The conventional approach of using a marketed share-weighted index proves unfeasible in a non-market economy. The assumption that all industrial value-added required marketing becomes unreasonable in a planned economy, where industrial products circulate according to plan without wholesale trade operations.

Furthermore, the foreign (inter-Soviet republic) trade component poses complications due to the necessity of price deflation in a system where state-set prices were either unreported or shown as having zero inflation. An attempt to estimate Lithuania's trade activity index using marketed shares yielded results that primarily reflected industrial sector movements and aligned

[49]Steinberg, *Economies of*, 66–69, 82–85, 86–89

[50]Broadberry et al., *British economic growth*, 168; F. L. Pryor et al., ''Czechoslovak aggregate production in the interwar period'', *Review of Income and Wealth* 17, no. 1 (1971): 56

with trade employment until 1990, before plummeting despite rising employment during 1990s marketisation.

Given these challenges, this thesis employs Soviet-calculated trade activity indices at *comparable prices*. These indices align with trade sector employment during the 1980-1987 stagnation period while showing faster growth in previous decades, consistent with shopping centre expansion. The 1987-1990 period shows particularly rapid growth in these indices compared to employment, corresponding with Gorbachev's restructuring policies.

Baltic financial, insurance & housing activities

For interwar Estonia, financial and insurance activities are incorporated into overall commercial services (*commerce*), reflecting the benchmark data structure. Valge provides constant-price value-added in housing for 1929-1938, whilst remaining data is extrapolated from urban (1921-1928, 1939-1940) and total (1919-1920) population change (Tables F.1 and F.2 in Appendix F).[51]

For interwar Lithuania and Latvia, financial activities series derive from changes in the difference between loan interest receipts and deposit interest expenses in credit institutions, based on prevailing interest rates and deflated by the cost of living and the overall price indices for Lithuania and Latvia respectively (Tables G.1, G.2 in Appendix F). Early data gaps were filled using population change figures.

Interwar insurance activities value-added changes are approximated through constant-price differences between insurance premiums paid and received. Data spans 1921-1938 for Latvia and 1928-1939 for Lithuania. Lithuanian values for 1919-1927 and 1940 are assumed to follow financial activities, whilst Latvia's remaining points (1919-1920 and 1940) are extrapolated from population movement.

Interwar Lithuania's housing index is compiled from deflated changes in 'taxable base', calculated by dividing annual real estate tax income by the tax rate, considering only urban housing activities. Latvia followed similar procedures, though with more complex and volatile real estate taxation than Lithuania's single 1935 rate change.[52] Latvian urban real estate taxation was fully regulated from 1926, with major rate changes in 1931 and 1936. There are no reports on post-1926 changes in rural taxation.

[51] Valge, ''Uue majanduse'', Table 42.

[52] A. Aizsilnieks, *Latvijas saimniecības vēsture, 1914-1945* (Sundbyberg: Daugava, 1968), 279.

Latvia's 1935 benchmark GDP includes five real estate sub-sectors: government, urban, rural, and imputed urban and rural real estate rents.[53]. Government real estate activities are assumed to follow overall population movements, whilst imputed urban and rural rents follow respective population changes. Urban and rural real estate activities post-1926 are estimated from price-deflated tax base, with pre-1926 figures following population indicators.

For the occupation period, this thesis adopts the CIA's employment indices approach for most sectors, given their resistance to measurement in an economy considering non-material services unproductive.[54] Financial and insurance activities receive productivity adjustments recommended by the CIA, calculated by dividing the trade activity index by the trade employment index.[55] Where employment data doesn't extend to 1937-1939, interwar sectoral volume indices are used for 1937-1940 changes.

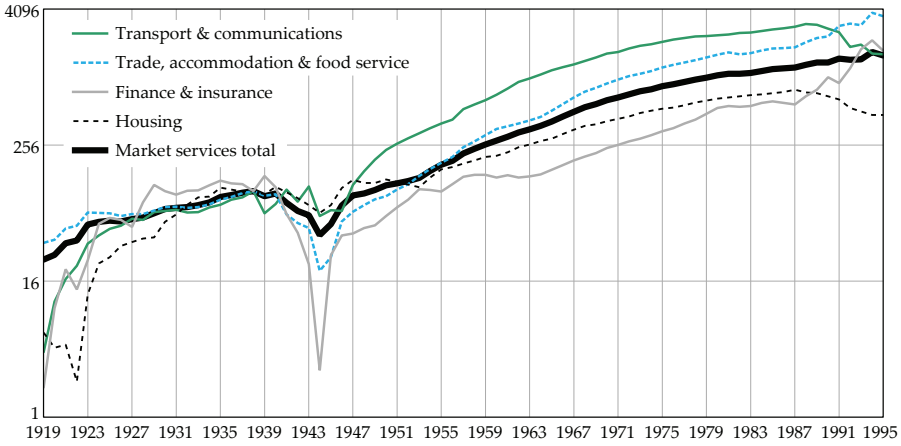
Lithuanian transportation & communications

The data on physical transport and communications indicators was predominantly gathered from published interwar and Soviet-period Lithuanian statistical publications. Several gaps required supplementation using archival data from the Library of the Lithuanian Academy of Sciences, monthly statistical bulletins and unpublished statistical collections from the Statistics Lithuania library.

As Figure 3.12 demonstrates, Lithuania's transport and communications sector exhibited steady expansion throughout the 20th century, with exceptions during 1939-1945 and from 1989 onwards. Notably, the sector showed remarkable resilience, experiencing only a single-year contraction of 5% during the Great Depression and avoiding the 1980s stagnation that affected manufacturing. Growth rates were impressive, achieving over 7% annually during 1929-1938, and following recovery to pre-WWII levels in 1947, maintaining 8.5% annual growth until 1989.

[53]Norkus et al., ''Benchmarking Latvia's''.
[54]Maddison, ''Measuring the Performance'', 319.
[55]Joint Economic Committee, *USSR: Measures*, 49.

Figure 3.12: LITHUANIA: MARKET SERVICES OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Market services total includes transport & communications, trade, accommodation & food service, finance & insurance and housing activities.

Lithuanian trade and accommodation & food service activities

Since interwar period movements were calculated using the marketed shares approach, data source information can be found within respective paragraphs covering crops, livestock, forestry, fishing and industry or in Appendices C and D. Import data was sourced from published statistical bulletins and modern databases. Marketed shares of agricultural products were derived from published 1932/33 and 1937/38 Agricultural accounting surveys.

Occupation-period trade activity indices at *comparable prices* and employment figures used for gap-filling were obtained from published Nazi statistical bulletins, Soviet Lithuanian yearbooks, World Bank studies from the 1990s and various archival documents from Lithuanian Central State Archive.

Figure 3.12 shows that during the interwar period, the trade sector maintained a steady upward trend from 1927, briefly interrupted by the Great Depression downturn in 1931. The sector achieved 7% annual growth between 1929 and 1938. Post-WWII recovery was notably protracted (until 1951), likely due to suppressed commercial activities in the command economy. Nevertheless, from this point until 1989, trade activities grew at 8.5% annually and continued expanding during the early 1990s as Lithuania transitioned to market capitalism. Throughout Soviet rule, the sector exper-

ienced only one contraction, a 3% decline in trading activities in 1982.

Lithuanian financial, insurance & housing activities

Data on deposits, loans and real estate tax revenues in interwar Lithuania was gathered from statistical yearbooks, archival material in the Library of Lithuanian Academy of Sciences and various secondary published statistical sources. Interest and tax rates were predominantly sourced from secondary statistical publications.

Employment data for 1940s-1990s was collected from Nazi statistical periodicals, archival documents in the Lithuanian Central State Archive, unpublished materials in Statistics Lithuania library, Soviet Lithuanian statistical yearbooks and World Bank studies from the 1990s.

Figure 3.12 reveals that financial and insurance services experienced volatile development during the interwar years, with two contractions in both the 1920s and 1930s. This resulted in a negative annual growth rate of -2% for 1929-1938. Like the trade sector, financial and insurance activities took until 1953 to regain pre-WWII levels, subsequently growing at nearly 6% annually until 1989. The sector continued expanding through the 1990s due to rapid growth in private banking and insurance activity.

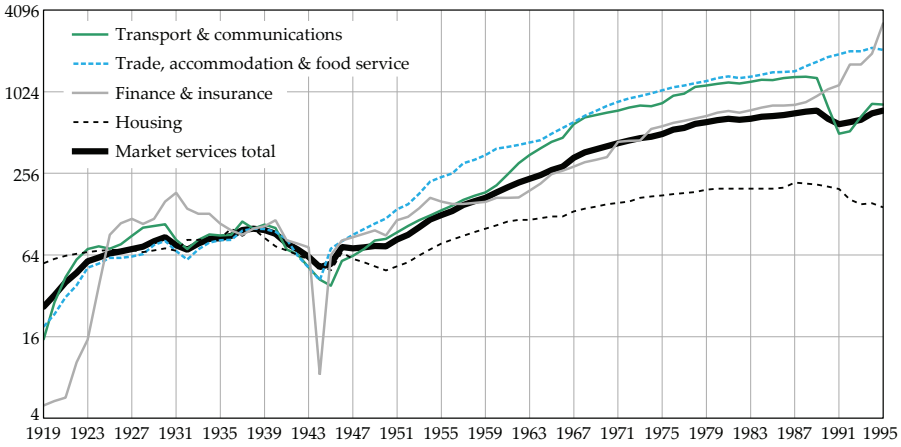
Housing activities demonstrated greater stability during the interwar period, achieving 17% annual growth between 1929 and 1938, likely driven by urban population growth. Following a mild WWII contraction, housing recovered to pre-WWII levels by 1946 and grew at nearly 5% annually until 1988, before entering decline. A notable three-year recession occurred in 1950-1953, possibly linked to reduced population growth resulting from Soviet deportations.

Latvian transportation & communications

Latvian transportation and communications data predominantly derives from statistical yearbooks, both interwar and Soviet-period editions. Figures for 1919-1921 and 1945-1950 were obtained from archival materials in Latvia's National Library and the Russian State Archive of Economy (available online).

Figure 3.13 presents a markedly different pattern of transport and communication development in Latvia during the interwar period compared to

Figure 3.13: LATVIA: MARKET SERVICES OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Market services total includes transport & communications, trade, accommodation & food service, finance & insurance and housing activities.

Lithuania. The sector reached peak activity levels in 1930, before experiencing a two-year recession during the Depression. It only surpassed these levels in 1937, then entered pre-WWII stagnation. Consequently, the 1929-1938 record was negative, and sectoral underperformance persisted post-WWII, with Latvian transport and communications taking until 1952 to regain interwar peak activity levels. Thereafter, growth remained stable and robust at over 7% annually until 1988. A dramatic reversal occurred in 1989, followed by a two-year free fall during which the sector lost 61% of its annual output.

Latvian trade and accommodation & food service activities

Interwar sources and procedures for Latvia parallel those of Lithuania, with detailed information provided in Appendices C and D. While most occupation period trade activity data similarly derived from published Nazi statistical bulletins, Soviet Latvian yearbooks, and World Bank studies from the 1990s, considerable early post-WWII data was sourced from USSR statistical collections on domestic trade.

Figure 3.13 demonstrates that the Latvian trade sector experienced a similarly positive overall trend to Lithuania in both interwar and occupation years. The sector expanded by 3% annually on average during 1929-1938, maintain-

ing 7% growth between recovery to interwar levels in 1948 and 1989. Like Lithuania, Latvia saw continued sector expansion in the early 1990s and experienced a corresponding 3% contraction in 1982. However, Latvian trading activities suffered more severely during the Great Depression, enduring a 13-16% decline over two years in 1931-1932.

Latvian financial, insurance & housing activities

In the case of interwar Latvian deposits, loans, interest rates and housing statistics, data was sourced from Latvian statistical yearbooks, finance and credit statistical publications, the 1942 Nazi occupational statistical collection, and various books on Latvia's economic history.

Employment data for the occupation period was gathered from Nazi statistical periodicals, Soviet Latvian statistical yearbooks, special statistical publications on Soviet Latvian employment trends and World Bank studies from the 1990s.

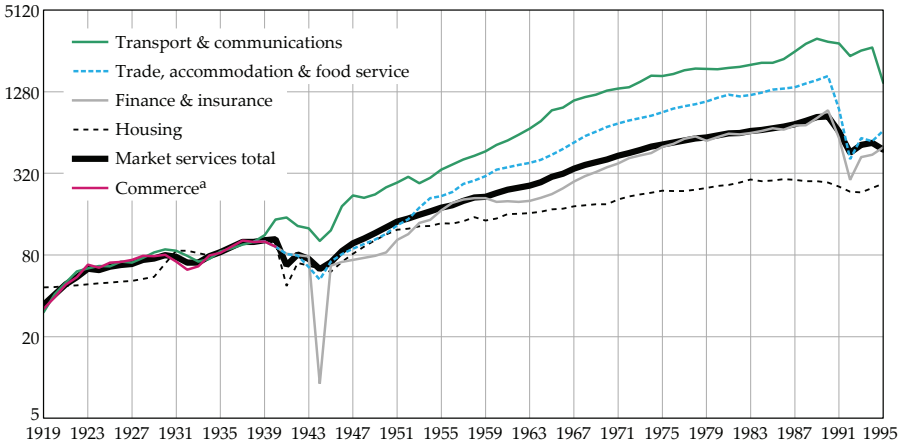
As Figure 3.13 illustrates, Latvia's finance and insurance sector recovered from complete disruption in 1920-1925 before experiencing a prolonged recession in 1931-1936. As in Lithuania, the 1929-1938 growth rate was negative at -2% per year. The sector attained peak interwar activity levels in 1951 and grew at nearly 6% annually until 1989, subsequently following a similar upward trajectory in the 1990s to that seen in Lithuania.

Housing in Latvia developed highly unevenly throughout the 1920s and 1930s, though achieving a formidable average growth rate of 4% per year during 1929-1938. Under socialist rule, housing sector development was surprisingly slow, taking until 1959 to reach interwar levels and growing at just 2.5% annually until 1989, before entering recession.

Estonian transportation & communications

In contrast to Lithuanian and Latvian data, many Estonian interwar and occupation period physical transport output figures have already been compiled and published in modern secondary works by Martin Klesment and Jaak Valge. However, communications data was less readily available and had to be directly obtained, along with post-1990 data, from published statistical collections (USSR and Estonian SSR yearbooks, periodicals and multi-year collections).

Figure 3.14: ESTONIA: MARKET SERVICES OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. There is no disaggregation to into trade, accommodation, catering, financial and insurance activities in Estonian 1938 benchmark 'Commerce' figure. Therefore, interwar 'Commerce'([a]) index, which is based on constant-price movement in marketed shares of previous sectors, is assumed to be representative of a joint figure for trade, catering, finance and insurance. Market services total includes transport & communications, trade, accommodation & food service, finance & insurance and housing activities.

Estonian transport and communications sector experienced highly positive developments during the 1920s, followed by a three-year recession in 1931-1933. The sector subsequently recovered, achieving an average growth rate of 3% annually in 1929-1938. Notably, Estonian transport and communications continued expanding until 1941, despite occupation and WWII, and by 1946 had already surpassed its 1941 peak activity level. The sector demonstrated outstanding performance between 1946 and 1989, growing at nearly 7% per annum almost continuously. A temporary slowdown occurred between 1978 and 1985, followed by renewed explosive growth of 6-14% annually in 1986-1989. While the sector declined in 1990, the contraction was considerably less severe than Latvia's.

Estonian trade and accommodation & food service activities

As with Latvia, procedures for estimating interwar Estonian trade, accommodation and food service activities paralleled Lithuania's methodology, with details available in Appendices C and D. Occupation period data predominantly derives from Estonian State Archives materials, supplemented

by Nazi statistical bulletins, USSR yearbooks and statistical collections on domestic trade.

Interwar Estonian trading activities, shown in Figure 3.14, are represented by the *commerce* index, which assumes synchronous movement of finance, insurance and other commercial service activities with trade. Following positive developments in the 1920s, the sector achieved nearly 3% annual growth in 1929-1938. While experiencing a milder recession than Latvia during 1931-1932, it still endured a two-year contraction of 11-13%.

Under socialist rule, the trade sector regained pre-WWII levels in 1949 and grew at an average annual rate of 7% continuously until 1989, experiencing only a 2% contraction in 1982, similar to the southern Baltic states. However, unlike Lithuania and Latvia, the Estonian trade sector declined in the early 1990s.[56]

Estonian financial, insurance & housing activities

Since the interwar benchmark GDP estimate does not differentiate between commercial service branches, this thesis assumes that financial and insurance activities moved in tandem with previously accounted trade activities. Interwar housing data derives from Valge's secondary statistical study, extended with urban and total population changes.

Occupation period Estonian employment data was, as with Lithuania, collected from Nazi statistical periodicals, documents in Estonian State Archives, Soviet Estonian statistical yearbooks and World Bank studies from the 1990s.

As Figure 3.14 shows, trends in Estonian financial and insurance activities can only be distinguished from 1938 onwards. The Soviet Estonian banking and insurance sector took until 1951 to reach pre-WWII levels, subsequently growing at 5.5% annually between 1951 and 1989 before entering recession.[57] Notably, the sector experienced an intriguing prolonged stagnation from 1958 to 1963, warranting historical investigation.

[56]This might be due to constant-price sales turnover data used which was unavailable for Lithuania and Latvia for the early 1990s. During the years of transition to market economy deflated sales data might contain understated inflation, leading to depressed real growth rate. Nevertheless, major downturns begin in 1992 which is of little relevance to the main result of this thesis since the final GDP series are spliced with modern figures at 1991.

[57]The downward trend, opposite to those observed in Lithuania and Latvia might again be due to 1991-1995 productivity adjustment in finance and insurance sector being based on potentially depressed real growth rate in trade sector. Again, however, this is unlikely to impact the main GDP series since they are spliced with modern figures at 1991.

The housing sector in interwar Estonia demonstrated exceptionally rapid growth in the 1930s, with only a minor setback during the Great Depression, achieving average annual growth of 7% between 1929 and 1938. Whilst post-WWII growth was initially rapid, reaching 1938 levels by 1938, subsequent growth proved disappointing, averaging just 2% annually until 1989, before experiencing a relatively mild recession in the 1990s.

Baltic public services

Public administration, defence and education in interwar Baltic states were predominantly non-profit sectors (excluding some private schools). Consequently, value-added (VA) changes in these activities are approximated by respective employment figures, assuming steady productivity. Healthcare, though partially private, is similarly approximated by employment changes and included among public services.

For interwar public administration indices, the thesis uses state servant numbers for 1921-1938 (Lithuania) and 1922-1939 (Latvia), with gaps filled by interpolation or population data. Social security and municipal administration, comprising 7-9% of total Lithuanian public administration wages, are assumed to follow the public administration index.[58]

Interwar education indices for Lithuania and Latvia derive from teaching staff numbers across primary, secondary and tertiary institutions, weighted by wage disparities. Lithuanian healthcare series uses doctor numbers exclusively, whilst Latvia's incorporates medical doctors, dentists and midwives, weighted by salary data. Social work activities are assumed to mirror healthcare movements.

Estonian data presents unique challenges, as the 1938 benchmark lacks public administration subsector differentiation (see Appendix A). Whilst teacher and doctor numbers are available, civil servant figures prove elusive. Consequently, public services (excluding defence) are assumed to follow general economic movements throughout the interwar period.

Interwar defence indices derive from military personnel numbers across all three Baltic states. Lithuanian and Latvian gaps (up to 2 years) were interpolated linearly. Estonian figures remain limited, with only 1919-1920 and 1939 data points available, assuming constant staffing between. The 1940 indices reflect Soviet garrison admittance, increased by half the total staff

[58] *Lietuvos statistikos metraštis 1936* (Kaunas: CSB, 1937), 184, 189.

enlargement to account for restricted consumption among Red Army soldiers.[59]

For the occupation period, public administration, education and healthcare follow CIA methodology using sectoral employment indices.[60] However, defence and security present particular challenges for occupied Baltic republics. Without CIA-style deflated military expenditure estimates, and limited Soviet troop data (available only for 1939-1940 and 1990-1994), the thesis assumes Red Army contingents grew proportionally with the government apparatus during 1940-1990. The 1937-1939 period uses extrapolated interwar value-added figures, while 1991-1995 employs comprehensive public and defence employment data.

Detailed procedures are described in Appendices C and D, with specific defence sector data presented in Table D.2.

Lithuanian public services

Most employment data for interwar public administration, defence, education and healthcare sectors, particularly regarding early Lithuanian republic years, was derived from pre-existing secondary studies. Later years were supplemented with data from primary sources such as statistical yearbooks.

Employment data for 1940s-1990s, as with finance, insurance and housing activities, was collected from Nazi statistical periodicals, archival documents in the Lithuanian Central State Archive, unpublished materials in Statistics Lithuania library, Soviet Lithuanian statistical yearbooks and World Bank studies from the 1990s. Military personnel numbers were gathered from various secondary studies, predominantly by modern historians.

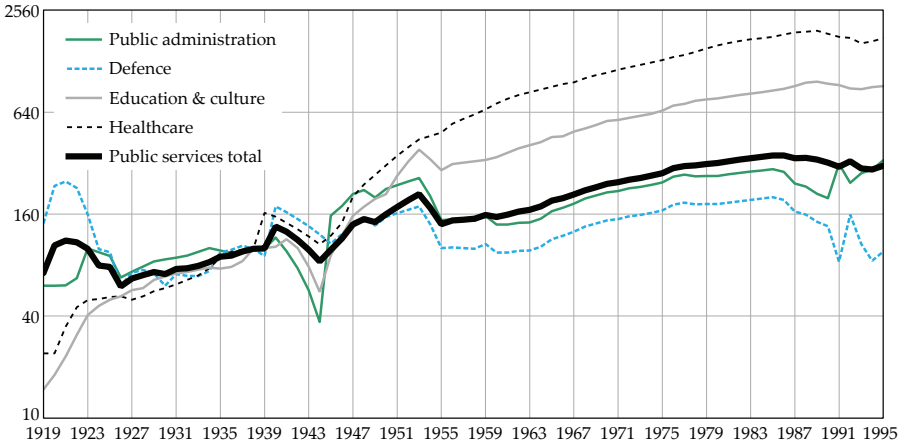
Figure 3.15 reveals several significant trends in Lithuanian public service throughout the 20th century. Public administration expanded in 1923 following the Klaipėda region annexation but declined sharply in 1926 with the authoritarian coup. During Smetona's autocratic reign, public administration employment grew and further increased in 1940 after the Vilnius area annexation. Post-WWII saw the vastly expanded government downsized in the 1950s, before increasing from mid-1960s through to 1985.

The military sector experienced massive expansion in 1919-1920 during the independence wars, followed by gradual downsizing until the 1926 au-

[59] Мельтюхов, *Прибалтийский*: 279

[60] Maddison, ''Measuring the Performance'', 319.

Figure 3.15: LITHUANIA: PUBLIC SERVICES OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Public services total includes public administration, defence, healthcare and education & culture activities.

thoritarian coup. Subsequent gradual expansion occurred, with the 1940 increase reflecting forced Soviet garrison stationing. During 1945-1990, the defence sector followed general government trends, declining unevenly after 1990 as Lithuanian independent military replaced departing Soviet soldiers.

Education and healthcare demonstrated similar gradual positive trends during both interwar and occupation periods, though healthcare showed accelerated growth from the 1950s. Both sectors experienced mild declines in the 1990s before recovering in 1994.

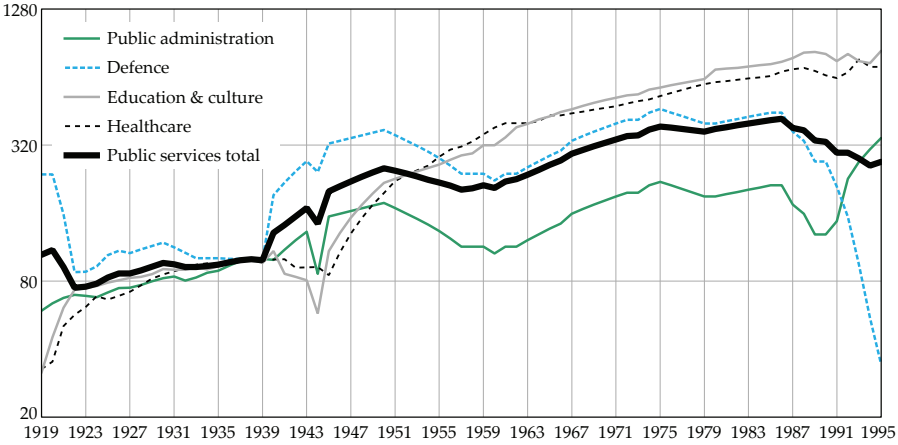
Latvian public services

Latvian interwar public administration employment data was sourced from Latvian interwar employment statistics yearbooks. Education and healthcare employment statistics were predominantly obtained from pre-processed online databases. Interwar Latvian military numbers were gathered from archival documents in Latvian State Historical Archives.

As with the financial, insurance and housing sector, occupation period employment data was collected from Nazi statistical periodicals, Soviet Latvian statistical yearbooks, special statistical publications on Soviet Latvian employment trends and World Bank studies from the 1990s. Military figures, as in Lithuania's case, were primarily sourced from modern scholars' second-

ary studies.

Figure 3.16: LATVIA: PUBLIC SERVICES OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Public services total includes public administration, defence, healthcare and education & culture activities.

Figure 3.16 shows that Latvia's government sector experienced relatively stable growth during the interwar years and followed similar post-WWII trends to Lithuania. The military sector, however, contracted during the 1930s, potentially as an austerity measure during the crisis. Notably, Latvia's independent military development in the 1990s progressed more slowly than Lithuania's, failing to compensate for the reduction and eventual withdrawal of Soviet garrisons.

Latvia's education and healthcare sectors display remarkably similar patterns in Figure 3.16. Both sectors developed in parallel throughout both interwar and occupation years and, like Lithuania, experienced relatively mild recessions in the 1990s.

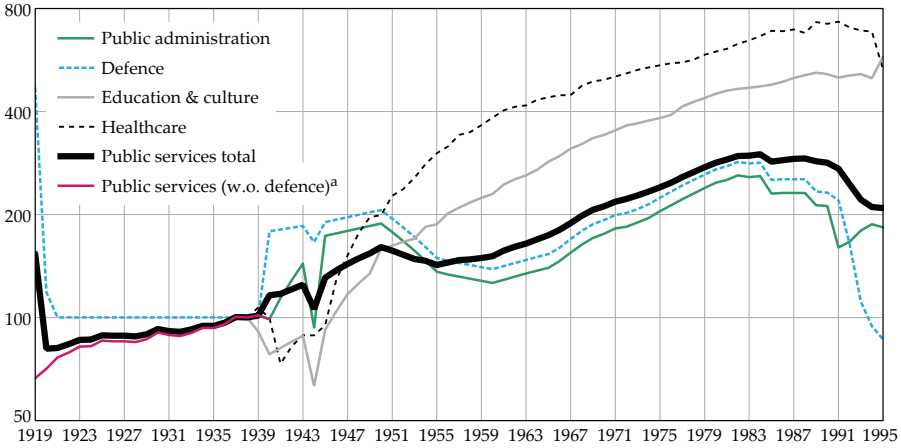
Estonian public services

Although interwar Estonian benchmark GDP provides only a combined figure for public administration, education and health value-added, with public administration employment statistics unavailable, this thesis assumes the *public services (without defence)* figure moved in tandem with the broader Estonian economy. Annual military staff figures for interwar Estonia were limited to 1919, 1920 and 1939, necessitating the assumption of constant garrison size

between 1921 and 1938—reasonable given the absence of international threats during this period.

Occupation period Estonian employment data was, as with financial, insurance and housing sectors, gathered from Nazi statistical periodicals, Estonian State Archives documents, Soviet Estonian statistical yearbooks and World Bank studies from the 1990s. Military staff numbers, like Latvia and Lithuania, were calculated from modern historians' secondary studies.

Figure 3.17: ESTONIA: PUBLIC SERVICES OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. There is no disaggregation to into public administration, healthcare and education activities in Estonian 1938 benchmark 'Public services' figure. Therefore, interwar 'Public services (without Defence)' index, which is based on movement in the rest of the economy, is assumed to be representative of a joint figure for public administration, healthcare and education. Public services total includes public administration, defence, healthcare and education & culture activities.

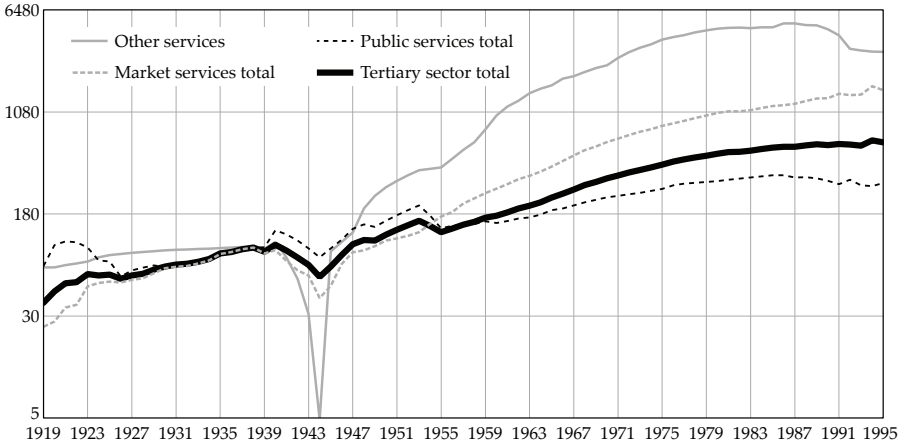
Figure 3.17 shows that Estonia's interwar public sector proves more challenging to track as it relies on movement in the broader economy. The sharp decline in defence sector size in 1920-1921 reflects post-independence war demobilisation, whilst the 1940 expansion stems from forced acceptance of Soviet garrisons in late 1939. From 1945, Estonian public administration followed similar trends to occupied Lithuania and Latvia, though 1980s downsizing began earlier than in the other Baltic states. Notably, Soviet Estonian government sector had expanded more than Lithuania and Latvia's by 1984 relative to 1940, potentially prompting downsizing initiatives. Like Latvia, Estonia's military development proceeded slowly during Soviet withdrawal in the 1990s, resulting in defence sector contraction.

Similar to Lithuania but contrasting with Latvia, Estonia's healthcare sector expanded more rapidly than education under socialist rule. Nevertheless, both sectors demonstrated continuous growth, experiencing only minor contractions in the early 1990s.

Other services and tertiary sector totals

The final sector encompasses remaining service activities, including professional, scientific and technical activities, administrative and support services, other service activities and domestic services. For interwar Lithuania and Latvia, volume indices of these subsectors are estimated where possible using employment, performance and attendance data, with population movements employed as proxies where data gaps exist.

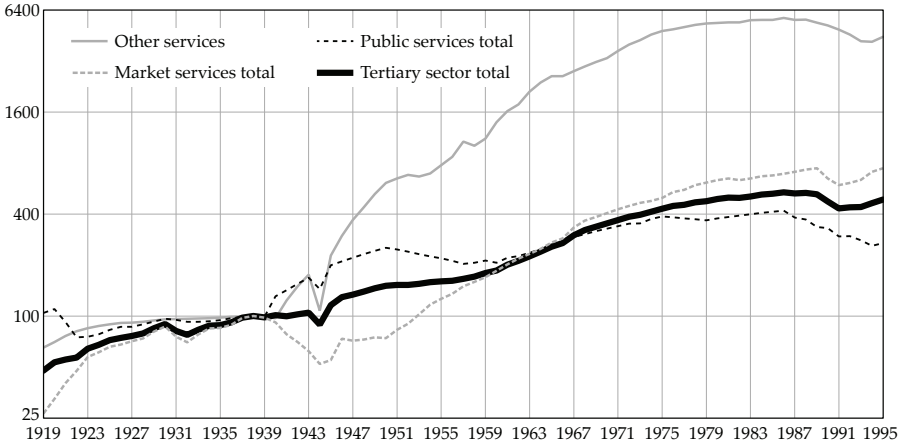
Figure 3.18: LITHUANIA: TERTIARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Tertiary sector total includes market services, public services and other services.

Lithuanian benchmark data provides a value-added figure for undifferentiated household income, derived from Agricultural accounting survey data. Consequently, this subsector's value-added series is compiled from rural population changes (Tables F.1 and F.2 in Appendix F). For interwar Estonia, the 'other services' category in the benchmark figure explicitly mentions only domestic (household) services, without differentiating other components. The current approach tracks this sector's movement using total population changes, acknowledging the need for future refinement.

Figure 3.19: LATVIA: TERTIARY SECTOR OUTPUT INDICES
1938=100, log scale



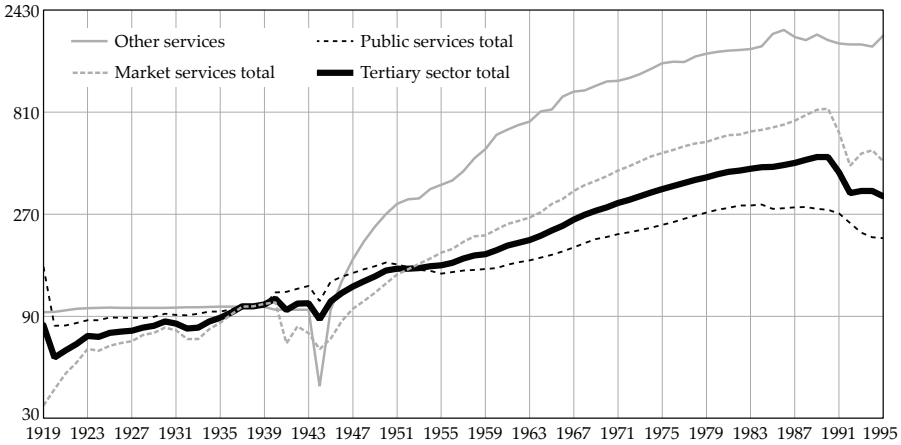
Sources: See Appendices C and D. Tertiary sector total includes market services, public services and other services.

Regarding the occupation period, 'other services' include scientific and other activities, all accounted for with respective employment data, sources for which were detailed in the financial, insurance and housing activities sections. Given the relatively small economic share of 'other services', detailed trend analysis is not warranted.

Overall, figures 3.18, 3.19 and 3.20 reveal one crucial pattern: the clear dominance of market services over public services in terms of growth rates throughout the 20th century. Notably, even under socialist rule, when commercial services were dismissed by planners as 'unproductive', market service activities in all three occupied Baltic republics expanded markedly faster than public services.

With all sectors now documented, the value-added indices and final interwar and occupation period GDP figures are presented in Tables C.1, C.2, C.3, E.1 in Appendix C and Tables D.3, D.4, D.5, E.2, E.3, E.4 in Appendix D.

Figure 3.20: ESTONIA: TERTIARY SECTOR OUTPUT INDICES, 1938=100, log scale



Sources: See Appendices C and D. Tertiary sector total includes market services, public services and other services.

Final GDP and GDP per capita series

With the completion of benchmark updates and sectoral value-added series assembly, the final estimation steps involve compiling 1919-1940 and 1937-1995 constant-price GDP per capita series, converting them to international PPP dollars, and anchoring them to existing figures. The series, expressed in both national and international PPP currencies, are presented in Tables E.1, E.2, E.3 and E.4 in Appendix E

Following Bolt and van Zanden's guidance, Maddison's 1990 benchmark is optimal for pre-1990 international comparisons, whilst the 2011 benchmark better suits post-1990 estimates.[61] Consequently, all MPD data before 1991 uses the 1990 benchmark in Int$_{1990}$, converted to Int$_{2011}$ using a standard 1.594 conversion ratio.[62] As most benchmark GDP per capita figures in this thesis are originally in Int$_{1990}$, the study first compiles complete 1913/1919-2024 series in Int$_{1990}$ before converting to Int$_{2011}$ for MPD version 2023

[61] J. Bolt and J. L. van Zanden, ''The long view on economic growth: New estimates of GDP'', How Was Life? Volume II New Perspectives on Well-being and Global Inequality since 1820 (Paris: OECD Publishing, 2021), 30.

[62] See page 12 in the MPD version 2023 paper.

Table 3.1: OVERLAP BETWEEN 1930S, 1990 AND 2011-BASED SERIES

	Differences between 1930s and 1990-based series		
	Lithuania	Latvia	Estonia
1937	-7.7%	1.7%	-1.6%
1938	-9.3%	3.2%	3.6%
1939	-3.5%	-1.9%	-3.0%
1940	1.1%	-0.7%	-0.3%

	Differences between 1990 and 2011-based series		
	Lithuania	Latvia	Estonia
1990	-15.1%	-2.9%	3.0%
1991	-12.8%	2.5%	-0.7%
1992	-8.0%	26.6%	-12.4%
1993	-2.0%	17.1%	-19.4%
1994	5.5%	12.9%	-18.6%
1995	1.0%	13.8%	-25.8%

Sources: Tables E.1, E.2, E.3, E.4 and E.5 in Appendix E.

compatibility. Figures are presented in Table 3.2 below and in Table F.3 in Appendix F.

The final series assembly involved linking three GDP data sets: existing post-1990 series (2011 benchmark) and newly constructed 1919-1940 (1930s benchmarks) and 1937-1995 (1990 benchmark) series. The 1919-1940 and 1937-1995 series are spliced at 1940, using an average of both datasets' 1940 data points, chosen for its minimal difference between overlapping years (see Table 3.1).

The 1990s present greater challenges, with MPD version 2023 figures likely upward-biased and requiring adjustment.[63] The MPD's 1990-2010 series adjustment appears in Table E.5 in Appendix E, accepting the 2011 benchmark and subsequent GDP per capita figures while extrapolating preceding years using World Bank's constant-price GDP per capita series. The adjusted post-1990 series are then converted to Int$$_{1990}$. These are referred to as '2011-based series' in Table 3.1.

As the table reveals, Latvia and Estonia's figures converge closely in 1990-1991, whilst Lithuania's differences reconcile only from 1993 onwards, due to World Bank overstatement of Lithuania's 1990 GDP per capita relative to the direct GDP per capita PPP estimation used as a benchmark in this thesis.[64]

[63] For further commentary, see page 57 and Figure 2.2

[64] See Bolotin, ''Former Soviet Union''.

The study splices the new Latvian and Estonian figures to adjusted existing ones at 1991, using averages as compromise estimates. Lithuania's connection occurs in 1993, accepting the 1991-1992 estimates from this thesis as more robust than adjusted MPD figures. This reduction of Lithuania's 1990 level aligns with both direct PPP-based benchmark estimates and previous critiques of existing GDP series' overstatement of 1990s crisis severity.[65]

[65] De Broeck and Koen, *The Great Contractions*, 3–4.

Table 3.2: GDP PER CAPITA IN THE BALTIC STATES in Int$$_{1990}$$

	Lithuania	Latvia	Estonia		Lithuania	Latvia	Estonia
1913	1632.0	2361.0	2058.0	1970	5890.1	8045.2	7688.1
				1971	6077.8	8244.2	8002.1
1919	1016.6	1481.0	1600.0	1972	6283.0	8327.9	7896.5
1920	1186.7	1521.8	1475.2	1973	6463.7	8522.9	8079.9
1921	1415.8	1670.5	1672.6	1974	6554.7	8616.8	8216.8
1922	1530.0	1654.3	1756.3	1975	6815.0	8833.8	8418.6
1923	1755.8	1899.0	1913.2	1976	6954.3	8952.3	8623.0
1924	1648.5	1942.7	1894.5	1977	7051.9	8900.5	8600.5
1925	1627.6	2084.6	2038.3	1978	7194.7	8780.1	8474.2
1926	1489.1	2095.2	2029.6	1979	7057.9	8737.1	8522.9
1927	1503.4	2150.8	2042.8	1980	6940.8	8867.0	8784.6
1928	1495.9	2152.5	2046.2	1981	7160.4	9002.4	8584.8
1929	1576.7	2350.8	2113.2	1982	7200.5	8944.6	8554.0
1930	1665.0	2537.2	2282.2	1983	7342.0	9102.5	8775.3
1931	1675.3	2314.2	2176.2	1984	7687.4	9345.5	8932.2
1932	1702.5	2285.9	2105.3	1985	7737.0	9284.0	8728.3
1933	1722.6	2496.3	2186.3	1986	7821.3	9438.1	8918.6
1934	1792.6	2722.4	2353.0	1987	7732.1	9124.0	8832.7
1935	1900.4	2776.1	2355.0	1988	7856.5	9049.0	8879.0
1936	1931.7	2797.0	2492.1	1989	7858.5	8771.8	8958.4
1937	2018.7	3031.0	2721.7	1990	7475.0	7965.0	8425.0
1938	2057.4	3098.9	2684.9				
1939	1942.7	3108.4	2736.1	1991	7234.2	7295.3[b]	7531.8[b]
1940	1746.5[a]	2995.9[a]	2771.5[a]	1992	6010.6	4958.8	6069.3
				1993	5446.4[c]	4805.5	5870.1
1941	1625.5	2891.1	2389.7	1994	4999.1	4993.7	5898.5
1942	1480.9	2702.7	2382.4	1995	5203.5	5017.5	6276.6
1943	1284.1	2596.2	2327.8	1996	5513.7	5205.7	6684.7
1944	1065.0	2236.3	1909.5	1997	6016.1	5722.4	7643.8
				1998	6512.9	6142.7	8052.5
1945	1320.5	2744.3	2656.1	1999	6484.4	6363.6	7994.7
1946	1592.3	2886.0	2833.1	2000	6771.5	6789.9	8758.7
1947	1941.3	3027.6	3123.0	2001	7273.1	7313.1	9343.9
1948	2079.6	3290.5	3323.2	2002	7826.7	7922.9	10040.0
1949	2193.6	3490.4	3474.3	2003	8724.2	8673.7	10871.1
1950	2298.3	3721.7	3667.2	2004	9402.4	9495.3	11680.4
1951	2359.9	3873.6	3709.0	2005	10295.7	10627.5	12866.5
1952	2436.0	4009.2	3757.6	2006	11237.0	12009.4	14206.5
1953	2650.4	4089.1	3746.9	2007	12634.4	13311.6	15353.1
1954	2662.0	4344.9	3786.5	2008	13098.7	13015.1	14604.3
1955	2624.8	4304.2	3950.9	2009	11279.6	11344.9	12491.9
1956	2820.1	4472.3	4242.8	2010	11708.8	11067.4	12826.4
1957	3139.1	4640.4	4460.0	2011	12699.5	11560.9	13799.9
1958	3327.5	4812.5	4727.2	2012	13365.7	12528.2	14293.8
1959	3573.6	5237.8	5010.3	2013	13981.0	12912.1	14557.2
1960	3696.9	5475.9	5318.9	2014	14600.5	13280.1	15045.7
1961	3760.6	5667.7	5513.3	2015	15036.9	13914.3	15353.6
1962	3735.4	5466.1	5546.5	2016	15612.8	14374.5	15806.9
1963	3969.1	5698.6	5840.0	2017	16510.7	14989.9	16726.2
1964	4242.5	6148.5	6149.8	2018	17334.7	15708.8	17312.7
1965	4499.6	6469.6	6466.5	2019	18184.5	16222.5	17883.1
1966	4823.8	6687.6	6612.8	2020	18175.6	15968.0	17730.0
1967	5204.3	7210.4	7012.6	2021	19170.0	16774.5	19133.7
1968	5398.9	7544.4	7347.8	2022	19362.2	17076.7	18862.9
1969	5658.4	7666.2	7442.0	2023	19162.2	17603.1	17836.9
				2024	19582.2	17724.6	17677.1

Sources: 1913 from Norkus and Markevičiūtė "New estimation": 603; 1919-1939 from Table E.1 in Appendix E; 1940 (denoted by [a]) are compromise (average) estimates between 1940 figures from inter-war benchmark-based series (Table E.1 in Appendix E) and 1990 benchmark-based series (Tables E.2, E.3 and E.4 in Appendix E); 1941-1992 for Lithuania and 1941-1990 for Latvia and Estonia from Tables E.2, E.3 and E.4 in Appendix E; 1991 for Latvia and Estonia (denoted by [b]) are compromise (average) estimates between 1991 data points in Tables E.3 and E.4 and E.5 in Appendix E; 1993 for Lithuania (denoted by [c]) is a compromise (average) estimate between 1993 data points in Tables E.2 and E.5 in Appendix E; 1994-2024 for Lithuania and 1992-2024 for Latvia and Estonia from Table E.5 in Appendix E.

Quality of the new series

The new GDP per capita series estimation presented in this thesis marks the first methodologically consistent reconstruction of Baltic income levels since post-WWI independence. The painstaking effort invested in meticulously gathering primary data on outputs of hundreds of products has enabled the construction of previously non-existent sectoral volume indices for the entire 1919-1995 period. Whilst some of these indices have limitations, most were compiled through consistent application of CIA methodologies. The CIA approach necessitated the use of non-monetary indicators and, although unavoidable when accounting for the trade sector, this thesis has generally succeeded in reconstructing CIA-level GDP aggregates for separate Soviet republics for the first time—an endeavour never before attempted for any economy within the Soviet Union except Russia.

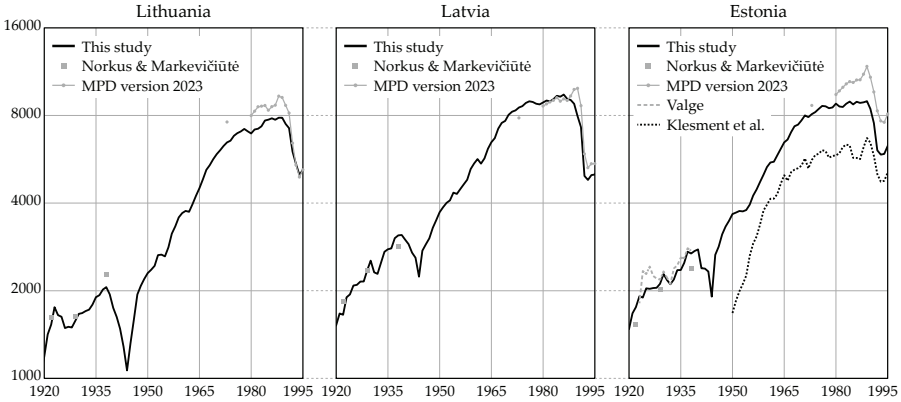
Despite important limitations to be discussed in the following section, the estimates can be judged as robust due to several factors. Firstly, this study employs two sets of detailed benchmark estimations with direct PPPs—one from the 1930s covering the interwar capitalist period and another from 1990 covering the socialist period. The broad sectoral coverage in these figures (except for interwar Estonia) allows for extensive use of newly constructed sectoral volume indices. Secondly, the volume indices compiled, though not without limitations, generally cover most of the economy using physical product or other indicator data, which helps to avoid pricing issues during both the volatile interwar period and the artificial price-plagued socialist era.

Thirdly, the quality of estimates can be assessed using Feinstein's framework, which assigns grades of robustness when series are connected. If the absolute difference between overlapping year figures is less than 5%, the figures are deemed firm; between 5% and 15%, good; 15-25%, rough; and above 25%, conjectural. As shown in Table 3.1, the datasets constructed in this thesis are exceptionally firm at the anchoring years (1940 and 1991 for Latvia and Estonia, 1993 for Lithuania). Moreover, figures extrapolated from the 1990 benchmark maintain their firmness as far back as 1937/1938, which coincides with another benchmark year for Lithuania and Estonia. Generally, series based on 1930s benchmarks and those based on 1990s benchmarks connect al-

most seamlessly in 1937-1940 (except for Lithuanian 1937-1938 figures, which still achieve a 'good' grade). The 1990s show greater discrepancy, but this is expected for such an extremely transformative period known for measurement challenges (see page 57). Given that all three countries have at least two years in all overlap periods where the difference between overlapping year figures is less than 5%, the overall outlook of the final series is reassuring.

Finally, although previous studies are scarce, some cross-check examinations are possible. Figure 3.21 provides a comparison of the new GDP per capita series with figures previously published by other authors.

Figure 3.21: CROSS-CHECKS FOR THE NEW SERIES,
GDP per capita in Int$$_{1990}$$, log scale



Sources: this study and Norkus and Markevičiūtė, "New estimation": 603; J. Valge, ''Uue majanduse lätteil. Eesti sisemajanduse kogutoodang aastatel 1923–1938'', *Akadeemia*, nos. 10-12 (2003): 2726; M. Klesment et al., ''Childbearing and macro-economic trends in Estonia in the XX century'', *Rahvastiku-uuringud* (Tallinn) Seeria B, no. 63 (2010): 44; MPD version 2023.

The comparison reveals significant divergence between the new figures and existing data, which can be attributed to the suboptimal quality of previous estimates. The interwar figures by Norkus and Markevičiūtė, based on indirect estimations using industrial workers' real wages as a proxy for GDP per capita, show discrepancies. As Tables C.1, C.2 and C.3 demonstrate, GDP and industrial growth rates were similar in the 1920s but diverged sharply in the 1930s for all three Baltic states, explaining the closer alignment in 1922 and 1929 compared to 1938.

Regarding the MPD version 2023 series, the upward bias due to questionable 1990 benchmark was previously established (see page 57). Moreover, the growth rates in 1980-1990 demonstrate significant discrepancies. Whilst

MPD data suggests notable positive GDP per capita trends, particularly a 3-5% increase in 1988-1989 for all three Baltic Soviet republics, Tables D.3, D.4 and D.5 indicate that total gross value-added increased by less than 2% in 1988-1989, with population growth leading stagnant (1%) or even negative (-2%) trends in per capita GDP.

The most striking misalignment appears in Latvia, where in 1989, virtually all sectors based on physical indicators were declining and population was still increasing, yet MPD version 2023 reported over 5% GDP per capita growth. It is likely that MPD used raw or adjusted net material product growth trends based on artificially priced Soviet data to extrapolate the 1980-1990 change in Baltic GDPs, leading to upward bias in growth rates.

Two previous studies on interwar and socialist Estonia warrant particular attention. Valge's 2003 study shows reasonable correspondence with this study's figures for the 1930s.[66] However, income levels during the inflationary 1920s are overstated in Valge's study by an average of 10% between 1923 and 1929, likely due to the use of consumer price or cost of living indices for deflating current price GDPs, which fail to capture the full extent of overall inflation.

Klesment et al.'s GDP per capita estimates for Soviet Estonia present even greater divergence, explained by poor benchmark data choice and incomplete sectoral coverage. Their use of outdated UN Economic Commission for Europe 1990 PPPs and 1990-2008 series suggests extremely low 1990 levels of Estonian GDP per capita.Klesment et al., ''Childbearing'', 39–44 Even in 1995, their figures indicate a 19% lower income level than this study, which is based on World Bank growth rates backcast from the 2011 benchmark. The authors' estimates cover only agriculture, industry, construction, and transport, omitting most service sectors and using geometric averages rather than output or value-added weights for aggregation. Consequently, their series are not only severely downward biased but also leave approximately 35% of the economy unaccounted for.

Perhaps the most desirable potential cross-checks would be at least two consumption-side GDP estimates for each of the Baltic states: one in the interwar period, the other in the occupation. This would allow to not only check the overall level of robustness of the figures, but would also confirm or deny whether the output-side estimates truly reflect changes in living standards in a command economy. The absence of such figures at present marks one of

[66] Valge, ''Uue majanduse'', 2726.

the most significant remaining data gaps in Baltic economic historiography which future scholars ought to address.

The reliability of the newly constructed post-1990 figures also deserves attention. Graphs and tables provided in the preceding sections of this chapter show enormous declines in overall, agricultural, and industrial production in 1990–1995 after three decades of growth. While the reasons for the dramatic post-socialist crisis were discussed on pages 38-40, several key factors related to the estimates themselves are worth noting.

The post-socialist crisis was a structural one, with many previously important sectors disappearing entirely (see pages 38-40). This was, however, partially offset by new, emerging (or previously unmeasured) branches, most prominently in the service sector.[67] Since this thesis uses 1987–1990 weights to aggregate all branches in the economy, it does not capture these activities, which would certainly have mitigated the apparent decline.

In order to remove bias in the overall GDP per capita, as discussed on page 140, this thesis follows the 'compromise estimates' approach of Feinstein by averaging early benchmark and late benchmark series at the point of best overlap. As Table 3.1 shows, figures based on the 2011 benchmark (which includes the newly emerging but excludes the disappeared sectors) connect with the 1990-based series at 1993–1995 for Lithuania and at 1990–1991 for Latvia and Estonia. It is therefore assumed that splicing in these years best captures the trade-off between declining and newly emerging sectors.

Finally, since the reliability of estimates showing steep declines in post-socialist countries has attracted considerable scholarly attention, there is sufficient data to perform cross-checks. Whilst some researchers maintain that only minor corrections to flawed official estimates are feasible, others, like Åslund, have attempted more substantial adjustments to account for the expanding shadow economy and other factors typically overlooked in estimates based on 1990 benchmarks.[68] Hamilton & de Vries offered the most recent revision of transitional crises in former USSR republics in 2025, constructing GDP series by backwards extrapolation from mid-1990s benchmarks using sectoral value-added series. Their methodology accounts for decline only in economic production branches that retained significance after Soviet internal demand collapsed, thus controlling for extremely inefficient

[67] O. Havrylyshyn et al., *Growth Experience in Transition Countries, 1990-98* (Washington DC: International Monetary Fund, 1999), 11.

[68] De Broeck and Koen, *The Great Contractions*, 22; A. Åslund, ''Myth of Output Collapse after Communism'', *Post-Soviet Economies Project Working papers*, 2001, 15

Table 3.3: DECLINE IN GDP PER CAPITA FROM 1989 LEVEL TO 1990s TROUGH

	MPD		This study		Åslund		Hamilton & de Vries	
	A	T	A	T	A	T	A	T
Lithuania	-47%	1994	-36%	1994	-21%	1994	-30%	1993
Latvia	-46%	1993	-45%	1993	-12%	1995	-51%	1993
Estonia	-36%	1994	-34%	1993	-16%	1994	-36%	1992
Baltics	-43%	1994	-38%	1994			-34%	1993
ECE	-20%	1992						
USSR	-40%	1996						

Sources: this thesis, MPD version 2023; A. Åslund, ''Myth of Output Collapse after Communism'', *Post-Soviet Economies Project Working papers*, 2001, 15; C. Hamilton and G. J. de Vries, ''The structural transformation of transition economies'', *World development* 191 (2025). 1989/1991 and 1989/1990 ratios taken from this study and applied to Åslund's and Hamilton & de Vries data since it only begins in 1991 and 1990 respectively.
Notes: A—amplitude of the recession, T—trough.

subsectors that vanished after 1991.[69]

The analysis presented in Table 3.3 indicates a strong correspondence between the newly constructed datasets and the Hamilton & de Vries backward-extrapolated data for all three Baltic countries, giving confidence in the compromise estimates presented in this thesis. The table also suggests that Lithuania's transitional crisis was considerably milder than previously implied by the original MPD version 2023 data.

In contrast, Åslund's calculations appear to understate the magnitude of the crisis. His methodology of incorporating the increasing size of the shadow economy is questionable, given that the shadow economy typically resists accurate accounting and its real impact remains absent from GDP figures. The Hamilton & de Vries estimates further weaken Åslund's findings. Due to their backward-extrapolation approach, their figures can only understate rather than overstate the level of the crisis, making Åslund's mild recession estimates particularly surprising. The fact that his working paper never achieved publication further undermines its credibility.

Thus, this thesis accepts the newly constructed 1990s compromise GDP estimates as reliable. It also, however, acknowledges that output declines in individual sectors after 1991 are likely exaggerated.

In terms of comparative quality, the new Baltic interwar GDP series are comparable to Icelandic and Danish figures, although double deflation was

[69] C. Hamilton and G. J. de Vries, ''The structural transformation of transition economies'', *World development* 191 (2025): 17.

used for the agricultural sector in the case of the latter.[70] In contrast, the superior Finnish, Swedish, and Norwegian series benefit from significantly broader secondary data availability compared to their Baltic counterparts.[71] As will be discussed in the following section, even if data is not eventually sufficient to reproduce Nordic-quality estimates, the results obtained in this thesis have room for improvement. If addressed by future scholars, these improvements can lead to substantial enhancements in the quality of the Lithuanian, Latvian and, in particular, Estonian interwar GDP series, bringing them closer to the standard of Northern Europe.

The socialist period series (with extensions to 1937-1995) are nearly identical in methodology and coverage to the CIA-produced USSR GNP datasets. Given their widely accepted status as the best available,[72] the new Baltic socialist period GDP series can also be deemed robust, particularly given their smooth connectivity to the 1930s-based series. While possible biases reviewed in the next section are still considerable, the estimation procedure applied in this thesis can serve as a basis for future GDP estimates of Ukrainian, Moldovan, and other former Soviet republics.

[70]G. Jonsson, ''The gross domestic product of Iceland, 1870–1945'', ed. O. H. Grytten, Nordic historical national accounts: proceedings of workshop IV, Solstrand, 13–15 November 1998 (Bergen, 1999), 7–25; J. P. Christensen et al., ''Nordic historical National Accounts since the 1880s'', *The Scandinavian economic history review* (Stockholm) 43, no. 1 (1995): 39–40

[71]Hjerppe, *Finnish economy*; Krantz and Schön, *Swedish Historical*; Grytten, ''Revising growth''.

[72]Vonyó and Markevich, ''Economic growth and structural'', 279–280.

Limitations

Besides scarcity of sources for cross-checking the new estimates, they contain several significant limitations. The first major area of possible bias is related to potential shortcomings in the benchmark estimates (Tables 2.1 and 2.2). The Lithuanian 1937 and Latvian 1935 figures are highly robust, covering all sectors in modern United Nations sectoral classification and employing firm methods to account for value-added at basic prices throughout the economy. The use of direct bilateral PPPs with Sweden provides additional confidence, as Swedish GDP per capita datasets are considered among the most robust worldwide.[73]

To maintain methodological consistency, this thesis compiled a 1938 benchmark for Estonia. Whilst an analogous bilateral comparison with Sweden established robust 'real' exchange rates to international dollars for Estonia, the overall quality of the 1938 benchmark is somewhat lower than that of the Lithuanian and Latvian figures. Agriculture, industry, construction, and housing are robustly covered sectors (65% of the total), but remaining service sector value-added figures are based on sporadic salary data and disaggregation using employment shares (see Appendix A for details). Consequently, at least 35% of the Estonian 1938 benchmark GDP is subject to improvement, warranting a separate paper similar to those by Klimantas & Zirgulis and Norkus et al. for Lithuania and Latvia.

Regarding the 1990 benchmark, whilst it offers the only available direct PPPs for separate Soviet republics, two potential risks arise from its use. Firstly, whilst agriculture, industry, construction, and transport & communications data, when converted back to roubles, correspond to value-added totals estimated in other sources such as the World Bank,[74] trade and other service sector figures in the *Memo* publication are significantly higher than those reported by the World Bank. These higher service totals align with regional averages of East-Central Europe, as seen in Table 3.4. However, uncertainty surrounds Bolotin's methodology for estimating these higher service sector numbers, which constitutes a limitation.

[73] Krantz, ''New estimates''; Edvinsson, ''New annual estimates''.
[74] For example, The World Bank, *Statistical handbook 1994*

Table 3.4: SECTORAL SHARES OF GDP
in the Baltics and ECE in 1990

	Lithuania	Latvia	Estonia	ECE
Agriculture	22% (28%)	18% (18%)	17% (16%)	14%
Industry & construction	36% (43%)	35% (47%)	41% (47%)	36%
Services	42% (29%)	47% (34%)	42% (38%)	46%

Sources: this study (Table 2.1), The World Bank *Statistical handbook*, 1993, 1994, 1996 editions, pages on the Baltic states and S. Houpt et al., ''Sectoral developments, 1945-2000'', ed. S. Broadberry and K. H. O'Rourke, vol. 2, The Cambridge Economic History of Modern Europe: 1870 to the Present (Cambridge: Cambridge University Press, 2010), 346.
Note: figures in brackets are World Bank estimates.

Another possible issue with the 1990 benchmark is the validity of the USSR's overall 'real' exchange rates of Soviet rouble to Int$$_{1990}$ for individual Soviet republics. Addressing this would require an archival investigation of prices recorded in non-state markets where they were not set by the government. Given the currently limited accessibility of Russian archives, such an investigation would constitute a separate research endeavour.

A third potential limitation related to the benchmarks is the extrapolation of both the 1919–1940 and 1940–1993 series from late-year respective benchmarks (1935/37/38 and 1990). This issue, previously discussed on pages 101-103, is reflected in Table 3.6. A late benchmark allows the inclusion of advanced branches such as computers, which, for instance, were only produced from the early 1980s in Lithuania. The CIA also uses a relatively late single-benchmark approach, noting that the 'base year should be close enough to the present so that prices approximate current trade-offs between competing uses of economic resources'.[75] The CIA also underscores that this creates an index number problem in their series, resulting in lower growth rates.[76]

An analogous challenge arises in the series produced in this thesis, particularly in the industrial output index: the Baltic manufacturing index grows at 7–10% per annum in 1950–1973 but decelerates to a sluggish −1–1% per year in 1973–1989. Nevertheless, as Table 3.5 indicates, rates in Russia were relatively similar and, given its explosive interwar industrialisation, its overall manufacturing growth in 1920–1990 matches that of the Baltic average,

[75]Joint Economic Committee, *Measures of Soviet*, 2.
[76]Joint Economic Committee, 6.

Table 3.5: INDUSTRIAL GROWTH RATES
in the Baltics and Russia, 1920-1990

	Lithuania	Latvia	Estonia	Baltic average	Russia
1920-1938	11%	12%	8%	10%	16%
1938-1950	3%	4%	5%	4%	-1%
1950-1973	10%	7%	8%	8%	6%
1973-1990	1%	-1%	0%	0%	1%
1920-1990	7%	6%	6%	6%	6%

Sources: this study and A. S. Bénétrix et al., ''Measuring the Spread of Modern Manufacturing to the Poor Periphery'', ed. K. H. O'Rourke and J. G. Williamson, The Spread of Modern Industry to the Periphery Since 1871 (Oxford: Oxford University Press, 2017), 19.

giving a degree of confidence in the new series.

A comparison with other socialist countries shows that the aggregate effect of the index number problem on GDP per capita is likely to be low. In 1950–1970, GDP per capita grew faster in Serbia, Macedonia, Montenegro, Slovenia, Croatia, Bulgaria, and Russia than in any of the Baltic republics. In 1970–1989, growth in Latvia was indeed the slowest in the Communist bloc, but Lithuanian and Estonian rates were similar to those of many other Eastern European countries.[77] It is therefore likely that the index number problem—probably most impactful in the industrial series, possibly overstating early-period growth and understating the rates in the 1970s and 1980s—is offset by other sectors that accelerated more gradually and where the limited introduction of new products is less likely to bias the series.

The USSR's overall growth rate in 1950–1989 was 2.4%, while in East–Central Europe the average was 2.7%. The Baltics fall in the middle with 2.6% on average, which lends credence to the series not being significantly biased in the early post-war periods. Nonetheless, the rather sudden deceleration of growth in the 1970s is a potential concern warranting future investigation, which somewhat limits the comparability of Baltic figures with those of other socialist economies whose figures are based on multiple benchmarks.

To address most benchmark-related issues, constructing new robust figures would be ideal. Whilst that was done in this thesis for interwar Estonia, constructing separate GDPs at factor cost for FSU republics has never been attempted and would require extensive archival research and calcu-

[77] MPD version 2023.

lation efforts. For context, Alton's single-year study serving as the benchmark for Hungarian GDP series during the socialist era comprised a 254-page volume. Given that Hungary was a separate and somewhat more liberal socialist country, performing similar tasks for three occupied Baltic republics would likely necessitate three separate elaborate studies.[78] Additional reliability enhancement could be achieved through demand-side estimation for at least one or two years in both the interwar and socialist periods.

Nevertheless, the benchmarks used in this thesis are highly elaborate, and their late years allow for wider sectoral coverage than would otherwise be possible with existing data. Considering the constraints of this thesis and the fact that the CIA approach also used a single and relatively late benchmark for the USSR as a whole (1982 for 1950-1990),[79] this thesis accepts existing benchmarks as robust. However, the impact of potential biases related to benchmarks is quantified in Table 3.6.

Amplified by the use of late benchmarks, the most significant potential bias in the new figures stems from possible distortions attributable to single deflation. The potential issues and reasoning for its use are discussed on pages 101-103. Given that currently available data is insufficient for double deflation, this thesis employed what is referred to as the 'next best' option—compiling physical output indices, aggregated by value-added weights from a benchmark study.[80] Drawing from Thomas and Feinstein, it was possible to provide a crude measurement of potential bias arising from using single versus double deflation. Details are provided in Table 3.6. It should be noted that, given the smooth connectivity between series extrapolated from different benchmarks (see Table 3.1), single-benchmark-related biases for socialist Baltics are likely insignificant.

Additional issues arise from limitations in individual sectoral volume indices. Firstly, the early 1920s and 1940s are generally the least statistically covered years, where proxy data or interpolation was used for several sub-sectors in this study (see Appendices C and D for details). Secondly, the methodology of using productivity-adjusted employment data for accounting for industrial sector growth during the interwar years (1919-1939 for Lithuania and Estonia, 1919-1929 for Latvia) is a substantial shortcoming of interwar GDP series. The series on industrial production is probably

[78] T. P. Alton, *Hungarian national income and product in 1955* (New York: Columbia University Press, 1963).

[79] Maddison, ''Measuring the Performance'', 309.

[80] Thomas and Feinstein, ''The value-added'', 427.

the area where significant improvement can be achieved in future studies. Alternative series might be compiled from the raw materials side; however, that is a major undertaking given the poor quality of interwar Baltic statistics and would constitute a paper on its own.

Thirdly, interwar Estonia's commercial and public service volume indices are not as broad as in Lithuania or Latvia. Finally, the most significant socialist period data limitations are within trade and defence sectors. Trade was the only sector where this thesis used Soviet monetary indices at *comparable prices*. Similarly deflated official series have been suspected of containing some degree of hidden inflation.[81] Being part of the Soviet empire, Baltic Soviet republics did not have autonomous defence apparatus and the presence of Red Army in the republics remains a secret. The only known data points are in 1940 and 1990-1994, the rest of the 1940-1990 years being extrapolated from changes in Public sector size which might lead to biases in GDP movement throughout the socialist period.

The final issue might arise from unaccounted shadow economic activity. Broeck and Koen hypothesise that its size could have been between 10% and 20% of GDP in 1989.[82] However, in 1989-1990 most OECD economies had similar shadow economy sizes.[83] Hence, there is little reason to believe that GDP per capita estimates in this thesis are of lower quality than those of any other country simply due to unaccounted and untaxed activity.

A summary of all noteworthy potential inaccuracies is given in Table 3.6. Size of the bias is assumed to be 10% in both directions unless stated otherwise.

[81] V. Kontorovich, ''Economists, Soviet Growth Slowdown and the Collapse'', *Europe-Asia studies* (Abingdon) 53, no. 5 (2001): 688–689.

[82] De Broeck and Koen, *The Great Contractions*, 5.

[83] F. Schneider, ''Dimensions of the Shadow Economy'', *The independent review* 5, no. 1 (2000): 90–91.

Table 3.6: SENSITIVITY ANALYSIS

Source of bias	Affected years	Affected sectors	Bias size	Maximum impact on total GDP[a]		
				Lithuania	Latvia	Estonia
Incorrect service sector evaluation	1919-1940	Services	±10%	-	-	±3%
Single deflation[b]	1919-1940	All	±2%	±2%	±2%	±2%
Labour productivity & real wage estimates	1919-1940	Industry	±10%	±1%	±2%	±1%
Bias in price indices[d]	1919-1940	Const., Trade, F&I, Housing	±10%	0%	0%	0%
Missing annual product T-S data[e]	1919-1940	Product T-S	±9%	±1%	±1%	±1%
Missing sectoral volume data	1919-1940	Const., T&C	±10%	±1%	0%	0%
No productivity adjustment in employment series	1919-1940	Publ., Educ., Health, Def.	±10%	±2%	±2%	±3%
Population movement as proxy for various service subsectors	1919-1940	Various service subsectors	±30%	±2%	±1%	±1%
Unknown Estonian military size	1921-1938	Defence	±20%	-	-	±1%
Incorrect service sector evaluation	1940-1990	Services (ex. T&C)	±10%	±4%	±4%	±4%
Missing taxes product T-S data[e]	1940-1990	Total	-0.5%	-0.5%	-0.5%	-0.5%
Single deflation[b]	1940-1990	All	-14%	-14%	-14%	-14%
Hidden inflation in trade series[c]	1945-1990	Trade, F&I	+59%	+2%	+2%	+2%
Unknown Soviet military size	1941-1989	Defence	±20%	±5%	±7%	±5%
No productivity adjustment in employment series[f]	1940-1990	Hous., Educ., Health, Science, Publ.	-147%	-9%	-10%	-10%

Notes: minus sign means that growth in the new series might be understated and vice versa.

[a] the year in which the difference in GDP per capita is the greatest;

[b] drawing from L. Schön and O. Krantz, ''Swedish Historical National Accounts 1560-2010'', *Lund Papers in Economic History*, no. 123 (2012): 19;

[c] difference between official and average real inflation from D. H. Howard, ''A note on hidden inflation in the Soviet Union'', *Soviet Studies* (Abingdon) 28, no. 4 (1976): 607; includes potential bias due to hidden inflation in finance and insurance productivity adjustment;

[d] general price indices not representative of the sectors they are used for, index number bias due to late-year based deflation;

[e] according to The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024, in 1971-2023 average absolute annual fluctuation in the ratio of product T-S to GVA among 38 European countries was <9%. Average product T-S to GVA ratio was 12%, while for Bulgaria and Ukraine—the only socialist countries for which data is available—in 1980-1990 the ratio was 0.5%;

[f] in the UK between 1948 and 1990 labour productivity in services increased 147%, see UK Office for National Statistics, *Historical series of labour productivity*, October 2024.

To conclude the estimation section, the figures compiled in this paper are undoubtedly the most accurate, consistent, and detailed GDP per capita estimates of 20th century Baltic states to date. The results offer two significant advantages over any previous study. Firstly, they present uninterrupted annual datasets, extending from 1913/1919 to 2024, suitable for working with time-series. Secondly, they provide sectoral breakdowns as well as sectoral growth indices of Baltic economies from 1919 to 1995 for scholars interested in specific parts of the economy. Consequently, it is fair to conclude that the new GDP per capita figures presented in this thesis confidently supersede any existing gross domestic product figures of pre-1995 Baltic states.

4

IMPLICATIONS OF THE RESULTS

How many five-year plans are needed before Estonians are reduced to a Russian standard of living?

—Estonian joke from the 1940s.[1]

The newly constructed value-added, GDP and GDP per capita series enable a comprehensive analysis of Baltic economic growth, offering fresh insights into the development of Europe's peripheral regions. This chapter utilises these series to examine the economic trajectory of the Baltic states since 1913.

The first section tracks the overall and sectoral performance of the Baltic economies. Whilst this thesis does not aim to produce an exhaustive economic history of the region, this concise overview serves as a foundation for future, more detailed studies. The second section examines the Baltic catch-up record with advanced economies throughout three distinctive periods—the interwar years, the occupation period, and modern independence—measured relative to the Western core nations and the Nordic coun-

[1] N. Taylor, *Estonia: a modern history* (London: Hurst & Company, 2018), 110.

tries. The final part of this chapter considers the potential sources of improvement or decline in Baltic income levels relative to Western Europe.

A new growth story of the Baltic states

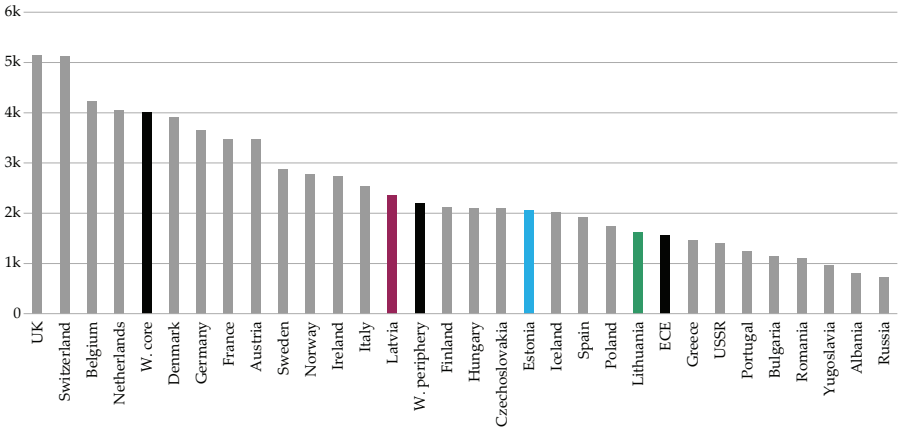
Prior to the First World War, the Baltic region, particularly future Latvia and Estonia, were economic powerhouses within the Russian Empire.[2] Whilst Lithuania remained largely agrarian, by 1913 Latvia and Estonia had evolved into significant industrial and trade hubs within the Romanov empire. These northern areas benefited from unique conditions: as relatively urbanised and almost fully literate governorates on the Baltic coast, they became the focus of Russian industrialisation efforts, bolstered by the immediate trading opportunities afforded by their Baltic sea ports.[3]

This strategic position inevitably led to strong integration with the vast Russian hinterland, with infrastructure developed to serve imperial interests.[4] By the late 19th century, the Russian market had become an 'El Dorado' for the West, with Latvian and Estonian ports assuming the role of entrance gates to it.[5] This position fostered close Western connections whilst simultaneously deepening their integration with and dependence on the Russian market.[6]

Although Lithuania's role in Russian designs was primarily agricultural, it possessed a valuable characteristic absent in other parts of East-Central Europe, such as Poland: a relatively high accumulation of human capital, expressed through comparatively high literacy rates (see page 20). Consequently, as Figure 4.1 indicates, by 1913 per capita incomes in all three future Baltic states exceeded numerous countries in Europe's periphery, including the average for East-Central Europe. Indeed, although dependent on Russia, pre-WWI Latvia and somewhat Estonia too appeared to be among the best positioned peripheral countries on the continent.

[2] Aldcroft and Morewood, *The European economy*, 94.
[3] Kahk and Tarvel, *An economic*, 107.
[4] Karnups, *The Little Country*, 175; Corum, "A View": 129
[5] J. C. Wood and M. C. Wood, *Henry Ford: critical evaluations in business and management* (London: Routledge, 2003), 51, 57.
[6] Karnups, *The Little Country*, 175

Figure 4.1: GDP PER CAPITA IN EUROPE IN 1913, Int$$_{1990}$$



Sources: own work, based on MPD version 2023 and this thesis, Greek 1913 figure corrected by M. Kopsidis and M. Schulze, ''Economic growth and sectoral developments, 1800–1914'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 44.

Interwar period, 1918-1940

The First World War and the collapse of empires in its aftermath provided Lithuania, Latvia and Estonia with their first opportunity to establish independent nation states. Following the devastating experience of World War One, the Baltic states endured a rather disappointing decade in the 1920s. The 1930s, however, brought a surprising period of relative success for the three-country region, which has already attracted international scholarly attention despite previously limited availability of national income data.[7]

WWI reached the Baltics in 1915 when Germany began pushing Russian forces eastward. By October 1915, the German advance on the eastern front had stabilised along the line shown in Map 6, which ran directly through Latvia's capital, Riga. This front remained largely static until early 1918, when Riga fell to the Germans. During this two-and-a-half-year period, Lithuania and Latvia suffered catastrophic demographic and economic losses.

Latvia, as a frontline country, saw a quarter of its buildings razed and more than 40% of its population lost by 1919, primarily through refugee displacement. Only a third of these refugees subsequently returned. Furthermore, the majority of Latvia's relatively advanced industry was relocated to

[7] Aldcroft, *Europe's third world*, 101.

Russia, with minimal repatriation.[8]

Lithuania faced an equally catastrophic situation, though through different circumstances. Having limited industrial capacity, most of its existing factories were evacuated in 1915. As an agricultural region, Lithuania endured severe exploitation under German occupation, with its population approaching starvation by 1918. The loss of its capital area, Vilnius, in 1920, which represented 22% of the country's industrial employment, further compounded the crisis.[9] Whilst half a million refugees contributed to the population decline, the loss of the Vilnius region accounted for much of the decrease.[10] Aldcroft characterised Lithuania as 'more or less completely devastated' by early 1920, an assessment supported by data showing Lithuania had by that year become Europe's third poorest country, surpassing only Russia and Romania.[11]

Estonia, which remained largely untouched by the war until 1918, experienced milder population outflux. Nevertheless, the evacuation of its industrial capacity resulted in substantial economic decline.

By 1919, amidst independence wars, the Baltic states had collectively lost 30% of their population, whilst their gross domestic product decreased by 54%, resulting in an average GDP per capita decline of 34%. Although 1918 data points would have enabled clearer differentiation between First World War devastation and subsequent impact of the independence struggle, the demographic and economic destruction endured by the Baltic states between 1913 and 1919 undoubtedly ranks amongst Europe's most severe (see Map 6 and Table 4.1).

Following 1920, the Baltic states confronted the formidable challenge of economic reconstruction and reform. Pre-war economic institutions, including the banking sector, trade networks, and industrial capacity, had been disrupted, whilst the severe loss of skilled personnel in these sectors hindered rapid recovery. This challenge proved most acute in Latvia, moderately severe in Estonia, and notably less pronounced in Lithuania.[12]

All three economies were also compelled to redirect exports from Rus-

[8] Norkus and Markevičiūtė, "New estimation": 616

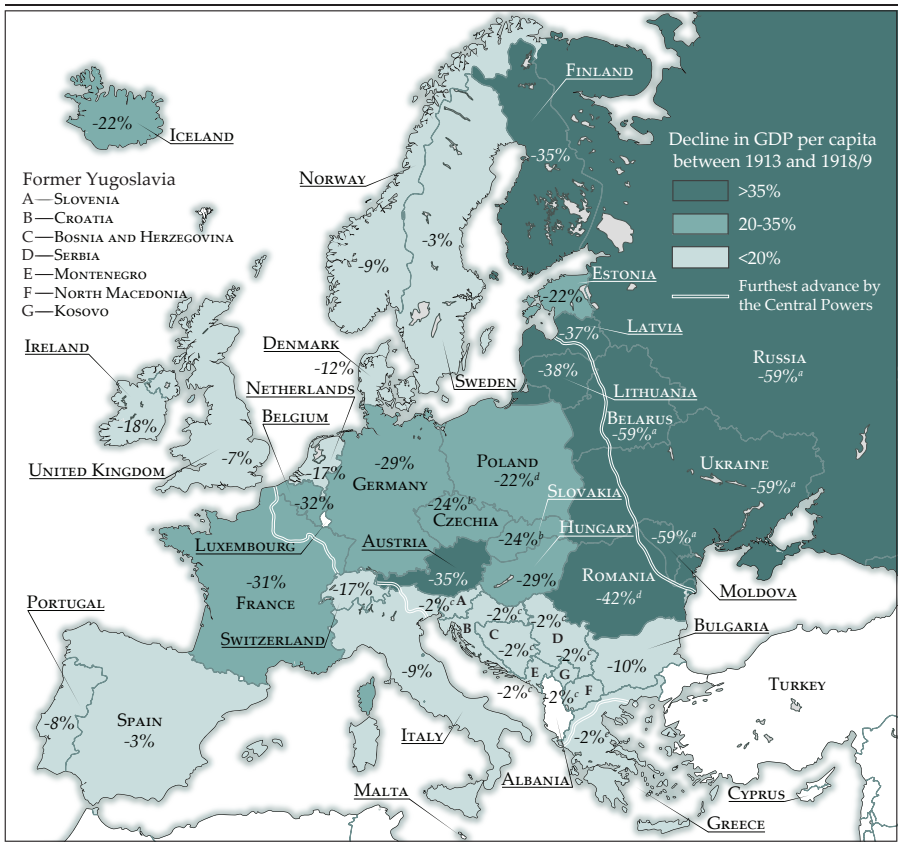
[9] G. Vaskela, ''Ekonomika'', Lietuvos istorija. Nepriklausomybė (1918-1940 m.) (Vilnius: Lietuvos istorijos instituto leidykla, 2015), 240–241.

[10] A. Griffante, ''Making the Nation: Refugees, Indigent People, and Lithuanian Relief, 1914–1920'', ed. T. Balkelis and V. Davoliūtė, vol. 43, Population Displacement in Lithuania in the Twentieth Century (2016), 21.

[11] Aldcroft, *Europe's third world*, 101.

[12] Aldcroft, 95–96; Crampton, *Eastern Europe*, 103

Map 6: IMPACT OF WORLD WAR ONE ON GDP PER CAPITA IN EUROPE



Sources: own work, based on MPD version 2023 and this thesis.
[a]figures for USSR total; [b]figures for Czechoslovakia total; [c]figures for Yugoslavia total; [d]doubtful reliability of the interwar data, see M. Morys, ''Economic growth and structural change in Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 166; [e]1913 figure corrected by M. Kopsidis and M. Schulze, ''Economic growth and sectoral developments, 1800–1914'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 44.

sia to Western Europe, especially Germany and Great Britain. This shift saw a move away from industrial goods towards agricultural produce such as bacon, butter, flax, and timber.[13] The loss of the Russian market and wartime destruction severely weakened the industrial sector, prompting a turn towards domestically oriented production and a period of limited industrial

[13]Kasekamp, *A history*, 115.

Table 4.1: DEMOGRAPHIC AND ECONOMIC IMPACT OF WWI, percentage decline from 1913 to 1918/19 trough

	Population	GDP	GDP per capita
Austria	-5%	-38%	-35%
Belgium	0%	-32%	-32%
France	-7%	-25%	-31%
USSR	-1%	-60%	-59%
Lithuania	-30%	-57%	-38%
Latvia	-41%	-63%	-37%
Estonia	-9%	-29%	-22%

Sources: MPD version 2023 and this thesis.

growth, supported by state and foreign capital via the banking sector.[14]

Agrarian reforms expropriated large estates—which comprised 26–48% of all Baltic land in 1919—and redistributed them to smallholders and the landless, with the aim of modernising farming and promoting peasant ownership.[15] Additionally, in the early 1920s, Latvia and Lithuania introduced gold-backed currencies, with Estonia completing the process in 1928. All three states established central banks and developed public finance tools, such as mortgage loan systems, largely without external assistance.[16]

Lithuania achieved the most rapid recovery, surpassing its pre-war GDP per capita by 1923, with Estonia following in 1925. Latvia's economy, however, required until 1929 to regain its 1913 level. The recovery trajectories of Latvia and Estonia remained largely continuous, suggesting relatively smooth adaptation to 'deindustrialisation' and separation from the Russian market during the 1920s. Nevertheless, modest downturns occurred in Latvia in 1922 and Estonia in 1924. Latvia encountered severe inflation in 1921, which was only contained following the year-end introduction of a national gold-backed currency, whilst Estonia's recession has been attributed to Russian market closure.[17] However, this connection appears tenuous,

[14] Plakans, *A concise*, 308; Royal Institute of International Affairs Information Department, *The Baltic states*, 116

[15] Plakans, *A concise*, 317; G. Vaskela, *Žemės reforma Lietuvoje 1919-1940 m.: analizuojant Rytų ir Vidurio Europos agrarinės raidos XX a. III-IV dešimtmečiais tendencijas* (Vilnius: Lietuvos istorijos institutas, 1998), 57;

[16] Plakans, *A concise*, 308; Royal Institute of International Affairs Information Department, *The Baltic states*, 131–142

[17] V. P. Karnups, ''Neatkarīgas valsts tautsaimniecības nostiprināšanās posms (1920–1933)'', ed. G. Krūmiņš, Latvijas tautsaimniecības vēsture (Riga: Jumava, 2017), 123; M. Laur et al., *History of Estonia* (Tallinn: Avita, 2000), 223-224.

as Latvian sources indicate substantial trade with the USSR persisted until 1926.[18]

Lithuania's fast recovery might be linked to its lower initial dependence on Russian demand for industrial products, as the country was less industrialised than Latvia and Estonia. Consequently, it also saw fewer factories evacuated to Russia after 1915. Moreover, the 1923 GDP per capita peak coincided with Lithuania's annexation of the Klaipėda region, an area of considerable industrial development.[19] This acquisition initially boosted Lithuania's industrial production by 87%, though the sector subsequently experienced annual declines of 2–21% over the following three years, resulting in severely reduced living standards in 1924–1925. This recession was matched by only four countries globally, with Portugal being the sole European case.

Lithuania pursued a very tight monetary policy in 1923–1925, which some have noted made credit expensive and hindered recovery growth.[20] The downturn may also have reflected an endogenous adjustment to the Klaipėda region's severed integration with highly developed Germany.

In 1926, all major sectors declined by 6–14% in Lithuania, culminating in an overall GDP per capita drop exceeding 8%. Whilst historiography has not fully acknowledged the magnitude of this downturn, the economic difficulties of 1926 have been cited among the factors contributing to that year's successful authoritarian coup.[21] However, the 1926 slowdown was part of a global trend, with Latvian and Estonian growth stagnating, and the United Kingdom, Hungary, and New Zealand, among others, experiencing 4–7% per capita income reductions.[22]

Both the 1923–1924 and 1926 slowdowns remain insufficiently studied at an international level, necessitating deeper analysis of growth during the 'roaring twenties'.[23]

During the first inter-war decade, the overall Baltic states achievements were disappointing. Previous research indicated that whilst Lithuania stagnated, Latvia and Estonia's economies grew by 4% annually between 1922

[18]Karnups, ''Neatkarīgas valsts'', 123.

[19]Vaskela, ''Ekonomika'', 249, 253.

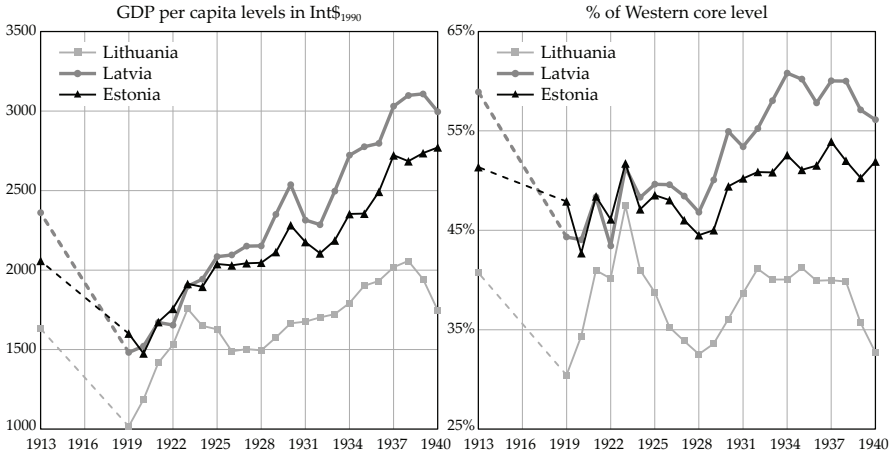
[20]Vaskela, 249.

[21]V. S. Vardys, ''The Rise of Authoritarian Rule in the Baltic States'', ed. V. S. Vardys and R. J. Misiunas, The Baltic states in peace and war, 1917-1945 (University Park: Pennsylvania State University Press, 1978), 70.

[22]MPD version 2023.

[23]One example is G. H. Moore, ''Measuring Recessions'', *Journal of the American Statistical Association* (Washington) 53, no. 281 (1958): 262

Figure 4.2: GDP PER CAPITA IN THE BALTICS, 1913-1940



Sources: this thesis and MPD version 2023.

and 1929.[24] New data partially corroborates this assessment, adjusting Latvian growth rates upward to 5% whilst revising Estonian rates downward to 3%. Though substantial, these rates stemmed primarily from bounce-back growth, with both Lithuania's and Estonia's advancement ceasing upon reaching their 1913 per capita GDP levels.

In *Decades of Crisis*, Ivan Berend identifies several 'success stories of the twenties' in East-Central Europe, Czechoslovakia being the star performer with 45% per capita income growth during 1913-1929.[25] The Baltic states, experiencing an overall 1% decline in GDP per capita between 1913 and 1929, fell markedly short of success.

The Baltic republics' primary challenge throughout the interwar period centred on modernisation and initial export-led industrialisation. With agriculture employing 77% of Lithuania's and 68-69% of Latvia and Estonia's workforce in the early 1920s, all three nations pursued a strategy of expanding food export capacity through emerging producer cooperatives, following Denmark's 1870s model.[26] The extent and success of Baltic 'denmarkisation'

[24]Norkus and Markevičiūtė, "New estimation": 39.

[25]I. T. Berend, *Decades of crisis: Central and Eastern Europe before World War II* (Berkeley: University of California Press, 1998), 243; Czechoslovakia's GDP data corrected with J. Bolt and J. L. van Zanden, *Maddison style estimates of the evolution of the world economy. A new 2020 update*, 2020.

[26]V. Vygandas, ''Savosios pramonės klausimu'', *Tautos ūkis*, no. 2 (1930): 47–50, 47; Vaskela, ''Ekonomika'', 286; Köll, ''Reinterpretation'', 4; I. T. Berend, *An economic history of nineteenth-century Europe: diversity and industrialization* (Cambridge: Cambridge University Press, 2013), 240, 247

Table 4.2: PERIPHERAL INTERWAR GROWTH RATES

	1913-1938	1913-1929	1929-1938
Lithuania	0.9%	-0.2%	3.0%
Latvia	1.1%	0.0%	3.1%
Estonia	1.1%	0.2%	2.7%
Baltics	1.0%	-0.1%	2.9%
Finland	2.1%	1.6%	3.1%
Iceland	1.3%	1.3%	1.5%
Ireland	0.4%	0.2%	0.9%
USSR	1.7%	-0.1%	5.0%
Czechoslovakia	1.3%	2.4%	-0.6%
Hungary	1.4%	1.8%	0.8%
Bulgaria	1.1%	0.5%	2.2%
Greece	2.5%	3.0%	1.5%
Yugoslavia	1.0%	1.6%	-0.1%
Portugal	1.3%	1.6%	0.9%
Western core	1.0%	1.0%	1.1%
Western periphery	1.0%[a]	1.4%	0.6%[a]
East-Central Europe	0.8%	1.3%	0.1%

Sources: this thesis, MPD version 2023 and M. Morys, ''Economic growth and structural change in Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 169. Regional rates are growth rates of weighted averages of GDP per capita.
[a]without Spain.

remains contested, as the Danish model incorporated import-substitution policies that emerged in Latvia and Estonia only in the 1930s, whilst remaining largely absent from Lithuanian discourse.[27] Given insufficient private initiative, the 1920s witnessed the emergence of state capitalism in the Baltics, which would shape these nations' post-Great Depression development.[28]

As Table 4.2 demonstrates, the lacklustre performance before 1929 contrasts sharply with remarkable growth during the 1930s. Between 1929 and 1938, all three Baltic countries reduced their income gap with the Western core by 7-10 percentage points (Figure 4.2). This achievement distinguished them within Europe, as the Baltic states and Finland emerged as the continent's top four performers in GDP per capita growth during 1929-1938, surpassed only by the USSR (see Table 4.2).

Aldcroft and Morewood claim that structural changes and successful export sector development was key in elevating the interwar Baltic republics among peripheral states in Europe.[29] Similar notions persisted in pre-WWII contemporary scholarship as well.[30] Evaluating this structural and export-centric growth hypothesis necessitates detailed examination of sectoral trends within the Baltics, as presented in Table 4.3, alongside trade indicators, explored in subsequent paragraphs.

As Table 4.3 demonstrates, the Baltic states underwent a transition from agriculture to industry whilst maintaining a relatively stable service sector share of GDP. The pace of structural change exceeded that of both Western and Eastern Europe, broadly validating Aldcroft and Morewood's assessment.

On the other hand, Table 4.3 reveals that the Baltic states were the most agrarian and the least industrial part of Europe during the interwar period, matched only among the peripheries by Bulgaria and Greece. Interestingly, the service sector maintained a relatively large share of GDP in the interwar

[27] On Denmark, see I. T. Berend, *An economic history of nineteenth-century*, 248; Lithuania: ''Radio equipment for Lithuania'', *Financial Times* (London), nos. 15,565 (January 1939): 10. Latvia in the 1920s consistently ran a negative trade balance which implies that growth was probably export-led, rather than import-substitution led. This changed after the Great Depression, see Royal Institute of International Affairs Information Department, *The Baltic states*, 128, 144. The need for import-substitution, however, was recognised in Latvia and Estonia in the 1920s already, see Kahk and Tarvel, *An economic*, 116

[28] Vaskela, ''Ekonomika'', 260-262; E. Puravs, *Kooperācijas saimnieciskā nozīme ražojošo spēku attīstībā* (Riga: Zelta Grauds, 1935).

[29] Aldcroft and Morewood, *The European economy*, 119–120.

[30] For example, Royal Institute of International Affairs Information Department, *The Baltic states*, 187

Table 4.3: SECTORAL SHARES OF GDP, c. 1927 & c. 1937

	Agriculture		Industry & construction		Services	
	c. 1927	c. 1937	c. 1927	c. 1937	c. 1927	c. 1937
Lithuania	51%	44%	15%	18%	35%	38%
Latvia	37%	40%	19%	23%	43%	37%
Estonia	49%	38%	15%	23%	36%	40%
Baltics	46%	40%	16%	21%	38%	38%
Finland	35%	32%	29%	30%	36%	38%
Iceland	49%	44%	14%	16%	37%	40%
Ireland	31%	25%	17%	24%	52%	51%
USSR	45%	31%	26%	32%	29%	37%
Czechoslovakia	24%	24%	37%	35%	39%	41%
Hungary	40%	34%	29%	30%	31%	37%
Bulgaria	53%	52%	16%	15%	31%	33%
Portugal	30%	30%	29%	27%	27%	43%
Greece	55%	54%	25%	26%	20%	20%
Western core	13%	14%	38%	38%	49%	49%
Western periphery	35%	36%[a]	25%	26%[a]	40%	39%[a]
East-Central Europe	38%	37%	26%	27%	36%	36%

Sources: Tables G.4, G.5, G.6 and M. Morys, ''Economic growth and structural change in Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 179; Palgrave Macmillan Ltd, *International Historical Statistics*, 1st ed. 2013. (London: Palgrave Macmillan UK, 2013); S. Kenny, ''Irish GDP since Independence'', *The Economic history review*, 2024, L. Amaral, *The Modern Portuguese Economy in the Twentieth and Twenty-First Centuries* (Cham: Palgrave Macmillan, 2019), 158; G. Jonsson, ''The gross domestic product of Iceland, 1870–1945'', ed. O. H. Grytten, Nordic historical national accounts: proceedings of workshop IV, Solstrand, 13–15 November 1998 (Bergen, 1999), 24; M. Ivanov, *The Gross Domestic Product of Bulgaria 1870-1945* (Sofia: Ciela, 2012), 460; L. Prados de la Escosura, *Spanish Economic Growth, 1850–2015* (Basingstoke: Springer, 2017), 297–298.
Note: for most countries the circa 1937 figures represent averages for 1935/1939 and circa 1927 averages for 1925/1929 except where only separate figures within the range were available. Regional figures are simple averages. [a]without Spain. GVA: gross value-added. Data provided at current prices.

Baltic republics, similar to that of numerous more industrialised peripheries. Latvia represented a unique case among the Baltic nations, being the only one to experience simultaneous increases in both the agricultural and industrial–construction sectors' share of GDP, at the expense of a contraction in the service sector's share. This distinctive pattern stemmed from heavily subsidised agriculture and the reduction of Latvia's public administration sector during the 1930s.[31]

Whether Baltic structural industrialisation was genuinely export-driven, as previous scholars have suggested, is also open to examination. The Royal Institute of International Affairs of the UK concluded in 1938 that 'the economic prosperity of the Baltic States depends largely on their export trade'.[32] Table 4.4 indicates that trade openness (measured as imports plus exports relative to GDP) was relatively high in Latvia and Estonia before the Great Depression, while Lithuania was much less engaged in international trade. After the Depression, Estonia maintained its trade openness, which remained among the highest in Europe, while Lithuania retained its relative isolation, aligning more closely with East–Central European patterns.

This stands in stark contrast to previous assumptions, and indeed the prevailing view, that Lithuania was a well-integrated and open economy with high levels of trade.[33] Interestingly, while both northern Baltic republics moved towards food self-sufficiency in the 1930s, Estonia retained its overall trade openness, whereas Latvia experienced a substantial reduction in trade levels.[34] Latvia thus became the most autarkic of the three Baltic states—a move motivated by the unfavourable trade terms created by the Great Depression.[35] The reasons for Lithuania's apparent relative isolation from the world market remain unknown and are therefore a subject for future scholarship.

An explicit economic policy broadly pursued by all three interwar Baltic republics was the much-vaunted 'denmarkisation', which, besides its import-

[31] Aizsilnieks, *Latvijas saimniecības*, 683.

[32] Royal Institute of International Affairs Information Department, *The Baltic states*, 189.

[33] For example, in V. Terleckas, *Pinigai Lietuvoje, 1915-1944*, 2nd. ed. (Vilnius: Lietuvos bankas, 2022), 213, Terleckas uses the highly flawed 1924 estimate of Lithuanian national income, calculating a 0.21 *exports-to-NI* ratio, more than double the *exports-to-GDP* resulting from this study.

[34] Royal Institute of International Affairs Information Department, *The Baltic states*, 143.

[35] K. O'Connor, *The History of the Baltic States, 2nd edition* (Santa Barbara: Greenwood, 2015), 127-128.; N. W. Balabkins, ''Latvia's Foreign Trade in the Interwar Period (1920-1940)'', in *Emancipation and Interdependence: The Baltic States as New Entities in the International Economy, 1918-1940*, ed. A. Johansson et al., Acta Universitatis Stockholmiensis. Studia Baltica Stockholmiensia, 13 (Stockholm: Stockholm University, 1994), 102

Table 4.4: FOREIGN TRADE DURING THE INTERWAR PERIOD

	Trade openness		% of processed goods in exports	
	1925/9	1935/8	c. 1929	1936
Lithuania	20%	22%	33%	45%
Latvia	38%	22%	50%	40%
Estonia	35%	31%	66%	57%
Baltics	31%	25%		
Finland	42%	34%		
Iceland	88%	49%		
Ireland	79%	50%		
USSR	4%	2%		
Czechoslovakia	36%	26%		
Hungary	22%	17%		
Bulgaria	19%	17%		
Greece	22%	16%		
Yugoslavia	20%	18%		
Portugal	22%	20%		
Western core	39%	30%		
Western periphery	41%	30%[a]		
East-Central Europe	23%	19%		

Sources: this thesis and G. Vaskela, *Lithuania Exports, 1919-1939*, 2022; G. Vaskela, *Lithuania Imports, 1919-1939*, 2022; Z. Norkus et al., *Latvia Imports, 1919-1939*, 2022; Z. Norkus et al., *Estonia Imports, 1919-1939*, 2022; Z. Norkus et al., *Latvia Exports, 1919-1939*, 2022; Z. Norkus et al., *Estonia Exports, 1919-1939*, 2022; Hagstofa Íslands, *Verslunarskýrslur árið 1928*, Hagskýrslur Íslands 68 (Reykjavík: Ríkisprentsmiðjan Gutenberg, 1930); Hagstofa Íslands, *Verslunarskýrslur árið 1931*, Hagskýrslur Íslands 78 (Reykjavík: Ríkisprentsmiðjan Gutenberg, 1933); Hagstofa Íslands, *Verslunarskýrslur árið 1934*, Hagskýrslur Íslands 89 (Reykjavík: Ríkisprentsmiðjan Gutenberg, 1936); Hagstofa Íslands, *Verslunarskýrslur árið 1937*, Hagskýrslur Íslands 101 (Reykjavík: Ríkisprentsmiðjan Gutenberg, 1939); Hagstofa Íslands, *Verslunarskýrslur árið 1940*, Hagskýrslur Íslands 110 (Reykjavík: Ríkisprentsmiðjan Gutenberg, 1942); G. Jonsson, ''The gross domestic product of Iceland, 1870–1945'', ed. O. H. Grytten, Nordic historical national accounts: proceedings of workshop IV, Solstrand, 13–15 November 1998 (Bergen, 1999), 21; M. J. Klasing and P. Milionis, ''Quantifying the evolution of world trade, 1870–1949'', *Journal of International Economics* 92, no. 1 (2014): 185–197; Royal Institute of International Affairs Information Department, *The Baltic states* (Oxford University Press, 1938), 123, 161.
Note: regional figures are simple averages.
[a]without Spain.

substituting side, entailed capital accumulation through increasing exports of processed foodstuffs.[36] The governments of Lithuania, Latvia, and Estonia all took active roles in fostering agricultural co-operatives and promoting exports of primarily bacon and butter.[37] However, despite Estonia remaining a highly open economy throughout the interwar period, both northern Baltic republics witnessed decreases in the proportion of processed goods within their exports (see Table 4.4). Lithuania saw the opposite trend, yet its 'denmarkisation' success was likely limited due to its overall isolation from international trade.

This underscores the general failure of the interwar Baltics to advance beyond supplying low value-added, unprocessed products to the world market.[38] The improvements in living standards achieved in the 1930s therefore stemmed from other factors, likely involving shifts in internal demand for manufactures and successful infant industry policies, explored below. The Baltic states achieved growth not through flourishing international trade, but despite its absence.

Another claim among previous literature has held that transition from crop farming to animal husbandry was among the clearest patterns of Baltic modernisation.[39] As Table 4.5 indicates, such trends within agriculture varied significantly across the Baltic states. Whilst Lithuania experienced substantially faster growth in its livestock sector compared to crops, Latvia and Estonia demonstrated opposing trends. This divergence persisted even during Latvia's 1920s recovery period, though Estonia's livestock sector did expand at twice the rate of crop production during this time.

Having regained their pre-war GDP per capita levels by 1929, the Baltic states subsequently achieved remarkable industrial growth rates. Lithuania's 8% annual increase reflected its low industrial base, yet Latvia and Estonia's post-recovery industrial expansion was also impressive by European standards. As Table 4.5 demonstrates, Lithuania's secondary sector grew faster than in any capitalist country in Europe, while Latvian and Estonian rates were matched only by Finland and Greece.

Latvia and Estonia achieved this expansion under import-substitution and infant industry protection strategies, reflecting the successful role of

[36] I. T. Berend, *An economic history of nineteenth-century*, 248; Köll, ''Reinterpretation'', 95–96

[37] Köll, 95–96

[38] Norkus, *Post-Communist Transformations*, 134, 138.

[39] Aldcroft, *Europe's third world*, 49, 51, 58, 95, 101–102; Aldcroft and Morewood, *The European economy*, 58

their governments in satisfying the increasing local demand for manufactures, including sophisticated electronics such as telephones and radios.[40] Similar industrialisation policies were largely absent in Lithuania until the late 1930s; one reason given was its limited initial industrial capacity, which could hardly meet local demand for manufactured goods.[41]

Given the lack of studies on Baltic industrialisation efforts throughout the interwar period, and the constraints of the present work, the drivers behind this expansion are left for future scholars to explore. Nonetheless, as Figure 4.6 confirms, Baltic growth in the 1930s was largely industry-driven.

The Baltic states demonstrated remarkable performance during the Great Depression and its aftermath, marking a distinctive feature of their interwar economic performance. Lithuania completely avoided recession, while Latvia and Estonia experienced only short-term and relatively mild downturns as seen in Figure 4.3. By 1933, all three Baltic economies had resumed positive growth trajectories alongside Nordic nations, in stark contrast much of Europe, where decline or stagnation continued until 1935. Overall this relatively robust performance initiated the Baltic states' first sustained period of convergence with the Western core, as demonstrated in Figure 4.2.

The crisis has received rather limited attention from Baltic scholars, usually from non-economic historians. Analysis of the Depression is particularly lacking in Lithuania, where researchers—lacking real aggregate output data—relied on price movements, nominal export levels, raw industrial unemployment statistics, and even qualitative data to draw conclusions about the Depression's severity in Lithuania, Latvia, and Estonia.[42] As a result, while growth in post-crisis industrial output has been recognised, existing studies have overstated the impact of the Great Depression on Lithuania: prices did sharply decline, but real output per capita did not turn negative during the entire 1930s (see Figure 4.3).

Analysis of Latvian and Estonian performance has been more extensive, yet, similarly lacking real GDP data, scholars have tended to overemphasise

[40] Kahk and Tarvel, *An economic*, 116.

[41] Royal Institute of International Affairs Information Department, *The Baltic states*, 154. For example, Lithuania continued to import manufactures from the west in large as exemplified by the 1939 purchase of radios from the UK, see ''Radio equipment for Lithuania''. A major shift towards state-pursued industrialisation began in 1939 only, see G. Vaskela, *Lietuva 1939–1940 metais: kursas į valstybės reguliuojamą ekonomiką* (Vilnius: Lietuvos istorijos institutas, 2002), 155–165

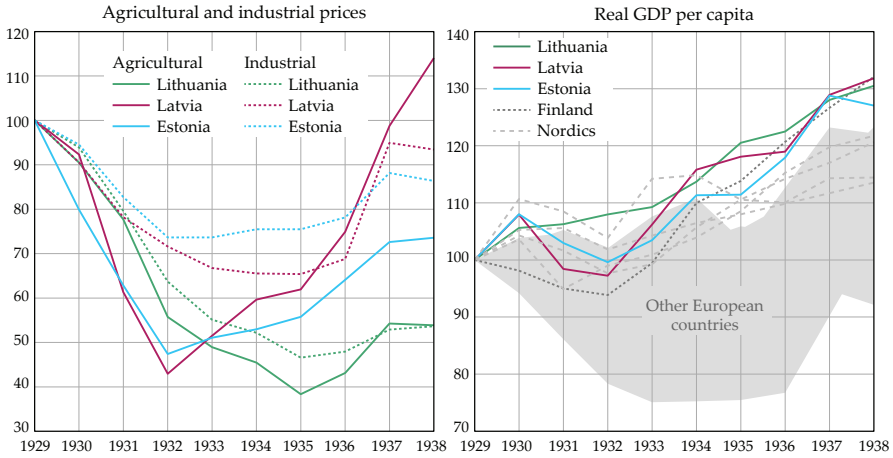
[42] For example, Z. Butkus and N. Černiauskas, ''Krizė keičia Lietuvą: 1931–1935 metų pokyčiai visuomenėje ir valstybėje'', *Lietuvos istorijos studijos* 36 (2016): 69–87

Table 4.5: GROWTH RATES IN INDUSTRIAL AND AGRICULTURAL OUTPUT
average per year, 1929-1938

	Industrial production	Crop output	Livestock output
Lithuania	8.0%	0.7%	4.5%
Latvia	6.8%	5.8%	3.8%
Estonia	5.7%	2.8%	1.5%
Baltics	6.9%	3.1%	3.3%
Finland	6.3%		
Iceland	3.7%		
Ireland	4.6%		
USSR	10.3%		
Czechoslovakia	-0.8%		
Poland	2%		
Hungary	3.6%		
Bulgaria	3.0%		
Romania	3%		
Greece	5.7%		
Portugal	2.2%		
Western core	1.1%		
Western periphery[a]	4.0%		
East-Central Europe	2.2%		

Sources: this thesis and A. Klein et al., ''How Peripheral was the Periphery? Industrialization in East Central Europe since 1870'', ed. K. H. O'Rourke and J. Gale, The spread of modern industry to the periphery since 1871 (Oxford: Oxford University Press, 2017), 86; Palgrave Macmillan Ltd, *International Historical Statistics*, 1st ed. 2013. (London: Palgrave Macmillan UK, 2013); D. Batista et al., *New Estimates for Portugal's GDP: 1910-1958* (Lisboa, 1997), 6–7; G. Jonsson, ''The gross domestic product of Iceland, 1870–1945'', ed. O. H. Grytten, Nordic historical national accounts: proceedings of workshop IV, Solstrand, 13–15 November 1998 (Bergen, 1999), 24; M. Ivanov, *The Gross Domestic Product of Bulgaria 1870-1945* (Sofia: Ciela, 2012), 552.
Note: regional figures are simple averages. [a]without Spain.

Figure 4.3: PRICE AND PER CAPITA OUTPUT INDICES, 1929=100



Sources: Tables G.1, G.2, G.3, E.1 and MPD version 2023.

the role of plummeting nominal exports and banking shocks.[43] Figure 4.3 indicates that Latvian and Estonian recessions were broadly similar to those of the Nordic countries, where the crisis is generally regarded as having been among the mildest in Europe.[44] The subsequent growth trajectories across the Baltics closely resembled that of Finland, and the four countries were clearly among the top post-Depression performers in the continent.

The conventional explanation of disparities in the impact of the Depression has held that less industrialised economies suffered less due to the predominantly industrial character of the recession.[45] Morys notes that South-East Europe experienced a milder impact from the crisis because growth there was chiefly driven by domestic advances in agricultural productivity.[46] The Baltics—and Lithuania in particular—appear to fit this pattern at first glance. As already explored, their growth was likely driven by manufacturing that primarily catered to domestic needs. Moreover, Lithuania was unable to achieve high trade openness, and only 33% of its exports consisted of industrial products (mostly processed food), as shown in Table 4.4. Thus,

[43]K. Stern, ''Mittetariifsete kaubandusmeetmete rakendamine 1930. aastatel Eesti Vabariigi näitel'' (PhD diss., 2017), 169; Royal Institute of International Affairs Information Department, *The Baltic states*, 171–184

[44]O. H. Grytten, ''Why was the Great Depression not so Great in the Nordic Countries? Economic Policy and Unemployment'', *The Journal of European economic history* (Rome) 37, nos. 2-3 (2008): 369–403.

[45]Morys, ''Economic growth'', 171.

[46]Morys, 173.

a drop in international demand for manufactures and processed goods likely did little to harm Lithuania's real output. Sectoral data confirms this: industrial production declined slightly between 1931 and 1934, but growth in other areas offset these trends in Lithuania's small manufacturing sector (see Table C.1).

However, as seen in Table 4.4, Latvia and Estonia maintained high levels of trade openness by interwar standards before the 1930s, and processed goods constituted half or more of their exports before the crisis. Moreover, analysis of sectoral trends reveals that both countries experienced major contractions in their manufacturing and service branches between 1930 and 1932, followed by strong recoveries (see Tables C.2 and C.3). Thus, Latvia and Estonia clearly were not insulated from the global demand shock, and their impressive recoveries warrant deeper analysis of the trade and exchange rate regime policies pursued.

Parallels with similar countries are of limited value. For example, Finland's superior performance has been linked to its early abandonment of the gold standard in 1931, subsequent currency depreciation, accession to the Sterling bloc, reduction of interest rates, and maintenance of downward flexibility in wages.[47] The Baltic states followed different exchange regime policies: Estonia and Latvia also imposed exchange controls in late 1931 but waited until 1933 and 1936, respectively, to devalue their currencies.[48] Lithuania, on the other hand, only imposed exchange controls in 1935 and retained the gold peg until occupation in 1940.

Although Latvian and Estonian recovery trends were highly similar to Finland's, as shown in Figure 4.3, drawing strong parallels with Finland would require detailed analysis of trade and real wage fluctuations—an undertaking that would constitute a study in its own right. The Great Depression remains a major topic in economic history, and it is therefore likely that such interesting cases of impressive performance as the Baltics will, in future, receive in-depth attention with the availability of the aggregate and sectoral output data presented in this thesis.

Growth rates in the Baltic states moderated after 1938. Nevertheless, the

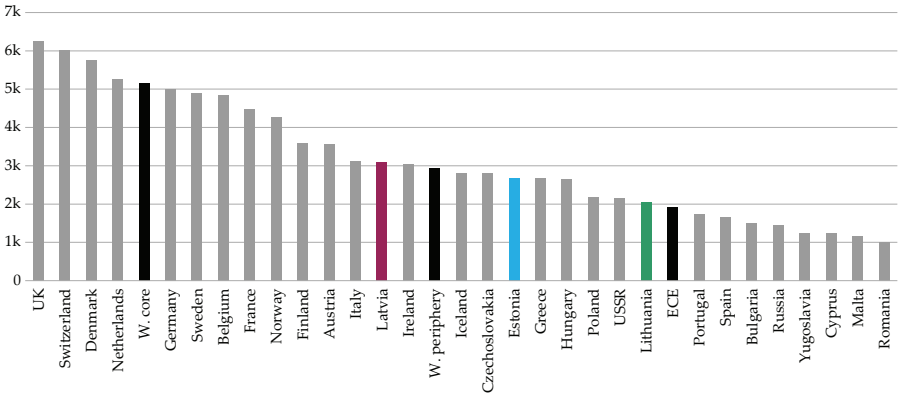
[47] R. Hjerppe and J. Jalava, ''Economic Growth and Structural Change: A Century and a Half of Catching-up'', ed. J. Ojala et al., The Road to Prosperity: An Economic History of Finland (Helsinki: Suomalaisen Kirjallisuuden Seura, 2006), 184, 198–200

[48] B. Bernanke and H. James, ''The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison'', Essays on the Great Depression (Princeton: Princeton University Press, 2000), 74.

new data presented in this thesis challenges Berend's negative assessment of Eastern European growth whilst substantiating Aldcroft's and Morys' more positive perspectives. In his brief analysis of the Baltic states, Aldcroft proposed that their per capita income exceeded Eastern European levels, with modest improvement over pre-war figures.[49]

This assessment finds support in the comparative 1930s data, which shows the capitalist Baltic states collectively achieving 50% of Western core GDP per capita, positioning them between East-Central Europe's 37% and the Western periphery's 57%. This intermediate position proves particularly significant when considering the subsequent trajectories: East-Central Europe would continue to lag behind the West for another half-century, whilst the Western periphery would successfully reach 90% of Western core levels by the early 2000s.

Figure 4.4: GDP PER CAPITA IN EUROPE IN 1938, Int$$_{1990}$$



Sources: own work, based on MPD version 2023 and this thesis. [a]since there is a huge difference between GDP per capita in Russia and the USSR, this thesis presents both datapoints. [b]without Spain.

Morys' analysis of East-Central European economic history reveals significant structural transformation and Western convergence during the periods before WWII, challenging the notion of perpetual regional backwardness there. He showed that pre-revolutionary Russia achieved substantial industrialisation, whilst Hungary and Bulgaria demonstrated marked growth and structural transformation during the interwar years.[50]

The Baltic states provide evidence supporting Morys' argument. Their

[49] Aldcroft, *Europe's third world*, 105.
[50] Morys, ''Economic growth'', 177–183.

industrial development outpaced Hungary's, with industrial and construction shares of GDP rising by 3.5, 4.2, and 7.6 percentage points in Lithuania, Latvia, and Estonia respectively (1925/9-1935/9).[51] Their industrial growth rate doubled Hungary's in the 1930s and exceeded agricultural growth twofold throughout the interwar period.[52] With GDP per capita growth surpassing Hungary's and nearly matching Bulgaria's between 1913-1938, the Baltic states—particularly Latvia and Estonia—emerge as champions of interwar Eastern European development even though they nearly stagnated relative to the West.

While many aspects of Baltic interwar development warrant further investigation, a nuanced picture emerges. The 1920s proved disappointing, characterised by slow recovery and gradual structural change, though much of this lag likely stemmed from extensive First World War devastation and subsequent nation-building challenges. The 1930s, by contrast, saw the opposite trend, with growth rates similar to or even faster than those in mature Western Europe (see Figure 4.2). The Baltic states modernised and industrialised more rapidly than the rest of Europe and demonstrated remarkable resilience during the Great Depression which, as shown in Figure 4.2, was the primary driver of the catch-up between 1928 and 1934.

Was Aldcroft correct in identifying the Baltics—particularly Latvia and Estonia—as the most promising backward region in Europe prior to the Second World War?[53] As shown in Figure 4.4, Latvia and Estonia retained their relative economic positions from 1913, ranking among the best-performing peripheral economies in Europe by 1938. Lithuania, by contrast, remained positioned between wealthier and poorer peripheries, suggesting a more intermediate status. Moreover, both Latvia and Estonia experienced a relative decline vis-à-vis Finland compared to 1913 (see Figure 4.1), calling into question the long-standing assumption of income parity among these three Protestant Baltic republics in the pre-war period.[54]

Nevertheless, the pace of industrialisation, structural transformation in GDP composition, and economic growth in the Baltic states during the 1930s surpassed that of any other region in Europe. This exceptional performance invites speculation as to whether the Baltics might have experienced continued catch-up growth had they remained part of the post-war capitalist eco-

[51] Calculated from Tables G.4, G.5, G.6

[52] See Tables C.1, C.1, C.1 and sources below Table 4.5.

[53] Aldcroft, *Europe's third world*, 105, 171; Aldcroft and Morewood, *The European economy*, 120.

[54] See, for example, Kalniņš and Piņķe, ''Determining''; Kukk, ''Economic damage''

nomic order.

Occupation period, 1940-1990

Beginning with Soviet occupation in 1940, the Baltic states underwent profound transformation during 50 years of foreign occupations. The Second World War precipitated catastrophic declines in both incomes and populations, whilst post-war Sovietisation achieved mixed results, comparable to the interwar capitalist period. The Soviet command system era can be divided into three distinct phases: an extremely rapid post-WWII recovery by 1948, accelerated industrialisation with explosive overall GDP growth in 1948-1968, and economic slowdown and stagnation in 1969-1989. The latter two periods warrant particular examination, as they illustrate how an encouraging start ultimately led to an agonising conclusion, in stark contrast to the interwar period.

Before examining the socialist growth story in the Baltics, it is crucial to address the interpretability of GDP per capita within the socialist system. The figures presented in this thesis, calculated according to CIA methodologies, maintain comparability with GDP per capita estimates for the entire post-WWII USSR and accurately represent aggregate production dynamics. However, extensive research has demonstrated that per capita income statistics, even when calculated by Western standards, do not accurately reflect living standards in socialist systems due to suppressed consumption levels and disproportionate emphasis on non-consumer goods production.[55] Essentially, the socialist-period GDP per capita figures in this thesis indicate the productive capacity of an average inhabitant in Lithuania, Latvia and Estonia, rather than their actual well-being.

Lithuania experienced the earliest economic decline among the Baltic states in 1939, beginning with the loss of the relatively modernised Klaipėda area and its vital Baltic Sea access, which the country had maintained for 16 years. The situation further evolved in October 1939 when all three Baltic countries were compelled to sign mutual assistance agreements with the USSR. Lithuania received a portion of the Vilnius area, including the cap-

[55]Broadberry and Klein, ''When and why'', 47, 49; Morys, ''Economic growth'', 172; Vonyó and Markevich, ''Economic growth and structural'', 287; I. B. Voskoboynikov, ''Accounting for growth in the USSR and Russia, 1950–2012'', *Journal of economic surveys* (Hoboken) 35, no. 3 (2021): 6–7. In the Baltic context, this issue was addressed by Misiunas and Taagepera, *The Baltic states*, 185

ital city itself, from the Soviet Union following their invasion of Poland. The Vilnius region, previously under Polish administration, had been notably underdeveloped and had suffered additional degradation from military action and Soviet atrocities.[56] The combined impact of losing its most industrialised region and only seaport, whilst having to reintegrate a backward capital area, resulted in significant sectoral declines: industrial output fell by 27%, transport and communications by 35%, and average GDP per capita by 6% in 1939.

Whilst Latvia and Estonia also experienced economic slowdowns in the late 1930s, their substantial economic downturns began with the Soviet and Nazi invasions of 1940-1941. The impact of the Second World War manifested more prominently in population losses than in other regions, resulting in somewhat more moderate declines in per capita incomes. The overall destruction in the Baltic states proved comparable to that experienced by Austria and the Netherlands, as demonstrated in Table 4.6.

Table 4.6 highlights a striking divergence between Lithuania and its northern Baltic neighbours: Lithuania experienced a per capita GDP decline during the Second World War that was approximately 20 percentage points greater than that observed in Latvia or Estonia. Part of this gap is attributable to two territorial changes in 1939: the loss of the more industrialised maritime Klaipėda region to Germany, and the annexation of the relatively underdeveloped Vilnius region. However, these adjustments account for no more than 9 percentage points of the observed decline.[57]

One crucial difference that may explain this disproportionate collapse concerns the scale and structure of Lithuania's Jewish population during the Nazi occupation (1941–1944). In the interwar period, Jews comprised approximately 7–8% of Lithuania's population, compared with around 5% in Latvia and less than 1% in Estonia.[58] Moreover, in predominantly agrarian Lithuania, the Jewish community was heavily engaged in higher value-added sectors. By the 1930s, they accounted for over 50% of trade enterprise ownership and contributed roughly 40% of the country's industrial output.[59]

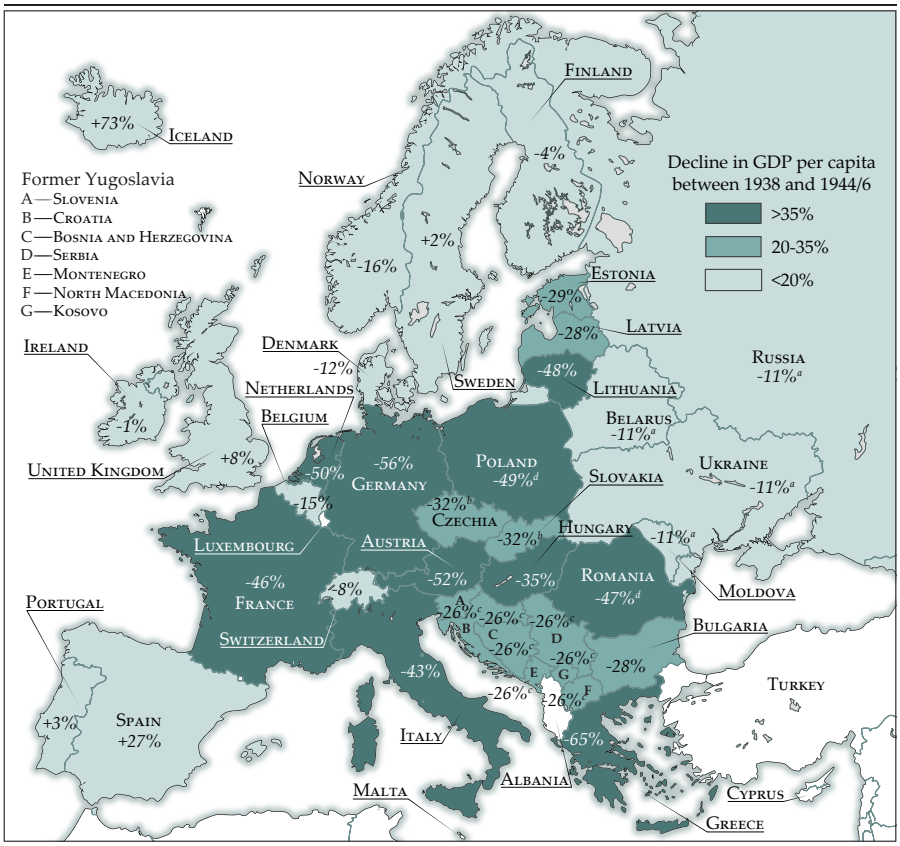
[56] J. Marcinkevičius, *Vilniaus kraštas*, in Visuotinė lietuvių enciklopedija, Jan 8, June 2014; Vaskela, ''Ekonomika'', 313.

[57] If the change is measured between 1940 and 1944 rather than 1938–1944, the GDP per capita decline still stands at 39%.

[58] Vaskela, *Tautiniai*, 139; P. Zvidrins, ''Changes in the ethnic composition in Latvia'', *Journal of Baltic studies* (Brooklyn) 23, no. 4 (1992): 364; T. Parming, ''The Jewish Community and Inter-Ethnic Relations in Estonia, 1918–1940'', *Journal of Baltic studies* (Brooklyn) 10, no. 3 (1979): 242

[59] Vaskela, *Tautiniai*, 157–160.

Map 7: IMPACT OF WORLD WAR TWO ON GDP PER CAPITA IN EUROPE



Sources: own work, based on MPD version 2023 and this thesis.
[a]figures for USSR total, 1944 figure was not available, hence the impact is likely understated; [b]figures for Czechoslovakia total; [c]figures for Yugoslavia total; [d]doubtful reliability of the interwar data, see M. Morys, ''Economic growth and structural change in Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 166.

The systematic extermination of this economically vital segment of the Lithuanian population during the Holocaust likely had a profound and immediate impact on the country's productive capacity—potentially exacerbating the GDP per capita decline to a degree not observed in Latvia or Estonia. While the specific effect in Lithuania requires further empirical investigation, existing quantitative research has established similar patterns across other re-

Table 4.6: DEMOGRAPHIC AND ECONOMIC IMPACT OF WWII, percentage decline from 1938 to 1944/46 trough

	Population	GDP	GDP per capita
Greece	3%	-64%	-65%
Germany	-6%	-58%	-56%
Austria	1%	-51%	-52%
Netherlands	6%	-47%	-50%
Poland	-23%	-57%	-49%
Lithuania	-22%[a]/-5%[b]	-48%[b]	-48%[b]
Estonia	-20%	-42%	-29%
Latvia	-23%	-40%	-28%

Sources: MPD version 2023 and this thesis. [a]post-war territory, see R. J. Misiunas and R. Taagepera, *The Baltic states: years of dependence, 1940-1990*, Expanded and updated ed. (London: Hurst, 1993), 353. [b]actual territory.

gions of pre-war Jewish settlement.[60]

Red Army's reoccupation of the Baltic republics in 1944 resulted in their reintegration into the USSR, accompanied by minor border adjustments in Latvia and Estonia and a significant territorial change in Lithuania, which regained the seaside Klaipėda region (see Map 2). The borders established for the Baltic Soviet republics have remained unchanged through their transition to post-1990 independent states.

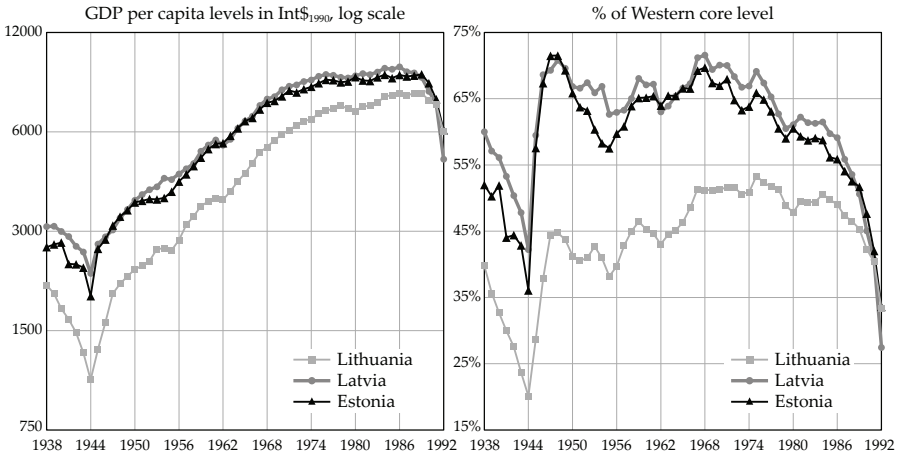
While demographic recovery was slow (see Table F.1), economic bounce-back was much faster: Estonia's total GDP exceeded its 1939 peak in 1948, followed by Lithuania and Latvia in 1949.[61] Given the reduced populations, per capita GDP recovery occurred even earlier—Estonia achieved pre-war levels by 1946, Latvia by 1947-1948, and Lithuania by 1948. The weighted average GDP per capita across the Baltic states reached and surpassed its 1938 peak in 1947 and 1948, respectively. This firmly establishes 1948 as the year when all socialist Baltic republics fully recovered their pre-war per capita GDP levels, aligning with both overall USSR and communist East-Central European recovery patterns. Notably, Western recovery proved slower, with both the

[60]D. Acemoglu et al., ''Social Structure and Development: A Legacy of the Holocaust in Russia'', *The Quarterly journal of economics* (Oxford) 126, no. 2 (2011): 895–946

[61]Lithuania's recovery in constant borders was likely slower since the 1939 peak did not include the Klaipėda region. Lithuania's GDP in 1938-1940 would have been around 8% higher if the Klaipėda region with 55% higher income level was retained. This would have postponed the recovery to 1950, see Vaskela, *Tautiniai*, 98.

Western core and periphery only returning to interwar peaks in 1950.[62]

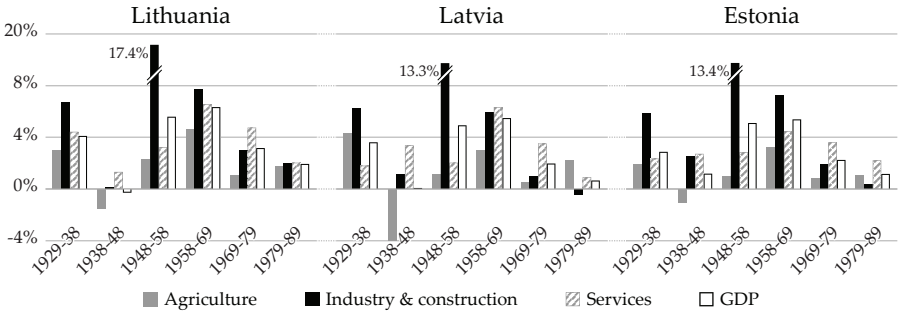
Figure 4.5: GDP PER CAPITA IN THE BALTICS, 1938-1992



Sources: MPD version 2023 and this thesis.

The Soviet command economy was systematically implemented across the Baltic republics during the late 1940s, with their incorporation into the USSR's unified planning system beginning in 1946. The transformation was swift and comprehensive: all private businesses were nationalised by 1947, and the majority of farms were collectivised by early 1950 (see Table 1.2).[63]

Figure 4.6: SECTORAL GROWTH RATES, 1929-1989



Sources: this thesis.

As illustrated in Figure 4.6, agriculture endured the most severe impact from World War II, with recovery continuing to lag into the 1950s due to

[62] Based on MPD version 2023.

[63] Misiunas and Taagepera, *The Baltic states*, 103–104, 108

collectivisation-induced inefficiencies (see Table 1.2). There is not a single country where collectivisation yielded positive outcomes for agriculture and the Baltic Soviet republics were no exceptions.[64]

However, whilst the pre-war capitalist Baltic republics had demonstrated considerable industrial growth, the expansion of industry and construction under socialist rule reached unprecedented levels in the 1950s. This extraordinary growth was facilitated by two key factors: the collectivisation-driven mass migration from rural areas to cities (2-3% annually), and the extraction of producer surplus from the agricultural population for reinvestment, following the successful Soviet model of the 1930s.[65] Lithuania's substantial rural population pool, comprising 80% of the population in 1946, provided ample potential for shifting labour from agriculture to the secondary sector. In contrast, Latvia and Estonia's more limited rural populations necessitated a sustained influx of predominantly Russian migrants from the Soviet hinterland beginning in the late 1940s to maintain their rapid pace of industrialisation.[66]

In 1955, explosive industrial expansion across all three Baltic republics experienced an abrupt deceleration. Having sustained annual growth rates of 16-24% since 1948, industrial expansion rates halved from 1956 onwards and never regained their previous momentum (see Tables D.3, D.4 and D.5 in Appendix D). However, as Figure 4.6 demonstrates, this industrial slowdown coincided with the emergence of services as a primary growth driver in the 1960s, alongside a recovered agricultural sector which has suffered terribly during the collectivisation years (see Table 1.2).

In response to declining industrial performance, Khrushchev introduced the *sovnarkhozy* system (regional economic councils) in 1957, granting considerable autonomy to local industrial planners within individual Soviet republics. Whilst Baltic historiography typically portrays the *sovnarkhozy* system favourably, particularly for Lithuania, this assessment may reflect a bias towards regional autonomy rather than economic reality. Industrial growth not only diminished by half compared to the previous seven years, but Lithuania also experienced a 2% decline in industrial output in 1962.[67] The *sovnarkhozy* system was superseded in 1965 by the Kosygin reform, which

[64] V. Skebas and V. Spečiūnas, *Kolektyvizacija*, in Visuotinė lietuvių enciklopedija, July 2018.
[65] Allen, *Farm to factory*, 99, 190, 211.
[66] Misiunas and Taagepera, *The Baltic states*, 112.
[67] For the description of the system and its positive appraisal, see Misiunas and Taagepera, 187–188.

Table 4.7: PERIPHERAL COLD WAR PERIOD GROWTH RATES

	1938-1989	1950-1959	1959-1969	1969-1979	1979-1989
Lithuania	2.7%	5.0%	4.7%	2.2%	1.1%
Latvia	2.1%	3.9%	3.9%	1.3%	0.0%
Estonia	2.4%	3.5%	4.0%	1.4%	0.5%
Baltics	2.4%	4.3%	4.2%	1.7%	0.6%
Finland	3.1%	3.4%	4.4%	3.3%	3.2%
Iceland	2.5%	1.8%	4.2%	3.2%	2.7%
Ireland	3.7%	2.6%	2.6%	5.4%	2.0%
USSR	2.4%	2.9%	3.6%	2.2%	0.9%
Czechoslovakia	2.3%	3.5%	2.9%	2.1%	1.2%
Poland	1.9%	2.6%	3.2%	3.4%	-0.4%
Hungary	1.9%	3.8%	3.8%	2.1%	1.0%
Bulgaria	2.8%	5.5%	5.4%	3.2%	0.0%
Romania	2.7%	4.7%	4.7%	3.9%	-0.5%
Yugoslavia	3.2%	5.1%	5.4%	5.1%	0.0%
Portugal	3.6%	3.3%	6.0%	4.5%	3.0%
Spain	3.6%[a]	4.4%	6.2%	3.9%	3.0%
Greece	2.6%	5.3%	6.6%	4.4%	1.3%
Western core	2.4%	3.7%	3.7%	2.7%	1.8%
Western periphery	3.0%[b]	4.8%	5.6%	3.3%	2.5%
East-Central Europe	2.3%	3.7%	3.8%	3.4%	0.1%
USSR	2.4%	2.9%	3.6%	2.2%	0.9%

Sources: this thesis and MPD version 2023. Regional rates are growth rates of population-weighted averages of GDP per capita.
[a]1935-1989; [b]1938 without Spain.

attempted to revitalise industrial growth through improved incentive structures. However, this reform, accompanied by enterprise recentralisation, resulted in significant planning complications. Although firm and worker incentives coupled with inefficient planning contributed to ongoing challenges, the persistent slowdown in industrial expansion has been primarily attributed to the natural exhaustion of growth potential following the substantial elevation from initially low starting levels.[68]

A prevalent interpretation of Soviet Union and satellite state growth suggests that expansion of heavy industries took precedence over consumer-oriented light industries, exacerbating consumer goods scarcity.[69] Previous research indicated this heavy industry focus manifested in the Baltic Soviet republics from the late 1940s, whilst acknowledging that traditional textile and food industries maintained significant positions.[70]

Empirical evidence in Table 4.8 partially validates both perspectives. During the period of rapid industrialisation and growth, heavy industries indeed demonstrated the fastest expansion, though traditional industries followed closely, particularly in Lithuania. However, the emphasis on heavy industry diminished during the final two decades before 1990. Nevertheless, by 1990, heavy industries constituted 41% of Estonian, 48% of Latvian, and 55% of Lithuanian industrial value-added.[71] These industries, designed to serve the vast Soviet empire, became largely obsolete after its collapse—their products held little value in Western markets, whilst production grew increasingly difficult due to raw material shortages.[72] Estonia's less painful transition to market economy in the 1990s has been partly attributed to its lower dependence on Soviet supply and demand, reflected in its smaller share of heavy and all-union industries.[73]

Despite industrial deceleration, overall growth until the late 1960s remained impressive and achieved greater balance, rather than relying exclusively on industrial expansion. A brief recession occurred in 1962, registering declines of 1% in Lithuania and 3.5% in Latvia—an event that has received no

[68] Misiunas and Taagepera, *The Baltic states*, 189.

[69] Allen, *Farm to factory*, 211; Vonyó and Markevich, ''Economic growth and structural'', 286–287; I. B. Voskoboynikov, ''Accounting for'', 6–7

[70] Misiunas and Taagepera, *The Baltic states*, 110, 184, 234.

[71] Bolotin, ''Former Soviet Union''.

[72] Reardon, "An Assessment": 630

[73] Reardon, "An Assessment": 632; Grennes, ''The economic'', 22; D. J. Smith, ''Estonia: Independence and European Integration'', ed. D. J. Smith et al., The Baltic states: Estonia, Latvia and Lithuania (London: Routledge, 2002), 117.

Table 4.8: GROWTH RATES ACROSS INDUSTRIAL BRANCHES, AVERAGE PER YEAR 1948-1989

	Lithuanian SSR		Latvian SSR		Estonian SSR	
	1948-69	1969-89	1948-69	1969-89	1948-69	1969-89
Heavy industries	13.8%	2.5%	11.9%	1.0%	13.5%	0.9%
Textiles	12.8%	1.3%	8.5%	0.4%	11.0%	0.6%
Food	12.1%	2.6%	8.0%	1.9%	9.0%	1.9%
Other light industries	9.3%	3.5%	7.2%	-0.9%	7.0%	2.0%

Sources: this thesis.

scholarly attention due to its being subsumed within the prevailing positive long-term trend.

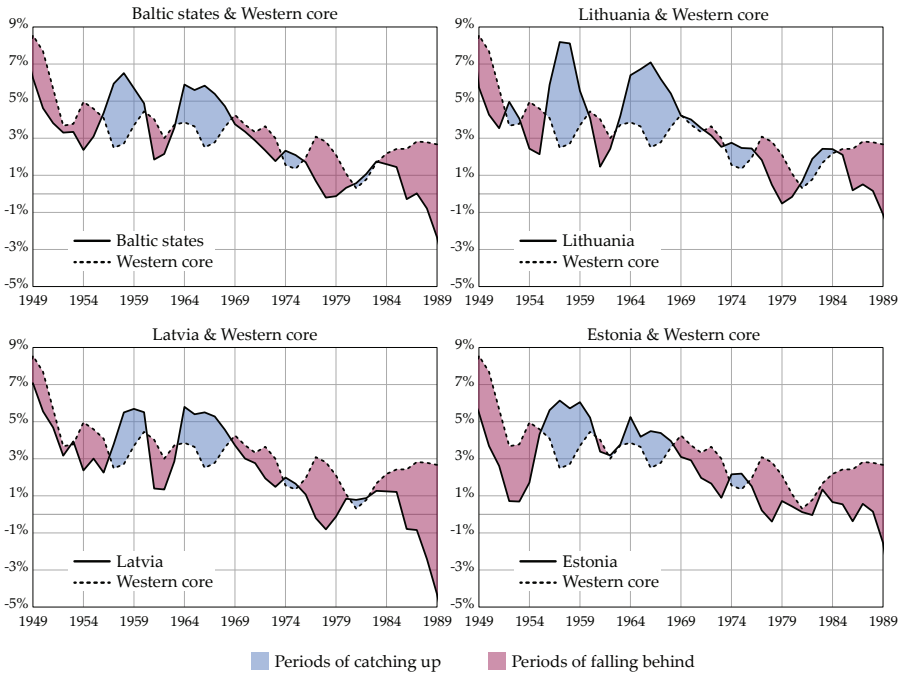
As Table 4.7 demonstrates, Lithuania, together with Yugoslavia and Bulgaria, achieved rapid convergence with the West during the 1950s, surpassing even the growth rates of the Western periphery, whilst Latvia and Estonia demonstrated comparatively modest performance. In the 1960s, Baltic growth rates subsided, while those of Bulgaria, Romania, and Yugoslavia remained well above the Western core average. Although the Western periphery led in convergence trends during this period, all three Baltic Soviet republics still exceeded the growth rates of the mature Western economies, narrowing their gap with the Western core during the 1960s (see Figure 4.5).

These findings substantiate Vonyó and Markevich's assertion that growth rates across much of the Soviet bloc in the first post-war decades were comparable to those in the West.[74] The two decades between 1948 and 1968 demonstrate that the socialist system—despite the devastating human cost of collectivisation, deportations, and suppressed human rights—represented a viable alternative to capitalism in pursuing modernisation, at least in the medium term.

Similar to the industrial slowdown of 1955, a watershed moment in Baltic socialist economic growth emerged around 1968, though less uniformly. As Figure 4.7 indicates, growth rates across all three economies began declining in the late 1960s and, following a brief respite during the early 1970s oil shock, continued their downward trajectory until the late 1970s. Growth rate differentials displayed in Figure 4.7 reveal that GDP per capita convergence rates towards mature Western economies turned negative in Latvia, Estonia and the Baltics as a region during 1968-1969. However, the less developed Lithuania maintained a predominantly positive catch-up record until 1975

[74] Vonyó and Markevich, ''Economic growth and structural'', 281–282.

Figure 4.7: GDP PER CAPITA GROWTH RATES, 1949-1989, 3-year moving averages



Sources: this thesis and calculations using MPD version 2023.

and, remarkably, achieved modest progress again in the early 1980s.

Notably, the 1968 economic turning point in Latvia and Estonia coincided with a pivotal event in East-Central Europe—the Prague Spring—and marked the end of Moscow's relatively supportive stance towards Baltic regional autonomy.[75] This timing also aligned with broader USSR trends, as the Soviet Union ceased converging with Western levels in 1968, preceding similar slowdowns in most other European communist countries.[76] The alignment of the late 1960s slowdowns across East-Central Europe, Baltics and the USSR, suggest similar factors likely contributed to diminishing economic growth in the Soviet Baltic republics, particularly following recentralisation

[75] Misiunas and Taagepera, *The Baltic states*, 203.

[76] East-Central Europe altogether was catching up until 1975, although data for Czechoslovakia, for example, seems to offer two different stories. According to Broadberry and Klein, ''When and why'', the country's industrial productivity kept up with British levels until 1980, whilst GDP per capita in MPD version 2023 consistently fell behind Western core levels since 1975 if not earlier.

in the mid-1960s. During this period, the Baltic socialist republics lost their limited economic decision-making autonomy, and consequently the institutional deficiencies that fostered inefficiency throughout the Soviet system (discussed on page 79) likely made a negative impact on Baltic economies as well.[77]

The 1970s witnessed minimal agricultural growth across all three Baltic republics, while industry and construction advanced modestly, with services emerging as the primary driver of increasingly sluggish GDP growth. As Figure 4.6 illustrates, these trends continued at an even slower pace throughout the 1980s. This pattern diverged from East-Central European socialist economies where, according to Vonyó and Markevich, industry remained the primary growth driver until 1989.[78] Latvia's secondary and tertiary sector performance proved particularly weak, with a modest 2% annual increase in agricultural value-added during 1979-1989 serving as the sole factor preventing GDP per capita from declining during that decade. The Baltic region, having ranked as Europe's second-best performer during the 1950s and 1960s, became its poorest performer in the 1970s and 1980s. Lithuania maintained somewhat stronger performance, though still trailing behind the Western core during these decades (see Table 4.7).

A brief improvement in Baltic growth trends during 1983-1984 primarily stemmed from an agricultural boom, evidenced by 10-25% increases in both crop and livestock output. Lithuania experienced additional industrial capacity expansion of 4% per annum during 1981-1984, driven by the launch of large-scale oil refinery and nuclear plant operations in 1981 and 1984 respectively.[79] However, by the implementation of Gorbachev's *perestroika* in 1987, the socialist system in the Baltics had become unsalvageable.[80] Between 1987 and 1989, Lithuanian and Estonian economies grew by less than 0.2% annually, while Latvia experienced a gradual decline of 2.4% per year from 1987 onwards. By 1989, agriculture remained the only consistently expanding sector across the Baltics, marginally supplemented by services in Lithuania and Estonia. This period also marked a significant shift in regional dynamics, as Latvia, the longtime Baltic leader since 1913, ceded its position to Estonia, which would emerge as a success story following the socialist bloc's collapse.

The socialist regimes had committed to delivering industrialisation and

[77] Misiunas and Taagepera, *The Baltic states*, 227–228.
[78] Vonyó and Markevich, ''Economic growth and structural'', 286–287.
[79] Orlen Lietuva, Fakelas; Misiunas and Taagepera, *The Baltic states*, 290
[80] Plakans, *A concise*, 387–388

facilitating delayed structural transition from agriculture in Europe's backward regions.[81] Recent research by Vonyó and Markevich indicates that the inability to fulfill this commitment contributed significantly to socialist slowdown in East-Central Europe. By the late 1980s, most European socialist economies maintained disproportionately high shares of both employment and value-added in agriculture, while their service sector remained underdeveloped.[82] Supporting their argument, Table 4.9 suggests that sluggish structural transformation may have contributed substantially to the Baltic socialist slowdown. By 1990, the Baltic primary sector's share of value-added exceeded that of East-Central Europe by five percentage points, indicating a persistently backward economic structure.

It is possible, however, that enduring low levels of industrialisation were the consequence of initially low industrial output levels. The secondary sector's share of GDP in the Baltics expanded from 21% in circa 1937 to 37% in 1990, representing a 16 percentage point increase (see Tables 4.3 and 4.9). This significantly exceeded East-Central Europe's more modest 9 percentage point change during the same period. Yet, a closer examination reveals that the Baltics had achieved a 5 percentage point improvement in just ten years under capitalism from 16% in circa 1927, compared to the 16 percentage point improvement over more than 40 years of socialist rule.

Similar patterns emerge when examining the transition towards service sectors in Lithuania and Estonia. Lithuania's service sector share of GDP increased from 35% to 38% between circa 1927 and 1937, while Estonia's grew from 36% to 40% during the same period, representing 3-4 percentage point increases over a decade of capitalist governance. In contrast, by 1990, the service sector's share of value-added reached only 42% in both republics, reflecting a mere 2-4 percentage point increase over more than four decades of socialist rule. Latvia presents an exception to this pattern, with its service share growing from 37% to 47% between circa 1937 and 1990, following a negative trend during the interwar years (discussed on page 167).

While a deceleration in structural transition naturally occurs as economies mature, Vonyó and Markevich note that significant potential for structural transformation remained unrealised by the late 1980s.[83] Indeed, the occupied Baltic states resembled mature economies neither in terms of overall GDP per

[81] Morys, ''Economic growth'', 163; Berend, *Economic history of a divided Europe*: 187.
[82] Vonyó and Markevich, ''Economic growth and structural'', 285–286
[83] Vonyó and Markevich, 285–286

Table 4.9: SECTORAL SHARES OF GDP, c. 1937 & c. 1990

	Agriculture		Industry & construction		Services	
	c. 1937	c. 1990	c. 1937	c. 1990	c. 1937	c. 1990
Lithuania	44%	22%	18%	36%	38%	42%
Latvia	40%	18%	23%	35%	37%	47%
Estonia	38%	17%	23%	41%	40%	42%
Baltics	40%	19%	21%	37%	38%	44%
Finland	32%	7%	30%	34%	38%	60%
Iceland	44%	10%	16%	25%	40%	65%
Ireland	25%	12%	24%	46%	51%	43%
USSR	31%	19%	32%	41%	37%	40%
Czechoslovakia	24%	17%	35%	48%	41%	35%
Hungary	34%	24%	30%	38%	37%	38%
Bulgaria	52%	13%	15%	57%	33%	30%
Portugal	30%	7%	27%	38%	43%	55%
Greece	54%	14%	26%	25%	20%	61%
Western core	14%	3%	38%	32%	49%	65%
Western periphery	36%	8%	26%	35%	39%	56%
East-Central Europe	37%	14%	27%	36%	36%	46%

Sources: Tables G.4, G.5, G.6, 2.1 and Palgrave Macmillan Ltd, *International Historical Statistics*, 1st ed. 2013. (London: Palgrave Macmillan UK, 2013); L. Amaral, *The Modern Portuguese Economy in the Twentieth and Twenty-First Centuries* (Cham: Palgrave Macmillan, 2019), 158; G. Jonsson, ''The gross domestic product of Iceland, 1870–1945'', ed. O. H. Grytten, Nordic historical national accounts: proceedings of workshop IV, Solstrand, 13–15 November 1998 (Bergen, 1999), 24; M. Ivanov, *The Gross Domestic Product of Bulgaria 1870-1945* (Sofia: Ciela, 2012), 460; B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 184; M. Morys, ''Economic growth and structural change in Central, East and South-East Europe, 1918–1939'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 179; United Nations, *Statistical Yearbook 1993* (New York, 1995), 182.

Note: for most countries the c. 1937 figures represent averages for 1935/1939 and c. 1990 averages for 1985/1993 except where only separate figures within the range were available, such as the Baltics and ECE where only 1990 figures are available. Regional aggregates are simple averages. [a] 1935/1939 without Spain. GVA: gross value-added. ECE 1990 shares from S. Houpt et al., ''Sectoral developments, 1945-2000'', ed. S. Broadberry and K. H. O'Rourke, vol. 2, The Cambridge Economic History of Modern Europe: 1870 to the Present (Cambridge: Cambridge University Press, 2010), 346. Data provided at current prices.

capita levels nor in the structural composition of value added, as evidenced in Table 4.9. Among capitalist European economies, by 1990 only Ireland had a share of GDP created in the service sector similar to that of the Baltic republics. Lithuania and Estonia also trailed behind the East–Central European average in this regard.[84] This unfulfilled Soviet promise of structural modernisation likely contributed substantially to the socialist stagnation in the Lithuanian, Latvian, and Estonian SSRs.

Moreover, evidence demonstrates that modernisation in the Baltics maintained momentum rather than stagnating during the interwar years, contradicting socialist apologists' arguments that the Soviet model represented the last hope for stagnant Eastern European economies (discussed on page 81). The unrealised structural modernisation potential, however, does not explain why stagnation in Lithuania was delayed until the 1980s (see Table 4.7).

Some explanations for the divergent growth trajectories of Lithuania, Latvia, and Estonia—as well as their dissimilar performance relative to East–Central Europe—may lie in republic-specific investment patterns determined by Moscow. Although under centralised Soviet control, each Baltic republic was assigned a distinct functional role within the USSR's specialised production system (discussed on page 35). It is plausible that the relatively strong growth seen during the 1950s and 1960s was enabled by economies of scale arising from Smithian forces of specialisation and division of labour.

Lithuania's continued growth during the 1970s, for instance, was primarily driven by expansion in food processing and light industry—especially fodder production—suggesting that Soviet planners may have channelled additional investment to reinforce Lithuania's role as an agricultural and food-processing area. Construction was another significant and dynamic sector in Soviet Lithuania during the 1970s and 1980s, accounting for 9% of GDP and growing at 2.6% annually—around 0.2 percentage points faster than GDP growth over 1970–1989.

By contrast, construction in Latvia and Estonia, despite comprising a comparable 7–11% share of total value added, stagnated during this period. In Latvia, the sector contracted by 0.7% per year, while in Estonia it grew at only 0.6% annually—well below national growth rates—thereby dragging on GDP performance in both republics. Since investment allocation remained

[84] Table 4.9 displays a contrasting difference between c. 1990 sectoral value-added shares in individual ECE economies and their regional average. Since different sources were used, this might be due to methodological differences. The regional figure for ECE is taken from Houpt et al., ''Sectoral developments'', 346 and is deemed as more reliable.

largely a centrally planned decision emanating from Moscow,[85] this pattern suggests that Lithuania may have been favoured as the primary site for new construction projects among the three Baltic republics.

Nevertheless, this remains a tentative conclusion. The argument rests in part on unreliable and upward-biased Soviet investment data, such as that shown in Figure 2.6, and no comprehensive analysis of regional investment decisions has yet been undertaken. As Kukič (2020) notes, the absence of such studies constitutes a major gap in the spatial economic analysis of Soviet growth.[86]

While official Soviet investment statistics must be treated with caution, they do offer suggestive patterns when considered alongside the new GDP data presented in this thesis. Figure 4.8 shows that per capita investment in Latvia and Estonia was generally above the Soviet average for much of the occupation period. However, when measured as a share of GDP, investment consistently remained below average in all three Baltic republics throughout the Cold War.

This pattern likely reflects a rational economic calculus rather than political favouritism. Moscow appears to have capitalised on the Baltics' relatively high educational attainment and infrastructure by allocating investments to support higher-value industries and services. Yet, since these investments were modest relative to GDP, this strategy does not indicate preferential treatment, confirming the findings of Krūminš and Komičienė in very broad terms.[87]

Despite the uncertainty about the reasons behind initial growth and ultimate stagnation, it is undeniable that the Baltic states achieved significant economic progress throughout the state socialist period, particularly during the 1950s and 1960s. Lithuania maintained catch-up growth until 1976, with a further resurgence in the 1980s. The Baltic case demonstrates that, for at least two decades—if not longer—the socialist catch-up model presented a viable alternative to Western capitalism, particularly for the most underdeveloped regions such as Lithuania.

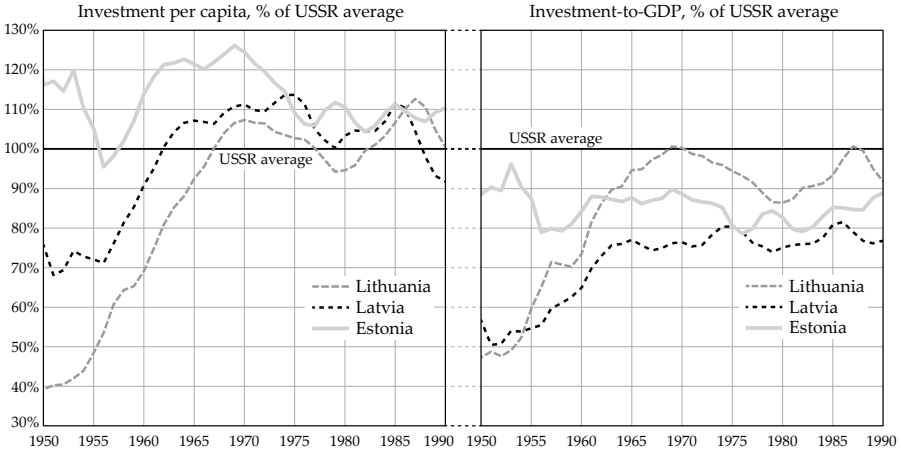
The progress manifested notably in rising living standards, acknow-

[85] G. E. Schroeder, ''Regional Economic Disparities, Gorbachev's Policies, and the Disintegration of the Soviet Union'', ed. R. F. Kaufman and J. P. Hardt, The Former Soviet Union in Transition (Routledge, 1993), 124.

[86] Kukić, ''Technical change'', 670.

[87] Krūmiņš, ''Soviet Economic''; Komičienė, ''SSRS finansų''

Figure 4.8: INVESTMENT RATIOS BASED ON OFFICIAL SOVIET DATA, 3-YEAR MOVING AVERAGES



Sources: Same as in Figure 2.6 complemented by population and GDP data from this thesis and MPD version 2023.

ledged even by anti-Soviet Baltic émigré scholars.[88] By 1990, nearly 70% of Baltic populations resided in urban areas with brick or concrete housing, most equipped with heating, electricity and water supply. This marked substantial progress from 1938, when urbanisation rates of 17-36% meant such amenities remained beyond reach for most rural-dwelling Lithuanians, Latvians and Estonians. Television ownership provides another indicator of improving living standards—from virtually non-existent during the interwar years to near-universal household ownership in all three republics by 1989.[89]

Although consumption levels in socialist countries generally trailed Western standards, claims that living standards remained stagnant throughout Soviet occupation prove entirely unfounded (these claims were discussed on page 5).[90] Progress undoubtedly occurred; the question is how much slower it was compared to peer countries—a topic explored in the next section of this chapter.

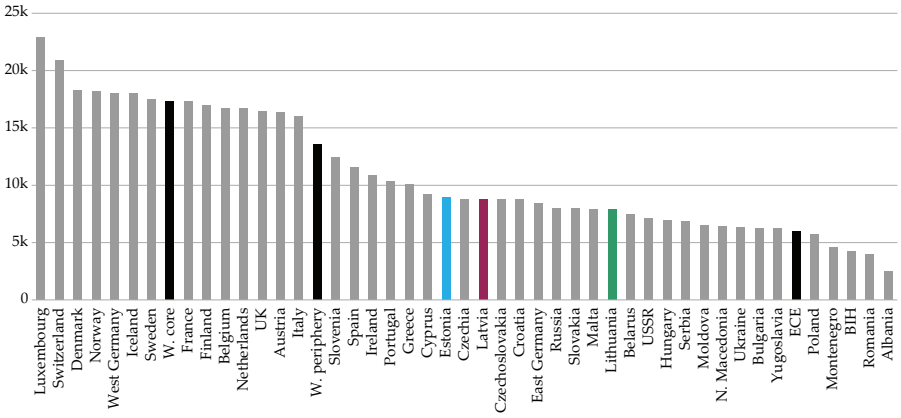
Despite undeniable advances in both material conditions and subjective living standards, particularly in the 1950s and 1960s, occupied Latvia and

[88]Misiunas and Taagepera, *The Baltic states*, 186.

[89]E. Neumayer, ''Beyond income: convergence in living standards, big time'', *Structural change and economic dynamics* 14, no. 3 (2003): 281–282; *Lietuvos statistikos metraštis 1989 m.* (Vilnius: Lietuvos statistikos departamentas, 1990), 67

[90]Maddison, ''Measuring the Performance'', 307–308.

Figure 4.9: GDP PER CAPITA IN EUROPE IN 1989, Int$$_{1990}$$



Sources: own work, based on MPD version 2023, T. Vonyó and A. Markevich, ''Economic growth and structural developments, 1945–1989'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 281 and this thesis.

Estonia had relinquished their positions as Europe's best-performing peripheral economies by 1989. As Figure 4.9 illustrates, Greece, Europe's poorest capitalist nation, surpassed even Estonia—the second wealthiest part of the socialist world after Slovenia—in per capita income by 1989.

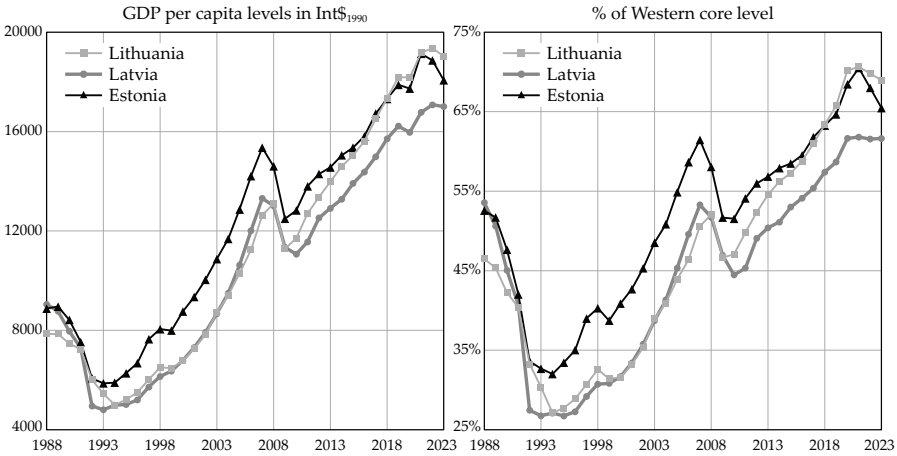
Modern independence, 1990-present

Although beginning turbulently, the post-Soviet independence period has brought unprecedented prosperity to the Baltic states. Following a devastating transitional crisis in the 1990s, the Baltic states achieved growth rates between 1995 and 2007 that astounded economists and earned them the 'Baltic tigers' moniker. The current phase in the modern development of Lithuania, Latvia and Estonia commenced with the Great Recession, which affected them severely. Since recovery, Baltic growth rates have remained impressive, albeit more moderate and divergent, currently constrained by economic disruptions from Russia's war with Ukraine.

The Baltic states, alongside the entire former socialist bloc, experienced massive output decline from 1990 onwards. Estonia's recession reached double digits in 1991, and by 1992 all three Baltic economies faced precipitous decline. Given their previous status as fully integrated, dependent components of the Soviet state, this situation parallels the post-WWI period when the

Baltic states struggled to adapt following the loss of Russian markets and supply chains.[91] The post-socialist recession in the Baltics reached nearly twice the depth and lasted one to two years longer than in most formerly communist countries (see Table 3.3). It also remains the deepest economic contraction so far experienced by modern Lithuania, Latvia and Estonia.

Figure 4.10: GDP PER CAPITA IN THE BALTICS, 1988-2023



Sources: MPD version 2023 and this thesis.

The disintegration of economic ties with the former USSR (discussed on pages 38–40) resulted in the abrupt loss of regional specialisation, division of labour, economies of scale, Soviet investments, and access to guaranteed demand and low-cost raw materials. It also exposed the deep inefficiencies of the centrally planned system, as Baltic manufacturers were suddenly required to compete with advanced Western imports. In many cases, this led to the disappearance of entire industrial sectors.

Nonetheless, as outlined on page 92, the conditions for renewed and sustained economic convergence began to emerge during the transformative 1990s. The Baltic states possessed advanced 'social capabilities', undertook determined Western-oriented reforms, and benefited from both geographical proximity to Western Europe and a broadly supportive stance from the European Union and Nordic countries. These factors facilitated access to foreign direct investment and advanced markets, further reinforcing the momentum for liberalisation. Inherited strong fiscal positions also improved the credibility of economic reforms and eased external borrowing constraints.

[91] Norkus, *Post-Communist Transformations*, 118.

By 1995, Lithuania, Latvia, and Estonia had signed Association Agreements with the European Union, and in 2004 all three became full EU members. Within just thirteen years of the Soviet market's collapse, these small economies had fully integrated into the European single market. Today, the Baltic states are more open and trade-dependent than at any previous point in their history. While trade-to-GDP ratios stood at just 22–31% during the 1930s, and 95–99% in 1990, these figures had surged to 138–155% by 2023.[92]

After recovery began in 1993–1994, all three Baltic countries embarked upon unprecedented growth that persisted until the 2008 recession, enabled by their reformed institutions, sustained investments in education, and adoption of ICT (see page 92 for a deeper discussion of the conditions facilitating post-1995 growth). The Russian financial crisis of 1998 only marginally interrupted this positive trajectory, and in the subsequent period, Lithuania, Latvia and Estonia earned their 'Baltic tigers' designation by maintaining 9-10% annual growth rates for eight consecutive years before 2008.[93] Estonia regained its 1989 GDP per capita level around 2001, followed by Lithuania in 2002 and Latvia a year later. For two decades or more, Lithuanians, Latvians and Estonians have enjoyed living standards surpassing those achieved during the peak years of socialism. This makes the 2016 survey showing preferences for planned economy among a quarter of Estonians and a third of Latvians appear unfounded at first glance.[94]

The liberal reforms of the 1990s, while creating conditions for sustained growth, also had their downsides. As Table 4.10 demonstrates, existing data reveals a dramatic increase in income inequality across all formerly socialist countries, with the Baltics experiencing particularly acute changes. Lithuania witnessed the highest increase, while the rises in Latvia and Estonia were exceeded only by those in other post-socialist regions. Although 1988 data might understate hidden inequality due to the unknown impact of shadow and shortage economies, the Baltic states' current position as the region with the highest GINI coefficient in Europe in 2022 partially explains dissatisfaction among their populations. This undoubtedly contributed to the massive voluntary emigration from the Baltic states between 1991 and 2018, which somewhat undermines the notion of unqualified Baltic success after regaining independence.

[92] This thesis; The World Bank, *Statistical handbook 1994*, 353, 403; The World Bank, *World Development Indicators 2024*

[93] Randveer and Staehr, "Macroeconomic": 214-227

[94] *Life in Transition*, 91, 106, 109

Table 4.10: INCOME INEQUALITY IN 1988 AND 2022
Gini coefficient (before tax)

	1988	2022	Increase
Lithuania	0.37	0.62	68%
Latvia	0.34	0.48	40%
Estonia	0.36	0.50	38%
Baltics	0.36	0.53	49%
Western core	0.40[a]	0.44	9%
Western periphery	0.43	0.46	7%
East-Central Europe	0.32[b]	0.46	42%
Former USSR	0.35[c]	0.53	51%

Sources: World Inequality Database (WID.world), *Gini coefficient (before tax)*, processed by Our World in Data, 2024.
Note: regional figures are simple averages. [a]without Austria; [b]Yugoslavia includes only Bosnia, Croatia, Montenegro, Macedonia, Serbia; [c]Estonia, Latvia, Lithuania, Moldova, Russia.

Impressive growth in per capita incomes among the 'Baltic tigers' proved unsustained. The Great Recession struck with great severity, producing peak decline rates of 13-14% in 2009. This contrasted sharply with Western core countries, which averaged declines of less than 4%, while East-Central Europe's aggregate GDP per capita maintained positive growth rates throughout.

Nevertheless, since 2011, the Baltic states resumed a less rapid, yet still impressive growth trajectory, maintaining 4-5% annual average rates until the Covid-19 recession. Throughout these nine years, Baltic growth rates

Table 4.11: GROWTH RATES SINCE MODERN INDEPENDENCE

	1989-2023	1995-2007	2007-2023
Lithuania	2.6%	7.7%	2.6%
Latvia	2.0%	8.5%	1.5%
Estonia	2.1%	7.7%	1.0%
Baltics	2.3%	8.0%	1.9%
Western core	1.4%	2.4%	0.6%
Western periphery	1.5%	2.9%	0.2%
East-Central Europe	3.2%	5.7%	3.2%

Sources: this thesis, MPD version 2023 and The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024.

Table 4.12: GDP PER CAPITA IN THE BALTICS RELATIVE TO EU_{27}

	Lithuania	Latvia	Estonia	Baltics
1938	60%	90%	78%	74%
2023[a]	80%	71%	76%	76%
2023[b]	86%	70%	81%	80%

Sources: this thesis, MPD version 2023 and The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024.
[a]MPD version 2023 extended by World Bank's 2022-2023 figures; [b]World Bank figures in current International dollars.

tripled those of the Western core. During this period, Lithuania increasingly established itself as the leading Baltic economy, surpassing Estonia in 2018. Moreover, while the pandemic triggered severe GDP per capita contractions of 6-9% in Western core and Western periphery nations, the Baltic states emerged relatively unscathed, experiencing less than 1% aggregate decline in GDP per capita.

The initial recovery in 2021 appeared to herald a new era of tiger-level growth, with per capita rates of 5-8% across the three economies. However, the economic contraction following Russia's full-scale invasion of Ukraine proved particularly pronounced in the Baltic region. While most of Europe stagnated, living standards after a 2022 slowdown declined by 4% in Estonia, 2% in Lithuania, and 0.4% in Latvia during 2023. Recovery signals are mixed, with Lithuanian per capita income rebounding at 2.2% in 2024, while Latvian figures stagnate at 0.4% and Estonian continue declining at -0.4% compared with 2023.[95]

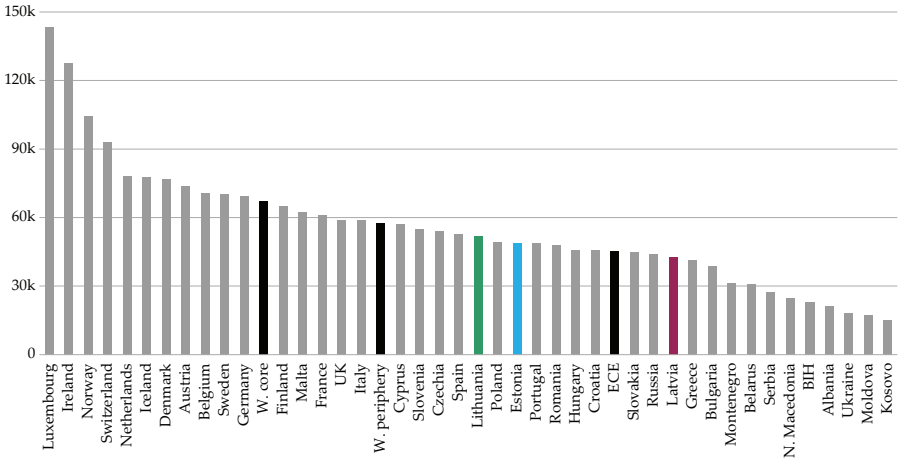
One of the paramount aspirations across post-socialist Europe, including the Baltic states, during the late 1980s and early 1990s was the desire to 'return to Europe'.[96] While EU accession in 2004 completed this process politically for all three republics, the economic dimension presents a more complex picture. Table 4.12 reveals that whilst Lithuania has achieved markedly closer proximity to EU average GDP per capita than during the interwar years, Estonia remains practically at its 1938 relative position, and Latvia still trails its pre-war comparative living standards. Thus, the economic return to Europe remains an ongoing process, particularly for Latvia.

[95]The World Bank, *World Development Indicators*, Accessed on August 4, 2025, Washington, D.C, 2025.
[96]Åslund, "Why Have": 3-7

Given its impressive modern performance, democratic governance, and solid security guarantees from NATO, Lithuania—despite massive population loss in the 1990s and 2000s—is clearly enjoying its 'golden age' today. Latvia's and Estonia's cases present greater ambiguity. Having led Baltic performance during the interwar period and surpassed the Western periphery's average level in 1938, Latvia appeared to possess all the prerequisites for sustained Western convergence. However, following more than 40 years of socialist occupation, Latvia's modern performance has proved somewhat disappointing. Recent growth patterns in Estonia have also been underwhelming, with the country's real GDP per capita still below its 2019 peak. Thus, the two northern Baltic republics appear to represent cases of countries caught in the middle-income trap.

As of mid-2020s, all three nations retain substantial scope for development. A comparison of Baltic relative standings within Europe across 1913, 1938, 1989 and 2023 (Figures 4.1, 4.4, 4.9 and 4.11) reveals that while their internal positions have shifted, none has successfully broken free from Europe's periphery, where they remain firmly positioned today.

Figure 4.11: GDP PER CAPITA IN EUROPE IN 2023, current Int$



Sources: The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024.

Catching up or falling behind? A Baltic perspective

Convergence towards Western European income levels has served as a crucial benchmark for evaluating not only the success or failure of Europe's peripheral countries but also the effectiveness of the two fundamentally different systems that governed this region over the past 110 years—market capitalism and state socialism.[97] With newly available robust Baltic income data, this thesis tests the triple hypothesis that *the Baltic states successfully reduced their gap from the West and achieved convergence with wealthy economies during each of the three modern historical regimes: interwar capitalism, post-war socialism and modern capitalism.*

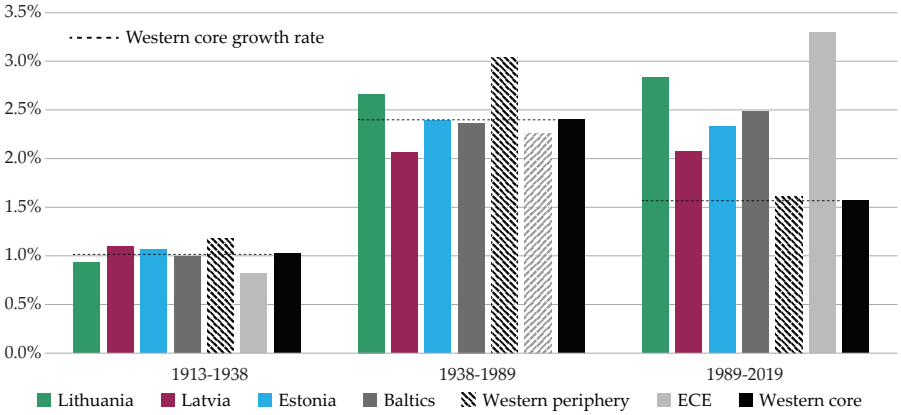
The analysis examines three distinct periods: 1913-1938, 1938-1989, and 1989-2019. The start and end years of each period represent peak performance years under four different systems: pre-war capitalism (1913), interwar capitalism (1938), state socialism (1989), and modern capitalism (2019). The selection of 2019 as the terminal year reflects the final year of uninterrupted post-Great Recession growth, preceding disruptions from Covid-19 and the Russo-Ukrainian war. This thesis proceeds by examining growth rates during each period, tracking Baltic GDP per capita levels relative to the West across the 110-year span, and conducting beta convergence analysis to evaluate comparative catch-up performance throughout the three periods.

Comparison of growth rates

As Figure 4.12 demonstrates, although the Baltic states achieved exceptional performance relative to their European peers during the 1930s, 1950s and 1960s, periods of negative or slower growth counterbalanced these positive developments when considering the three countries collectively. Neither the capitalist interwar nor the post-war socialist periods generated growth rates sufficient for the Baltic aggregate to outpace Western rates. However, examining individual countries reveals that Latvian and Estonian interwar growth exceeded Western core rates by 0.05-0.07 percentage points, although

[97] Some of the most recent major studies that explored catch-up convergence rates in the region include Morys, ''Economic growth''; Vonyó and Markevich, ''Economic growth and structural''.

Figure 4.12: GDP PER CAPITA GROWTH RATES IN EUROPE
1913-2019, average per year



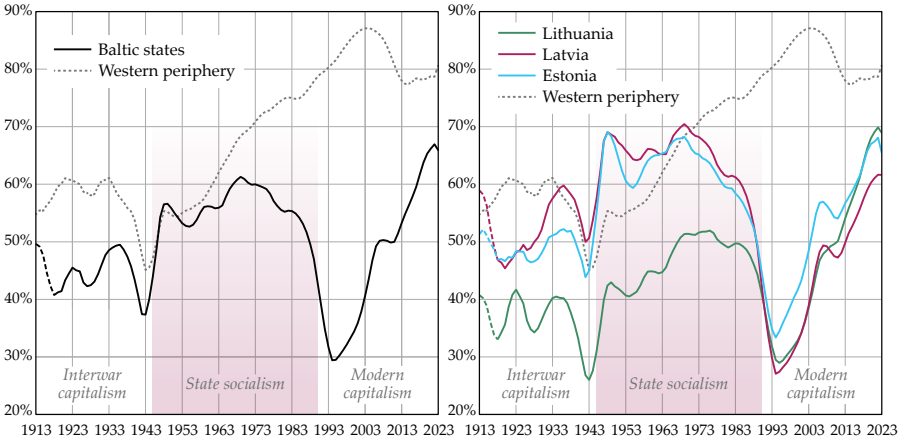
Sources: MPD version 2023 and this thesis, Greek 1913 figure corrected by M. Kopsidis and M. Schulze, ''Economic growth and sectoral developments, 1800–1914'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 44.
Note: Western periphery 1938 figure without Spain due to its civil war.

remaining slower than the Western periphery, while Lithuania's performance of less than 1% per annum in 1913-1938 proved too weak to compensate for the catastrophic post-World War One decline.

The occupation period brought a reversal of fortunes. Lithuania's spectacular growth rates of the 1950s and 1960s outweighed the poor performance of the 1970s and 1980s, resulting in a definitively positive socialist period outcome. Latvia experienced the opposite trajectory, with socialist period growth falling below even East-Central Europe's rates, while Estonia's performance fell between these extremes, showing negligible progress relative to the West.

Finally, in marked contrast to the previous two regimes, the modern capitalist independence era has delivered notably faster growth across formerly socialist European regions compared to the West. All three Baltic countries decisively outpaced the Western core during 1989-2019, marking the first period of universal convergence with advanced European economies.

Figure 4.13: GDP PER CAPITA, % OF WESTERN CORE LEVEL
in Int$$_{1990}$$, 5-year moving averages



Sources: own work, based on MPD version 2023 and this thesis, Greek 1913 figure corrected by M. Kopsidis and M. Schulze, ''Economic growth and sectoral developments, 1800–1914'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 44.
Note: Western periphery weighted average in 1930-1942 without Spain due to its civil war.

Catch-up record with the West

An analysis of income levels relative to the West in Figure 4.13 reveals, there were several significant developments over the past 110 years. As a region, the Baltics experienced a marginal decline during both the interwar capitalist and post-war socialist periods, falling from 50% of Western levels in 1913 to 49% in 1938 and further to 48% in 1989. In contrast, the period between 1989 and 2019 brought substantial catch-up of 15 percentage points.

While both interwar and modern capitalist eras showed peak catch-up results at their respective period ends, the socialist period's convergence peaked in 1968 for the Baltics collectively, followed by gradual decline. Only in 2019 did the Baltic average GDP per capita surpass its 1968 relative position.

Lithuania presents a unique case, being the only Baltic state failing to reduce its Western gap during 1913-1938 but achieving successful convergence during the socialist period—a rare achievement among European nations. Although Lithuania's Western convergence halted in 1968 alongside Latvia and Estonia, its decline was delayed by nearly a decade, contrasting with Latvian and Estonian trends.

Latvia and Estonia experienced a substantial long-term decline relative to the West lasting 26 years (1968-1994). Despite subsequent appreciation, neither country has regained their 1968 positions of 70-72% of Western core levels by 2023. Conversely, Lithuania, never exceeding 53% of Western GDP per capita during occupation, now approaches 70%.

The Baltic states demonstrated several extended periods of growth outpacing Western Europe, notably the 1930s, 1950s/1960s, and two modern decades since 2002. These convergence periods generally exceeded East-Central European performance, except in recent decades.

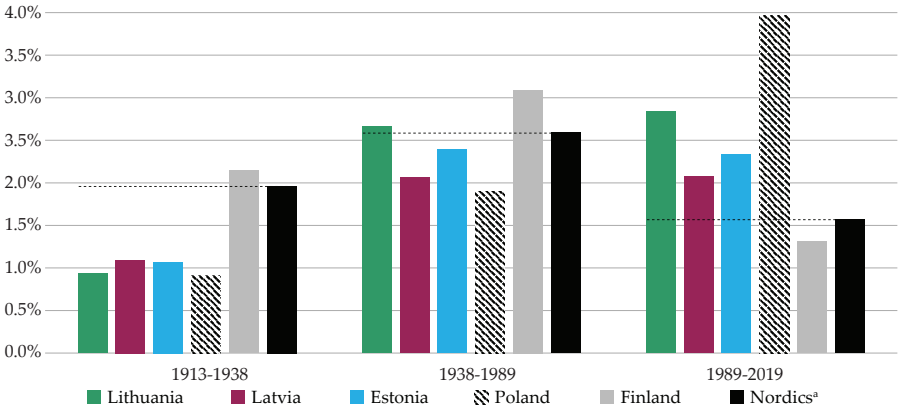
Perhaps most striking is the shift in Baltic performance relative to the Western periphery. From near parity in 1938 (Baltic average at 49%, Western periphery at 50%, with Latvia and Estonia exceeding 50%), and continued outperformance by socialist Latvia and Estonia until the 1970s, a significant gap emerged by 1989, when the Western periphery reached nearly 80% of Western GDP per capita while occupied Latvia and Estonia achieved only 51-52%.

A triple conclusion emerges from the analysis of Baltic-Western European catch-up performance. First, the interwar capitalist years failed to deliver improvement in relative living standards despite promising trends in the 1930s. Second, the socialist growth model successfully achieved rapid Western convergence in the two post-war decades, surpassing the convergence rates of capitalist countries with similar starting positions. Thirdly, however, a complete reversal occurred between the late 1960s and mid-1970s, with the income gap between the socialist Baltics and the West progressively widening until 1994. Although modern Latvia and Estonia continue to make progress, they remain below their 1968 peak GDP per capita levels relative to the West.

Catch-up record with regional peers

The century-long Baltic catch-up narrative becomes more complex when set against the experience of neighbouring Nordic countries and Poland (Figure 4.14). The interwar period stands out as particularly disappointing for all three Baltic republics—and for Poland—when benchmarked against the robust growth rates achieved by the Nordic region. This is reinforced in Figure 4.15, which shows that Lithuania, Latvia, and Estonia were already significantly behind Nordic income levels in 1913, and that this gap generally widened up to the end of the Second World War. Latvia was a partial ex-

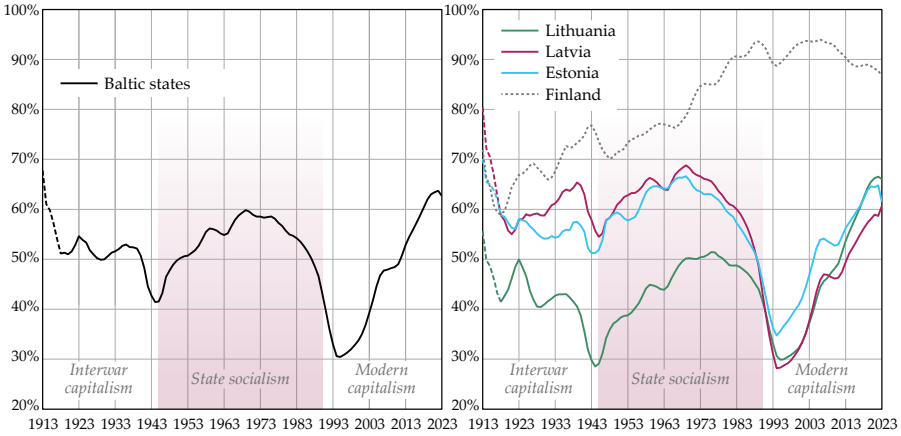
Figure 4.14: GDP PER CAPITA GROWTH RATES IN THE BALTICS, NORDICS AND POLAND
1913-2019, average per year



Sources: MPD version 2023 and this thesis. [a]Nordics include Sweden, Finland, Denmark and Iceland, aggregated with population as weights. Norway is omitted due to its post-1990 explosive growth driven by oil rents.

ception, achieving faster growth than the Nordic average between 1929 and 1938; yet even this only lifted it to 65% of the Nordic level—down from 80% in 1913.

Figure 4.15: GDP PER CAPITA, % OF NORDIC LEVEL
in Int$$_{1990}$$, 5-year moving averages



Sources: MPD version 2023 and this thesis. Nordics include Sweden, Finland, Denmark and Iceland, aggregated with population as weights. Norway is omitted due to its post-1990 explosive growth driven by oil rents.

The socialist era also failed to deliver meaningful convergence. Even during their peak relative performance in the 1960s, none of the three Baltic republics managed to regain the position they held relative to the Nordics in 1913. As was the case in comparison with Western Europe, relative income levels in the Baltics declined through the 1970s and 1980s, reaching their lowest point by the mid-1990s, when GDP per capita stood at just 28–35% of the Nordic average. Lithuania presents a modest exception: as shown in Figure 4.14, the southern republic narrowly outperformed the Nordic average in terms of growth between 1938 and 1989. However, Figure 4.15 reveals that Lithuania was already on a clear downward trajectory throughout the 1980s and, in the absence of major reforms, would likely have lost all relative gains in the following years.

Figure 4.14 indicates that the post-1989 period marks the first sustained phase of convergence with Northern Europe for the newly independent Baltic republics. Yet this modern convergence also merits a more critical assessment. First, Poland—after decades of relative decline—has outpaced all three Baltic countries in catch-up rates with the Nordics since 1989. Although starting from a lower base, it has reached comparable living standards to Lithuania and Estonia since 2018.[98] Second, as shown in Figure 4.15, only Lithuania has improved its relative position compared with 1913—rising from 56% to 66% of the Nordic average. Latvia and Estonia remain below their 1913 benchmarks.

Finally, much of the apparent catch-up has been driven not by strong output growth, but by demographic contraction. As demonstrated in Table 2.3, both Latvia and Estonia saw no improvement in their relative levels of total GDP between 1990 and 2023. Therefore, even the modern convergence phase has been neither universal nor rapid.

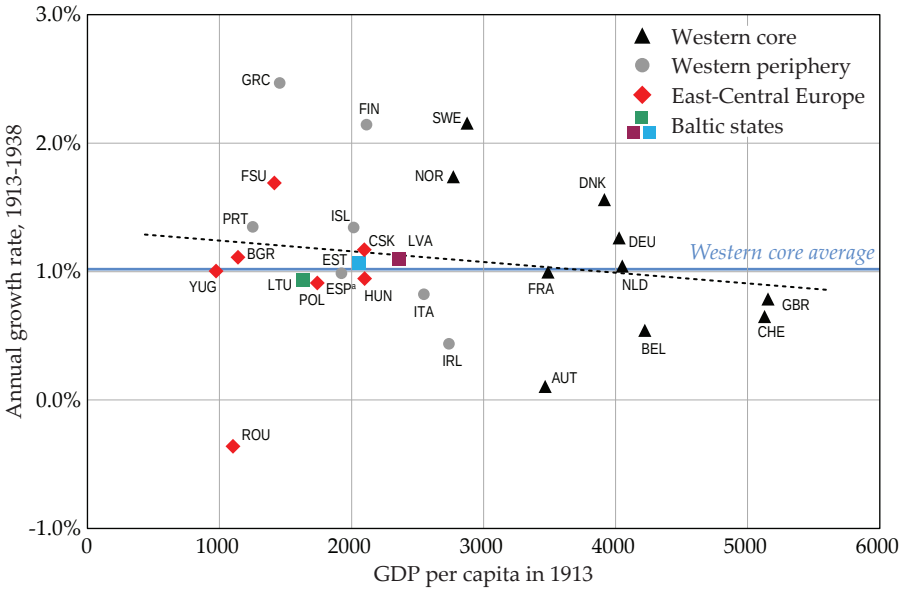
Beta-convergence analysis

Previous sections compared the Baltic republics both collectively and individually against regional European averages. However, examining individual country records might provide greater clarity and potentially reveal star performers within underperforming regions and vice versa. To test this,

[98] The 2023 release of the Maddison Project dataset indicates that Poland is ahead of all three Baltic states in real GDP per capita (PPP). However, current price estimates in the World Bank WDI still show Poland slightly behind Lithuania and Estonia. See MPD 2023 and The World Bank, *World Development Indicators 2024*.

this thesis conducts unconditional convergence analysis for the periods 1913-1938, 1938-1989, and 1989-2019.

Figure 4.16: ECONOMIC GROWTH AND CONVERGENCE, 1913-1938
Figures in Int$$_{1990}$$



Sources: this thesis and MPD version 2023, Greek 1913 figure corrected by M. Kopsidis and M. Schulze, ''Economic growth and sectoral developments, 1800–1914'', ed. M. Morys, The economic history of Central, East and South-East Europe: 1800 to the present (Abingdon: Routledge, 2021), 44. Dashed regression line is fitted against all countries in Europe. [a]Spanish GDP per capita in 1935 and growth rates between 1913 and 1935 due to subsequent Civil war disruptions. Solid blue line represents the population-weighted average growth rate in Western core countries.

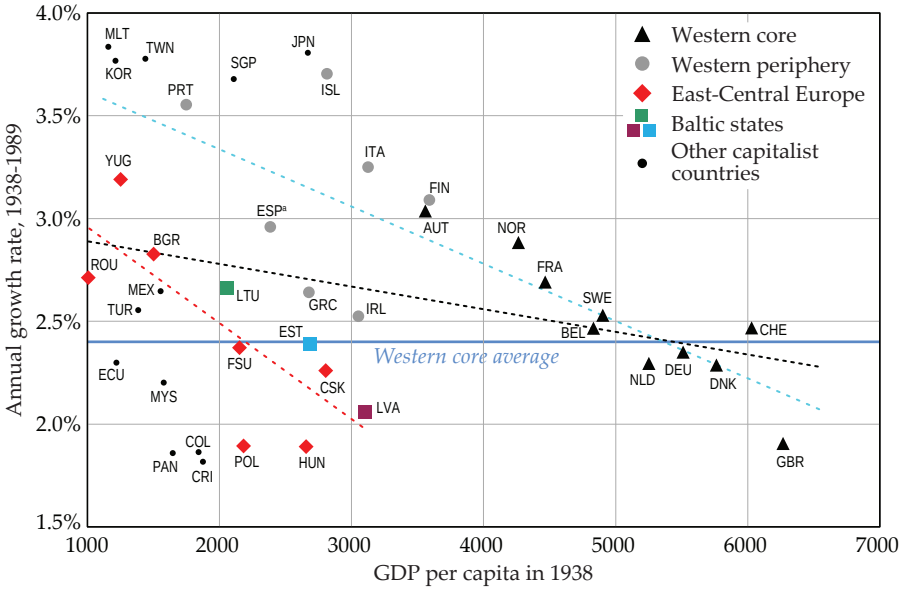
As Figure 4.16 demonstrates, the unconditional convergence regression line across all interwar European economies during 1913-1938 appears nearly flat, indicating that the continent's peripheries were largely trapped in a backwardness loop during those years. Moreover, most poor countries falling below the line are Eastern European economies, including the Baltic states. Notably, all countries poorer than Italy in 1913 which failed to meet convergence expectations during the interwar period subsequently embraced state socialism.[99] Czechoslovakia stands as the only interwar capitalist country above the convergence regression line that later turned to socialism after WWII.

[99]The sole exception was pre-civil war Spain, which itself came close to socialist rule had the civil war's outcome differed.

Regarding the interwar Baltic states, while Lithuania's performance fell decidedly below expectations set by the broader European economy pool, Latvia and, to some extent, Estonia closely approached the regression line. With both slightly exceeding Western core growth rates during 1913-1938, they can be considered marginally positive interwar performers overall and clearly the leading performers among future communist countries.

The interwar beta-convergence thus aligns with socialist apologists' arguments, such as Ivan Berend's assertion that socialism appeared as an attractive alternative to poorly performing interwar economies disappointed with capitalism (discussed on page 81). However, with the exception of Yugoslavia, these countries were also those overrun by the Red Army in 1945, leaving them little choice but to embrace state socialism in the late 1940s.

Figure 4.17: ECONOMIC GROWTH AND CONVERGENCE, 1938-1989
Figures in Int$$_{1990}$$



Sources: this thesis and MPD version 2023. Dashed black regression line is fitted against all European countries, dashed red line against communist countries in Europe and dashed blue line against capitalist European economies. [a]Spanish GDP per capita in 1935 and growth rates between 1935 and 1989 due to 1936-1939 Civil war disruptions. Small dots represent non-European capitalist countries with GDP per capita similar to Baltic levels. Blue line represents the population-weighted average growth rate in Western core countries.

Contrasting interwar convergence with the 1938-1989 period reveals a markedly different picture, as shown in Figure 4.17. Given Europe's polar-

isation between two fundamentally different economic systems during these decades, the figure presents two additional regression lines—blue for capitalist European countries and red for socialist regions. Non-European countries, indicated by black dots, do not influence these regression lines.

Both capitalist and socialist regression lines slope downward, indicating clear convergence patterns within their respective regime-regions. Capitalist convergence appears particularly pronounced, with most countries clustering around the regression line. Only Ireland and Greece stand out as disappointing exceptions. Nevertheless, all Western periphery countries outpaced the Western core, enabling universal, if not uniform, convergence among initially poorer capitalist economies.

The convergence analysis reveals highly disappointing results across the socialist country group. The regression line for the entire group falls below both capitalist and overall lines, with Yugoslavia emerging as the sole positive exception. This finding reinforces Vonyó and Markevich's recent observation that socialist convergence significantly underperformed compared to Western capitalist counterparts, with the Baltic states' inclusion further strengthening their argument.[100]

Six out of ten examined communist countries failed to exceed the minimum 2.4% annual GDP per capita growth threshold required to keep pace with the West. Only the sample's poorest countries—Lithuania, Bulgaria, Yugoslavia, and Romania—achieved faster growth than the Western core.[101] While Bulgaria and Romania have been previously highlighted as socialist star performers in earlier studies, Lithuania's performance suggests it warrants inclusion among them. Notably, although Latvia and Estonia failed to outpace the West, they still ranked among the better performers within the socialist group, as evidenced by their positions above the respective regression line.

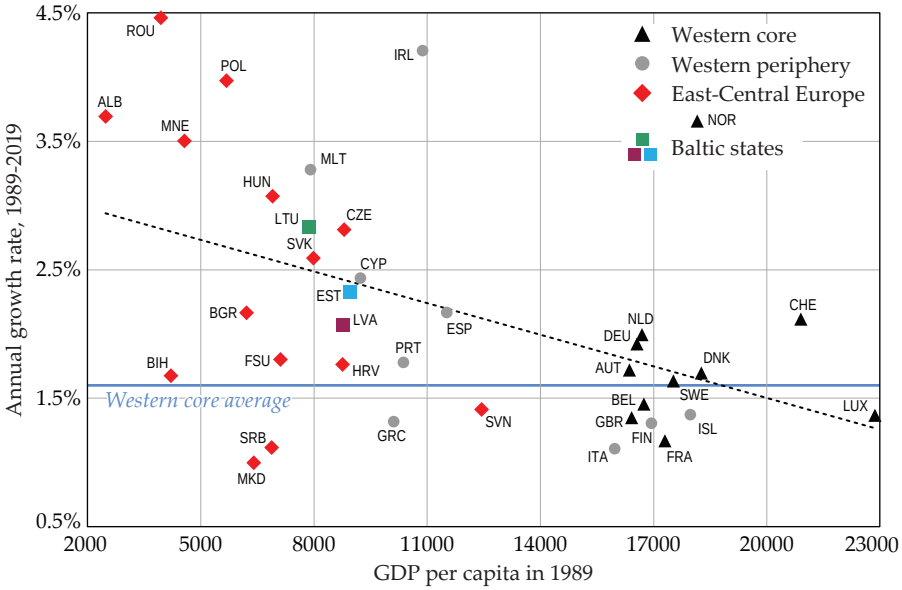
The 1989-2019 period presents a considerably more positive picture for East-Central Europe and the Baltics. Figure 4.18 shows that all peripheral countries, except Slovenia, Greece, Serbia and North Macedonia, exceeded the Western core's GDP per capita growth rate and achieved catch-up progress.

However, only half of the formerly socialist countries, including

[100] Vonyó and Markevich, ''Economic growth and structural'', 282.

[101] It should be noted that the extremely low Romanian interwar GDPs are subject to serious critique, see Morys, ''Economic growth'', 165.

Figure 4.18: ECONOMIC GROWTH AND CONVERGENCE, 1989-2019
Figures in Int$$_{1990}$$



Sources: this thesis and MPD version 2023. Dashed regression line is fitted against all European countries. Solid blue line represents the population-weighted average growth rate in Western core countries. Former USSR is kept as a single entity instead of dividing into Ukraine, Russia and other post-Soviet states because, as revealed by the revisions to the existing Baltic GDP figures in MPD version 2023 completed in this thesis, 1980-1990 GDP per capital figures among individual Soviet republics are likely severely biased.

Lithuania, meet the expectations indicated by the regression line in Figure 4.18. The other half, including Latvia, fall well below the convergence regression line, while Estonia sits practically on it. Notably, EU membership does not clearly correlate with stronger convergence patterns—non-members Albania and Montenegro show strong performance, while EU members Bulgaria, Latvia, Croatia and Slovenia demonstrate disappointing results.

Several key conclusions emerge from the growth rate and catch-up convergence analyses. First, *Western catch-up during both interwar and socialist periods progressed slowly* and unevenly across the Baltic states. However, *all three states have been approaching Western income levels in the modern era.*

Second, alongside most of East-Central Europe, *none of the Baltic republics exceeded convergence expectations* set by the broader European economy pool during interwar and occupation periods. *Latvia and Estonia continue to underperform even under modern capitalism, while Lithuania ranks among the strongest*

converging economies today.

Third, while at least two Baltic countries during both interwar (Latvia and Estonia) and modern capitalist (Lithuania and Estonia) periods approached average European convergence trends, *Baltic performance under communist rule proved extremely disappointing.* All three fell well below the average regression line, aligning more closely with the lower socialist convergence line.

While the convergence framework clearly demonstrates underperformance of socialist European countries, it does not establish a causal negative impact of communist rule on formerly capitalist countries. The question of whether East-Central Europe and the Baltics' continuing lag represents socialism's legacy remains unresolved. Indeed, examining non-European capitalist countries during the Cold War reveals varied outcomes (see Figure 4.17). Some, like Japan, South Korea, or Malta, achieved remarkable success, while others, particularly Latin American nations, performed even worse than most European socialist economies. There is some reason to believe that the Baltic republics—particularly Latvia and Estonia—would have performed better without socialism (page 214). This, however, remains somewhat speculative.

Importantly, this subchapter has demonstrated that neither the interwar period, nor the era of socialist rule, nor even the years of modern independence, can be considered revolutionary in propelling Baltic catch-up growth. During the interwar years (1913–1938), all three Baltic states exhibited income per capita growth rates comparable to those of the average-performing European peripheries.

Under Soviet occupation, the Baltic republics performed somewhat better than the broader East–Central European regional trend would suggest, yet still fell short of the convergence achieved by peripheral capitalist economies such as Portugal, Iceland, Italy, Finland, and South Korea. In the contemporary period, although the Baltics have experienced notable per capita income convergence with the West, their growth—particularly in Latvia and Estonia—has been driven by population decline and has fallen short of the rates achieved by countries such as Poland, Romania, Albania, Hungary, and Montenegro, which are Europe's current frontrunners in terms of convergence.

Modern Lithuania, however, stands out as a notable exception. Since 2020, the country has not only experienced consistent population growth but its per capita income has also returned to a stable growth trajectory, exceed-

ing 2% annually. In the first half of 2025 alone, Lithuania's real GDP increased by 3.1% compared with the same period in 2024,[102] positioning Lithuania as one of the fastest-growing economies in Europe and firmly placing it back on a positive catch-up track. If it manages to sustain this momentum, it may—together with Croatia and Romania—soon achieve a relative income convergence with advanced Western economies comparable to the Spanish or Portuguese 'economic miracles' of the post-war golden age.

[102] *Eurostat Database*.

Sources of Baltic catch-up and decline. A discussion

As the preceding sections of this chapter have shown, the Baltic states had clear opportunities for catching up with advanced economies under each of the three systems they experienced over the past 110 years. Yet their convergence trajectory was marked by inconsistency, with phases of progress repeatedly offset by periods of relative decline. Why has Baltic catch-up remained moderate and uneven? Why did it accelerate during certain periods—such as the 1930s, 1950s–1960s, or 2000s—but stall or reverse in others?

The final section of this thesis aims to explore the possible drivers behind both convergence and divergence in the Baltics' development relative to advanced Western economies. The lack of consistent input data precludes formal growth accounting—typically necessary for robust analysis of the sources of growth.[103] However, this preliminary discussion aims to open avenues for future empirical studies, which will hopefully make use of the newly available Baltic cases in their research on peripheral catching up.

Interwar period

The initial economic positions of the Baltic states following the First World War were shaped by their historical legacies and institutional conditions (see page 86). Yet the short interwar growth episode appears to have been primarily driven by Gerschenkronian–Solow mechanisms of 'automatic catch-up'—albeit with important qualifications. The early 1920s were dominated by post-war recovery, the collapse of the Russian economic space, and fragile state formation. Pre-war output levels were only restored by the late 1920s. In Latvia, recovery was accelerated by foreign capital inflows, suggesting a reconstruction-driven growth dynamic.[104]

Most importantly, in 1929–1938, strong catching up was underpinned primarily by two forces: industrialisation-fuelled growth in per capita income and relative insulation from the Great Depression. In both respects, the

[103] For example, V. Kontorovich, ''Soviet growth slowdown: econometric vs. direct evidence'', *The American economic review* (Menasha) 76, no. 2 (1986): 181; Vonyó and Klein, ''Why did socialist'', 25; I. B. Voskoboynikov, ''Accounting for'', 11

[104] Aldcroft, *Europe's third world*, 100.

'advantages of backwardness' seem to have played a key role, despite widespread political instability, coordination failures, and resource misallocation across Europe.[105]

Table 4.3 confirms that Baltic economies were among the least industrialised even by Eastern European standards, with less than 20% of GDP derived from the secondary sector in the 1920s. Convergence is often faster from a lower base, and the rapid growth in industrial output after 1929 in the Baltics exemplifies this logic. Labour reallocation from agriculture proceeded slowly, implying that industrial growth was driven mainly by within-sector productivity gains rather than structural change. These gains likely stemmed from basic technology imports—such as Lithuania's use of Danish purebred cattle to build its dairy industry[106]—and successful imitation of more advanced technologies, as in the Latvian and Estonian electronics sectors.

Given the low capital intensity—evident, for example, in the highly under-mechanised agricultural sector (page 88)—the marginal returns to capital investment were likely high. In such settings, modest investment in relatively simple technologies (e.g., machinery, tools, livestock) could yield outsized productivity improvements.

The Baltic states' relative resilience during the Great Depression likely stemmed from their structural backwardness. Lithuania, in particular, had among the lowest export-to-GDP ratios in Europe and exported mainly unprocessed goods. This made it less vulnerable to the collapse in industrial trade that defined the global downturn. Latvia and Estonia, with more developed and externally oriented economies, suffered somewhat more—but still less than the industrialised core countries (page 174).

Furthermore, the absence of major technological revolutions, such as the ICT revolution of the 1970s and 1980s, created a favourable environment for laggards, allowing them to benefit from sustained catch-up through imitation, while leading economies drifted towards steady-state growth in the neo-classical sense. Under these conditions, the Baltics—particularly Latvia and Estonia—were able to establish relatively sophisticated electronics sectors, largely through the replication and adaptation of frontier technologies.

Nevertheless, conditional forces may also have played a role in the Baltic progress of the 1930s. In a capital-scarce environment, Baltic governments in

[105] Roses and Wolf, ''Aggregate growth'', 182–183.

[106] J. D. Pociūtė and M. M. Plioplys, ''Quality management in the Lithuanian dairy industry: the beginning and the experience'', *Economics and rural development* 2, no. 1 (2006): 32–37.

the 1930s assumed active roles in mobilising domestic savings for targeted industrial investment. In all three republics, public policy aimed to enhance agricultural quality and productivity. In Latvia and Estonia, it also supported the emergence of technologically advanced infant industries in sectors such as radio and telephone manufacturing.

Relatively advanced 'social capabilities' and 'technological congruence'—particularly in Latvia and Estonia—may further explain successful productivity growth. High literacy rates, developed infrastructure, and Western legal traditions may have enabled more effective absorption of transferred or imitated technologies.[107]

Finally, deeper shifts in 'social capability' may have contributed to late interwar growth dynamics in all three Baltic states. As discussed in the Literature Review, the radical land reforms and liberal constitutions of the 1920s helped create unusually egalitarian societies in Lithuania and, particularly, in Latvia and Estonia. In these settings, it is likely that status was increasingly earned through economic success rather than inherited class position—a value system that paralleled that of the United States in the late 19th and early 20th centuries. This transformation may correspond to what Rostow described as the 'social, political, and cultural victory of those who would modernise the economy over those who would cling to the traditional society'—a necessary condition for rapid catch-up growth.[108] In this light, the Baltic land reforms, which decisively removed semi-feudal economic structures, constituted a foundational precondition for modernisation. However, the extent to which this potential could be realised in the autarkic and stagnant international environment of the interwar period is unclear.

In sum, the interwar catch-up of the Baltic republics appears to have been driven primarily by the 'advantages of backwardness'—particularly in Lithuania, where growth came from a very low base. Latvia and Estonia, however, provide stronger evidence for conditional convergence, supported by higher 'social capability' and better 'technological congruence'. Across all three countries, their relatively egalitarian—if not fully democratic—capitalist institutions suggest that they may have been well positioned to benefit from greater structural change and technology transfer in the post-war globalising capitalist environment. Yet history took a different course.

[107] See Misiunas and Taagepera, *The Baltic states*, 108–109; T. I. Berend, *Economic history of a divided Europe*, 260.

[108] Rostow, ''The stages'', 7.

Occupation

Despite the devastation of the Second World War and the loss of significant segments of the population—including disproportionately educated and professional groups—the occupied Baltic republics had, by 1950, recovered to their pre-war income levels. Under Soviet rule, they experienced impressive economic growth for two decades, up until the 1970s (see Table 4.7). By 1968, GDP per capita in Lithuania and Latvia had narrowed their gap with Western Europe by 11–12 percentage points compared with 1938, while Estonia had improved its position by a remarkable 18 percentage points.

At first glance, the Baltic Soviet republics appeared to have followed an unconditional convergence trajectory in the 1950s and 1960s, driven by the four mechanisms of automatic catch-up outlined on page 63, reflecting clear 'advantages of backwardness'.

Firstly, the Baltics benefited from industrial technology transfer from the already industrialised USSR. The annexation of the largely agrarian Baltic territories presented a natural opportunity to apply mass-production technologies already in use across the Soviet Union. This corresponds closely with the Broadberry–Klein thesis that command economies were particularly effective in the dissemination of mass-production technologies.[109]

Secondly, the occupied Baltic republics were capital-scarce, making them ideal candidates for the Soviet model of 'extensive growth', based on high-volume capital investments.[110] Investment growth was fastest in Lithuania, the least industrialised republic, but Latvia and Estonia also experienced above-average investment rate growth in the 1960s (see Figure 2.6).

Thirdly, in the late 1940s, the majority of the Baltic populations were still engaged in agriculture, offering clear advantages for structural modernisation. The movement of labour from agriculture to more productive industrial sectors—visible in Figure 2.4—mirrored trends seen across socialist Europe and was undoubtedly a major factor behind catch-up growth.[111]

Finally, integration into the Soviet economy facilitated deep specialisation and the realisation of the potential of scale economies within a vast internal market, further fuelling productivity growth.

However, closer examination suggests that these 'advantages of back-

[109] Broadberry and Klein, ''When and why'', 44–45

[110] Crafts and Toniolo, "Aggregate growth": 314; see also Figure 2.6. Capital scarcity is illustrated by the extremely low level of agricultural mechanisation (page 88).

[111] Houpt et al., ''Sectoral developments'', 344.

wardness' resulted in successful catching up in large part due to specific conditions across all three Baltic Soviet republics. Beyond being capital-scarce, even after the massive destruction and outmigration of the Second World War, Latvia and Estonia also retained relatively advanced 'social capabilities' and 'technological congruence', allowing for more effective absorption of Soviet investment and technologies.[112] Moreover, centralised planning policy ensured the rapid dissemination of technologies across republics, removing cross-border frictions that might otherwise have slowed their spread. Coercive policies—particularly collectivisation—also played a critical role in enabling labour reallocation that might not have occurred under less repressive circumstances.

Importantly, the Second World War had caused greater population than physical capital destruction in the Baltics. Over 20% of the population was lost, including many members of the intelligentsia, through death, deportation, or emigration. As a result, post-war productive capacity remained underutilised.[113] Growth may thus have stemmed more from reallocating labour to underused capital than from new investment per se. This mechanism mirrors that observed in post-war East–Central Europe by Vonyó and Markevich.[114] Figure 4.8 supports this interpretation: even according to official Soviet data, the investment-to-GDP ratio in the early years of occupation was significantly below the Soviet mean and only gradually approached average levels.

At the same time, Russian-speaking migrant workers were being relocated to the Latvian and Estonian SSRs—according to Baltic scholars, facilitated by deliberate Moscow policy rather than automatic labour migration.[115] Thus, advanced Baltic 'social capabilities' and 'technological congruence', coupled with deliberate and coercive Soviet policies, played important roles in accelerating growth in the newly occupied republics during the 1950s and 1960s.

After two decades of rapid growth, Lithuanian GDP per capita had reached 51% of the Western European average by 1968, while Latvian and Estonian relative levels stood at 70–72%. Substantial room for convergence with advanced economies therefore still remained. Yet, unlike the capitalist peripheries of Europe, which continued catching up into the 1980s, Latvian

[112]Misiunas and Taagepera, *The Baltic states*, 108–109, 112, 184.
[113]Misiunas and Taagepera, 108.
[114]Vonyó and Markevich, ''Economic growth and structural'', 290.
[115]Kasekamp, *A history*, 126–128

and Estonian convergence trends reversed after 1969, entering a sustained period of relative decline lasting through the Soviet collapse until 1994 (see Figure 4.13). In Lithuania, relative stagnation set in during the 1980s, delaying the onset of divergence but not avoiding it.

What explains this? By the 1970s, agricultural mechanisation and industrial development had caught up with—or even surpassed—average Soviet levels (see Figure 2.5 and Table 4.9), and advantages in Baltic 'social capability' had eroded.[116] Moreover, in the 1970s Soviet investment focus shifted eastward towards Siberia,[117] and while Lithuania still benefited from large-scale projects—such as the new oil refinery and a massive nuclear power plant—Latvia and Estonia were largely bypassed. Even official data confirms this: the investment-to-GDP ratio in all three republics fell below the Soviet average by the mid-1970s and remained there.

Thus, by the late 1970s, the Baltic republics—particularly Latvia and Estonia—no longer enjoyed any clear advantages over the rest of the USSR to sustain growth. It is likely, therefore, that the slowdown and stagnation of the 1970s and 1980s in the occupied Baltics were driven by the same factors that precipitated economic decline across the Soviet Union. Lithuania provides an exception, although its brief resilience appears tied to the momentum generated by Moscow's major construction projects rather than to superior economic management. Nevertheless, Moscow's republic-specific policies remain to be analysed in detail by future scholars before definite conclusions about the slowdown in the Baltics can be drawn.

As in the rest of the USSR, where 'extensive growth' was dominated by shifts from agriculture to industry, the model faced diminishing returns in the occupied Baltics as well.[118] The Baltic SSRs, which had earlier benefited from the diffusion of mass-production technologies, now struggled with the obsolescence of these same systems. As Western Europe transitioned to flexible production and eventually embraced the new ICT revolution, the USSR was barred from accessing these advancements due to CoCom restrictions on technology transfer.[119]

The domestic innovation system also failed to deliver. Although R&D

[116]This is evident from initially superior educational levels in Latvia and Estonia falling slightly below the Soviet average in the 1970s, see Государственный комитет по статистике, *Народное хозяйство СССР за 70 лет. Юбилейный статистический ежегодник* (Moscow: Финансы и статистика, 1987), 525

[117]CIA, *Economic Development*, 2; Crafts and Toniolo, "Aggregate growth": 323

[118]I. B. Voskoboynikov, ''Accounting for'', 2; Crafts and Toniolo, "Aggregate growth": 314

[119]Broadberry and Klein, ''When and why'', 49; I. T. Berend, *From the Soviet Bloc*, 29

spending was substantial and education levels improved, these advances did not translate into firm-level productivity gains.[120] Even though the Baltic republics were treated as experimental regions within the USSR—with more diversified industries and faster implementation of new technologies—the flexibility allowed was insufficient to yield tangible productivity benefits from innovation.[121] Crafts and Toniolo attribute this failure to a deficit in 'social capability': rational economic analysis and decision-making were impossible under artificial pricing; incentives for innovation among firms were lacking due to a flawed reward system; the absence of private property encouraged wasteful practices towards 'common property'; and the system's limited flexibility prevented adaptation to the new technological revolution. By the 1980s, total factor productivity growth in the USSR had turned negative,[122] and there is no reason to assume the Baltic Soviet republics were an exception.

While reliable investment series like those constructed by Vonyó and Klein for East–Central Europe do not yet exist for the USSR,[123] it is plausible that similar over-reporting of capital accumulation occurred. Indeed, Latvian and Lithuanian historians have already challenged the official budgetary transfer data that claimed preferential treatment of the occupied Baltic republics by Moscow.[124] If confirmed, inadequate investment—rather than diminishing marginal returns alone—may help explain the severe Baltic slowdown of the 1970s and 1980s. Further research is therefore needed to address this gap and to establish the definitive causes of the strong catch-up growth in the 1950s and 1960s, and the stagnation and decline in the 1970s and 1980s.

In conclusion, the rapid post-war convergence of the Baltic republics during the 1950s and 1960s was the product of 'advantages of backwardness'—driven by capital deepening, technology transfer, labour reallocation, and emerging scale economies—enabled by conditional factors, especially their advanced 'social capabilities' inherited from the interwar years and the largely coercive Soviet policies.

The subsequent stagnation of the 1970s and 1980s reflects a broader Soviet failure that was also largely conditional. While exclusion from global tech-

[120] Crafts and Toniolo, "Aggregate growth": 315

[121] CIA, *Economic Development*, 4; Misiunas and Taagepera, *The Baltic states*, 108–109, 112, 120–125, 184, 203–215, 247–261

[122] Crafts and Toniolo, "Aggregate growth": 323

[123] Vonyó and Klein, ''Why did socialist''.

[124] See Krūmiņš, ''Soviet Economic''; Komičienė, ''SSRS finansų''

nology flows played a role, the decisive factor was the Soviet institutional system itself: it failed to incentivise innovation and lacked the flexibility to transition away from mass production, representing an ultimate failure in 'social capability'. By the 1970s, the occupied Baltic republics had converged with the rest of the USSR in terms of 'social capability' and possibly capital stock, and, having no control over economic policy, were ultimately bound to share in the wider collapse of the Soviet growth model.

Modern independence

Following the declarations of independence and the collapse of the USSR, the Baltic states experienced a dramatic fall in GDP per capita. From 1995 onwards, however, they joined the broader post-socialist trend of rapid catch-up growth.[125]

At first glance, this process again appears to have been driven largely by automatic mechanisms. Berend identifies the key drivers of post-socialist growth as the inflow of foreign capital, advanced technology, and managerial expertise, drawing parallels with the post-war reconstruction-fuelled growth of Western Europe.[126] Indeed, the socialist system had left a legacy of deep inefficiencies, misallocation of resources, and repressed consumption. The economic collapse of 1989–1994 in the Baltics was comparable to the wartime disaster of 1938–1944, suggesting that post-socialist recovery was at least partly fuelled by similar dynamics to those of post-war Europe, particularly the reallocation of underutilised resources.[127]

Most Eastern and Central European countries, including the Baltics, emerged from communism with relatively skilled but low-cost labour forces, combined with severe capital shortages and outdated industries.[128] With capital mobility restored, these conditions attracted significant foreign direct investment from advanced economies. In many cases, obsolete production facilities were replaced by state-of-the-art technologies, allowing some countries to leapfrog intermediate development stages.[129] This was exemplified

[125] See Figure 4.13 and Åslund, *How capitalism*, 69

[126] I. T. Berend, *From the Soviet Bloc*, 263.

[127] Åslund, *How capitalism*, 76; Vonyó and Markevich, ''Economic growth and structural'', 290

[128] I. T. Berend, *From the Soviet Bloc*, 123; J. Slater, ''Foreign Direct Investment in the Transition to a Market Economy'', ed. P. Artisien-Maksimenko and Y. Adjubei, Foreign investment in Russia and other Soviet successor states (Basingstoke: Macmillan, 1996), 3; Åslund, *How capitalism*, 205

[129] I. T. Berend, *From the Soviet Bloc*, 123, 128; Slater, ''Foreign Direct'', 3

by the rapid digitisation of the Baltic states and the installation of cutting-edge telecommunications infrastructure, placing them at the forefront of ICT adoption in Europe—a clear demonstration of the 'advantage of backwardness'.[130]

However, this narrative of automatic catch-up falters when applied to non-EU post-socialist states. Kyrgyzstan, Macedonia, Moldova, Tajikistan, and Ukraine have been characterised as transition failures, while countries such as Armenia, Belarus, Georgia, Serbia, and even Slovenia have seen limited or no progress in narrowing the income gap with Western Europe since 1989.[131]

Upon closer inspection, it becomes clear that sound, sustained policies played a decisive role in the Baltic states' relative post-1990 success. Although Western support—particularly from institutions such as the World Bank and the IMF—was broadly available, not all countries implemented reforms with comparable scope or determination. In the Baltics, wide-ranging and relatively rapid liberalisation measures were enacted (pages 38–40), including the establishment of secure property rights, currency stabilisation, liberalisation of prices and capital movement, and a reorientation of trade towards the West. These reforms entrenched flexibility in business conditions, allowing catch-up mechanisms to function, though they came at a significant social cost, including deindustrialisation, unemployment, inequality, and mass emigration.

Why, then, did Baltic politicians persist with such painful reforms, and why did societies tolerate them despite experiencing income declines on a scale comparable to the Second World War? As noted on page 92, two principal factors stand out. First, there was a deeply rooted desire to reassert sovereignty, stemming from the collective memory of interwar independence and the stark contrast it presented to the traumatic and disappointing experience of Soviet occupation. This created an unyielding determination to sever ties with Russia, offering Baltic policymakers a rare 'window of opportunity' to pursue radical change. Hardships resulting from reform could be framed as necessary sacrifices for the restoration of national independence

[130] I. T. Berend, *From the Soviet Bloc*, 137; Avlijaš, ''Beyond Neoliberalism?'', 14, 25; Korhonen, ''Progress'', 452; K. Girnius, ''Lithuania. Economy'', Europa regional surveys of the world 2011 11th ed.: Central and South-Eastern Europe (London: Routledge, 2010), 405–408

[131] C. Wyplosz, ''Twenty-Five Years Later: Macroeconomic Aspects of Transition'', ed. A. Åslund and S. Djankov, The great rebirth: lessons from the victory of capitalism over communism (Washington: Peterson Institute for International Economics, 2014), 207; MPD version 2023

and the 'return to Europe'. These reforms included adopting a liberal, low-cost welfare model across the Baltics which provided a clear alternative to the command economy.[132]

Second, the conditional prospect of European Union accession exerted powerful constraints on policy-making, as meeting EU criteria required institutional reform, democratic consolidation, and market liberalisation.[133] Both of these mechanisms effectively prevented Baltic reform efforts from stalling midway or serving only narrow oligarchic interests, as occurred in many other post-socialist countries. The interplay between relatively recent historical memory and the tangible prospect of a powerful alternative was therefore a crucial factor in the relative success of modern Lithuania, Latvia, and Estonia, in contrast to other former members of the USSR. This is broadly comparable to the experience of Western Europe, where the trauma of 1929–1945 and the inclusive post-war international order placed the capitalist side of the continent firmly on a path of welfare consensus and pro-Western orientation.[134]

However, there were also additional region-specific enabling factors in the Baltic case. These included geographical proximity to Western Europe,[135] as well as favourable initial fiscal positions, partly the result of sound domestic policies and partly due to Russia's assumption of all Soviet debt.[136] Both of these elements add further conditionality to the Baltic catch-up story of the 1990s and 2000s, somewhat reducing the extent to which their success can be attributed solely to superior policy-making.

Since 2000—aside from the 2008 crisis—Baltic growth has been sustained by inflows of foreign capital, initially through direct investment and later via financial lending, which fuelled both consumption and investment booms, as well as by an export-oriented growth model.[137] This was supported by a favourable global environment of strong growth and low interest rates, together with the emergence of dynamic private sectors domestically and improved access to European markets following EU accession and the adoption

[132] Åslund, *How capitalism*, 232.

[133] Korhonen, ''Progress'', 459.

[134] T. Piketty, *Capital in the Twenty-First Century* (Cambridge, Harvard University Press, 2018), 344; Crafts and Toniolo, "Aggregate growth": 310

[135] Korhonen, ''Progress'', 461.

[136] Saavalainen, ''Stabilization'', 5; I. T. Berend, *From the Soviet Bloc*, 52

[137] K. Kukk et al., *A Long Transition: The Estonian Currency Board Arrangement 1992-2010* (Tallinn: Eesti Pank, 2014), 103, 169; Randveer and Staehr, "Macroeconomic": 217–218; Norkus, *Post-Communist Transformations*, 164; Åslund, ''Why Have''

of the euro.[138] Additionally, pro-business policies and relatively low tax burdens have continued to maintain a favourable investment climate in the Baltics.[139] Finally, the recent reversal of population outflows suggests growing attractiveness of Lithuania, Estonia, and, to a lesser extent, Latvia, for both returning citizens and foreign nationals.

There are, however, some worrying trends. The role of inherited 'social capabilities' and the advantages of 'technological congruence' cultivated in the 1990s and 2000s appears to be waning across all three republics. Labour costs—though still below the EU average—are rising rapidly, while other EU states are catching up in digital infrastructure,[140] placing the Baltics under pressure to identify new sources of competitiveness.

Moreover, while Lithuania has continued to converge with Western European income levels despite the disruptions caused by COVID-19 and the war in Ukraine, Latvia and Estonia appear at risk of falling into a middle-income trap. Lithuania's relative outperformance is linked to looser fiscal policy, more effective absorption of EU funds, and a diversified export base, alongside an influx of Belarusian IT talent and a more open approach to labour migration.[141] While the first three factors reflect stronger policy choices, the latter two seem more circumstantial or historically conditioned. In particular, Lithuania's inclusive stance towards Russian-speaking migrants—helping to offset population ageing—was likely facilitated by its relatively homogenous ethnic composition. By contrast, the absence of such homogeneity in Latvia and Estonia has long posed challenges to political and social cohesion, potentially limiting their willingness to adopt similarly open immigration policies.

The overall growth story of the Baltic states strongly underscores the importance of conditional convergence mechanisms. Over the past century, Lithuania, Latvia, and Estonia have benefited from the 'advantages of back-

[138]Kukk et al., *A Long Transition*, 189; Randveer and Staehr, "Macroeconomic": 217–218; G. Černiauskas and A. Dobravolskas, ''Emerging of market economy in lithuania (1990-2010)'', *Intelektinė ekonomika* (Vilnius) 5, no. 3 (2011): 377–378

[139]The Baltic states have for many years retained high positions in Ease of Doing Business rankings, for example The World Bank, *Ease of Doing Business rankings*, 2020

[140]Real wage trends: *Eurostat Database*; digital infrastructure: European Commission, *DESI indicators*, 2025

[141]*OECD Economic Surveys: Lithuania 2025* (Paris: OECD Publishing, 2025); *OECD Economic Surveys: Latvia 2024* (Paris: OECD Publishing, 2024); *OECD Economic Surveys: Estonia 2024* (Paris: OECD Publishing, 2024); B. Chmielewski, ''Far behind Riga: Latvia's problems with uneven development'', *OSW Commentary*, nos. 2023-03-15 (March 2023); Luminor Bank, *Baltic Economic Outlook*, September 2024; B. Marly, ''Baltic update: divergence in macro-fiscal outlooks drive recent rating actions'', *Scope Ratings*, October 2024,

wardness', though their ability to translate these into sustained catch-up has varied by period. Briefly, in the 1930s, convergence may have occurred more automatically, with minimal enabling conditions. By contrast, catch-up during the 1950s and 1960s under Soviet rule was driven by inherited 'social capabilities'—such as relatively well-educated populations and perhaps a cultural emphasis on personal gain—augmented by Moscow's largely coercive policies. These early advantages were gradually eroded by the inefficiencies of the Soviet system, whose deficient imposed 'social capabilities' ultimately stifled productivity and contributed to the USSR's collapse. As a result, Baltic income levels remained suppressed into the 1990s.

Following independence, the Baltic states finally began to fully harness their 'advantages of backwardness'. Their modern growth trajectory—surpassing both interwar and socialist-era performance—closely aligns with Crafts' concept of conditional, policy-driven convergence, as described in his account of the post-war golden age.[142] In the 1990s, the Baltics pursued institutional reforms that enhanced 'social capability', attracted foreign direct investment, and facilitated successful capital inflows and technology transfer. These reforms, however, came at considerable cost, including widening income inequality, rapid deindustrialisation, and large-scale emigration. Nonetheless, a sustained pro-Western liberal reform path—rooted in historical memory and reinforced by a favourable international environment—enabled the Baltic states to emerge by the mid-2000s as the most successful former members of the USSR.

Yet the divergent Baltic trends in the 2020s introduce uncertainty. While much of Lithuania's sustained catch-up record can be attributed to sound policy-making, structural constraints—particularly the demographic profiles of Latvia and Estonia—may limit their ability to replicate past labour-cost advantages through immigration, as many Western nations once did and as Lithuania continues to attempt.

Ultimately, the Baltic historical catch-up experience underscores that the benefits of backwardness can only be realised over the long term through institutional reforms that enhance 'social capability'. The future trajectory, however, remains uncertain—likely to be shaped by a new constellation of enabling or limiting factors still in the making.

[142] Crafts, ''The golden age'', 441.

5

CONCLUSION

By estimating the first Baltic GDP per capita series for 1919–1995, this thesis has bridged one of the last substantial gaps in European economic history and introduced three significant new cases to the study of peripheral catch-up in the context of the capitalist–socialist divide. With few secondary sources available, the research drew extensively on primary physical data covering sectoral and product-level movements in all three Baltic states between 1919 and 1995, utilising both published and archival statistical materials. By combining existing and newly constructed benchmark GDP figures, it estimated GDP and GDP per capita levels for Lithuania, Latvia, and Estonia from the output side over the entire period.

A particularly notable achievement is the estimation of Soviet Baltic GDP per capita levels—the first successful attempt at regional national accounting within the USSR based on the CIA's methodology. This provides a framework for future GDP estimations for other former Soviet republics, such as Ukraine or Belarus, which remain major gaps in Europe's historical economic accounts. After conversion into international dollars, complete 1913/1919–2024 GDP per capita PPP series in Int$$_{1990}$ and Int$$_{2011}$ were produced for all three Baltic countries.

The new figures reveal that Lithuania and Latvia emerged among the

most devastated regions in Europe after the First World War, alongside France and Belgium. The subsequent wars of independence, combined with the collapse of pre-war economic integration with imperial Russia, led to a protracted recovery lasting until 1929 for the Baltic region as a whole. The 1920s proved generally disappointing: growth rates in Latvia and Estonia merely kept pace with those of the advanced economies, while Lithuania experienced a prolonged recession following the annexation of the Klaipėda region in 1923—a downturn that remains only partially explained.

The 1930s saw the capitalist Baltic states weather the Great Depression remarkably well compared to much of Europe. Although the reasons for this relatively surprising resilience remain largely unstudied, external trade factors may offer part of the explanation. Despite efforts to shift towards processed foodstuffs, all three countries continued to rely heavily on exports of primary goods. Consequently, the global contraction in demand for manufactures may have had a more limited impact on the Baltic republics than on more industrialised economies.

Lithuania's experience is particularly illustrative: the country avoided recession altogether, possibly due to possessing one of the lowest levels of trade openness in Europe. Beyond above-average crisis performance, state-directed industrialisation—driven primarily by internal demand for manufactured goods—became a major engine of catch-up growth, outpacing much of the continent. As a result, the Baltic republics not only weathered the Depression better than most but also narrowed their gap with the mature Western economies during the 1930s.

The newly estimated GDP per capita figures lend support to Aldcroft's view that, by the late 1930s, Latvia and Estonia were among the best-positioned peripheral states in Europe.[1] Latvia's case, in particular, validates the nostalgic perception held by many modern Latvians towards the interwar era: in 1938, the country's living standards were closer to the Nordic level than they are today. Lithuania, by contrast, remained entrenched within the European periphery despite undertaking institutional reforms broadly similar to those in Latvia and Estonia. Estonia's performance fell short of Latvia's, yet still reflected a sustained trajectory of catching up with the West throughout the interwar years.

After the Second World War—which, like the First, brought severe population losses and sharp declines in output—the Soviet-occupied repub-

[1] Aldcroft, *Europe's third world*, 105, 171; Aldcroft and Morewood, *The European economy*, 120.

lics of Lithuania, Latvia, and Estonia resumed rapid economic expansion. The exceptional acceleration of the 1950s and 1960s mirrored the post-collectivisation industrial surge of the USSR, implemented with ruthless determination in the 1920s and 1930s. Although agriculture quickly lost its growth potential, industry-led expansion in the Soviet Baltics ranked among the fastest in Europe, underpinning a prolonged phase of catch-up convergence with the West.

By the 1970s, however, the post-war boom across Europe had run its course, and the slowdown was far more pronounced in socialist economies, including the occupied Baltic republics. The year 1968 marked a clear turning point for Latvia and Estonia: from then on, growth rates steadily weakened and never again outpaced those of the Western core until after the collapse of communism. Between 1969 and 1989, industry stagnated, with modest gains in GDP per capita sustained only by the expansion of the service sector. Lithuania proved an exception for a time, maintaining strong growth until the mid-1970s, before entering a period of disappointing performance similar to its northern neighbours. Contrary to the trends suggested by the Maddison Project Database, there was no meaningful revival in 1989. By that year, most economic indicators—including GDP per capita—were already in decline.

A comparison of Baltic industrialisation during the interwar and socialist periods yields a striking result: in terms of GDP composition, the shift away from agriculture towards industry and services progressed more rapidly during the interwar capitalist years than between 1937 and 1990. The early decades of Soviet rule placed a notable—though not overwhelming—emphasis on heavy industry, which in turn constrained the development of consumer goods sectors and contributed to depressed living standards. By contrast, in 1969–1989 traditional food and light industries re-emerged as the dominant manufacturing branches. Whether this shift translated into higher personal consumption remains impossible to establish at this stage.

By 1989, the favourable positions once held by Latvia and Estonia among Europe's peripheral nations in the 1930s had disappeared. Both occupied republics had lower GDP per capita than any capitalist country in Europe. Lithuania—considerably poorer than its northern neighbours in 1938—narrowed its gap slightly, yet socialism as a whole failed to deliver substantial or sustained relative improvements in Baltic living standards, even before its eventual collapse.

The newly constructed GDP per capita series, spliced with existing data for 1991–1993, reveal notable transitional patterns in the Baltic states. Latvia—long the economic leader among the three republics—entered a period of decline from 1987, relinquishing its lead to Estonia in 1989. It subsequently endured perhaps the most severe transitional crisis of any post-Soviet country during the 1990s. This collapse brought Latvian and Lithuanian income levels into parity, with all three Baltic economies expanding at similar rates until the 2008 crisis. Estonia, having suffered a considerably milder recession in the 1990s, retained its leading position throughout this period.

From 2010 onwards, Lithuania has exhibited the most impressive relative growth, overtaking Estonia in 2019 to become the Baltic leader in living standards. As of 2024, Lithuania maintains this lead, followed closely by Estonia, while Latvia lags significantly behind. Lithuania's transformation over the past century—from one of Europe's poorest nations to the Baltic region's economic frontrunner—contrasts sharply with Latvia's relative decline, offering fertile ground for future research.

Despite comparatively rapid progress during the later interwar years and the 1950s–1960s under socialist rule, both the 1913–1938 and 1938–1989 periods proved disappointing from the standpoint of convergence with advanced economies. The relative stagnation of the Baltic economies under interwar capitalism broadly supports Berend's thesis of a lagging Eastern periphery, rather than the catch-up dynamic proposed by Morys.[2]

Under socialism, Latvia and Estonia fell further behind the West, while Lithuania emerged as a relative star performer within the Communist bloc, narrowing its gap with the Western core between 1938 and 1989. Nevertheless, in neither the interwar period nor under Soviet occupation did any of the Baltic republics surpass the beta-convergence expectations of the European continent. With some variation within each group, all peripheral capitalist economies in Europe outperformed their socialist counterparts—with the notable exceptions of Slovenia on the communist side and Malta on the capitalist.

In the modern era, while convergence rates in Latvia and Estonia have been somewhat disappointing, all three Baltic states maintained considerably stronger growth than the Western core between 1989 and 2019, in line with most peripheral European countries that embraced modern capitalism.

[2]Berend, *Economic history of a divided Europe*: 24; Morys, ''Economic growth'', 175.

Lithuania stands out as a particularly notable success story, having significantly exceeded convergence expectations in recent decades.

When measured against the Nordic countries, however, the picture is less encouraging. Between 1913–1938 and 1938–1989, all three Baltic states suffered substantial declines in living standards relative to the Nordic average. Since regaining independence, per capita convergence towards Nordic levels has resumed—especially in Lithuania—but in Latvia and Estonia this improvement has been driven partly by population decline. Both countries still remain below their 1913 relative income peaks.

Overall, the Baltic republics failed to close the gap with the wealthiest regions of Europe during both the interwar capitalist period and the era of socialist rule. Moreover, their post-socialist convergence has been less pronounced than that of Poland, Romania, Hungary, and several other peripheral states. As of 2023, all three Baltic economies remain part of Europe's periphery, with incomes at just 63–77% of the Western core average and 55–67% of the Nordic average.[3]

As the final application of the newly constructed datasets, this thesis has also sought to shed light on the underlying drivers of economic growth and decline in the Baltic region over the past century, with particular attention to periods of catching up with, and falling behind, advanced Western European economies. Although the absence of consistent input data renders these findings preliminary, they nonetheless provide a valuable starting point for future analyses of Baltic growth trajectories.

During the interwar period, the Baltic states' economic progress was largely shaped by their status as latecomers to industrial development—often described as the 'advantage of backwardness'. This dynamic was particularly evident in Lithuania, where growth was driven from an exceptionally low starting point. Latvia and Estonia, by contrast, displayed clearer signs of conditional convergence, underpinned by stronger 'social capabilities' and greater 'technological congruence'. While none of the three republics were fully democratic, their relatively egalitarian and market-oriented institutional frameworks suggest that they might have been well placed to benefit from the post-war liberal capitalist order.

The strong post-war economic performance of the occupied Baltic republics during the 1950s and 1960s was primarily driven by rapid capital accumulation from a low initial base, structural shifts of labour from agriculture

[3] Excluding Norway.

to more productive industry, technology transfer from the Soviet Union, and the scale economies available within the USSR's vast market for specialised mass production. Crucially, these mechanisms did not operate in isolation. Their effectiveness was conditioned by the interwar legacy of relatively high 'social capability' and by the top-down coordination of Soviet central planning—often enforced through coercive measures such as forced collectivisation.

By contrast, the stagnation that emerged in the 1970s and deepened through the 1980s exposed the institutional limitations of the Soviet model itself. While exclusion from global technology transfer—particularly as a result of Cold War restrictions—undoubtedly hindered innovation, the more fundamental constraint was internal. The Soviet system lacked both the institutional flexibility and the incentive structures necessary to implement productivity-enhancing technologies at the firm level. By this stage, the Baltic republics were deeply embedded within the Soviet economic framework, resembling other republics in both 'social capability' and, quite possibly, capital stock. With no independent control over economic policy, they were bound to share in the system-wide collapse of the Soviet growth model.

Since regaining independence in 1990, the Baltic states have once again experienced sustained catch-up growth, largely driven by the 'advantages of backwardness' inherited from the structural distortions and technological obsolescence of the Soviet era. The availability of relatively inexpensive yet well-educated labour attracted substantial FDI, while liberalised trade and capital flows facilitated rapid technology transfer. However, this modern convergence was far from automatic. It was critically underpinned by decisive and sustained pro-market, Western-oriented institutional reforms, anchored by the prospect of EU accession. Public willingness to endure short-term hardship in pursuit of sovereignty and integration with the West provided the political space necessary to maintain reform momentum, despite the accompanying rise in inequality and large-scale emigration.

Taken together, the Baltic growth narrative is best understood as a story of exploiting the 'advantages of backwardness' under specific enabling conditions—particularly those linked to evolving 'social capabilities'. At present, however, concerns are mounting over the sustainability of catch-up dynamics in the modern independent Baltic states. Latvia and Estonia appear to have stalled in a middle-income trap over the past five years, while Lithuania's continued growth appears to depend heavily on low-cost labour immigra-

tion. Given the absence of a comparable policy in Latvia and Estonia—largely due to ethnic tensions—questions also arise over the long-term viability of such growth in Lithuania.

This study, having addressed a major gap in long-term European GDP per capita datasets, raises several important questions for future research. What factors and policies drove Baltic industrial growth during the 1930s? Why did the Baltic states weather the Great Depression so much more successfully than many of their peers? What were Moscow's actual investment policies and capital flows towards the occupied Baltic republics? And what were real living standards in the Soviet Baltics when assessed through consumption-based indicators? With robust GDP per capita series now available, future scholars are well placed to investigate these issues and shed further light on the long-run economic dynamics of peripheral Europe.

Despite varying degrees of progress, all three Baltic states in 2025 still fall significantly short of the income levels of advanced economies. A substantial body of literature attributes this persistent underdevelopment across post-socialist Europe to the legacy of communism.[4] Could decades of socialism have diminished the long-term growth potential of the Baltic states as well?

The newly estimated GDP data revealed strong interwar growth rates, lending support to Aldcroft's claim that they were among the most promising performers of the period.[5] Institutional reforms in the 1920s—most notably the radical land redistribution—transformed the traditionally stratified societies of Lithuania, Latvia, and Estonia into relatively egalitarian ones. These societies likely increasingly valued private property and status derived from personal achievement rather than inheritance or class, laying the groundwork for some of the crucial 'social capabilities' needed to exploit their 'advantages of backwardness'.

There remains much to be explored in the study of peripheral catch-up under both capitalism and socialism. Yet if, as Piatkowski argues, the principal contribution of socialism lay in dismantling quasi-feudal social structures that hindered growth,[6] then the Baltic states—having already achieved this transformation during the interwar period—had little, if anything, to gain from socialist rule.

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[4] J. C. Buggle and S. Nafziger, ''The Slow Road from Serfdom: Labor Coercion and Long-Run Development in the Former Russian Empire'', *The review of economics and statistics* (Cambridge, MA) 103, no. 1 (2021): 1, 16.

[5] Aldcroft, *Europe's third world*, 171.

[6] Piatkowski, *Europe's growth champion*, 113.

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Appendices

APPENDIX A

Estimating Estonian 1938 benchmark GDP

Estimation of a robust interwar Estonian GDP figure mostly involves recalculation and improvement of Valge's figures.[1] Since he calculated incomplete current-price value-added figures for 1923-1938 and the best price data is available for the last of these years, this thesis opts for improvement of the 1938 figure to reach consistency with Lithuanian 1937 and Latvian 1935 figures.

Agriculture, Industry, Construction, Housing

Estonian 1938 value-added figures for agriculture, forestry, fishing, industry, construction and housing are taken directly from Valge's original work. Agricultural (incl. forestry and fishing) value-added amounted to 250.1 million EEK, industrial to 132.1 million EEK, construction to 14 million EEK and housing to 29 million EEK.[2] Strangely, Valge's industrial figures from Table 38 do not add up to his total. This thesis uses the sum of disaggregated figures.

[1] Valge, ''Uue majanduse''.
[2] Valge, Tables 2, 21, 23, 38.

Rest of the economy

The rest of the economy needed deeper analysis and recalculation. In his original work Valge assumed that all remaining service sectors—commerce (incl. trade, accommodation and food, financial, insurance and other private services), transport and communications, public administration, education, defence and household services—contributed the same amount of 'real' value-added per person. Hence, he simply multiplied the previously assumed per capita 'production' in services by population series and reflated it to current prices. The resulting total service value-added was just 122.9 million EEK—less than in industry.

This procedure is clearly highly questionable as services most probably expanded throughout the interwar period and an overall value-added per person for the entire sector seems misleadingly small. It therefore necessitates a more disaggregated estimation of value-added in these sectors. Since value-added from production side is very problematic to estimate in the service sector, this thesis employs the 'component of value-added' approach from Klimantas and Zirgulis.[3] In this way, value-added in a sector is obtained by summing up total compensation of employees (direct and indirect salaries), consumption of fixed capital (depreciation), net operating surplus (close to a measure of profits) and other production taxes less subsidies which were paid in the process of producing the output but were not taken directly for providing the services.

However, since estimating all of these components would be a task excessive of the limits of this thesis, this study employs a 'short-cut' approach. This involves estimating compensation of employees in each subsector based on average salary (including benefits) data and total number of employees in the subsector. The rest of the components are estimated by taking the respective ratios of these components to compensation of employees from the most similar neighbouring country—Latvia—and applying them to Estonia's case. Latvian data comes from the benchmark study by Norkus et al.[4] Summing the resulting components gives a better approximation of value-added created in the services subsectors.

Finally, taxes less subsidies on products are again taken from Valge's original work and are added back to the value-added total to obtain the final GDP figure. Using population data from Table F.1, a measure of 1938 GDP per capita at market prices is estimated. The data and sources used are presented in Table A.2.

[3] Klimantas and Zirgulis, ''A new estimate'', 238.
[4] Norkus et al., ''Benchmarking Latvia's''.

Table A.1: SERVICE VA IN ESTONIA IN 1938, million EEK

	No. of employees, thous	Annual salary[a]	CE	Other prod. taxes less subsidies	NOS	CFC	VA
Commerce	63.6	720.0	45.8	4.4 (9.6%)[b]	33.7 (73.6%)[b]	7.6 (16.7%)[b]	91.5
T&C	43.7	600.0	26.2	0.4 (1.7%)[b]	2.9 (11%)[b]	2.7 (10.2%)[b]	32.2
Public serv.	84.3	1071.6	90.3	1.1 (1.2%)[b]	0 (0%)[b]	7.9 (8.8%)[b]	99.3
Household serv.	21.7	219.3	4.8	0.3 (5.3%)[b]	0 (0.4%)[b]	0.5 (9.6%)[b]	5.5

Notes:
Number of employees taken from Tables 8, 9 and 16 in Valge's original work. He gives disaggregated numbers for 1934 and service totals for subsequent years. Disaggregation for 1938 is done by multiplying 1934 proportions by 1938 total.
Annual salary in commerce is assumed to be equal to average net salary in Tallinn, in transport and communications—to an average tram worker's salary in Tallinn, in public services—to country average salary of civil servants and in household services—to 20.5% of civil servants salary, a proportion taken from 1936 data.
CE (compensation of employees) was thus produced by multiplying the number of employees by the annual salary. The rest of the components were taken from Latvian 1935 proportions.
Sources:
J. Konsap, ''Töölisperekondade eluolust 1930ndate II poole Tallinnas'' (master's thesis, 2022), 22; P. Erelt, *Kas Pätsi ajal oli elu parem?*, 2009; *Eesti Statistika kuukiri 211 (6) 1939-06* (Tallinn: RSK, 1939), 316–321; *Kaubandus ja transport: 1937. a. majandusloenduse andmed. Vihk III* (Tallinn: RSK, 1939); *Akadeemia 2 1940* (Tallinn: Eesti Üliõpilasseltside Liit, 1940), 86; J. Valge, ''Uue majanduse lätteil. Eesti sisemajanduse kogutoodang aastatel 1923–1938'', *Akadeemia*, nos. 10-12 (2003): 2202–2735. [a]EEK per person, including indirect salary.
[b]percentage of CE in Latvia, taken from Z. Norkus et al., ''Benchmarking Latvia's economy: a new estimate of gross domestic product in the 1930s'', *Cliometrica*, 2022,

PPP conversion to 1990 international dollars

The final task in recalculating Estonian interwar GDP to match its Latvian and Lithuanian counterparts in terms of consistency is to perform a PPP analysis and convert the 1938 GDP per capita in Estonian kroon to Int$$_{1990}$. For these purposes a price basket comparison with Sweden is completed, following the works of Klimantas and Zirgulis and Norkus et al.[5]

The Estonian GDP per capita at current market prices in 1938 was 592.5 EEK, as established in Table A.2. Its Swedish counterpart was 1931.1 SEK in the same year.[6]

The official exchange rate which did not reflect the actual price level disparities was 1 EEK = 1.057 SEK.[7] However, to establish the 'real' difference between per capita income levels, adjusted for price differences, it is necessary to calculate the 'real' exchange rate between these two currencies. Swedish GDP per capita, converted using the 'real' exchange rate would thus reflect the actual differences in living standards between Estonians and Swedes, since prices in Sweden were generally higher.

The 'real' exchange rate is calculated using a comparison of prices of 30

[5]Klimantas and Zirgulis, ''A new estimate''; Norkus et al., ''Benchmarking Latvia's''.
[6]L. Schön and O. Krantz, ''New Swedish Historical National Accounts since the 16th Century in Constant and Current Prices'', *Lund Papers in Economic History*, no. 140 (2015): 23.
[7]*Eesti majandus 1938* (Tallinn: Eesti Pank, 1938), 143.

Table A.2: ESTONIAN 1938 GDP AND ITS SECTORAL COMPONENTS

	Original Valge's data		New estimation	
	Million EEK	%	Million EEK	%
Agriculture, forestry & fishing	250.1	45%	250.1	38%
Industry	132.1[a]	24%	132.1	20%
Construction	14.0	3%	14.0	2%
Housing	29.0	5%	29.0	4%
Commerce	125.9	23%	91.5	35%
Transport & communications			32.2	
Public administration, defence, health & education			77.9[b]	
Defence			21.4[b]	
Household services			5.5	
Total GVA	551.1	100%	653.8	100%
Taxes less subsidies	17.2		17.2	
GDP	568.3		671.0	
Population, million	1.1325		1.1325	
GDP per capita, EEK	501.8		592.5	

Sources: Table A.1 and Tables 2, 21, 23, 38, 45, 46 from Valge's original work J. Valge, ''Uue majanduse lätteil. Eesti sisemajanduse kogutoodang aastatel 1923–1938'', *Akadeemia*, nos. 10-12 (2003): 2202–2735

[a]discrepancy between this table and Table 46 in Valge's original work is due to an unexplained mismatch between the industrial components and aggregate from Valge's Table 38.

[b]defence separated from Public services using an employee ratio from 1934 with Public service employee data from Valge 2003 Tables 8 and 9 and number of servants in defence (15,900) from Kaitseväe peastaap, *Ajalugu*, 2024.

food items, a housing component (rent of one bedroom apartment), 5 clothing items and 15 other consumer items and the respective shares of these categories in total consumption expenditure by Estonian and Swedish households. Following the practice in Klimantas and Zirgulis paper, Laspeyres (SEK/EEK) and Paasche (EEK/SEK) ratios are established for each item and their resulting averages for all items allow to calculate the Fisher ratio which is the geometric average of Laspeyres and Paasche ratios. The resulting 1938 Fisher (SEK/EEK) ratio is 1.79 (or 0.56 EEK/SEK). Since both Klimantas and Zirgulis and Norkus et al. use Fisher ratios in their conversion procedures, this study also follows the same approach.[8]

[8]Swedish consumption expenditure composition taken from Klimantas and Zirgulis, ''A new estimate'' which did not change throughout the 1930s, see Kungliga socialstyrelsen, *Konsumentpriser och indexberäkningar åren 1931-1959* (Stockholm: Sveriges officiella statistik, 1961), 96. Estonian consumption expenditure composition from H. Allik, ''Eesti töölisklassi elatustase kodanlikul ajal ja praegu'', *Eesti Kommunist*, no. 10 (1956): 9–20. Swedish prices from Kungliga socialstyrelsen, *Konsumentpriser*, 122–142; ''Bilpriser 1938'', *Motor*, no. 1 (1961): 24; Film Sound

The resulting 'real' Swedish GDP per capita in Estonian kroon (EEK) is therefore 1080.6 (1931.1 times 0.56), which means that Estonian 'real' GDP per capita in EEK was 54.8% of the Swedish 'real' GDP per capita in EEK level. Thus, 0.548 is the PPP conversion ratio which can be used to obtain a measure of Estonian GDP per capita in international dollars by performing a bilateral comparison with Swedish data already available in Int$.

Sweden's GDP per capita PPP in international dollars in 1938 was 7812 in $\text{Int\$}_{2011}$ or 4901 in $\text{Int\$}_{1990}$.[9] Using the obtained PPP conversion ratio of 0.548, the resulting Estonian GDP per capita is therefore 4279.6 $\text{Int\$}_{2011}$ or 2684.9 $\text{Int\$}_{1990}$.

Interestingly, in his original work Valge used a 'guestimated' ratio of 1925-1934 'real' national income between Estonia and Finland from Clark's 1938 work to convert his figures into $\text{Int\$}_{1990}$.[10] This put Estonia at 90% of Finland's level of GDP per capita and, when converted to $\text{Int\$}_{1990}$, yielded an Estonian 1938 figure of 2745 $\text{Int\$}_{1990}$. Thus, the new comparison performed in this thesis suggest that Valge's data underestimated Estonia's GDP domestically but overestimated Estonian living standards internationally.

Sweden, *Radio advertisements from 1938*, 2024; monthly rent price of 1 bedroom apartment in Stockholm estimated at 31.7 SEK (increasing the 1933/1934 price of 30.8 by real estate price index increase from 152.8 to 157.9 between 1933 and 1938) using data from *Statistisk årsbok för Sverige 1939* (Stockholm: Sveriges officiella statistik, 1940), 245 and R. Edvinsson et al., ''A price index for residential property in Stockholm, 1875–2011'', Historical Monetary and Financial Statistics for Sweden (2014), 94. Estonian prices from *Eesti majandus 1938*, 125; J. Konsap, ''Töölisperekondade eluolust 1930ndate II poole Tallinnas'' (master's thesis, 2022), 50; P. Erelt, *Kas Pätsi ajal oli elu parem?*, 2009; *Eesti Statistika kuukiri 197 (4) 1938-04* (Tallinn: RSK, 1938), 207; *Eesti Statistika kuukiri 202 (9) 1938-09* (Tallinn: RSK, 1938), 483; *Eesti Statistika kuukiri 204 (11) 1938-11* (Tallinn: RSK, 1938), 593; *Eesti Statistika kuukiri 214 (9) 1939-09* (Tallinn: RSK, 1939), 482–485; monthly rent price of 1 bedroom apartment in Tallinn estimated at 19.5 EEK from Allik, ''Eesti töölisklassi'', 9–20 and *Majandusteated 19 1939-05-09* (Tallinn: Eesti Konjunktuurinstituut, 1939), 347

[9] MPD version 2023; data in $\text{Int\$}_{2011}$ converted into $\text{Int\$}_{1990}$ using the ratio of 1.594, see page 12 in the original MPD version 2023 paper.

[10] Valge, ''Uue majanduse'', 2725.

APPENDIX B

Improving the Lithuanian 1937 GDP

This section provides an overview of the improvements to the 1937 Lithuanian benchmark GDP estimate.[1] Firstly, the distributive trade VA is moved from the transportation to the trade sector.

Secondly, the housing output is recalculated. The original paper used the housing 'taxable base' as the main output entry. This is misleading as the tax had to be paid on the property owned rather than actually leased.[2] This study managed to obtain data on rental incomes and intermediate consumption of property developers in Kaunas (interwar temporary capital city) from 1932.[3] Thus, VA in 1932 is reconstructed, reflated by the cost of living index from Table G.2, multiplied by entire urban to Kaunas city population ratio to arrive at the constant-price VA of housing activities in 1932. Using an index compiled in housing part of the interwar time-series estimation, 1937 VA of 90.75 million LTL is obtained. Adding up the government housing activities from Klimantas & Zirgulis gives a total VA of 92.94 million LTL in 1937. As there is no data on brokerage firm operations and rural housing activities are covered by undifferentiated household income in 'Other services', this figure is assumed to represent the entire Lithuanian commercial housing activity.

Thirdly, private healthcare activities are included using a 1.6 ratio of total

[1] Klimantas and Zirgulis, ''A new estimate''.

[2] D. Micuta, ''Lietuvos finansai 1918-1928'', 2nd ed. (reprint from 1930), Pirmasis nepriklausomos Lietuvos dešimtmetis (Kaunas: Šviesa, 1990), 183.

[3] Valdininkas, ''Dėl butų nuomos piginimo. Valdininko nuomonė'', *Lietuvos žinios*, no. 39 (February 1932): 3.

to public hospital beds.[4] This results in the healthcare VA of 8.2 million LTL instead of 5.1 million.

Fourth, value-adding activities of households (ISIC sector T) from the benchmark study are expanded to include the rural household crafts and other activities from the Agricultural survey results.[5] This results in a total of 39.7 million LTL attributed to the activities of households as employers/undifferentiated household income in 'Other services'.

Finally, the Int$$_{1990}$$-to- LTL$$_{1937}$$ PPP conversion ratio was increased by 1.4% to *2.647* as suggested by.[6] The amendment was needed as there was a slight mistake in the benchmark study.

[4] *Lietuvos statistikos metraštis 1937* (Kaunas: CSB, 1938), 57.

[5] *1937/1938 ūkio metų žemės ūkio sąskaitybos rezultatai* (Kaunas: Žemės ūkio rūmai, 1940), 39.

[6] Norkus et al., ''Benchmarking Latvia's''.

APPENDIX C

Details of interwar VA series estimations

This appendix presents the details of volume index construction of all sectors included in GDP estimation in this thesis. As a rule, value-added series are obtained by multiplying series obtained from sources listed below by the benchmark value-added figures from Table 2.2.

Crops

Lithuania

Sources: Yields: *Lietuvos statistikos metraštis 1924-1926* (Kaunas: CSB, 1927), 146–147; *Lietuvos statistikos metraštis 1937*, 127–133; A. Musteikis, *Lietuvos žemės ūkis ir statistika* (Dillingen: Mūsų kelias, 1948), 208; *Žemės ūkio ministerijos metraštis 1918-1937 m.* (Kaunas: Ministry of Agriculture, 1940), 12; *A review of Lithuania's economic position*, Archival material in Lietuvos nacionalinė Martyno Mažvydo biblioteka, Retų knygų ir rankraščių skyriaus fondas, Lozoraičių šeimos kolekcija (1923), 4.
Weights: Agricultural survey results from *1937/1938 ūkio metų žemės ūkio sąskaitybos*, 37–39; Klimantas and Zirgulis, ''A new estimate'', 256.
Oats were reported together with meslin (used for fodder) until 1925. Data is separated using 1926-1940 ratio.

Latvia

Sources:
Yields: Z. Norkus et al., *Volume and Value of Crop Production in Latvia, 1919-1939*, 2022; *Ostland in Zahlen*, 26; Aizsilnieks, *Latvijas saimniecības*, 138, 213, 513; *Lauksaimniecības skaitīšana Latvijā 1936* (Riga: Valsts statistiskā pārvalde, 1937), 75–78; *Lauksaimniecības skaitīšana Latvijā 1930* (Riga: Valsts statistiskā pārvalde, 1931), 55–62; *Lauksaimniecības skaitīšana Latvijā 1934* (Riga: Valsts statistiskā pārvalde, 1935), 94; *Lauksaimniecības skaitīšana Latvijā 1920-1925* (Riga: Valsts statistiskā pārvalde, 1926), 46–51; *Lauksaimniecības skaitīšana Latvijā 1937* (Riga: Valsts statistiskā pārvalde, 1938), 48–50; *Lauksaimniecības skaitīšana Latvijā 1939* (Riga: Valsts statistiskā pārvalde, 1940), 39–40; M. Ārons, *Latvija desmit gados: Latvijas valsts nodibināšanas un viņas pirmo 10 gadu darbības vēsture* (Riga: Jubilejas komisijas, 1928), 115
Weights: Agricultural survey results from *Latvijas statistikas gadagrāmata 1935* (Riga: Valsts statistiskā pārvalde, 1936), 134–135; Norkus et al., ''Benchmarking Latvia's'', 263–283
1919 data separated using 1920 ratios, flax fibre and linseed calculated from 1920, missing clover hay and meadow hay figures (1919-1920) extrapolated from average crop index for corresponding years

Estonia

Sources:
Yields: Klesment and Valge, ''Eesti rahvastiku''; *Eesti põllumajandus 1939* (Tallinn: RSK, 1940), 23–24; *Eesti põllumajandus: statistiline album* (Tallinn: RSK, 1928), 21–30; *Kogu statistilisi andmeid Eestist* (Tallinn: Põllutööministeeriumi statistika osakond, 1921), 61; *Eesti arvudes 1937* (Tallinn: RSK, 1937), 54–57; *Majandusteated 36 1940-09-10* (Tallinn: Eesti Konjunktuurinstituut, 1940), 579
Weights: Valge, ''Uue majanduse'', Table 21; Klesment and Valge, ''Eesti rahvastiku''; Agricultural survey results from *Eesti põllumajandus 1939*, 23–24
1919 data separated using 1920 ratios.

Livestock

Lithuania

Sources:
Animal numbers: ''Lietuvos žemės ūkis ir žemės reforma'', *Lietuvos ūkis*, no. 4 (1922): 5 ; A. Rimka, ''Tautos pelnas ir metodai jam surasti, part 1'', *Lietuvos ūkis*, no. 3 (1926): 72; *Lietuvos statistikos metraštis 1929-1930* (Kaunas: CSB, 1931), 176–177; *Lietuvos statistikos metraštis 1932* (Kaunas: CSB, 1933), 78–81, 78-81; *Lietuvos statistikos metraštis 1936*, 80–81; *Statistikos biuletenis 1938 no. 3*

(173), Kaunas, 1938, 3; Musteikis, *Lietuvos žemės ūkis*, 209.
Milk per cow: LMA rankraščių skyrius, *F.123. B.147.*; F. Klupšas, ''Lietuvos žemės ūkis'', vol. XII, Visuotinė lietuvių enciklopedija (Vilnius: Mokslo ir enciklopedijų leidybos centras, 2008), 789.
Proportions of slaughtered animals: *Lietuva skaitmenimis, 1918-1928 m.: diagramų albomas* (Kaunas: Finansų ministerija. CSB, 1929), 65; *Lietuvos statistikos metraštis 1939* (Vilnius: CSB, 1940), 115.
Exports: *Visa Lietuva: informacinė knyga 1923 metams* (Kaunas: CSB, 1923), 186; *Lietuvos statistikos metraštis 1924-1926*, X–XVI; *Lietuvos statistikos metraštis 1927-1928* (Kaunas: CSB, 1929); *Lietuvos statistikos metraštis 1939*, 114, 244, 281; *Lietuva skaitmenimis, 1918-1928*, 91; LMA rankraščių skyrius, *F.123. B.147.*; *Žemės ūkio ministerijos metraštis 1918-1937*, 60; *Lietuvos užsienio prekyba 1929* (Kaunas: CSB, 1930), 1–2; *Lietuvos užsienio prekyba 1931* (Kaunas: CSB, 1932), 1–2; *Lietuvos užsienio prekyba 1933* (Kaunas: CSB, 1934), 1–2; *Lietuvos užsienio prekyba 1934* (Kaunas: CSB, 1935), 1–2; *Lietuvos užsienio prekyba 1935* (Kaunas: CSB, 1936), 1–2; *Lietuvos užsienio prekyba 1936* (Kaunas: CSB, 1937), 1–2; *Lietuvos užsienio prekyba 1937* (Kaunas: CSB, 1938), 1–2; *Lietuvos užsienio prekyba 1938* (Kaunas: CSB, 1939), 1–2; *Statistikos biuletenis 1940 no. 7 (200)*, Vilnius, 1940, 70.
Animal weights and basic prices: *Pirmas „Maisto" dešimtmetis: 1923-1933 metai* (Kaunas: Maistas AB, 1933), 69–72; *AB „Maistas" 1932 m. apyskaita* (Kaunas: Maistas AB, 1933), 9; *AB „Maistas" 1933 m. apyskaita* (Kaunas: Maistas AB, 1934), 7; *AB „Maistas" 1934 m. apyskaita* (Kaunas: Maistas AB, 1935), 7; *AB „Maistas" 1935 m. apyskaita* (Kaunas: Maistas AB, 1936), 7; *AB „Maistas" 1936 m. apyskaita* (Kaunas: Maistas AB, 1937), 8; *AB „Maistas" 1937 m. apyskaita* (Kaunas: Maistas AB, 1938), 27; *AB „Maistas" 1938 m. apyskaita* (Kaunas: Maistas AB, 1939), 10; *AB „Maistas" 1939 m. apyskaita* (Kaunas: Maistas AB, 1940), 6; Lithuanian Central State Archive (LCVA), 1941.
Wool output from K. Meškauskas and M. Meškauskienė, ''Lietuvos pramonė iki 1940 m.'', *Lietuvos TSR Mokslų akademijos darbai* A serija, no. 2(39) (1972): 28.
Consumption of eggs from A. Rimka, *Tautos pelnas ir metodai jam surasti, part 2*, 4, 1926, 107; Musteikis, *Lietuvos žemės ūkis*, 209; Klupšas, ''Lietuvos žemės ūkis'', 790
Weights: Agricultural survey results from *1937/1938 ūkio metų žemės ūkio sąskaitybos*, 37–39; Klimantas and Zirgulis, ''A new estimate'', 256.
In the case of milk, the annual number of milk cows is multiplied by the annual output of milk per cow. Output per cow is only available 1926 and 1939, being 700kg and 1964kg respectively. This study assumes no change in 1919-1926.Output for 1927-1938 is interpolated.
Other cattle, pig and sheep output consists of the value of animals slaughtered by farmers plus sales for slaughter or export (including the value of hides). Total weight of such animals is obtained from proportions of slaughtered and exported animals multiplied by average annual weights of

respective cattle (bulls and calves), pigs and sheep. With regards to wool production, the annual output of 1.15kg per sheep from 1937 is used. That is the only figure available. These series are joined using basic prices of calves and bulls for other cattle index, and wool and sheep meat for sheep index.
Egg production index is compiled from consumption and export data. Consumption figures are only available for 1924 and 1936-1939. The 1924 figure of 65 eggs per capita comes from ''minimum existential consumption'' and is thus assumed to be the same in 1919-1923, 1925-1935 figures are interpolated and 1940 is assumed to have brought no change from 1936-1939 average (152 eggs per capita). The total number of eggs are obtained by multiplying per capita averages by population and adding up exported eggs. A 1930-1939 cross-check with the number of chicken yielded almost identical series.
Horse growing activities in Agricultural accounting survey includes both sales of horses and hide output. Assuming a constant number of working horses, the series of horse sales is approximated by changes in numbers of offspring horses. Such data is available since 1925. The full index is obtained by applying the post-1925 proportion of young to mature horses for 1919-1924.
Changes in the output of other livestock are taken from 1932-1938 Agricultural accounting survey results, reflated by the agricultural price index. It is assumed that during the years 1919-1931 and 1938-1940 other livestock followed the overall trend of the livestock sector.
In case of missing data, unavailable numbers are extrapolated from related data if possible. If not, constant pre-crisis or post-crisis averages assumed for longer periods and nearest year data for single missing years.

Latvia

Sources:
Yields: Z. Norkus et al., *Volume and Value of Animal Production in Latvia, 1919-1939*, 2022; Z. Norkus et al., *Number of Cattle in Latvia, 1919-1939*, 2022; *Ostland in Zahlen*, 5, 27; *Latvijas PSR statistikas tabulas 1940* (Riga: CSP, 1940), 120; *Lauksaimniecības skaitīšana Latvijā 1935* (Riga: Valsts statistiskā pārvalde, 1936), 36; *Lauksaimniecības skaitīšana Latvijā 1936*, 39; *Lauksaimniecības skaitīšana Latvijā 1937*, 25–28; *Lauksaimniecības skaitīšana Latvijā 1938* (Riga: Valsts statistiskā pārvalde, 1939), 23–25; *Lauksaimniecības skaitīšana Latvijā 1939*, 131–133;
Weights: Agricultural survey results from *Latvijas statistikas gadagrāmata 1935*, 134–135; Norkus et al., ''Benchmarking Latvia's'', 263–283
Price data for aggregation: M. Skujenieks, *Rūpniecības statistika 1938, Trešais gads* (Riga: Valsts statistiskās pārvalde, 1940), 32
Most of the product categories are covered by the official statistics, except beekeeping for 1920-1922 and poultry for 1920-1927. These are assumed to have moved together with the rest of the subsectors throughout the missing years.

Milk production movement was estimated from the total output of milk (1929-1939), missing years from the number of cows for 1920-1928.
Cattle meat (beef and veal) production was estimated from total tons of meat produced (1934-1939), missing years (1923-1933) from output per animal times the number of animals slaughtered, missing years (1920-1923) from the total number of cattle.
Other cattle production (hides) from the number of calves and grown-up cattle slaughtered (1923-1939), figures joined using 1938 hide prices, missing years (1920-1923) from the number of cattle. Pig farming output movement was estimated from the pork meat yield (1934-1939) with missing years from the number of grown-up pigs (1929-1933) and the total number of pigs (1920-1928).
The change in sheep farming output was inferred from two production sides – wool and sheep meat (joined by weighting the respective production yields by the 1935 price data). Wool yields were taken from the numbers of grown-up sheep and numbers of lambs times their respective wool yields per animal (1925-1939, with some gaps in the sheep-lamb ratio filled by extrapolation from the total number of sheep), missing years from the total number of sheep (1920-1924).
Sheep meat output movement was estimated from the sheep meat yield (1934-1939), missing years from the total number of sheep (1920-1933).
Poultry farming movement – from the total number of eggs laid (1929-1939, with some gaps filled by extrapolation from the number of chicken), missing years assumed to have moved with the rest of the sector.
Movement in the output of beekeeping was estimated from the price-weighted movement in the yield of honey and wax production (1923-1939, with gaps in wax production extrapolated from the honey yield), missing years assumed to have moved with the rest of the sector.
Horse farming had two output sides distinguished in the Agricultural accounts – horse output from the horses used for cultivation and from the horse sales. The movement in the former was estimated from the number of grown-up (>3 year-old) horses (1929-1939), with missing years extrapolated from the total number of horses, and the movement in the latter – from the total number of horses (1920-1939).

Estonia

Sources:
Yields: Klesment and Valge, ''Eesti rahvastiku''; Z. Norkus et al., *Volume and Value of Animal Production in Estonia, 1919-1939*, 2022.
Animal numbers: *Kogu statistilisi andmeid*, 65, 84; Klesment and Valge, ''Eesti rahvastiku''; *Eesti arvudes 1937*, 60; *Ostland in Zahlen*, 93; Z. Norkus et al., *Number of Cattle in Estonia, 1919-1939*, 2022; Z. Norkus et al., *Number of Pigs in Estonia, 1919-1939*, 2022; Z. Norkus et al., *Number of Sheep in Es-*

tonia, 1919-1939, 2022; Z. Norkus et al., *Number of Horses in Estonia, 1919-1939*, 2022; *Majandusteated 33 1940-08-20* (Tallinn: Eesti Konjunktuurinstituut, 1940), 515; *Достижения советской Эстонии за 20 лет* (Tallinn: Эстонское государственное издательство, 1960), 43.
Animals slaughtered: *Kogu statistilisi andmeid*, 120.
Weights: Valge, ''Uue majanduse'', Table 21; Klesment and Valge, ''Eesti rahvastiku''; Agricultural survey results from *Eesti põllumajandus 1939*, 23–24
For 1922-1938 all animal categories except Horse auxiliary activities estimated directly from physical outputs of meat, milk, wool, honey, etc. Several missing year figures interpolated. 1919-1921 and 1939-1940 figures estimated from change in animal numbers or number of animals slaughtered in case of meat output.

Forestry and fishing

Lithuania

Sources:
Yields: *Žemės ūkio ministerijos metraštis 1918-1937*, 303; LMA rankraščių skyrius, *F.123. B.330.*; LMA rankraščių skyrius, *F.123. B.145.*; *Lietuvos statistikos metraštis 1927-1928*, 201–205; *Lietuvos statistikos metraštis 1929-1930*, 192–193; *Lietuvos statistikos metraštis 1934* (Kaunas: CSB, 1935), 93; *Lietuvos statistikos metraštis 1936*, 101; *Lietuvos statistikos metraštis 1938* (Kaunas: CSB, 1939), 141; *Lietuvos statistikos metraštis 1939*, 131, 136; *Tarybų Lietuvos dvidešimtmetis: statistinių duomenų rinkinys* (Vilnius: Valstybinė statistikos leidykla, 1960), 112, 130.
Weights: Klimantas and Zirgulis, ''A new estimate'', 258.
Lithuania's total physical fishing output data exists from 1933 to 1940 and the period 1923-1932 is covered by data from the seaside Klaipėda region. No data for the years before to 1923 is available. 1939-1940 figures represent fishing output in Lithuania without Klaipėda region. Ratio Klaipėda region to whole Lithuania's output is used to estimate the whole Lithuania's fishing output between 1923 and 1932. For 1919-1920 and 1921-1922, figures are assumed to be the same as was in 1933-1939 in the respective territory.

Latvia

Sources:
Yields: A. Bīlmans et al., *Latvijas Republika desmit pastāvēšanas gados* (Riga: Golts un Jurjans, 1928), 336; *Latvijas PSR statistikas tabulas 1940*, 121, 123; *Latvijas statistikas gadagrāmata 1926* (Riga: Valsts statistiskā pārvalde, 1927), 131; *Latvijas statistikas gadagrāmata 1929* (Riga: Valsts statistiskā pārvalde, 1930),

166; *Latvijas statistikas gadagrāmata 1937-38* (Riga: Valsts statistiskā pārvalde, 1938), 139; *Ostland in Zahlen*, 45; O. Krastiņš, *Gadsimts Latvijas mežos*, 115/116 (Riga: Latvijas Vēstnesis, 2000).
Weights: Norkus et al., ''Benchmarking Latvia's'', 296.
Missing fishing index values for 1920-1923 assumed to have moved together with the rest of agricultural sector.

Estonia

Sources:
Yields: Klesment and Valge, ''Eesti rahvastiku''; *Eesti 1920-1930* (Tallinn: RSK, 1931), 130
Weights (totals in EEK): forestry from Klesment and Valge, ''Eesti rahvastiku''; *Eesti põllumajandus 1939*, 23–24; A. Pullerits and E. Taska, *Estonia: population, cultural and economic life* (Tallinn: Eesti Rahvusraamatukogu, 1937), 93; fishing from Valge, ''Uue majanduse'', Table 21.
Missing forestry (1919-1921) and fishing (1919-1927) movement extrapolated from change in crops and livestock weighted volume index.

Industry

Lithuania

Sources:
Weights: Klimantas and Zirgulis, ''A new estimate'', 258–260
Industrial worker numbers: *Statistikos biuletenis 1939 no. 3 (185)*, 96; *Lietuvos statistikos metraštis 1935* (Kaunas: CSB, 1936), 203; *Lietuvos statistikos metraštis 1939*, 160–161; K. Meškauskas et al., *Lietuvos pramonė ikisocialistiniu laikotarpiu* (Vilnius: Mintis, 1976), 457, 457; K. Meškauskas and M. Meškauskienė, *Lietuvos pramonė socializmo laikotarpiu* (Vilnius: Mintis, 1980), 17.
Industrial certificate data: P. Šalčius, *Lietuvos pramonės istorija*, vol. 1 - Bendroji dalis, manuscript (1956), 248–249; *Lietuvos statistikos metraštis 1929-1930*, 250–253; *Lietuvos statistikos metraštis 1932*, 178; *Lietuvos statistikos metraštis 1935*, 221; *Lietuvos statistikos metraštis 1939*, 191; *Statistikos biuletenis 1940 no. 8 (201)*, Vilnius, 1940, 95.
1919 tax data: Micuta, ''Lietuvos finansai'', 180–182.
Mean number of workers per certificate category: *Lietuvos statistikos metraštis 1927-1928*, 211–216; *Lietuvos statistikos metraštis 1929-1930*, 241; Š. Fridbergas, *Buržuazinės Lietuvos pramonė: statistinė apybraiža* (Vilnius: Mintis, 1988), 34–35;
Worker wages: *Lietuvos statistikos metraštis 1939*, 188; *Statistikos biuletenis 1940 no. 5-6 (198-199)*, Vilnius, 1940, 36; *Statistikos biuletenis 1940 no. 10 (203)*, Vilnius, 1940, 159; Real wages: Norkus and Markevičiūtė, "New estimation": 652.

Cost of living index for obtaining real wages for missing years in Table G.1.
Employment data used in this paper to estimate the movement of the industrial sector mainly comes from the number of workers in the largest enterprises reported since 1926. Pre-1926 whole employment figures and post-1926 small enterprise employment figures are estimated from industrial certificate data. Industrial enterprises in inter-war Lithuania had to obtain certificates according to the number of workers they have and the machinery they own. Therefore, the average numbers of workers in each certificate category were multiplied by the number of enterprises in the respective category to arrive at the number of workers.[1] A cross-check with 1940 total number of industrial workers data provides great confidence in such procedure (62300 versus 63210 obtained in this study).[2]
To account for worker productivity change, real wages of industrial workers are used for 1930-1940 period and those of construction workers[3] for 1924-1929 period. Due to data constraints, an assumption is made that there were no productivity gains between 1919 and 1924, except for adjustment for industrially more productive Klaipėda region's inclusion in 1923.
Full industrial workforce estimated directly only for 1935-1940 when certificate data became available for individual craftsmen as well. 1919-1934 data excluded individual craftsmen who did not have to take out a certificate. Those figures are extrapolated using movement of workers in larger industrial firms.
Workforce numbers represent mean annual figures, adjusted for territorial change.

Latvia

Sources:
Weights: Norkus et al., ''Benchmarking Latvia's'', 296–298
1930-1939 manufacturing volume index: *Ostland in Zahlen*, 45 Numbers of workers: *Latvijas statistikas gadagrāmata 1925* (Riga: Valsts statistiskā pārvalde, 1926), 396–397; *Latvijas statistikas gadagrāmata 1926*, 247; *Latvijas statistikas gadagrāmata 1927* (Riga: Valsts statistiskā pārvalde, 1928), 283–287; *Latvijas statistikas gadagrāmata 1928* (Riga: Valsts statistiskā pārvalde, 1929), 229–233; *Latvijas statistikas gadagrāmata 1929*, 252; *Latvijas statistikas gadagrāmata 1931* (Riga: Valsts statistiskā pārvalde, 1932), 216–220; *Latvijas statistikas gadagrāmata 1932* (Riga: Valsts statistiskā pārvalde, 1933), 127–130;

[1] The only exception is 1919 for which only tax data is available. The tax, however, was levied according to the certificate category an enterprise belongs to, allowing to connect 1919 figure with the rest of the period data.

[2] *Tarybų Lietuvos dvidešimtmetis*, 282.

[3] The paper follows the assumption by Allen that construction worker wages are representative of all unskilled workers, see R. C. Allen, ''The Great Divergence in European Wages and Prices from the Middle Ages to the First World War'', *Explorations in economic history* 38, no. 4 (2001): 414

Latvijas statistikas gadagrāmata 1934 (Riga: Valsts statistiskā pārvalde, 1935), 131–134; *Ostland in Zahlen*, 39.
Real wages: Norkus and Markevičiūtė, "New estimation": 642; M. Skujenieks, *Latvija 1918.-1928. gados* (Riga: Valsts statistiskās pārvalde, 1928), 67.
In Latvian benchmark data, manufacturing is separated from other industrial branches. There is a robust 1930-1939 manufacturing volume index available which is used to cover the respective period. The rest of the years and the full periods for the non-manufacturing industrial branches are covered by the productivity-adjusted workforce index which is obtained in the same way as in Lithuania.
This index is obtained by averaging an index of worker numbers and an index of real wage-adjusted worker numbers index. The result which was for comparison estimated for manufacturing branches as well, yields almost identical volumes as in the manufacturing volume index from Ostland in Zahlen.

Estonia

Sources:
Weights: Valge, ''Uue majanduse'', Table 38
Numbers of workers: *Eesti majandus 1938*, 105–106; *Eesti arvudes 1937*, 114; *Eesti 1920-1930*, 135; *Igaunijas rūpniecība 1920. gada*, 24, Riga, 1921, 542; *Majandusteated 31 1938-08-09* (Tallinn: Eesti Konjunktuurinstituut, 1938), 550; *Majandusteated 34 1939-08-22* (Tallinn: Eesti Konjunktuurinstituut, 1939), 591–593; *Majandusteated 33 1940-08-20*, 518–519; *Majandusteated 36 1940-09-10*, 556–560; *Eesti Statistika kuukiri 104-105 (7-8) 1930-07/08* (Tallinn: RSK, 1930), 462; *Eesti Statistika kuukiri 92-93 (7-8) 1929-07/08* (Tallinn: RSK, 1929), 472; *Eesti Statistika kuukiri 81 (8) 1928-08* (Tallinn: RSK, 1928), 506; *Eesti Statistika kuukiri 69 (8) 1927-08* (Tallinn: RSK, 1927), 480; *Eesti Statistika kuukiri 57 (12) 1926-08* (Tallinn: RSK, 1926), 13; *Eesti Statistika kuukiri 42 (9) 1925-09* (Tallinn: RSK, 1925), 37; *Eesti Statistika kuukiri 30 (9) 1924-09* (Tallinn: RSK, 1924), 45.
Real wages: Norkus and Markevičiūtė, "New estimation": 638; *Majandusteated 31 1938-08-09*, 553; *Majandusteated 34 1939-08-22*, 591–593; *Majandusteated 33 1940-08-20*, 518–519; *Majandusteated 36 1940-09-10*, 556–560.
Estimation procedures for Estonia follow identical approach as in Latvia and Lithuania, except that, number of employees are available for the entire period covered, although there is no existing volume index to draw on. Worker numbers are consistently available from 1930 to 1940. For 1919-1929, these numbers are extrapolated from various other sources of employee data which offer annual increases.

Construction

Lithuania

Sources:
Housing construction data from *Lietuvos statistikos metraštis*, 1927-1939 editions, pages on housing construction.
Infrastructure construction data from *Valstybės kontrolės Lietuvos Respublikos biudžeto* 1924-1930 editions, pages on infrastructure construction; *Lietuvos statistikos metraštis*, 1931-1939 editions, pages on infrastructure construction; *Statistikos biuletenis 1940 no. 10 (203)*, 152; Micuta, ''Lietuvos finansai'', 180.
Weights: Klimantas and Zirgulis, ''A new estimate'', 260–261 Regarding housing construction, the number of houses built is used for 1922-1932, cubic volume for 1937-1939, deflated monetary value of capital invested for 1933-1936 and urban/rural population change for 1919-1921 and 1940. To obtain monetary constant-price series, average capital investments in residential and non-residential (urban and rural) housing are taken from 1937 Statistical yearbook.
In case of infrastructure projects, there are no consistent physical series to account for these activities. Therefore, the deflated monetary series of respective construction spending are used. Separate figures are available in statistical yearbooks since 1932. Earlier year figures are extrapolated using the change in extraordinary expenditures by the Ministry of Transport and Communications.[4] The resulting infrastructure project series was deflated using the construction material price index from Table G.1.

Latvia

Sources:
Index of new apartments built (1926-1939) from *Ostland in Zahlen*, 48.
Weights: Norkus et al., ''Benchmarking Latvia's'', 298 Since no other data on construction activities in Latvia exists, this thesis uses urban population change from Tables F.1 and F.2 as proxy.

Estonia

Sources:
Production, imports and exports of cement: Valge, ''Uue majanduse'', Table 35; Klesment and Valge, ''Eesti rahvastiku'', 76–78.
Weights: Valge, ''Uue majanduse'', Table 38 Missing 1919-1921 years extrapolated from population movement (Table F.1); 1940 figures covered with

[4] 86% of which were construction expenditures, see *Valstybės kontrolės Lietuvos Respublikos biudžeto už 1937 m. vykdymo apyskaita* (Kaunas: Valstybės kontrolė, 1938), 214–221

production of cement data only.
For further commentary see the respective section in the main text.

Trade and accommodation & food service activities

Lithuania

Sources:
Weights: Klimantas and Zirgulis, ''A new estimate'', 262–264, 266.
Marketed shares of agricultural products: *1932/1933 ūkio metų žemės ūkio sąskaitybos rezultatai* (Kaunas: Žemės ūkio rūmai, 1934), 33; *1937/1938 ūkio metų žemės ūkio sąskaitybos*, 56–58.
Value added totals of crops, livestock, forestry and fishing and industry, see sections above and Table C.1.
Imports: G. Vaskela, *Lithuania Imports, 1919-1939*, 2022; *Statistikos biuletenis 1940 no. 9 (202)*, Vilnius, 1940, 122, deflated with general price index presented in Table G.1.
Accommodation and food service movement from urban population in Tables F.1 and F.2.
For further commentary see the respective section in the main text.

Latvia

Sources:
Weights: Norkus et al., ''Benchmarking Latvia's'', 299–300.
Marketed shares of agricultural and forestry products: *Lauksaimniecības skaitīšana Latvijā 1931* (Riga: Valsts statistiskā pārvalde, 1932), 123; *Lauksaimniecības skaitīšana Latvijā 1933* (Riga: Valsts statistiskā pārvalde, 1934), 183; *Lauksaimniecības skaitīšana Latvijā 1935*, 141, 253; *Lauksaimniecības skaitīšana Latvijā 1938*, 150; *Lauksaimniecības skaitīšana Latvijā 1939*, 191, 196; *Latvijas statistikas gadagrāmata 1939* (Riga: Valsts statistiskā pārvalde, 1939), 119, 123–124.
Value added totals of crops, livestock, forestry and fishing and industry, see sections above and Table C.2.
Imports: Z. Norkus et al., *Latvia Imports, 1919-1939*, 2022; deflated with general price index presented in Table G.2.
Accommodation and food service movement from urban population in Tables F.1 and F.2.
Differently from Lithuania and Estonia, it was possible to obtain marketed share of forestry for Latvia.
Missing imports data for 1919-1920 are linearly interpolated assuming 0 in 1918 and for 1940 are assumed to have been the same as deflated imports in 1939.

Estonia

Sources:
Weights: commerce (incl. trade, accommodation and food, financial, insurance and other private services) data from Table A.1.
Marketed shares of agricultural products: *Eesti põllumajandus 1939*, 69, 75.
Value added totals of crops, livestock, forestry and fishing and industry, see sections above and Table C.3.
Imports: Z. Norkus et al., *Estonia Imports, 1919-1939*, 2022; *The Esthonian economic bulletin* (Tallinn: Kaubandus-tööstusministeerium, 1923), 21; *Majandusteated 33 1940-08-20*, 532; deflated with general price index presented in Table G.3.
No data on accommodation and food service. They are assumed to have moved together with trade.
Imports in 1919 converted to EEK using 1:100 exchange rate. 1940 import figures only available for the first 7 months. Full year figure obtained by taking a ratio of first 7 months in 1939 to first 7 months in 1940.

Transportation and communications

Lithuania

Sources:
Weights: Klimantas and Zirgulis, ''A new estimate'', 265–266.
Railway data: *Lietuvos geležinkelių 1919-1923 metų darbuotės apyskaita* (Kaunas: Susisiekimo ministerija, 1925), 14–21; *Lietuvos geležinkelių 1933 metų darbuotės apyskaita* (Kaunas: Susisiekimo ministerija, 1934), 143, 163; G. Vaskela, *Keleivių ir krovinių važta geležinkeliais 1923–1939 metais*, 2002; *Statistikos biuletenis 1940 no. 10 (203)*, 161.
Land transportation data: *Lietuvos statistikos metraštis* 1927-1939 editions, pages on bus transportation; *Statistikos biuletenis 1940 no. 10 (203)*, 162; population from Table F.1.
Water transportation data: P. Linkevičius, ''Lietuvos vandens keliai'', *Lietuvos ūkis*, no. 10 (1925): 417–418; LMA rankraščių skyrius, *F.123. B.145.*; *Susisiekimo ministerijos 1937 metų metraštis* (Kaunas: Susisiekimo ministerija, 1938), 377; *Lietuvos statistikos metraštis 1938*, 360; *Lietuvos statistikos metraštis 1939*, 378; *Statistikos biuletenis 1940 no. 9 (202)*, 136.
Communications (postal, telephone, telegraph and radio services) data: *Susisiekimo ministerijos 1937 metų*, 69, 72; *Lietuvos statistikos metraštis* 1924-1939 editions, pages on bus communications; *Tarybų Lietuvos dvidešimtmetis*, 245; LMA rankraščių skyrius, *F.123. B.189.*, 18.
Railway passenger-km 1919-1920 extrapolated from number of passengers.
Land transportation passenger-km is available only for 1933-1940 period, showing signs of growing popularity towards the end of the decade. This

paper uses the number of buses (1927-1932) and population growth (1919-1926) to extrapolate land transportation series.
Weight of goods transported via marine and inland transport figures are available for the entire inter-war period, as with communications services data.

Latvia

Sources:
Weights: Norkus et al., ''Benchmarking Latvia's'', 299–300; revenue shares in railways *Latvijas statistikas gadagrāmata 1926*, 183–184.
Transportation data: *Latvijas statistikas gadagrāmata* 1922-1938 issues, pages on transportation; *Latvijas PSR statistikas tabulas 1940*, 152, 157; *Tirdzniecības ziņu grāmata*, Archival material in Latvijas Nacionālā bibliotēka (Riga, 1922), 10; Skujenieks, *Latvija 1918.-1928.*, 47, 52.
Communications data: *Latvijas statistikas gadagrāmata 1926*, 391; *Latvijas statistikas gadagrāmata 1936* (Riga: Valsts statistiskā pārvalde, 1937), 185; *Latvijas PSR statistikas tabulas 1940*, 159; *Ostland in Zahlen*, 56; *Latvijas pasts, telegrafs un telefons 1918-1938* (Riga: Pasta un telegrāfa departamenta, 1938), 106.
Movement of railway transportation was estimated from the ton-km and passenger-km figures, joined using the respective revenue shares in Latvian railways in 1925-1926 (the only years with reported revenue compositions). Unavailable 1920 freight and passenger transportation data was extrapolated from the 1920-1921 change in the total volume of goods transported. Water transportation series was obtained by calculating the total turnover (internal plus sea freight) of goods shipped via the waterways.
Land and other transportation was assumed to have moved in line with the water transportation series as there is no data on these types of transportation.
Finally, the postal activities movement was estimated from the change in the total number of postal items sent, with the missing 1939 figure extrapolated from the population movement.
Movement in telegraph activities is covered by the series of total number of telegrams sent, with missing 1938-1939 years extrapolated from the quantity of establishments providing telegraph services in Latvia. The change in telephone service activities was estimated from the number of telephone subscribers and the change in the radio services – from the number of radiophone subscribers. The Latvian radio company was only established in 1925, so it is assumed that the number of radio broadcasts (and thus the activity in the subsector) before that was zero. The missing 1925 number of radiophone subscribers was extrapolated from the change in 1925-1926 number of radio broadcasts.

Estonia

Sources:
Weights: Table A.1; revenue shares from *Eesti arvudes 1937*, 164–165, 194–195; *Eesti majandus 1938*, 123.
Railway data: Klesment and Valge, ''Eesti rahvastiku''; *Eesti 1920-1930*, 196–198.
Water transportation data: *Eesti majandus 1938*, 64; *Eesti arvudes 1937*, 180; *Esthonian economic bulletin*, 30; *Majandusteated 33 1940-08-20*.
Communications data: *Eesti arvudes 1937*, 190; *Eesti majandus 1938*, 123; *Eesti Statistika kuukiri 3-4 1922* (Tallinn: RSK, 1922), 108, 112; Klesment and Valge, ''Eesti rahvastiku''.
1919 railway activity data from change in railway freight wagon rolling stock and number of kilometres run by passenger trains.
Water transport from change in the gross weight of the merchant fleet, missing 1923-1925 data from tons of merchandise transported with ships and 1919-1922 from net tonnage of ships in Tallinn.
Number of parcels posted, telegrams sent and phone calls made not available for 1939, which are taken as averages of 1938 and 1940.
Number of telephone calls not available for 1919-1920, thus are extrapolated from telephone subscriptions.

Financial, insurance & housing activities

Lithuania

Sources:
Weights: Klimantas and Zirgulis, ''A new estimate'', 266–269.
Deposits and loans from LMA rankraščių skyrius, *F.123. B.279/2.*, 170; *Lietuva skaitmenimis, 1918-1928*, 182–183; P. Šalčius, *Lietuvos prekybos istorija, II dalis*, vol. 2, manuscript (1952), 610; *Statistikos biuletenis 1936 no. 12*, Kaunas, 1936, 33; *Statistikos biuletenis 1937 no. 12*, Kaunas, 1937, 33; *Statistikos biuletenis 1938 no. 12*, Kaunas, 1938, 35; *Statistikos biuletenis 1939 no. 11-12*, Kaunas, 1939, 441; *Statistikos biuletenis 1940 no. 10 (203)*, 167.
Interest rates from V. Terleckas, *Lietuvos bankininkystės istorija, 1918-1941* (Vilnius: Lietuvos banko Leidybos ir poligrafijos skyrius, 2000).
Insurance data from Šalčius, *Lietuvos prekybos*, 620.
Real estate tax data from Micuta, ''Lietuvos finansai'', 178–202; A. Rimka, *Lietuvos ūkis: statistikos tyrinėjimai*, 2nd ed. (Kaunas: „Švyturio“ bendrovė, 1922), 124, *Lietuvos statistikos metraštis* 1924-1939 editions, pages on state revenues. Tax rates from J. Baltrušaitis, *Nekilnojamųjų turtų mokestis*, 12, 1937, 247; L. Dargis, ''Bendrinės tautinės Lietuvos pajamos 1937 metais'', *Naujoji viltis*, no. 8 (1975): 48, 247. 1940 figure estimated from change in population relative to 1939.

Bank deposit statistics are available for entire 1919-1940 period. Loan data only begins in 1922. 1919-1921 loan data is extrapolated using the loan/deposit ratio from later periods. In cases of early data, only the largest credit institutions are documented. This issue is solved by applying ratios of total deposits/loans to large bank deposits/loans from later periods. Annual interest rates on loans and deposits are used to obtain the output of banking. There are gaps in interest rate data which are filled by interpolation. Data on insurance premiums is available for 1928-1939. Insurance is assumed to have moved together with financial services for the rest of the inter-war.
Using relevant real estate tax rates, 'taxable base' figure is obtained and deflated by the cost of living index from Table G.1.

Latvia

Sources:
Weights: Norkus et al., ''Benchmarking Latvia's'', 301.
Deposits, loans and bank interest rates: Aizsilnieks, *Latvijas saimniecības*, 627; *Latvijas statistikas gadagrāmata 1935*, 95, 166–168; *Latvijas statistikas gadagrāmata 1939*, 90; *Finanču un kredita statistika 1939* (Riga: Valsts statistiskā pārvalde, 1939), 60–62; *Ostland in Zahlen*, 68.
Insurance data: G. Krūmiņš, *Apdrošināšana Baltijas valstīs un Somijā* (Riga: Izdevējs Jēkabs Krūmiņš, 1935), 28–29; *Latvijas statistikas gadagrāmata 1929*, 275; *Latvijas PSR statistikas tabulas 1940*, 102.
Housing data: *Latvijas valsts finanses 1918./1920. - 1931./1932* (Riga: Valsts statistiskā pārvalde, 1932), 29; *Latvijas statistikas gadagrāmata 1936*, 90; *Latvijas statistikas gadagrāmata 1939*, 81; Aizsilnieks, *Latvijas saimniecības*, 279, 478, 683.
First, as the financial and insurance activities are reported in a single figure in the benchmark study, they had to be divided. This is done by firstly obtaining the insurance sector value-added in 1935 (Premiums earned (11.0 million LVL), minus benefits paid (4.4 million LVL), plus change in technical reserves (0.7 million LVL)) and subtracting its IC (1.9 million LVL), which yields 5.4 million LVL as value-added of the insurance sector. Subtracting this from the total 13.9 million LVL of the whole sector results in 8.5 million LVL as the gross value-added of the financial sector.
Interest rates on loans were obtained for the benchmark 1935 and then extrapolated for the rest of the years using the closest available average interest rate figure on loans from the Bank of Latvia to account for the overall changes in the lending market. The resulting interest rate series were multiplied by the respective series of loans and short term deposits to arrive at the series of revenues and expenses from lending activities. The difference between the two yielded the output of financial activities at current prices. The output before 1923, however, appears to be negative and thus the data is deemed unreliable for those periods. Change in population was used to account for the subsector changes in 1920-1922. The resulting output series was deflated

by the price index to arrive at a constant-price index which was then multiplied by the benchmark value-added figure to arrive at the final series.
The data series on insurance premiums paid and received is available for 1921-1938. The difference between these yield the current-price output of the insurance sector, the value-added of which is obtained afterwards in the same way as with the financial services. The missing 1920 and 1939 data was extrapolated from the population movement in Table F.1.
The housing (real estate) sector is divided into five parts in the benchmark study – government RE, urban RE, rural RE, imputed urban RE and imputed rural RE. Movement in government RE activities is assumed to have been reflected by the overall population change, while the urban and rural imputed rent changes – by the urban and rural population movement.
The main urban and rural real estate activities require more attention. It was decided to calculate the taxable bases for both of these activities, using the amounts of respective real estate taxes collected, adjusted by the changes in the respective tax rates and deflated by the general price index. Although the tax rate data is blurry, it can be assumed that the urban RE tax rate was 30% in 1926-1930, 50% in 1931-1935 and 40% in 1936-1940, while the rural RE tax rate was constant at 30% in 1926-1940. The tax rates for the earlier years are unknown, thus for 1920-1925 real estate activities are assumed to have been in line with the respective population movements. The amounts of urban and rural real estate tax received by the government is also tricky to acquire.
The total RE tax revenues are available throughout the period in question, but the urban-rural split reporting ends after 1931. Thus, an average urban-rural tax revenue split ratio from 1921-1931 is used to obtain the revenue shares from urban and rural tax for the entire period. These are then divided by the respective tax rates (only 1926-1939) to arrive at current price tax base series. These series are deflated by the price index from Table 3 in the main text, extended by the respective population data from the same table to account for the missing years, resulting in the urban and rural RE activity indices. These are then multiplied by the benchmark value-added figures of urban and rural RE to arrive at their series.

Estonia

Estonian benchmark data does not differentiate commerce activities into subparts. Thus, this thesis assumes that financial and insurance sectors moved together with the commerce total, estimated in the Trade section above.

For housing, *sources* are as follows:
Weights: Table A.2.
Housing data: Valge, ''Uue majanduse'', Table 42 offers constant price housing value-added from 1929 to 1938. 1922-1928 and 1939-1940 are extrapolated from urban population change and 1919-1921 from total population change from Tables F.1 and F.2.

Public & social security administration, defence, education & health

Lithuania

Sources:
Weights: Klimantas and Zirgulis, ''A new estimate'', 274–276.
Public servant numbers: A. Mikalauskas, ''Valstybės tarnautojai ir valstybės tarnyba Pirmojoje Lietuvos Respublikoje (1918-1940 m.)'' (PhD diss., 2007), 45; P. Žostautaitė, ''Tarnautojų skaičius Lietuvoje 1919–1926 m., jų profesinė, socialinė ir nacionalinė sudėtis'', *Lietuvos TSR Mokslų akademijos darbai* A serija, no. 4(61) (1977): 108–109; *Lietuvos statistikos metraštis 1934*, 304; *Lietuvos statistikos metraštis 1937*, 333.
Number of soldiers: J. Vaičenonis, ''Lietuvos kariuomenės skaičiai 1920-1939 m.'', *Karo archyvas*, no. XVII (2002): 144–180; A. Gaidys et al., ''Lietuvos ginkluotosios pajėgos 1918–1940 '', Visuotinė Lietuvių Enciklopedija (Vilnius: Mokslo ir enciklopedijų leidybos institutas, March 2016).
Number of doctors: V. Tercijonas, ''Sveikatos apsauga: Nepriklausomieji 1918-1940 metai'', vol. XV, Lietuvių enciklopedija (Boston: Lietuvių enciklopedijos leidykla, 1968), 122. Adjustment for inclusion of private hospitals from *Lietuvos statistikos metraštis 1939*, 59.
Education staff numbers and wage differences: J. Vokietaitis, ''Pradžios mokslo plitimo 10 metų (1918-1928) apžvalga'', 2nd ed. (reprint from 1930), Pirmasis nepriklausomos Lietuvos dešimtmetis (Kaunas: Šviesa, 1990), 314–315; A. Kasakaitis, ''Vidurinis ir aukštesnysis mokslas Lietuvoj 1918-1928 m.'', 2nd ed. (reprint from 1930), Pirmasis nepriklausomos Lietuvos dešimtmetis (Kaunas: Šviesa, 1990), 322, 330; V. Biržiška, ''Lietuvos aukštosios mokyklos'', 2nd ed. (reprint from 1930), Pirmasis nepriklausomos Lietuvos dešimtmetis (Kaunas: Šviesa, 1990), 338; later year figures from *Lietuvos statistikos metraštis* 1929-1939 editions, pages on education.
For further commentary see the respective section in the main text.

Latvia

Sources:
Weights: Norkus et al., ''Benchmarking Latvia's'', 304–307.
Public administration: J. Baltais and V. Salnais, *Darba Statistika 1926* (Rīga: Valsts statistiskā pārvalde, 1927), 66–67; J. Baltais and V. Salnais, *Darba Statistika 1930* (Rīga: Valsts statistiskā pārvalde, 1931), 177; J. Baltais and V. Salnais, *Darba Statistika 1932* (Rīga: Valsts statistiskā pārvalde, 1933), 144; J. Baltais and V. Salnais, *Darba Statistika 1934* (Rīga: Valsts statistiskā pārvalde, 1935), 73; J. Baltais and V. Salnais, *Darba Statistika 1935* (Rīga: Valsts statistiskā pārvalde, 1936), 100; J. Baltais and V. Salnais, *Darba Statistika 1936*

(Rīga: Valsts statistiskā pārvalde, 1937), 171; *Latvijas statistikas gadagrāmata 1937-38*, 271; *Latvijas statistikas gadagrāmata 1939*, 249;
Number of soldiers: Latvian State Historical Archives (LSHA), *5192, inv. 1, file 846*, 5, 205, 336; Latvian State Historical Archives (LSHA), *5192, inv. 1, file 847*, 147.
Education: Kasakaitis, ''Vidurinis ir aukštesnysis'', 322; Z. Norkus et al., *Number of Teachers in Primary Schools in Latvia, 1919-1939*, 2022; Z. Norkus et al., *Number of Teachers in Secondary Schools in Latvia, 1919-1939*, 2022; Z. Norkus et al., *Number of Academic Staff in Universities in Latvia, 1919-1939*, 2022.
Healthcare: Baltais and Salnais, *Darba Statistika 1936*, 191; Z. Norkus et al., *Number of Medical Staff (N) in Latvia, 1919-1939*, 2022.
The salary data used as weights to combine the numbers of primary, secondary and tertiary education instructors was taken from Lithuanian data as there was no available information on the respective salaries in Latvia. Secondary and tertiary institution instructors are treated equally as there is no wage differentiation between the two available. In case of healthcare, separate salary data for doctors and secondary medical personnel (such as midwives) is available for Latvia to use as weights.
For further commentary see the respective section in the main text.

Estonia

Unfortunately, Estonian benchmark data does not differentiate public services into subparts. Thus, this thesis assumes that public administration, education and health sectors moved together with the rest of the economy. Data on defence, however, is separated and accounted for.

Sources:
Weights: Tables A.2 and A.1.
Public services: calculated from aggregate index of all sectors except Public services and other services in Tables C.3.
Defence: number of servants in defence in 'normal' time (15,900) from Kaitseväe peastaap, *Ajalugu*, 2024, these numbers are assumed to have held for the entire period between the end of independence wars and entry of Soviet garrisons, that is, 1921-1939. For 1919-1921 number of soliers are 74,769 in 1919 and 18,871 in 1920, see A. Gerut, ''Viiekümne aasta eest saabus Eestile 20-aastane rahu'', *Võitleja*, February 1970, 2; A. Pajur, *Eesti riigikaitsepoliitika aastail 1918–1934* (Tartu: Eesti Ajalooarhiiv, 1999), 80. The size of the Soviet garrison which was established in Estonia at the end of 1939 was 25,000 in size, see E. Tiit, *Eesti rahvastik: Viis põlvkonda ja kümme loendust* (Tallinn: Statistikaamet, 2011), 42
For further commentary see the respective section in the main text.

Other services

Lithuania

Sources:
Weights: Klimantas and Zirgulis, ''A new estimate'', 268–277.
Theatrical performances: J. Vienožinskis, ''Valstybės teatro dešimtmetis'', 2nd ed. (reprint from 1930), Pirmasis nepriklausomos Lietuvos dešimtmetis (Kaunas: Šviesa, 1990), 384.
There was no data on theatrical performances after 1928. Existing data implies that the number of performances rapidly increased during the early 1920s and stabilised since 1926. Thus, it is assumed that during the rest of the inter-war period the change was reflected by population increase.
All other service activities are assumed to have moved with population (Table F.1) except undifferentiated household incomes which are originally based on Agricultural accounting survey data.Thus, VA series for this subsector is compiled from rural population change (Tables F.1 and F.2).

Latvia

Sources:
Weights: Norkus et al., ''Benchmarking Latvia's'', 303–310.
Population: Tables F.1 and F.2.
Data: Baltais and Salnais, *Darba Statistika 1930*, 177; J. Baltais and V. Salnais, *Darba Statistika 1931* (Rīga: Valsts statistiskā pārvalde, 1932), 124–127; Baltais and Salnais, *Darba Statistika 1932*, 75–77; Baltais and Salnais, *Darba Statistika 1934*, 73–75; Baltais and Salnais, *Darba Statistika 1936*, 166–170; Ārons, *Latvija desmit gados*, 215; V. Salnitis, *Latvijas Kulturas Statistika 1918-1937* (Riga: Valsts statistiskā pārvalde, 1938), 122, 144; *Latvijas statistikas gadagrāmata 1926*, 247–257; *Latvijas statistikas gadagrāmata 1927*, 283–287; *Latvijas statistikas gadagrāmata 1928*, 229–233; *Latvijas statistikas gadagrāmata 1929*, 252; *Latvijas statistikas gadagrāmata 1931*, 216–220; *Latvijas statistikas gadagrāmata 1932*, 127–130; *Latvijas statistikas gadagrāmata 1934*, 131–134; *Latvijas PSR statistikas tabulas 1940*, 59; *Ostland in Zahlen*, 39.
Whenever possible, employment figures or the number of theatre visitors, library readers in various other service activities covered by the benchmark weights are used to estimate the value-added change in these activities. Where such data is missing, population change is used as proxy except in arts and entertainment where urban population data is used.
Activities of households as employers have two components in the benchmark study: work by farmers outside farms and the activities of domestic workers. As there are again no specific respective series available to approximate the movement in these subsectors, rural population change is used to estimate the change in the former subsector and urban – in the latter.

Estonia

Sources:
Weights: Tables A.2 and A.1.
Since other services in Estonian are only differentiated into domestic services (household services), movement in the sector is assumed to have gone in line with population from Table F.1.

Table C.1: VALUE-ADDED INDICES IN INTERWAR LITHUANIA, 1937=100

	Crops	Liv.	F&F	Ind.	Constr.	T&C	Trade	Hous.	F&I	Publ.	Def.	Health	Educ.	Other	GVA/ GDP
1919	52.3	41.1	11.8	21.8	48.2	4.3	36.1	5.6	1.6	61.7	134.9	24.4	17.4	69.9	39.1
1920	50.9	56.6	18.6	17.0	48.6	11.9	38.7	4.1	8.0	61.6	225.4	24.4	21.3	70.1	45.5
1921	59.6	65.6	33.4	33.1	49.2	19.0	48.4	4.4	17.7	62.0	239.3	35.1	27.3	72.8	54.6
1922	71.3	74.9	43.7	33.5	49.4	24.8	51.4	2.1	11.7	68.4	219.2	45.8	36.6	74.7	59.7
1923	70.5	87.2	63.9	62.7	80.0	39.0	67.3	12.2	21.1	102.2	153.2	50.5	47.9	77.6	71.7
1924	67.3	86.0	43.7	61.1	98.7	46.0	66.5	23.2	44.7	97.3	95.5	51.1	54.4	83.5	70.4
1925	82.5	82.6	58.4	48.1	92.9	52.6	66.1	26.3	50.4	92.3	91.6	52.5	59.1	86.6	70.4
1926	65.1	86.1	43.8	42.0	80.2	55.9	62.5	33.1	48.3	69.1	58.3	53.1	61.9	88.4	65.2
1927	73.8	72.7	66.7	52.3	89.9	64.3	64.8	35.7	41.9	74.7	69.1	50.6	67.2	90.1	66.7
1928	71.5	75.5	72.9	44.8	100.2	63.3	65.1	38.2	68.7	80.2	71.9	53.0	69.2	91.6	67.2
1929	92.9	70.6	68.7	51.4	86.2	74.0	69.5	39.4	98.3	85.8	68.6	56.8	77.3	92.9	71.6
1930	95.9	75.6	60.2	58.5	102.7	75.8	75.0	53.7	86.9	88.1	58.0	59.4	80.9	94.2	76.5
1931	79.6	83.7	73.6	63.7	103.7	77.2	75.6	62.5	80.6	90.4	67.9	62.6	84.3	95.3	77.8
1932	88.0	85.9	69.6	66.6	88.1	73.5	73.6	76.2	87.7	92.7	66.3	66.2	85.9	95.6	80.0
1933	84.7	89.3	88.2	67.7	90.5	73.8	74.8	88.8	88.4	97.7	66.1	70.4	88.9	96.5	81.9
1934	101.9	91.7	74.7	70.4	65.2	80.9	79.1	89.9	97.8	102.7	70.7	77.6	91.5	97.3	86.2
1935	103.0	94.6	77.4	82.7	68.6	85.5	87.4	107.9	107.0	99.6	91.1	90.1	90.0	98.0	92.3
1936	92.1	97.7	105.5	91.9	87.1	94.9	92.2	104.1	102.0	96.6	94.3	97.3	92.4	99.0	94.7
1937	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1938	99.2	105.0	92.2	102.9	107.9	113.1	103.5	100.5	86.7	102.1	95.9	101.4	118.2	99.2	102.9
1939	109.1	107.6	74.3	75.3	113.4	72.0	94.1	94.3	118.2	101.7	86.9	165.1	119.3	96.6	98.2
1940	96.2	102.4	101.0	81.7	141.8	87.4	97.4	110.1	94.0	118.8	170.8	156.4	121.6	109.0	101.7
1937 GVA[a]	311.2	483.4	28.4	279.7	68.2	51.9	335.6	92.9	22.5	45.6	51.7	8.2	36.9	51.1	1867.2
GDP															1935.5[b]

Sources: Table 2.2 and calculations in Appendix C. Liv. - livestock, F&F - forestry and fishing, Ind. - industry, Constr.- construction, T&C - transport and communications, Trade - trade, accommodation and food service, Hous. - housing, F&I - finance and insurance, Publ. - public administration and social security, Def. - defence, Educ. - education, Other - other services.

[a]benchmark value-added, million LTL, current prices.

[b]taxes less subsidies on products added back from Table 2.2.

Table C.2: VALUE-ADDED INDICES IN INTERWAR LATVIA, 1935=100

	Crops	Liv.	F&F	Ind.	Constr.	T&C	Trade	Hous.	F&I	Publ.	Def.	Health	Educ.	Other	GVA/ GDP
1919	20.4	53.9	34.2	11.0	54.0	17.2	23.0	65.1	4.6	66.6	234.5	34.3	33.8	66.7	40.4
1920	23.7	57.5	37.1	17.5	58.2	32.3	28.4	70.3	4.9	71.8	234.5	37.0	48.6	71.9	45.7
1921	45.6	62.7	41.3	27.1	67.7	49.4	37.9	74.3	5.2	75.8	156.2	53.1	65.6	78.1	52.9
1922	42.7	60.9	56.8	33.0	76.3	66.4	46.3	76.8	9.5	78.3	86.8	59.7	78.8	83.1	54.5
1923	50.9	69.2	70.2	45.2	81.3	79.8	62.5	79.1	14.0	77.3	86.9	64.6	80.2	86.8	63.5
1924	52.0	67.8	67.4	48.6	85.8	83.4	67.0	80.8	34.5	76.2	92.1	72.1	81.9	89.5	65.7
1925	65.2	69.9	73.1	53.5	89.4	79.9	73.8	81.7	82.7	80.1	102.9	69.6	84.8	91.5	71.1
1926	53.4	73.1	93.1	54.6	91.2	86.4	74.0	82.3	100.6	83.9	107.7	72.3	86.9	93.0	72.0
1927	52.8	74.3	108.7	59.3	89.4	99.8	75.7	81.9	108.9	84.1	105.3	75.3	88.9	93.6	74.4
1928	39.9	74.4	114.1	62.2	102.7	114.6	79.0	78.8	99.4	86.5	109.3	80.7	89.9	94.7	74.9
1929	62.2	75.2	92.4	70.1	114.6	118.0	92.1	81.1	108.7	89.9	113.3	86.2	92.4	96.4	82.2
1930	75.8	78.5	65.9	78.8	156.2	121.5	98.8	84.1	145.8	92.5	117.3	89.9	97.2	97.9	89.1
1931	56.3	86.0	83.8	67.3	124.6	93.0	83.1	80.6	169.8	94.2	111.4	93.2	96.5	98.1	81.8
1932	76.1	87.3	103.8	61.3	99.9	79.7	71.9	97.0	128.8	90.5	105.6	95.8	96.6	98.7	81.3
1933	88.1	86.6	115.4	81.0	95.1	93.1	85.2	97.2	118.4	93.4	99.7	99.4	98.9	99.1	89.2
1934	106.2	92.5	100.8	93.7	110.1	102.0	96.0	99.3	118.4	97.8	99.9	100.8	97.1	99.4	97.7
1935	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1936	82.9	101.0	112.3	104.9	121.5	101.3	100.5	117.5	89.4	105.2	99.3	101.7	104.2	101.2	101.1
1937	106.3	99.3	101.0	119.2	143.0	126.8	117.6	104.2	82.9	110.4	99.1	102.8	106.2	101.7	110.0
1938	103.4	105.6	95.4	127.2	138.6	112.4	121.4	117.5	91.9	112.4	98.8	105.1	107.6	102.3	113.3
1939	109.8	106.1	93.4	128.2	156.4	120.5	120.7	100.6	95.7	112.9	97.9	105.8	103.7	101.3	113.9
1940	107.1	87.1	70.5	126.4	151.3	113.9	115.3	87.0	106.4	111.6	189.9	104.6	117.1	99.4	110.0
1935 GVA[a]	137.8	227.0	18.7	216.5	23.6	53.1	150.8	68.9	13.9	29.7	34.7	11.5	27.6	48.0	1061.8
GDP															1139.6[b]

Sources: Table 2.2 and calculations in Appendix C. Liv. - livestock, F&F - forestry and fishing, Ind. - industry, Constr.- construction, T&C - transport and communications, Trade - trade, accommodation and food service, Hous. - housing, F&I - finance and insurance, Publ. - public administration and social security, Def. - defence, Educ. - education, Other - other services.

[a]benchmark value-added, million LVL, current prices.

[b]taxes less subsidies on products added back from Table 2.2.

Table C.3: VALUE-ADDED INDICES IN INTERWAR ESTONIA, 1938=100

	Crops	Liv.	F&F	Ind.	Constr.	T&C	Commerce[a]	Hous.	Public services[b]	Def.	Other services (household services)	GVA/ GDP
1919	60.6	41.5	60.0	20.4	17.1	30.3	32.1	46.2	66.5	470.2	93.9	56.0
1920	62.7	58.6	72.5	26.3	17.2	41.2	39.1	46.4	70.9	118.7	94.3	51.8
1921	77.6	66.9	86.0	35.3	17.5	50.1	48.3	47.2	76.5	100.0	96.0	59.8
1922	74.6	72.0	87.7	42.7	17.8	60.4	55.0	47.9	79.0	100.0	97.3	63.7
1923	72.2	74.9	93.4	55.1	61.7	63.9	67.9	48.6	82.3	100.0	98.1	69.9
1924	71.0	78.4	108.1	54.8	18.4	66.4	64.4	49.4	82.5	100.0	98.5	69.5
1925	83.3	87.6	116.1	53.8	36.2	65.8	70.3	50.1	85.6	100.0	98.6	74.9
1926	71.8	91.3	95.9	57.7	39.6	71.4	71.3	50.8	85.3	100.0	98.6	74.5
1927	76.5	93.0	106.0	54.1	15.7	70.3	73.6	51.6	85.3	100.0	98.5	75.0
1928	64.3	93.7	96.2	55.6	51.9	76.2	78.9	53.4	84.9	100.0	98.5	75.1
1929	78.2	87.4	94.6	60.7	51.8	83.3	78.5	55.2	86.5	100.0	98.5	77.5
1930	100.1	92.9	85.5	63.4	46.1	88.2	80.1	69.0	90.5	100.0	98.5	83.8
1931	79.3	96.9	80.3	62.1	39.1	86.2	71.4	86.2	88.9	100.0	98.8	80.0
1932	79.8	96.2	111.8	55.0	37.2	79.0	62.3	86.2	88.3	100.0	99.0	77.7
1933	92.5	94.9	111.8	61.1	36.8	71.6	66.1	82.8	90.2	100.0	99.3	80.8
1934	104.8	93.2	100.1	75.2	38.7	74.7	79.1	79.3	93.2	100.0	99.5	87.2
1935	90.2	93.9	98.7	78.8	55.7	84.9	83.0	86.2	93.1	100.0	99.7	87.4
1936	87.2	89.7	100.0	98.5	72.1	89.6	92.0	93.1	95.8	100.0	99.8	92.6
1937	101.7	100.2	98.6	104.4	102.6	95.4	102.2	96.6	100.5	100.0	99.8	101.2
1938	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1939	101.5	99.7	96.7	107.1	111.7	112.0	100.3	100.6	101.5	100.0	99.6	102.6
1940	104.4	85.3	83.4	108.3	102.5	145.9	91.9	97.8	99.0	178.6	96.4	102.5
1938 GVA[c]	101.5	131.3	17.3	132.1	14.0	32.2	91.5	29.0	77.9	21.4	5.5	653.8
GDP												671.0[b]

Sources: Tables 2.2, A.1, A.2 and calculations in Appendix C. Liv. - livestock, F&F - forestry and fishing, Ind. - industry, Constr.- construction, T&C - transport and communications, Hous. - housing, Def. - defence.

[a]including trade, accommodation, financial, insurance and other commercial services.

[b]including health and education.

[c]benchmark value-added, million EEK, current prices.

[b]taxes less subsidies on products added back from Table 2.2.

APPENDIX D

Details of post-war VA series estimations

This appendix presents the details of volume index construction of all sectors included in GDP estimation in this thesis. As a rule, value-added series are obtained by multiplying series obtained from sources listed below by the benchmark value-added figures from Table 2.1. Bolotin's benchmark data only provides separate service figures for trade and transport and communications.Bolotin, ''Former Soviet Union'' Hence, further disaggregation of the remaining service sectors is based on value-added shares in Steinberg, *Economies of*.

Crops

Lithuania

Sources: Weights, 1990 base: The World Bank, *Statistical handbook 1994*, 429; disaggregation of grains: 1995 Economic accounts for agriculture in *Eurostat Database*; disaggregation of grasses: M. Gregorauskas, *Tarybų Lietuvos žemės ūkis, 1940-1990* (Vilnius: Valstybinė politinės ir mokslinės literatūros leidykla, 1960), 290–291.
Yields and sown area: G. Vaskela, *Winter Wheat Harvest in Lithuania, 1919-1939*, 2023; *Statistika ir ekonomija*, Archival material in Lietuvos nacionalinė Martyno Mažvydo biblioteka (1943), 7; *Сельское хозяйство Литовской ССР за 35 лет Советской власти* (Vilnius: Центральное статистическое управление при Совете Министров Литовской ССР, 1977), 133, 106,

103; *Агропромышленный комплекс Литовской ССР* (Vilnius: Центральное статистическое управление Литовской ССР, 1986), 146; *Lietuvos TSR liaudies ūkis per 40 metų* (Vilnius: CSV, 1980), 92; Musteikis, *Lietuvos žemės ūkis*, 208; *Statistische Berichte für das Ostland nr. 3-4* (Riga, 1942), 114–116; *Statistische Berichte für das Ostland nr. 11-12* (Riga, 1943), 449; *Statistische Berichte für das Ostland nr. 1-4* (Riga, 1944), 95–96; *Lietuvos TSR Liaudies ūkis; Lietuvos TSR ekonomika ir kultūra; Lietuvos statistikos metraštis*: 1960-1998 editions, pages on crop output; *Основные показатели развития народного хозяйства Литовской ССР* (Vilnius: Статистическое управление Литовской ССР, 1950), 40; Gregorauskas, *Tarybų Lietuvos žemės ūkis*, 290–291; *Tarybų Lietuvai 25 metai: statistikos duomenų rinkinys* (Vilnius: CSV, 1965), 81; *Tarybų Lietuvos dvidešimtmetis*, 180; *Lietuvos žemės ūkis 1995 m.* (Vilnius: Lietuvos statistikos departamentas, 1996), 24; *Lietuvos žemės ūkis 1998 m.* (Vilnius: Lietuvos statistikos departamentas, 1999), 41, 49; Statistics Lithuania, *Indicators database*, December 2024; *Сельское хозяйство Литовской ССР в 1966 году*, 25(654), Vilnius, 1966, 131; *Валовые сборы и урожайность сельскогохозяйственных культур в 1967 году по Литовской ССР*, 20(701), Vilnius, 1968, 5.

For years when data for separate grains was not available, the total grain output was disaggregated using the ratios of surrounding years. For 1964 only state farm data available, full data extrapolated from surrounding year ratios state to all farms. In cases of single missing figures, surrounding year averages taken. Fodder beet for 1944-1949 extrapolated from sugar beet. Fruits and berries extrapolated from existing years using Natural meadow hay as the best correlating crop, except 1941-1949 when it was linearly interpolated In 1989 grain output calculation methodologies in Lithuania changed, leading to lower figures reported in later published data. To estimate coherent indices, this series extrapolates 1989-1995 figures using 1988 ratio of new to old methodology. In some cases missing data was extrapolated from surrounding years' yield to sown area ratio

Latvia

Sources: Weights: 1990 base: The World Bank, *Latvia – The transition*, 286; disaggregation of grains: 1995 Economic accounts for agriculture in *Eurostat Database*.

Yields and sown area: for 1937-1940 see sources in Crops section in Appendix C; Vidzemes Augstskola, *Baltic 100*; Statistics Latvia, *Sown areas, thsd ha, 1939-1955*, Unpublished data, personal communication with Krūmiņš, G. and Klavina, B. Riga, 2022; *Statistische Berichte für das Ostland 1942 nr. 3–4*, 65; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 54–55; *Statistische Berichte für das Ostland nr. 9-10* (Riga, 1943), 235; *Latvijas statistikas gadagrāmata 1939*; *Latvijas PSR statistikas tabulas 1940*; *Сельское хозяйство Латвийской ССР* (Riga: Latvijas PSR CSP, 1973), 118; *Padomju Latvijas tautas saimniecība 20 gados* (Riga: Valsts statistikas izdevniecības Latvijas nodaļa, 1960), 126; *Padomju Latvijas*

tautas saimniecība 20 gados, 127–134, 144; *Padomju Latvijas tautas saimniecība* (Riga: Latvijas PSR CSP, 1968), 193, 197–202; *Latvijas PSR Tautas saimniecība 1975 gada* (Riga: Latvijas PSR CSP, 1976); *Latvijas PSR Tautas saimniecība 1980* (Riga: Latvijas PSR CSP, 1981), 119, 149–152; *Latvijas PSR Tautas saimniecība 1985* (Riga: Latvijas PSR CSP, 1986), 122, 128, 178–183; *Latvijas Tautas saimniecība 1990 gada* (Riga: CSP, 1991), 68–69, 86–92, 98.
Disaggregated grain data for 1947-1952 not available, thus all grain categories assumed to have moved with the total during the period. In some cases missing data was extrapolated from surrounding years' yield to sown area ratio Fodder beet for 1937-1939 and 1941 extrapolated from sugar beet. Various grasses extrapolated from movement of other grasses in cases where data was missing. Vegetable output in 1937-1939 and 1941-1943 extrapolated from total grains movement. In cases of single missing figures, surrounding year averages taken.

Estonia

Sources: Weights: 1990 base: The World Bank, *Statistical handbook 1996: states of the former USSR (English)*, 21, Washington, D.C., 1996, Table 6-1; disaggregation of grains: 1995 Economic accounts for agriculture in *Eurostat Database*.
Yields and sown area: O. Mertelsmann, *Stalinist Restructuring in Estonia: From Market to Command Economy* (Lausanne: Peter Lang, 2024), 140–175; *Statistischer Jahresbericht für den Generalbezirk Estland 1942* (Tallinn: Eesti Statistika Valitsus, 1943), 43; The World Bank, *Statistical handbook 1996*, Table 5-3; *Eesti NSV rahvamajandus*, 1967-1987 editions, pages on crop output; *Eesti statistika aastaraamat*, 1990-1996 editions, pages on crop output; *Ostland in Zahlen*, 87; *Eesti majandus 1938*, 101; *Eesti põllumajandus 1939*, 23–24; *Eesti NSV rahvamajandus 1987. aastal* (Tallinn: Eesti NSV SKV, 1988), 143; *Statistische Berichte für das Ostland 1942 nr. 3–4*, 95; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 24; Klesment and Valge, ''Eesti rahvastiku''; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 117.*
In some cases data was available only every five years. If no correlating figures were available, missing data was linearly interpolated. An overall fodder index was created in two steps. First, a hay and grass index was created by taking an average of perennial grass hay and natural meadow hay figures. Second, a root-maize fodder index was created by adding up the yields of root crops and maize. These two indices were further aggregated into an overall fodder index.

Livestock

Lithuania

Sources: Weights: 1990 base: The World Bank, *Statistical handbook 1994*, 429; separation of wool: 1995 Economic accounts for agriculture in *Eurostat Database*.
Yields: for 1937-1940 see sources in Livestock section in Appendix C; LMA rankraščių skyrius, *F.123. B.147.*; Meškauskas and Meškauskienė, ''Lietuvos pramonė'', 2–23; Klupšas, ''Lietuvos žemės ūkis'', 789; *Сельское хозяйство Литовской ССР за 35*, 158, 162; *Сельское хозяйство Литовской ССР за 35*, 158, 162; *Tarybų Lietuvai 25 metai*, 194–195, 198; Gregorauskas, *Tarybų Lietuvos žemės ūkis*, 313, 412; Statistics Lithuania, *Statistics Lithuania*; *Сельское хозяйство Литовской ССР за 35*, 158, 162; *Tarybų Lietuvai 25 metai*, 198; *Сельское хозяйство Литовской ССР за 35*, 158, 162; *Агропромышленный комплекс Литовской ССР 1986*, 217, 225; *Lietuvos žemės ūkis 1990 m.* (Vilnius: Lietuvos statistikos departamentas, 1991), 128, 133; Statistics Lithuania, *Statistics Lithuania*; *Lietuvos žemės ūkis 1998*, 59; *Lietuvos žemės ūkis 1994 m.* (Vilnius: Lietuvos statistikos departamentas, 1995), 46; *Lietuvos TSR Liaudies ūkis; Lietuvos TSR ekonomika ir kultūra*: 1965-1980 editions, pages on animal product output;
Number of animals: *Lietuvos statistikos metraštis 1936*, 78–84; *Statistische Berichte für das Ostland nr. 9-12* (Riga, 1941), 36–37; *Statistische Berichte für das Ostland 1943 nr. 11–12*, 450–451; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 99–100; *Statistika ir ekonomija*, 8; *Lietuvos TSR Liaudies ūkis 1980 m.* (Vilnius: CSV, 1981), 93; *Агропромышленный комплекс Литовской ССР 1986*, 182; *Основные показатели*, 61; *Сельское хозяйство Литовской ССР за 35*, 139; *Lietuvos TSR Liaudies ūkis 1980*, 93;
For several meat categories figures before 1970 were only available for every five years. In those cases data was extrapolated from total meat yield, based on surrounding year ratios. 1941-1944 yields were missing, data extrapolated using yields per animal from surrounding periods multiplied by the number of animals. 1937-1939 milk yield from interwar interpolations between 1926 and 1939 Horse meat assumed 0 as in 1940 1937-1939 sheep and goat meat extrapolated from weight of animals slaughtered and exported from interwar data; For animal numbers, an average year start—year end figure was used.

Latvia

Sources: Weights: 1990 base: The World Bank, *Statistical handbook 1994*, 379; The World Bank, *Latvia – The transition*, 286.
Yields and number of animals: for 1937-1940 see sources in Livestock section in Appendix C; Vidzemes Augstskola, *Baltic 100*; *Statistische Berichte für das Ostland 1942 nr. 3–4*, 65; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 54–

55; *Statistische Berichte für das Ostland 1943 nr. 9–10*, 235; *Latvijas statistikas gadagrāmata 1939*; *Latvijas PSR statistikas tabulas 1940*; *Сельское хозяйство Латвийской ССР 1973*, 191; *Padomju Latvijas tautas saimniecība 20 gados*, 126–134, 144; *Padomju Latvijas tautas saimniecība 1968*, 193, 197–202; *Latvijas PSR Tautas saimniecība 1975*; *Latvijas PSR Tautas saimniecība 1980*, 119, 149–152; *Latvijas PSR Tautas saimniecība 1985*, 122, 128, 178–183; *Latvijas Tautas saimniecība 1990*, 68–69, 86–92, 98; Latvian State Archive (LVA), *Latvijas PSR statistikas pārvalde F.277. Apr.8.*

1941-1949 yields extrapolated from animal numbers using yields per animal from 1940, 1945 and 1950. Disaggregated meat output data for 1945 was extrapolated from total meat yield, based on 1940 and 1950 ratios. For animal numbers, an average year start—year end figure was used. Goat numbers 1941-1943 assumed to be an average of 1940-1945 and 1937-1939 assumed equal to 1940. Total bird numbers 1940-1942 extrapolated from chicken numbers, 1943 assumed to be the average of 1942 and 1945. Bee families 1943-1952 taken as averages of surrounding figures.

Estonia

Sources: Weights: The World Bank, *Estonia – The transition*, 319.

Yields and number of animals: for 1937-1940 see sources in Livestock section in Appendix C; *Ostland in Zahlen*, 90; *Eesti põllumajandus 1939*, 31, 35; *Statistischer Jahresbericht für den Generalbezirk Estland 1942*, 46–50, 52–55; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 26, 11; *Statistische Berichte für das Ostland nr. 5-7* (Riga, 1944), 126; *Statistische Berichte für das Ostland 1942 nr. 3–4*, 95; Klesment and Valge, ''Eesti rahvastiku''.

1939 meat yields extrapolated from animal numbers using yields per animal from 1938 and 1940. Same procedure for most animal products during WWII. Where yields per animal were impossible to construct, surrounding year averages were taken. Meat yields in 1946-1949 linearly interpolated. Honey produced in 1945 assumed equal to 1943. 1946-1954 data linearly interpolated. In cases of single year missing data, surrounding year averages were used. Number of poultry 1946-1948 linearly interpolated. For animal numbers, an average year start—year end figure was used.

Forestry & fishing

The procedure was uniform for all three Baltic states with forestry indices constructed from total physical amount state or total forest cut in cubic metres and fishing indices from the total output of fish in kilograms.

Sources: Weights: see Chapter 3.

Yields: for 1937-1940 see sources in Forestry and Fishing section in Appendix C; *Latvijas statistikas gadagrāmata 1939*; *Latvijas PSR statistikas tabulas 1940*;

Сельское хозяйство Латвийской ССР 1973, 191; *Padomju Latvijas tautas saimniecība 20 gados*, 126–134, 144; *Padomju Latvijas tautas saimniecība 1968*, 193, 197–202; *Latvijas PSR Tautas saimniecība 1975*; *Latvijas PSR Tautas saimniecība 1980*, 119, 149–152; *Latvijas PSR Tautas saimniecība 1985*, 122, 128, 178–183; *Latvijas Tautas saimniecība 1990*, 68–69, 86–92, 98; Klesment and Valge, ''Eesti rahvastiku''; Statistics Lithuania, *Statistics Lithuania*; *Žemės ūkio ministerijos metraštis 1918-1937*, 303; *Lietuvos statistikos metraštis 1939*, 136; *Tarybų Lietuvai 25 metai*, 112, 130; *Lietuvos TSR Liaudies ūkis 1965 m.* (Vilnius: CSV, 1966), 55; *Lietuvos TSR ekonomika ir kultūra 1970 m.* (Vilnius: CSV, 1971), 70; *Lietuvos TSR ekonomika ir kultūra 1975 m.* (Vilnius: CSV, 1976), 63, 58; *Lietuvos TSR Liaudies ūkis 1980*, 48, 50; *Lietuvos TSR Liaudies ūkis 1985 m.* (Vilnius: CSV, 1986), 36, 51; *Lietuvos statistikos metraštis 1990 m.* (Vilnius: Lietuvos statistikos departamentas, 1991), 143, 165; L. Kairiūkštis, *Lietuvos TSR miškų ūkis* (Vilnius: Mintis, 1968), 88; *Lietuvos statistikos metraštis 1998 m.* (Vilnius: Lietuvos statistikos departamentas, 1999), 368; *Lietuvos statistikos metraštis 1999 m.* (Vilnius: Lietuvos statistikos departamentas, 2000), 398, 399; *Statistische Berichte für das Ostland 1943 nr. 9–10*, 367; *Statistische Berichte für das Ostland 1943 nr. 11–12*, 466, 424; *Lietuvos TSR ekonomika ir kultūra 1972 m.* (Vilnius: CSV, 1973), 103; *Lietuvos TSR ekonomika ir kultūra 1973 m.* (Vilnius: CSV, 1974), 89; *Lietuvos statistikos metraštis 1991 m.* (Vilnius: Lietuvos statistikos departamentas, 1992), 164; *Lietuvos statistikos metraštis 1992 m.* (Vilnius: Lietuvos statistikos departamentas, 1993), 184; *Lietuvos statistikos metraštis 1996 m.* (Vilnius: Lietuvos statistikos departamentas, 1997), 273; *Lietuvos statistikos metraštis 2000 m.* (Vilnius: Lietuvos statistikos departamentas, 2001), 285; *Lietuvos statistikos metraštis 1997 m.* (Vilnius: Lietuvos statistikos departamentas, 1998), 405; *Statistikas biļetens Latvijas ģenerālapgabalam* (Riga: Latvijas Statistikas pārvalde, 1943), 179; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 62; *Ostland in Zahlen*, 90.

Lithuanian fishing output for 1976-1979 interpolated using canned fish production changes. Latvian fishing output for 1941, 1971 and 1974-1976 taken as average of the surrounding years. Estonian forestry figure for 1939 extrapolated from Latvian 1938-1939 and 1939-1940 ratios. Estonian forestry and fishing figures for 1941-1944 linearly interpolated.

Industry

Lithuania

Sources: Weights: see main text in Chapter 3 for major industrial branch weights. Minor output weights of individual products within industrial branches: Lithuanian Central State Archive (LCVA), *Data about the number of industrial enterprises, number of personnel, capital stock and production output of industrial enterprises. LSSR statistikos valdyba F. R-363. Ap.8. B.1799.*, 1–17.

Physical output and number of workers: Musteikis, *Lietuvos žemės ūkis*, 80–

Table D.1: INDUSTRIAL PRODUCT SERIES COMPILED IN THIS THESIS, 1937-1995

	Lithuania	Latvia	Estonia
Electricity	1	1	1
Petroleum	1	0	3
Other fuels	1	3	2
Metals	7	4	4
Chemical	10	8	11
Machine building & metal working (MBMW)	36	30	21
Wood & paper	14	9	10
Construction materials	15	22	8
Light industry	18	18	9
Food industry	36	25	25
Other	4	9	7
Total	143	129	101

83; *Lietuvos statistikos metraštis 1939*, 131, 136, 158–185, 204; *Lietuvos statistikos metraštis 1938*, 141, 199–212; *Žemės ūkio ministerijos metraštis 1918-1937*, 303; *Промышленность Литовской ССР: Статистический сборник*, Archival material in Statistics Lithuania library (Vilnius: Центральное статистическое управление при Совете Министров Литовской ССР, 1973), 37–39, 95–304, 330; *Основные показатели*, 2–3, 13–18; *Tarybų Lietuvos dvidešimtmetis*, 107–135, 202, 320–321; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 17–18, 108; *Statistische Berichte für das Ostland nr. 1-4* (Riga, 1943), 15–16; *Промышленность Литовской ССР: Статистический сборник*, Archival material in Statistics Lithuania library (Vilnius: Центральное статистическое управление при Совете Министров Литовской ССР, 1963), 126–244; *Промышленность Литовской ССР: Статистический сборник*, Archival material in Statistics Lithuania library (Vilnius: Статистическое управление Литовской ССР, 1959), 27–29, 69–98, 148–171; *Показатели состояния отдельных отраслей народного хозяйства и культуры Литвы за 1913, 1939 и 1940 годы*, Archival material in Statistics Lithuania library (Vilnius: Центральное статистическое управление при Совете Министров Литовской ССР, 1969), 17–19; *Сельское хозяйство Литовской ССР за 35*, 43, 205; *Statistische Berichte für das Ostland nr. 11-12* (Riga, 1944), 359; *Statistische Berichte für das Ostland 1943 nr. 9–10*, 276; *Svarbiausia Telšių rajono įmonė*, 2019; *Lietuvos TSR Liaudies ūkis 1965 m.*, 79, 130, 192, 248; *Lietuvos TSR ekonomika ir kultūra 1970 m.*, 182, 351; *Lietuvos TSR ekonomika ir kultūra 1975*, 61–65, 79, 109, 192, 280; *Lietuvos TSR Liaudies ūkis 1986 m.* (Vilnius: CSV, 1987), 79; *Lietuvos TSR Liaudies ūkis 1985*, 34–43, 51, 86, 189; *Агропромышленный комплекс Литовской ССР 1986*, 14–26, 52; *Lietuvos TSR Liaudies ūkis 1980*, 46–51, 222; *Промышленность Литовской ССР: Статистический сборник*,

vol. 1, Archival material in Statistics Lithuania library (Vilnius: Центральное статистическое управление Литовской ССР, 1982), 109–219; Orlen Lietuva, Fakelas, 14–21; *Промышленность Литовской ССР: Статистический сборник*, vol. 1, Archival material in Statistics Lithuania library (Vilnius: Центральное статистическое управление Литовской ССР, 1987), 123–252; *Промышленность Литовской ССР: Статистический сборник*, vol. 2, Archival material in Statistics Lithuania library (Vilnius: Центральное статистическое управление Литовской ССР, 1987), 29–222; *Lietuvos žemės ūkis 1990*, 8–11, 26; *Lietuvos žemės ūkis 1989*, 137; *Lietuvos statistikos metraštis 1989*, 172–180; *Lietuvos statistikos metraštis 1990*, 98, 135, 142–146; A. Grigelis and V. Kadūnas, *Lietuvos geologija* (Vilnius: Mokslo ir enciklopedijų leidykla, 1994), 290; The World Bank, *Statistical handbook 1994*, 433; *Lietuvos statistikos metraštis 1992*, 154, 160–163, 183–185; *Lietuvos statistikos metraštis 1993 m.* (Vilnius: Lietuvos statistikos departamentas, 1994), 122; *Lietuvos statistikos metraštis 1997*, 280–288; *Lietuvos žemės ūkis 1996 m.* (Vilnius: Lietuvos statistikos departamentas, 1997), 20; *Lietuvos statistikos metraštis 1998*, 272–280, 368; Meškauskas, *Lietuvos ūkis, 1940-1990*, 17; *Statistische Berichte für das Ostland nr. 1-2* (Riga, 1942), 55; *Statistische Berichte für das Ostland nr. 7-8* (Riga, 1942), 276; *Statistische Berichte für das Ostland nr. 9-10* (Riga, 1942), 364; *Statistische Berichte für das Ostland 1944 nr. 11-12*, 368; *Statistische Berichte für das Ostland 1944 nr. 5-7*, 205; Meškauskas and Meškauskienė, *Lietuvos pramonė socializmo*; *Lietuvos statistikos metraštis 1991*, 135.

In cases of gaps employment data was used if gaps are for the entire branch, interpolation if the gap only appears for a separate product and extrapolation if data for a related product is available. Oil refining for 1986-1988 extrapolated from monetary data in The World Bank, *Statistical handbook 1993: states of the former USSR (Russian)*, 8, Washington, D.C., 1993, 449 Repair of transport vehicles and construction vehicles extrapolated from respective sector (transport and construction) series. Pre-1955 meat industry disaggregation into separate products based on 1955 composition of meat total. Index of other industrial branches consists of a weighted average of combined fodder which began production in the 1950s and printing industry where movement was estimated by combining the annual number of printed pages in published books, newspapers and magazines.

Latvia

Sources: Weights: see main text in Chapter 3 for major industrial branch weights. Minor output weights of individual products (and sub-branches) within industrial branches: Steinberg, *Economies of*, 82–85, extended by The World Bank, *Latvia – The transition*, 289.

Physical output and number of workers: *Латвийская ССР в цифрах в 1961 году* (Riga: Latvijas PSR CSP, 1962), 48–49; *Советская Латвия за 25 лет* (Riga: Latvijas PSR CSP, 1965), 3, 458; *Padomju Latvijas ekonomika un*

kultūra (Riga: Latvijas PSR CSP, 1966), 50, 69, 296–297; *Padomju Latvijas tautas saimniecība 1968*, 59, 72, 92–102, 131–137; *Latvijas PSR Tautas saimniecība 1970* (Riga: Latvijas PSR CSP, 1972), 80, 94, 124–135; *Народное хозяйство Латвийской ССР в 1974 году* (Riga: Latvijas PSR CSP, 1975), 70–71, 83; *Народное хозяйство Латвийской ССР в 1979 году* (Riga: Latvijas PSR CSP, 1980), 52, 88; *Латвийская ССР в цифрах в 1968 году* (Riga: Latvijas PSR CSP, 1969), 96; *Latvijas PSR Tautas saimniecība 1975*, 101, 315, 324–325; The World Bank, *Latvia – The transition*, 227, 289–290; *Латвия за годы советской власти* (Riga: Latvijas PSR CSP, 1967); *Народное хозяйство Латвийской ССР в 1976 году* (Riga: Latvijas PSR CSP, 1977), 51; *Latvijas PSR Tautas saimniecība 1984 gada* (Riga: Latvijas PSR CSP, 1985), 65; *Latvijas Tautas saimniecība 1989 gada* (Riga: Latvijas PSR CSP, 1990), 175, 181; *Latvijas Tautas saimniecība 1990*, 68–69, 86–92, 98, 195, 201; *Latvijas statistikas gadagramata 1991 gada* (Riga: CSP, 1992), 293; The World Bank, *Latvia – The transition*, 227; Skujenieks, *Rūpniecības statistika 1938*, 21–56; *Latvijas PSR statistikas tabulas 1940*, 141–143; M. Skujenieks, *Rūpniecības statistika 1937, Otrais gads* (Riga: Valsts statistiskās pārvalde, 1939), 16, 40–47; *Latvijas statistikas gadagrāmata 1939*; *Труд в Латвийской ССР* (Riga: Latvijas PSR CSP, 1960), 16–17; *Промышленность Латвиийской ССР* (Riga: Latvijas PSR CSP, 1959), 60–67; *Padomju Latvijas tautas saimniecība 20 gados*, 60–65; *Промышленная продукция Латвиийской ССР 1940 - 1966 г.г.* (Riga: Latvijas PSR CSP, 1967), 20, 32–94, 77–78; *Padomju Latvija skaitļos* (Riga: Valsts statistikas izdevniecības Latvijas nodaļa, 1965), 64–70; *Промышленность Латвиийской ССР* (Riga: Latvijas PSR CSP, 1977), 225, 256, 379, 395–403; *Latvijas PSR Tautas saimniecība 1980*, 94–114; *Latvijas PSR Tautas saimniecība 1985*, 97–115, 180–183; *Промышленность Латвиийской ССР* (Riga: Latvijas PSR CSP, 1986); *Statistische Berichte für das Ostland*, all editions, pages on industry; *Economic Review. Latvia* (Washington, D. C: International Monetary Fund, 1992), 57–59.

Fuels index for 1980-1990 taken from World Bank *Transition* study, rest of the years extended using an average index of natural gas consumption and production of peat and peat briquettes. Natural gas production data is very sporadic and was not reported after 1960s. Gas consumption is only available since 1962. This thesis assumes that consumption was equal to production and thus natural gas index is produced by joining the pre-1962 production data and post-1962 consumption data. In cases of gaps employment data was used if gaps are for the entire branch, interpolation if the gap only appears for a separate product and extrapolation if data for a related product is available. In most cases when data was reported for every 5th year, interpolation between these years was used. In cases when product series begin or end with 0, it was assumed that previous or following years also had 0 production output. Other industries include furniture, cigarettes, musical instruments, baby strollers, boats and cutters, furnace and household iron castings.

Estonia

Sources: Weights: see main text in Chapter 3 for major industrial branch weights (only petroleum separated from other fuels using value-added data in Steinberg, *Economies of*, 66–69). Minor output weights of individual products within industrial branches: Estonian State Archives (ERA), *Data about the number of industrial enterprises, number of personnel, capital stock and production output of industrial enterprises R-1969. 1. 9934.*
Physical output and number of workers: *Eesti majandus 1938*, 111; *Statistische Berichte für das Ostland 1944 nr. 1-4*, 17–18; *Statistische Berichte für das Ostland 1943 nr. 1–4*, 15–16; *Statistischer Jahresbericht für den Generalbezirk Estland 1942*, 60–72; *Достижения советской Эстонии за 20*, 101; Klesment and Valge, ''Eesti rahvastiku'', 74–91, 100–111; *Eesti NSV rahvamajandus 1968. aastal* (Tallinn: Eesti NSV SKV, 1969), 235–236; *Eesti NSV rahvamajandus 1971. aastal* (Tallinn: Eesti NSV SKV, 1972), 110–111, 113, 341; *Eesti NSV rahvamajandus 1970. aastal* (Tallinn: Eesti NSV SKV, 1971), 114, 334; *Eesti NSV rahvamajandus 1972. aastal* (Tallinn: Eesti NSV SKV, 1973), 95; *Eesti NSV rahvamajandus 1974. aastal* (Tallinn: Eesti NSV SKV, 1975), 98–101, 103–105, 349–350; *Eesti NSV rahvamajandus 1975. aastal* (Tallinn: Eesti NSV SKV, 1976), 98, 347; *Eesti NSV rahvamajandus 1980. aastal* (Tallinn: Eesti NSV SKV, 1981), 93–95, 97, 322–323; *Eesti NSV rahvamajandus 1985. aastal* (Tallinn: Eesti NSV SKV, 1986), 58–59, 61, 65, 264–265; *Eesti NSV rahvamajandus 1989. aastal* (Tallinn: Eesti NSV SKV, 1990), 66–70; *Statistika aastaraamat 1996* (Tallinn: Eesti Statistikaamet, 1997), 101, 201–203; *Eesti statistika aastaraamat 1994* (Tallinn: Eesti Statistikaamet, 1995), 100, 178–181; *Statistika aastaraamat 1993* (Tallinn: Eesti Statistikaamet, 1993), 107, 178–181; *Statistika aastaraamat 1991* (Tallinn: Eesti Statistikaamet, 1992), 104–109; *Eesti statistika aastaraamat 1990* (Tallinn: Eesti Statistikaamet, 1991), 177–178, 184, 375–376; *Eesti NSV rahvamajandus 1988. aastal* (Tallinn: Eesti NSV SKV, 1989), 100, 106, 332–333; *Eesti NSV rahvamajandus 1969. aastal* (Tallinn: Eesti NSV SKV, 1970), 89–90, 92, 94–95; *Eesti NSV rahvamajandus 1984. aastal* (Tallinn: Eesti NSV SKV, 1985), 58–59; *Eesti NSV rahvamajandus* (Tallinn: Eesti NSV SKV, 1957), 50; (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 117.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 244.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 240.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 238.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 243.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 242.*
In cases of gaps employment data was used if gaps are for the entire branch, interpolation if the gap only appears for a separate product and extrapolation if data for a related product is available. In most cases when data was reported for every 5th year, interpolation between these years was used. Such procedure was applied to all furniture products for 1945-1965, sewn products for 1945-1960 In cases when product series begin or end with 0, it was assumed that previous or following years also had 0 production output. Other indus-

tries include combined fodder, printing industry, musical instruments and skis. Printing industry movement was estimated by combining the annual number of printed pages in published books, newspapers and magazines. Other industry total taken as average of the combined fodder, printing and musical instruments/skis indices.

Construction

For all three Baltic countries this thesis constructs an average index of inputs into construction from other branches of the economy weighted by the 1987 input weights from the World Bank input-output study.[1] Indices of other branches are estimated in the preceding and subsequent sections of this Chapter.

Transport & communications

Sources: Major weights (all three countries), freight, passenger transport and communications: Steinberg, *Economies of*, 66–69, 82–85, 86–89. Minor weights for communication from Klimantas and Zirgulis, ''A new estimate'', 265, disaggregated by data from *Susisiekimo ministerijos 1937 metų*, 348.[2]
Output data:
Lithuania: *Lietuvos statistikos metraštis 1990*, 31–38, 48, 58, 67–68, 188, 191–193; *Lietuvos TSR Liaudies ūkis 1985*, 93–100, 149–150; *Lietuvos TSR Liaudies ūkis 1980*, 115–123, 173–174; *Lietuvos TSR Liaudies ūkis 1978 m.* (Vilnius: CSV, 1979), 133; *Lietuvos TSR ekonomika ir kultūra 1975*, 156–164, 220; *Lietuvos TSR ekonomika ir kultūra 1977 m.* (Vilnius: CSV, 1978), 132, 140; *Lietuvos TSR ekonomika ir kultūra 1970 m.*, 216–227, 252, 277; *Lietuvos TSR Liaudies ūkis 1965 m.*, 143–150; *Lietuvos TSR ekonomika ir kultūra 1966 m.* (Vilnius: CSV, 1967), 186–193; *Lietuvos TSR ekonomika ir kultūra 1967 m.* (Vilnius: CSV, 1968), 186; *Lietuvos TSR ekonomika ir kultūra 1968 m.* (Vilnius: CSV, 1969), 202–210; *Tarybų Lietuvai 25 metai*, 111–118, 135; *Tarybų Lietuvos dvidešimtmetis*, 235–245, 282–283; *Lietuvos TSR ekonomika ir kultūra 1963 m.* (Vilnius: CSV, 1964), 139–147; *Основные показатели*, 22, 26–30, 78–79; *Lietuvos statistikos metraštis 1939*, 351–352, 370, 373–374; *Statistikos biuletenis 1940 no. 9 (202)*, 161; *Lietuvos statistikos metraštis 1992*, 38, 48; *Lietuvos TSR ekonomika ir kultūra 1973*, 322; *Lietuvos TSR ekonomika ir kultūra 1974 m.* (Vilnius: CSV, 1975), 302–303; *Lietuvos TSR Liaudies ūkis 1982 m.* (Vilnius: CSV, 1983), 105; *Lietuvos TSR Liaudies ūkis 1981*

[1] Steinberg, *Economies of*, 66–69, 82–85, 86–89

[2] Telephone, telegraph and radio services figure from Klimantas and Zirgulis disaggregated into telephone and radio services. Subsequently, telegraph services are added to the postal services value-added figure from Klimantas and Zirgulis to arrive at value-added weights for three branches of communications: Postal and telegraph services, Telephone services and Radio and TV broadcasting.

m. (Vilnius: CSV, 1982), 118; *Lietuvos TSR ekonomika ir kultūra 1972*, 250; *Lietuvos TSR liaudies ūkis per 40 metų*, 135; *Lietuvos statistikos metraštis 1938*, 352; *Susisiekimo ministerijos 1937 metų*, 69, 72; *Lietuvos statistikos metraštis 1937*, 370; *Показатели состояния отдельных отраслей народного хозяйства и культуры Литвы за 1913, 1939 и 1940 годы*, 22; *Lietuvos statistikos metraštis 1993*, 385; *Lietuvos statistikos metraštis 1996*, 494; *Lietuvos statistikos metraštis 1989*, 67–68; *Lietuvos statistikos metraštis 1991*, 33;

Latvia: Russian State Archive of Economy (РГАЭ), *Статистические динамические ряды за 1913-1951 годы Ф.1562, Оп.41, Д.65.*, 279; *Народное хозяйство СССР* years 1965-1990, pages on transport and communications; *Latvijas PSR Tautas saimniecība* (Riga: Latvijas PSR CSP, 1957), 136, 137, 139, 140; *Latvijas PSR tautas saimniecības attīstība* (Riga: Latvijas PSR CSP, 1962), 202, 204; *Советская Латвия за 25 лет*, 149, 151, 153; *Latvijas PSR statistikas tabulas 1940*, 152; *Латвийская ССР в цифрах в 1961*, 126; The World Bank, *Statistical handbook 1995: states of the former USSR (English)*, 19, Washington, D.C., 1995, pages on Latvia; The World Bank, *Statistical handbook 1996*, pages on Latvia; *Труд в Латвийской ССР*, 16–17; *Padomju Latvijas tautas saimniecība 20 gados*, 165–174; *Padomju Latvijas tautas saimniecība 1968*, 257–272; *Народное хозяйство Латвийской ССР в 1976*, 315, 324–325; *Latvijas PSR Tautas saimniecība 1980*, 177–189; *Latvijas PSR Tautas saimniecība 1985*, 184–185, 186–199; *Latvijas Tautas saimniecība 1990*, 68–69, 282–287; *Padomju Latvijas ekonomika un kultūra*, 296–297; *Latvijas PSR Tautas saimniecība 1975*, 315, 324–325;

Estonia: *Народное хозяйство СССР* years 1965-1990, pages on transport and communications; Klesment and Valge, ''Eesti rahvastiku''; (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 240.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 214.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 269.*; *Statistika aastaraamat 1996*, 102–103, 222–225; *Eesti statistika aastaraamat 1990*, 223; *Eesti statistika aastaraamat 1994*, 207–212; *Statistika aastaraamat 1992* (Tallinn: Eesti Statistikaamet, 1993), 129; *Statistika aastaraamat 1993*, 108; *Eesti NSV rahvamajandus 1985*, 125; *Eesti NSV rahvamajandus 1980*, 163; *Eesti Statistika kuukiri 219 (2) 1940-02* (Tallinn: RSK, 1940), 96; *Eesti riigiraudteede tegevus 1936/37* (Tallinn: RSK, 1937), 27; *Eesti riigiraudteede tegevus 1937/38* (Tallinn: RSK, 1938), 27; *Eesti riigiraudteede veiklus 1938/39* (Tallinn: RSK, 1939), 27; *Statistische Berichte für den Generalbezirk Estland 1942 3-4* (Tallinn: Eesti Statistika Valitsus, 1942), 64; *Достижения советской Эстонии за 20*, 71; *Eesti majandus 1938*, 123;

It is assumed that *transport and communications in production sphere* corresponds to freight, *transport in non-production sphere* corresponds to passenger transport and *communications in non-production sphere* corresponds to overall communications subsector. Since there is not enough data to disaggregate freight and passenger transport into separate branches such as railways, land transportation, water transportation and air transportation, total ton-km and passenger-km covered by all means of transport. Minor weights for communication services are taken from 1937 Lithuania's data and applied for all

three countries (since there is no later figures or any data for Latvia and Estonia). Communications indices are compiled as weighted indices comprising postal and telegraph services, telephone services, and radio and television services. The postal and telegraph services indices include data on total items sent, including letters, newspapers and magazines, parcels, money transfers and pension payments, and telegrams. The telephone services indices are based on the number of long-distance telephone calls. The radio and television services indices uses the total number of radio and TV sets or broadcasting points. Where gaps in the data exist, they are filled based on volumes transported or the number of workers in the respective sectors. Since almost there is almost no data on transport and communications during the Nazi occupation period between 1941 and 1944, it is assumed that the sector moved in line with the rest of the economy. Missing 1937-1939 figures extended using value-added indices compiled in Appendix C. In cases where total ton-km or pass-km data was incomplete, indices were extended either by summing the respective numbers of separate transport branches or by extrapolating the numbers from volumes in tons or passenger numbers. In cases where data on communications was reported in per capita terms, figures were multiplied by total population data in Table F.1. There were several periods with up to 4 year gaps which were filled by interpolation. If there was no data for certain communications series, employment in communications was used. To cover 1990s data for Lithuania, an average index of radio and TV broadcasting time was used. 1990s Latvia all transport and communications data extrapolated from total employment in the sector. In cases of small gaps in pre-1945 data, figures assumed to be the same as in the closest year if there is no correlated data to extrapolate from and interpolation is not possible either.

Trade

For commentary on validity of using Soviet trade activity indices at *comparable prices*, see Chapter 3 in the main text.

Lithuania

Sources: Weights: see main text in Chapter 3.
Soviet trade activity indices at *comparable prices* and employment data: Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.175.*; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.300.*; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.320.*; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.342.*; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.366.*; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363.*

Ap.1. B.175.; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.71.*; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.1094.*; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.1094.*; *Lietuvos TSR ekonomika ir kultūra 1975*, 190–192, 215; *Lietuvos TSR Liaudies ūkis 1980*, 169, 179; *Lietuvos TSR liaudies ūkis per 40 metų*, 192, 195; The World Bank, *Lithuania – The transition*, 312–313, 372; *Lietuvos TSR ekonomika ir kultūra 1970 m.*, 251–253, 291, 307; *Tarybų Lietuvai 25 metai*, 134–136, 149–154; *Lietuvos TSR Liaudies ūkis 1965 m.*, 172–174, 190–195; *Tarybų Lietuvos dvidešimtmetis*, 250–257, 281–283; *Statistische Berichte für das Ostland 1944 nr. 5-7*, 214–215; *Statistische Berichte für das Ostland 1944 nr. 11-12*, 373; *Lietuvos statistikos metraštis 1991*, 32–33; *Основные показатели*, 78–79; *Lietuvos statistikos metraštis 1996*, 95; *Lietuvos statistikos metraštis 1992*, 35.

Soviet trade activity indices at *comparable prices* were incomplete or had cut-offs with new indices starting with another base year. This thesis joins the existing indices and extends them where data is missing using inter-war trade indices from Appendix C and employment data for filling gaps and extrapolating trade movement in post-1990 period.

Latvia

Sources: Weights: see main text in Chapter 3.

Soviet trade activity indices at *comparable prices* and employment data: *Советская торговля: Статистический сборник* (Moscow: Центральное статистическое управление при Совете Министров СССР, 1964); *Торговля СССР: Статистический сборник* (Moscow: Государственный комитет СССР по статистике, Информационно-издательский центр, 1989); The World Bank, *Statistical handbook 1995*, pages on Latvia; The World Bank, *Statistical handbook 1996*, pages on Latvia; *Latvijas PSR Tautas saimniecība 1984*, 233–235; *Latvijas PSR Tautas saimniecība 1977 gada* (Riga: Latvijas PSR CSP, 1978), 213; *Latvijas PSR Tautas saimniecība 1980*, 215, 270, 284–285; *Statistische Berichte für das Ostland 1943 nr. 9–10*, 248; *Statistische Berichte für das Ostland 1944 nr. 5-7*, 177; *Statistische Berichte für das Ostland 1943 nr. 11–12*, 431; *Padomju Latvijas tautas saimniecība 1968*, 362, 363–372, 378–380; *Latvijas PSR Tautas saimniecība 1957*, 152; *Padomju Latvijas tautas saimniecība 20 gados*, 203–226; *Padomju Latvija skaitļos 1965*, 258–263; *Latvijas PSR Tautas saimniecība 1975*, 315, 324–325; *Latvijas PSR Tautas saimniecība 1985*, 278–281, 294–295; *Latvijas Tautas saimniecība 1990*, 68–69, 86–92, 98; *Труд в Латвийской ССР*, 16–17; *Padomju Latvijas ekonomika un kultūra*, 296–297.

Soviet trade activity indices at *comparable prices* were incomplete or had cut-offs with new indices starting with another base year. This thesis joins the existing indices and extends them where data is missing using inter-war trade indices from Appendix C and employment data for filling gaps and extrapolating trade movement in post-1990 period.

Estonia

Sources: Weights: see main text in Chapter 3.
Soviet trade activity indices at *comparable prices* and employment data: (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 269.*; Estonian State Archives (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 251.*; *Statistischer Jahresbericht für den Generalbezirk Estland 1942*; *Eesti NSV rahvamajandus 1980*, 249–250; *Eesti NSV rahvamajandus 1985*, 203; *Eesti NSV rahvamajandus 1970*, 249; *Достижения советской Эстонии за 20*, 82; Государственный комитет по статистике, *Народное хозяйство СССР в 1990 г. Статистический ежегодник* (Moscow: Финансы и статистика, 1991), 117–118; *Statistische Berichte für den Generalbezirk Estland 1943 14-15* (Tallinn: Eesti Statistika Valitsus, 1943), 215–222; *Statistische Berichte für den Generalbezirk Estland 1943 13* (Tallinn: Eesti Statistika Valitsus, 1943), 160–166; *Statistische Berichte für den Generalbezirk Estland 1942 9-10* (Tallinn: Eesti Statistika Valitsus, 1942), 258–259; *Statistika aastaraamat 1993*, 245; *Statistika aastaraamat 1996*, 245; *Statistika aastaraamat 1995* (Tallinn: Eesti Statistikaamet, 1996), 260.
Soviet trade activity indices at *comparable prices* were incomplete or had cut-offs with new indices starting with another base year. This thesis joins the existing indices and extends them where data is missing using inter-war trade indices from Appendix C for 1937-1939, deflated trade sales for post-1990 period and employment data for filling gaps.

Financial, insurance, housing, education, cultural, health, science and other service activities

For all three Baltic economies, movement in financial, insurance, housing, education, cultural, health, science and other service sectors are approximated by constructing employment indices and, in case of financial and insurance services, adjusted for productivity. The approach is based on the CIA methods and is the only possible option since the usual methods in the FIRE sector involve monetary data. For CIA approach, see Maddison, ''Measuring the Performance'', 319 and Joint Economic Committee, *USSR: Measures*, 49.

For all three countries, in cases where employment data does not extend into the 1937-1939 period, this thesis uses sectoral volume indices from inter-war datasets to account for the change in 1937-1940.

Lithuania

Sources: Weights: see main text in Chapter 3.
Employment data, including trade and public administration: *Statistische Berichte für das Ostland*, all editions, pages on employment; *Lietuvos statistikos metraštis 1992*, 35, 36, 38, 40; *Lietuvos statistikos metraštis 1993*, 207; The World

Bank, *Statistical handbook 1993*, 411; The World Bank, *Statistical handbook 1994*, 401; The World Bank, *Statistical handbook 1996*, Table 1-2; *Lietuvos statistikos metraštis 1996*, 95, 96; *Lietuvos statistikos metraštis 1990*, 30–31, 72; *Lietuvos statistikos metraštis 1991*, 32–33; *Lietuvos TSR ekonomika ir kultūra 1975*, 190–192; *Lietuvos TSR ekonomika ir kultūra 1970 m.*, 251–253; *Tarybų Lietuvai 25 metai*, 134–136; *Lietuvos TSR Liaudies ūkis 1965 m.*, 172–174; *Tarybų Lietuvos dvidešimtmetis*, 281–283; *Основные показатели*, 78–79; The World Bank, *Lithuania – The transition*, 313; (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.175.*, 55, 145, 212; (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.300.*, 34; (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.320.*, 34; (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.342.*, 33, 76; (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.366.*, 29, 49; (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.71.*, 3, 7, 3–37; (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.1094.*, 21, 30, 37; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.2711.*, 10; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.167.*, 6, 24; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.1. B.328.*, 1; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.44.*, 2–5; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.84.*, 43; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.61.*, 15–16; Lithuanian Central State Archive (LCVA), *LSSR statistikos valdyba F. R-363. Ap.10. B.66.*, 39–41; Meškauskas, *Lietuvos ūkis, 1940-1990*, 17; *Промышленность Литовской ССР: Статистический сборник*, 37–39, 101, 113, 129, 154, 183, 210, 230–231, 257, 304, 330.

Productivity adjustment for financial and insurance service series trade index compiled above and trade employment data. 1937-1939 movement from respective sectoral interwar series constructed in Appendix C. Scientific activities index assumed to have moved together with education sector from interwar series in 1937-1939 and with education sector index for 1993-1995. Other services movement in 1992-1995 assumed to have changed together with the entire workforce totals. In cases where multiple sources were used to compile employment indices and their reported end points do not match with starting points in series from another source, these indices were linked to an index originally created from 1990 data. In cases where available data was missing altogether, interpolation was used. More significant gaps include 1981-1984 for housing and public administration and 1971-1979 for other services. Other small gaps are up to two missing years. For the 1940-1949 period there were cases where employment data was available for several scattered months rather than an early average. In such cases, an average number of the beginning of the year data and end of the year data was taken.

Latvia

Sources: Weights: see main text in Chapter 3.
Employment data, including trade and public administration: Norkus et al., *Number of Medical Staff (N) in Latvia*; *Капитальное строительство СССР: Статистический сборник* (Moscow: Госкомстат СССР, 1988), 156–157; The World Bank, *Statistical handbook 1995*; The World Bank, *Statistical handbook 1996*; *Latvijas PSR Tautas saimniecība 1957*, 144, 193, 195–197, 207; *Latvijas PSR saimniecības attīstība 1962*, 230–231; *Труд в Латвийской ССР*, 16–17; *Padomju Latvijas ekonomika un kultūra*, 296–297; *Latvijas PSR Tautas saimniecība 1975*, 315, 324–325; *Latvijas Tautas saimniecība 1990*, 68–69, 124–125, 130, 136, 140–147, 183; *Economic Review. Latvia*, 57–59; *Латвийская ССР в цифрах в 1961*, 139, 183–184; *Советская Латвия за 25 лет*, 239; *Padomju Latvijas tautas saimniecība 20 gados*, 242, 255, 261, 269–270; *Padomju Latvijas tautas saimniecība 1968*, 412, 425, 432, 437–441; *Latvijas PSR Tautas saimniecība 1980*, 46, 304–306, 323, 332–339; *Latvijas PSR Tautas saimniecība 1985*, 49, 307–309, 323, 330–336.
Productivity adjustment for financial and insurance service series trade index compiled above and trade employment data. 1937-1939 movement from respective sectoral interwar series constructed in Appendix C, unless employment data was available. Scientific activities index assumed to have moved together with education sector index for 1990-1995. In cases where multiple sources were used to compile employment indices and their reported end points do not match with starting points in series from another source, these indices were linked to an index originally created from 1990 data. In cases where available data was missing altogether, interpolation was used. More significant gaps include 1941-1944 for banking and insurance, housing, education and other sectors; 1941-1944 and 1946-1949 for health science sectors; 1941-1944, 1946-1949 and 1951-1954 for public administration. Other small gaps are up to two missing years.

Estonia

Sources: Weights: see main text in Chapter 3.
Employment data, including trade and public administration:

Eesti NSV rahvamajandus 1970, 237; *Eesti NSV rahvamajandus 1967. aastal* (Tallinn: Eesti NSV SKV, 1968), 179; *Statistika aastaraamat 1998* (Tallinn: Eesti Statistikaamet, 1999), 183; *Statistischer Jahresbericht für den Generalbezirk Estland 1942*, 116; The World Bank, *Estonia – The transition*, 265; *Statistika aastaraamat 1992*, 72; *Eesti statistika aastaraamat 1994*, 141; The World Bank, *Statistical handbook 1992: states of the former USSR*, 3, Washington, D.C., 1992, Table 1-1; *Капитальное строительство СССР*, 156–157; *Ostland in Zahlen*, 112; The World Bank, *Statistical handbook 1993*, 171; (ERA), *Eesti NSV Statistikavalitsus R-10. 43. 269.*; U. Kask, *Haridus Eestis: Statistikateatmik* (Tallinn: Eesti Vabariigi Riiklik Statistikaamet, 1990); Klesment and Valge,

''Eesti rahvastiku''; *Eesti NSV rahvamajandus 1957*; *Eesti NSV rahvamajandus 1969*; *Eesti NSV rahvamajandus 1971*; *Eesti NSV rahvamajandus 1974*; *Eesti NSV rahvamajandus 1980*; *Eesti NSV rahvamajandus 1985*; *Eesti NSV rahvamajandus 1988*; *Eesti statistika aastaraamat 1990*.
Productivity adjustment for financial and insurance service series trade index compiled above and trade employment data. 1937-1939 movement from respective sectoral interwar series constructed in Appendix C, unless employment data was available. Scientific activities index assumed to have moved together with education sector in 1937-1939 and 1991-1995. In cases where multiple sources were used to compile employment indices and their reported end points do not match with starting points in series from another source, these indices were linked to an index originally created from 1990 data. In cases where available data was missing altogether, interpolation was used. More significant gaps include 1941-1944 (finance and insurance, science, government administration and other services), 1946-1949 (finance and insurance, housing, science, government administration and other services), 1951-1954 (government administration), 1961-1964 (finance and insurance, government administration). Other small gaps are up to two missing years.

Public administration and defence

This thesis assumes that the size of Red Army contingents in the Baltic states grew and shrank together with the entire government apparatus. The joint index of public administration and defence is estimated by adding up the employment in the public administration and defence sectors in 1940 and 1990 and extrapolating the rest of the 1941-1989 years from public administration employment index. The indices were extended to 1937-1939 using Value-added indices for respective sectors from inter-war data (Appendix C). Procedures for calculating the 1940 and 1990 totals as well as employment figures for 1991-1995 are presented in Table D.2.

Sources: Weights: see main text in Chapter 3.
Number of employees in public administration between 1940 and 1990: sources in section above. Rest of the data (employment and number of soldiers) used to compile the data in Table D.2: *Visuotinė Lietuvių Enciklopedija: Vol 12 - Lietuva* (Vilnius: Mokslo ir enciklopedijų leidybos institutas, 2007), 207–208; Misiunas and Taagepera, *The Baltic states*, 15–16; Anušauskas, *Lietuva 1940-1990*, 551; V. Bērziņš and A. Bambals, *Latvijas armija* (Vilnius: Zinātne, 1991), 93; J. Pärn, *Nõukogude Liidu relvajõud Eestis 1944–1995*, 2024; J. Haud et al., *Eesti okupatsioonikahjud ja inimkaotused* (Tallinn: Valge Raamat, 2018), 74; L. E. Kauppila, ''The Baltic Puzzle: Russia's Policy towards Estonia and Latvia 1992 - 1997'' (master's thesis, University of Helsinki, January 1999), 47; E. Barkāns, *Padomju okupantu karapūļi: Latvija kā PSRS karabāze*, 2013;

Statistika aastaraamat 1998, 183; The World Bank, *Statistical handbook 1995*; The World Bank, *Statistical handbook 1996*, pages on Lithuania and Latvia; The World Bank, *Statistical handbook 1993*, 411; The World Bank, *Statistical handbook 1994*, 401; LR KAM and Generolo Jono Žemaičio Lietuvos Karo Akademija, *Rusijos kariuomenės išvedimas iš Lietuvos dokumentuose* (Vilnius: Generolo Jono Žemaičio Lietuvos Karo Akademija, 2005), 7–13, 355; A. Anušauskas and A. Bumblauskas, *Lietuvos vidaus reikalų istorija* (Vilnius: Vidaus reikalų ministerija, 2008), 273–291; *Estonia, 1940-1945: Reports of the Estonian International Commission for the Investigation of Crimes Against Humanity* (Tallinn: Estonian Foundation for the Investigation of Crimes Against Humanity, 2006), 119.

Table D.2: CALCULATIONS OF PUBLIC AND DEFENCE EMPLOYMENT, 1940-1995

	Public adm., official	Soviet garrison	Lithuanian garrison	Lithuanian police	Public adm. & Defence (w.o. Soviet garrison)	Public adm. Total	Defence Total
Lithuania	A	B	C	D	E		
1940	14.4	20.0	22.3	7.5		14.4	49.8
1990	24.6	34.5			28.0	24.6	37.9
1991	39.1	29.6[a]			33.0	39.1	23.4
1992	30.3	24.6			50.0	30.3	44.3
1993		7.3			57.0	*34.5*[b]	*29.8*
1994		0.0			60.0	*36.3*[b]	23.7
1995		0.0			68.0	*41.2*[b]	26.8
Latvia							
1940	13.1	30.0	29.6			13.1	59.6
1990	17.0	80.0			21.0	17.0	84.0
1991		60.3[a]			24.0	*19.4*[b]	64.9
1992		40.7[a]			37.0	*30.0*[b]	47.7
1993		21.0			44.0	*35.6*[b]	29.4
1994		7.5			50.0	*40.5*[b]	17.0
1995		0.0			56.0	*45.3*[b]	10.7
Estonia							
1940	8.0	25.0	16.0	2.2		8.0	43.2
1990	17.1	41.7			31.5	17.1	56.1
1991	13.0	35.0			31.2	13.0	53.2
1992		20.8[a]			32.4	*13.5*[b]	39.7
1993		6.5			34.9	*14.5*[b]	26.9
1994		1.5			36.4	*15.1*[b]	22.8
1995		0.0			35.7	*14.8*[b]	20.9

Sources: see source section above.
Notes: column A represents officially reported employment in Public administration figures which do not include Defence figures. These figures are the basis for extrapolating the rest of the 1941-1989 period from 1990 base; in column B, Soviet garrison only includes permanently stationed soldiers, excluding additional occupation force which entered the Baltic states in mid-1940 since there is no data about whether it stayed in the country. Column C excludes any 1990-1995 data since it was not reported separately and is included in column E totals. Since the size of Latvian police contingent in 1940 is unknown, this thesis assumes that Latvian total garrison in column C includes police numbers too. Since independence, Public administration and Defence employment was reported together, although excluding the still existing Soviet garrisons. This data is presented in column E
[a]interpolated figures.
Calculation procedures of the Public administration totals: 1940 and 1990-1995 figures are equal to figures in column A, except where denoted by [b], where figures are extrapolated from column E.
Calculation procedures of the Defence totals (mid-year figures taken as averages of year start and year end):
1940: sum of the data in columns B, C and D.
1990-1995: columns B plus E minus Public administration Total

Table D.3: VALUE-ADDED INDICES IN LITHUANIA, 1937-1995, 1990=100

	Agr.	Ind.	Const.	T&C	Trade	F&I	Hous.	E&C	He.	Sc.	Publ.	Def.	Oth.	GVA/ GDP
1937	46.8	3.7	4.4	3.3	4.1	11.3	14.4	9.0	5.3	1.1	49.3	76.9	3.2	17.0
1938	46.9	4.2	4.3	3.7	4.3	9.8	14.4	10.5	5.4	1.3	50.3	73.7	3.2	17.2
1939	48.9	4.3	4.3	2.3	3.9	13.4	13.6	10.5	8.8	1.3	50.2	66.8	3.2	17.5
1940	44.2	5.3	5.2	2.8	4.0	10.7	15.8	10.9	8.3	1.4	58.6	131.3	3.8	19.0
1941	39.7	3.7	4.8	*3.8*[b]	2.7	6.2	14.2	12.0	7.6	1.0	48.6	120.8	2.9	16.8
1942	34.1	2.7	3.2	*3.0*[b]	2.2	4.2	12.5	10.7	7.0	0.7	38.6	110.3	2.0	14.4
1943	29.4	2.4	2.5	*4.0*[b]	2.0	2.2	10.9	8.3	6.4	0.3	28.6	99.8	1.1	12.5
1944	25.2	0.6	0.7	*2.2*[b]	0.8	0.3	9.2	5.9	5.7	0.0	18.6	89.4	0.2	10.0
1945	27.8	1.5	2.3	2.5	1.1	2.7	10.9	9.7	6.4	1.6	78.9	78.9	2.6	11.8
1946	30.9	2.7	3.3	2.4	2.3	4.0	15.4	12.6	7.6	2.1	89.7	89.7	2.7	14.0
1947	37.2	4.0	4.6	4.1	2.8	4.2	18.2	16.5	10.9	2.7	105.7	105.7	3.0	17.1
1948	38.7	5.6	6.9	5.5	3.2	4.7	17.1	18.8	12.9	4.1	111.9	111.9	4.5	18.7
1949	42.6	7.3	9.0	6.9	3.6	4.9	17.1	20.8	14.6	5.6	101.0	101.0	5.0	20.1
1950	41.1	9.1	10.8	8.4	3.9	5.9	18.4	22.3	16.7	7.1	113.5	113.5	5.0	21.3
1951	37.2	11.0	13.0	9.6	4.4	7.1	17.4	28.5	19.0	8.4	119.4	119.4	5.0	21.9
1952	34.1	12.9	15.9	10.7	4.9	8.3	16.5	34.6	21.4	9.7	125.3	125.3	4.9	22.8
1953	34.8	15.7	19.8	11.8	5.8	10.2	15.6	40.8	23.7	11.0	131.3	131.3	4.9	24.9
1954	37.4	17.6	20.9	13.2	6.7	10.1	19.1	35.8	24.9	10.1	102.8	102.8	6.6	25.1
1955	35.2	21.3	24.5	14.5	7.6	9.8	22.6	30.8	26.1	9.2	74.4	74.4	8.3	24.9
1956	40.8	23.2	22.3	15.6	8.6	11.4	23.6	33.4	29.3	11.4	74.9	74.9	8.8	27.0
1957	46.3	27.1	24.9	19.4	10.4	13.2	25.3	34.1	31.4	14.1	74.2	74.2	9.2	30.2
1958	48.6	29.8	28.6	21.3	11.8	13.8	27.0	34.8	33.4	16.7	73.6	73.6	9.6	32.2
1959	52.7	33.0	32.6	23.1	13.4	13.7	29.1	35.4	35.7	20.6	78.5	78.5	12.4	35.2
1960	55.9	34.7	35.2	26.0	15.2	13.0	29.8	36.7	38.7	26.8	69.9	69.9	15.5	37.0
1961	52.0	38.7	38.4	29.4	16.0	13.6	32.0	39.0	41.3	32.8	69.9	69.9	16.1	38.3
1962	50.8	38.0	36.5	33.6	17.0	12.9	35.4	41.6	43.4	36.5	71.6	71.6	17.5	38.5
1963	53.7	43.2	39.0	36.2	18.0	13.3	37.4	43.2	45.1	43.3	72.0	72.0	17.6	41.5
1964	59.3	46.5	42.9	39.2	19.4	13.8	40.2	45.1	46.8	47.5	75.6	75.6	18.4	44.9
1965	63.5	49.2	46.7	42.7	22.0	15.3	42.1	48.4	48.6	50.2	83.8	83.8	19.7	48.2
1966	69.8	53.8	49.9	45.6	25.1	16.8	46.3	48.8	50.5	56.2	87.8	87.8	22.8	52.3
1967	77.4	58.5	55.4	48.3	28.8	18.4	50.4	52.1	51.6	56.4	92.7	92.7	26.6	57.1
1968	77.2	62.5	58.1	51.8	32.4	20.0	54.5	54.2	54.7	60.3	99.6	99.6	29.4	59.9
1969	79.4	68.1	62.8	55.5	35.0	21.5	56.3	56.9	56.8	63.1	103.7	103.7	33.3	63.5
1970	81.7	72.3	65.9	60.0	38.3	23.6	60.0	60.2	58.9	65.6	108.2	108.2	36.3	66.8
1971	82.1	76.9	70.6	62.2	41.5	25.2	63.3	61.0	61.2	74.4	110.2	110.2	41.0	69.7
1972	85.1	79.6	74.4	66.3	44.4	27.1	66.3	62.8	63.4	82.7	114.3	114.3	45.7	72.8
1973	85.7	83.8	77.9	70.1	46.8	28.6	71.1	64.4	65.4	88.5	116.7	116.7	50.3	75.6
1974	84.5	86.7	78.7	72.4	49.2	30.8	74.3	66.5	67.7	92.6	120.0	120.0	55.0	77.4
1975	88.3	90.4	82.5	75.8	53.0	33.2	77.7	69.3	69.8	100.9	124.0	124.0	59.7	81.1
1976	90.2	91.1	84.5	79.9	56.0	35.6	79.3	74.1	72.8	100.0	133.8	133.8	69.1	83.5
1977	89.9	92.9	87.6	82.7	58.6	38.9	83.1	76.0	74.9	102.5	137.9	137.9	73.8	85.4
1978	94.1	93.7	88.4	84.7	61.6	42.3	88.0	79.1	78.1	106.8	134.6	134.6	78.5	87.8
1979	88.3	91.1	85.7	85.5	65.1	47.7	91.5	80.5	81.7	108.6	135.1	135.1	83.2	86.7
1980	77.0	92.1	87.6	87.3	68.8	53.6	95.0	81.9	85.3	110.5	135.6	135.6	87.9	85.8
1981	81.9	96.0	91.3	88.4	71.9	55.6	97.2	83.8	88.1	112.2	138.2	138.2	88.8	89.3
1982	82.5	98.2	94.3	91.2	69.5	54.9	99.5	85.5	90.6	112.5	140.8	140.8	90.2	90.5
1983	86.7	100.8	98.6	92.4	71.1	55.7	101.8	87.3	92.6	109.9	143.4	143.4	91.1	93.2
1984	97.5	106.2	102.1	95.3	75.0	59.5	104.1	88.9	93.9	111.4	146.0	146.0	92.5	98.5
1985	95.8	107.8	104.2	98.3	78.1	61.1	106.3	90.9	95.7	111.4	148.6	148.6	92.9	99.7
1986	100.3	108.0	104.7	100.6	78.9	59.6	109.3	93.0	99.0	112.0	142.8	142.8	109.9	101.4
1987	98.8	108.4	106.3	104.0	79.7	57.7	113.8	96.5	101.7	111.1	122.1	122.1	111.0	101.3
1988	103.0	109.8	108.0	109.5	88.3	68.0	108.0	101.3	102.5	107.3	117.3	117.3	108.2	103.9
1989	104.9	109.1	107.7	107.9	96.9	77.9	106.7	102.7	104.0	107.0	106.3	106.3	107.7	105.0
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	92.8	92.0	91.7	92.6	123.8	89.2	93.5	98.0	95.9	83.2	159.1	61.8	98.4	96.6
1992	76.3	57.8	55.7	68.4	129.6	120.0	78.9	93.6	94.5	52.7	123.1	116.9	96.2	80.1
1993	68.6	41.4	38.4	72.1	125.3	176.7	73.5	92.5	87.7	52.1	140.3	78.6	92.2	71.5
1994	54.3	32.1	31.5	59.9	161.4	211.7	68.1	95.2	89.9	53.6	147.7	62.5	86.8	69.5
1995	56.4	33.3	31.1	59.1	150.8	171.7	68.3	96.5	94.0	54.3	167.4	70.8	85.2	68.7
1990 GVA[a]	3500.0	4196.1	1454.5	785.7	2069.0	285.4	935.0	929.2	505.4	330.6	172.2	479.7	241.3	15884.1

Sources: Table 2.1 and calculations in Appendix D. Abbreviations: Agr.—agriculture, forestry and fishing, Ind.—industry, Const.—construction, T&C—transport and communications, F&I—finance and insurance, Hous.—housing, E&C—education and culture, He.—health, Sc.—science, Publ.—public administration, Def.—defence., Oth.—other services. [a]benchmark value-added, million Soviet roubles, current prices. [b]extrapolated from movement in the rest of the sectors.

Table D.4: VALUE-ADDED INDICES IN LATVIA, 1937-1995, 1990=100

	Agr.	Ind.	Const.	T&C	Trade	F&I	Hous.	E&C	He.	Sc.	Publ.	Def.	Oth.	GVA/ GDP
1937	82.2	15.8	17.7	12.3	5.2	8.4	43.4	12.2	15.0	1.8	76.2	37.0	1.7	28.6
1938	86.5	16.3	19.1	11.1	5.4	9.3	48.9	12.4	15.3	1.8	77.6	36.9	1.7	29.9
1939	81.6	15.8	19.0	12.7	5.4	9.7	41.9	11.9	15.4	1.9	78.0	36.6	1.6	28.6
1940	73.3	14.3	13.7	12.8	5.1	10.8	36.2	13.4	15.3	2.1	77.1	70.9	1.6	27.9
1941	66.0	11.6	14.0	*8.9*[b]	4.5	7.7	33.8	10.6	15.3	2.3	85.6	80.7	2.5	25.8
1942	56.6	7.8	9.0	*8.2*[b]	3.4	7.3	31.4	10.3	14.0	2.5	94.2	90.5	3.3	22.9
1943	51.2	7.3	9.2	*6.6*[b]	2.8	6.8	29.0	10.0	14.1	2.8	102.8	100.4	4.1	22.1
1944	*44.6*[c]	*1.8*[c]	*2.5*[c]	*5.3*[c]	2.2	*0.8*[c]	26.6	*7.1*[c]	14.2	3.0	*66.9*[c]	*89.8*[c]	*0.9*[c]	17.4
1945	38.1	3.9	4.7	4.8	3.8	6.0	24.1	13.4	13.0	3.2	120.0	120.0	5.8	19.6
1946	39.5	6.6	8.2	7.3	4.4	7.6	32.8	16.1	16.5	5.2	123.5	123.5	6.5	22.2
1947	48.0	10.2	12.6	8.0	4.9	8.1	29.3	18.8	19.9	7.1	127.1	127.1	7.1	25.5
1948	54.5	15.2	18.5	8.9	5.4	8.6	27.6	21.5	23.3	9.0	130.6	130.6	7.8	29.0
1949	52.3	19.7	25.4	10.3	5.9	9.1	25.9	24.2	26.7	11.0	134.1	134.1	9.0	31.0
1950	54.5	22.9	29.6	10.6	6.4	8.3	24.1	26.9	30.1	12.9	137.6	137.6	10.3	33.1
1951	52.6	27.7	33.9	11.9	7.5	10.8	25.9	28.0	34.0	13.7	130.8	130.8	11.0	34.6
1952	53.5	31.2	37.7	13.2	8.2	11.4	27.6	29.1	36.2	14.3	124.0	124.0	11.6	36.0
1953	50.0	35.0	43.7	14.6	9.8	13.2	31.0	30.2	38.0	13.3	117.2	117.2	12.3	37.1
1954	52.3	41.0	50.3	15.8	12.1	15.8	34.5	31.3	39.8	13.7	110.4	110.4	12.9	40.0
1955	49.1	42.2	52.9	17.2	12.9	14.8	37.9	32.4	43.5	16.1	103.5	103.5	13.6	40.2
1956	55.9	44.7	57.3	18.7	13.8	14.3	40.7	34.0	46.8	19.4	95.9	95.9	13.6	42.6
1957	58.6	49.1	61.0	20.7	16.4	14.2	43.4	35.5	48.2	25.8	88.2	88.2	14.2	44.9
1958	60.7	52.3	65.7	22.2	17.4	14.5	46.2	36.3	50.8	25.8	88.2	88.2	11.6	47.0
1959	70.9	57.6	73.2	23.5	18.8	14.7	49.0	39.5	54.8	29.0	88.2	88.2	12.3	51.7
1960	75.1	62.4	78.8	26.4	21.0	15.8	51.7	39.5	58.7	35.5	82.4	82.4	16.2	54.8
1961	76.4	65.0	82.6	31.8	21.7	15.8	55.2	42.7	61.3	41.9	88.2	88.2	18.1	57.5
1962	57.7	67.9	83.7	38.3	22.5	15.8	56.9	47.4	61.3	45.2	88.2	88.2	20.7	56.2
1963	63.1	70.5	86.3	44.2	23.4	17.8	56.9	49.0	61.3	54.8	94.1	94.1	23.3	59.4
1964	72.5	76.7	96.1	49.6	24.4	20.1	58.6	51.3	62.6	64.5	100.0	100.0	23.3	64.9
1965	77.2	80.5	103.7	55.2	27.2	23.6	60.3	52.9	66.5	71.0	105.9	105.9	24.6	69.1
1966	80.1	83.3	108.8	59.1	29.9	25.1	60.3	55.3	66.5	71.0	111.8	111.8	24.6	72.0
1967	85.6	88.6	119.1	74.6	33.0	26.9	65.5	56.9	67.8	77.4	123.5	123.5	24.6	78.2
1968	88.9	93.0	125.4	83.8	36.9	28.9	68.6	58.8	69.1	78.5	129.4	129.4	31.0	82.6
1969	83.9	97.4	128.4	87.2	39.9	30.0	71.0	60.8	70.4	79.7	135.3	135.3	37.5	84.7
1970	93.6	102.0	131.7	90.4	43.5	31.5	74.1	62.4	71.7	80.6	141.2	141.2	44.0	89.5
1971	92.0	105.1	140.3	93.7	46.6	40.9	75.9	64.0	73.0	87.1	147.1	147.1	50.4	92.4
1972	93.1	106.6	132.6	98.7	49.5	41.6	77.6	65.6	75.0	93.5	152.9	152.9	56.9	94.1
1973	96.0	110.0	138.8	102.1	51.4	41.8	82.8	66.4	76.7	96.8	152.9	152.9	63.3	97.1
1974	92.6	112.3	141.6	101.2	53.8	51.0	84.5	69.5	78.2	103.2	164.7	164.7	69.8	99.0
1975	90.7	117.3	149.1	106.3	56.8	53.4	86.2	71.1	80.8	106.5	170.6	170.6	76.3	102.3
1976	93.1	118.2	144.4	121.1	59.8	56.5	87.9	72.7	83.4	104.8	164.7	164.7	82.7	104.3
1977	92.9	117.5	139.6	125.1	61.7	58.5	89.7	74.2	86.0	104.8	158.8	158.8	89.2	104.3
1978	84.9	114.8	134.7	140.6	63.9	60.9	91.4	75.8	88.7	104.8	152.9	152.9	95.7	103.4
1979	88.4	112.0	125.1	143.8	66.3	63.4	94.8	77.4	91.3	104.8	147.1	147.1	100.2	103.2
1980	88.8	113.4	123.0	147.6	69.9	67.2	96.6	85.4	93.2	103.2	147.1	147.1	103.9	105.0
1981	91.9	114.5	124.3	151.9	72.0	69.1	96.6	86.1	94.1	104.8	150.6	150.6	104.0	106.9
1982	93.0	115.3	120.0	148.8	69.7	67.2	96.6	86.7	95.6	104.8	154.1	154.1	103.5	106.7
1983	100.4	115.7	120.7	153.1	71.3	69.8	96.6	87.8	96.7	106.5	157.6	157.6	109.0	109.3
1984	109.0	117.6	125.4	159.0	74.1	73.3	96.6	89.1	97.9	106.5	161.2	161.2	109.5	112.9
1985	103.8	119.5	121.2	158.0	76.9	75.8	96.6	90.3	99.2	106.5	164.7	164.7	109.9	112.9
1986	109.6	121.4	125.0	163.2	77.7	75.6	98.3	92.4	103.8	109.7	164.7	164.7	112.1	115.7
1987	105.2	118.4	121.6	166.2	78.5	76.6	106.9	96.0	106.1	106.5	135.3	135.3	110.2	113.0
1988	107.3	116.9	118.6	167.1	85.4	80.3	105.2	101.5	107.7	103.2	123.5	123.5	114.9	113.2
1989	110.3	110.0	113.4	163.5	92.3	89.0	103.4	102.0	104.3	100.0	100.0	100.0	108.9	110.3
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	94.2	93.0	94.0	63.6	104.7	106.7	96.3	93.1	97.1	93.1	114.3	77.3	96.5	92.3
1992	84.9	52.7	56.7	66.2	110.0	152.5	80.2	100.0	102.9	100.0	176.2	56.8	73.9	77.4
1993	73.7	30.5	37.3	84.4	110.0	152.5	74.1	93.1	117.6	93.1	209.5	35.0	65.7	68.0
1994	59.6	28.2	34.0	105.2	116.5	182.9	75.3	91.1	108.8	91.1	238.1	20.3	66.7	67.0
1995	51.7	25.6	30.5	104.2	112.4	304.9	70.4	103.0	108.8	103.0	266.7	12.7	64.7	66.9
1990 GVA	2000.0	3190.8	818.2	964.3	1448.3	234.1	689.2	580.2	357.1	203.4	114.8	626.9	163.9	11391.3

Sources: Table 2.1 and calculations in Appendix D.
Abbreviations: Agr.—agriculture, forestry and fishing, Ind.—industry, Const.—construction, T&C—transport and communications, F&I—finance and insurance, Hous.—housing, E&C—education and culture, He.—health, Sc.—science, Publ.—public administration, Def.—defence., Oth.—other services. [a]benchmark value-added, million Soviet roubles, current prices. [b]extrapolated from movement in the rest of the sectors. [c]extrapolated from 1943-1944 change in Lithuanian series since no other data exists.

Table D.5: VALUE-ADDED INDICES IN ESTONIA, 1937-1995, 1990=100

	Agr.	Ind.	Const.	T&C	Trade	F&I	Hous.	E&C	He.	Sc.	Publ.	Def.	Oth.	GVA/ GDP
1937	66.8	10.0	11.6	3.2	6.1	11.0	35.3	17.0	13.7	3.5	47.5	43.1	7.8	22.9
1938	70.0	10.4	12.3	3.3	6.0	10.7	36.6	19.5	13.9	4.0	47.2	43.1	7.8	23.8
1939	64.6	10.3	12.4	3.7	6.0	10.8	36.8	17.7	14.8	3.6	48.0	43.1	7.9	22.9
1940	60.7	9.7	10.5	4.9	5.5	9.9	35.8	15.2	13.8	3.1	46.8	77.0	7.8	23.5
1941	45.0	7.5	9.1	5.1	4.9	8.8	17.2	15.9	10.2	3.1	53.8	78.0	7.8	19.0
1942	40.3	5.8	8.2	*4.4*[b]	4.7	8.6	25.6	16.6	11.4	3.1	60.8	79.0	7.8	18.1
1943	36.0	5.7	7.1	*4.2*[b]	3.9	8.4	24.4	17.2	12.3	3.1	67.8	79.9	7.8	17.3
1944	*31.2*[c]	*1.4*[c]	*1.9*[c]	*3.4*[c]	*3.1*[c]	*1.0*[c]	23.2	*12.3*[c]	12.3	3.1	*44.1*[c]	*71.5*[c]	*1.7*[c]	13.3
1945	39.1	5.5	8.9	4.1	4.3	7.2	22.0	17.9	13.2	3.1	81.9	81.9	7.8	18.1
1946	42.5	7.0	9.8	6.1	4.9	7.6	25.9	20.4	17.9	5.4	83.3	83.3	9.5	20.1
1947	53.0	8.9	12.0	7.4	5.3	7.9	29.8	22.8	21.1	7.6	84.7	84.7	11.2	23.4
1948	58.8	11.0	13.9	7.1	5.8	8.2	33.8	24.5	24.5	9.9	86.1	86.1	12.9	25.8
1949	55.9	13.5	16.6	7.5	6.2	8.4	37.7	26.2	27.2	12.1	87.5	87.5	14.7	27.0
1950	55.8	16.0	19.1	8.4	6.9	9.0	41.6	31.0	27.6	14.4	88.9	88.9	16.4	28.7
1951	54.1	18.8	21.4	9.2	7.9	11.1	45.0	31.5	31.4	14.4	84.0	84.0	19.8	29.8
1952	54.9	20.8	23.7	10.1	8.8	12.2	45.9	32.4	32.9	14.4	79.1	79.1	21.6	30.8
1953	52.0	23.3	25.8	9.1	10.7	14.8	47.7	33.1	35.5	15.6	74.2	74.2	20.7	31.4
1954	51.4	25.5	27.5	9.9	12.5	15.5	48.0	35.9	38.9	16.9	69.2	69.2	23.3	32.3
1955	50.6	29.7	32.8	11.4	13.0	18.3	50.2	36.5	41.9	18.8	64.3	64.3	23.3	34.2
1956	58.7	32.6	36.4	12.5	14.0	20.8	49.8	39.2	43.8	20.0	63.2	63.2	24.1	37.2
1957	61.1	35.9	39.6	13.6	16.1	22.0	52.0	40.8	47.4	23.8	62.3	62.3	25.0	39.5
1958	64.7	40.1	44.6	14.5	17.0	22.5	55.7	42.2	48.2	29.4	61.4	61.4	26.7	42.5
1959	71.6	44.0	49.3	15.6	18.3	22.5	52.6	43.5	50.6	31.9	60.5	60.5	30.2	45.5
1960	78.1	47.7	52.8	17.3	20.5	21.1	54.4	44.7	53.1	31.6	59.6	59.6	40.5	48.7
1961	75.4	52.0	59.3	18.7	21.2	21.3	58.7	47.6	55.9	31.3	60.9	60.9	44.8	51.1
1962	68.6	55.7	64.4	20.7	22.1	21.1	59.0	49.3	57.2	38.8	62.2	62.2	41.4	52.1
1963	75.5	60.2	69.2	22.9	22.9	21.5	59.6	50.6	57.8	41.9	63.5	63.5	41.4	55.6
1964	82.2	64.4	74.3	26.0	24.1	22.6	61.2	52.7	59.9	43.8	64.8	64.8	49.1	59.4
1965	85.3	69.6	81.2	31.2	26.3	24.2	63.6	55.5	61.0	47.5	66.1	66.1	47.4	63.3
1966	85.4	71.7	86.0	32.8	29.0	26.6	64.2	57.7	61.8	51.9	69.0	69.0	56.9	65.5
1967	90.8	77.5	90.6	36.9	32.3	29.9	67.0	60.6	61.8	54.4	73.1	73.1	60.3	70.0
1968	96.3	82.4	94.8	39.1	36.0	32.7	68.2	62.5	65.9	55.0	77.2	77.2	61.2	74.0
1969	91.7	86.6	97.0	40.8	38.9	35.2	69.4	65.1	67.8	59.4	80.7	80.7	62.9	75.7
1970	96.3	90.6	101.4	43.6	42.1	38.1	69.1	66.5	68.6	62.5	83.0	83.0	65.5	79.1
1971	100.1	96.9	107.1	45.3	44.6	40.6	75.2	68.6	70.1	66.3	86.0	86.0	62.9	83.3
1972	93.3	97.3	106.6	46.2	47.1	44.5	78.9	70.9	71.6	69.4	87.1	87.1	63.8	83.2
1973	98.7	98.8	109.3	50.9	49.1	46.6	82.0	71.9	73.3	74.4	89.5	89.5	64.7	85.9
1974	102.0	99.4	112.2	56.3	50.9	48.5	84.4	73.3	74.6	80.6	92.4	92.4	66.4	88.1
1975	104.4	102.4	117.4	55.9	54.0	53.6	87.2	74.5	75.6	89.4	96.5	96.5	67.2	91.0
1976	106.5	106.9	119.1	57.9	57.5	56.7	86.9	76.1	76.7	91.9	100.6	100.6	67.2	93.9
1977	105.5	105.3	119.2	61.7	60.0	61.9	86.9	80.4	77.1	89.4	104.7	104.7	69.0	94.3
1978	94.4	105.9	117.8	63.6	62.0	64.4	88.7	83.0	78.6	93.1	108.8	108.8	75.0	93.6
1979	99.2	106.0	112.4	63.0	65.0	59.7	91.4	85.2	81.2	99.4	112.9	112.9	74.1	94.7
1980	107.2	108.1	115.5	62.9	69.4	63.5	94.5	87.7	82.9	100.0	117.0	117.0	76.7	98.2
1981	96.0	106.9	113.2	64.2	72.7	67.3	96.3	89.5	84.5	100.0	119.3	119.3	79.3	96.6
1982	97.7	106.4	110.8	65.5	70.9	66.7	100.3	90.6	87.3	98.3	122.8	122.8	81.9	97.0
1983	103.7	109.8	115.2	67.7	72.5	68.0	105.2	91.3	89.4	97.2	121.6	121.6	84.5	100.1
1984	110.4	111.7	116.3	70.3	75.3	70.6	102.8	92.2	92.0	100.6	122.2	122.2	87.1	102.6
1985	103.2	110.5	114.2	70.2	79.4	73.8	103.7	93.2	95.3	99.4	108.8	108.8	113.8	100.9
1986	112.6	111.9	115.6	74.7	81.0	72.2	105.8	95.1	95.1	100.6	109.4	109.4	122.4	103.9
1987	104.8	112.1	117.3	84.6	82.5	77.1	104.9	97.6	96.3	100.0	109.4	109.4	106.9	103.7
1988	100.7	113.9	117.9	96.8	88.1	77.6	102.8	99.4	94.1	101.1	109.4	109.4	99.1	104.9
1989	109.9	110.6	113.3	105.8	93.7	87.6	102.4	101.0	101.2	103.9	100.6	100.6	108.6	106.3
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	91.2	91.5	92.0	97.2	57.0	62.4	93.3	97.8	101.4	97.8	75.8	95.0	95.3	88.6
1992	71.0	52.2	49.4	78.5	24.4	30.8	85.6	99.2	97.6	99.2	78.7	70.8	92.0	61.6
1993	63.8	32.5	34.4	86.1	34.9	45.1	84.7	100.2	95.6	100.2	84.8	48.0	90.7	53.5
1994	57.1	34.3	36.3	90.8	33.2	47.1	91.4	97.2	94.9	97.2	88.4	40.6	89.7	53.1
1995	54.7	33.1	34.9	49.8	39.6	53.6	98.5	112.5	73.7	112.5	86.7	37.2	97.3	50.6
1990 GVA[a]	1250.0	2203.4	818.2	535.7	758.6	151.2	412.5	361.2	218.3	93.4	73.1	411.7	96.7	7384.1

Sources: Table 2.1 and calculations in Appendix D.
Abbreviations: Agr.—agriculture, forestry and fishing, Ind.—industry, Const.—construction, T&C—transport and communications, F&I—finance and insurance, Hous.—housing, E&C—education and culture, He.—health, Sc.—science, Publ.—public administration, Def.—defence., Oth.—other services. [a]benchmark value-added, million Soviet roubles, current prices. [b]extrapolated from movement in the rest of the sectors. [c]extrapolated from 1943-1944 change in Lithuanian series since no other data exists.

APPENDIX E

Final GDP and GDP per capita figures

Table E.1: GDP AND GDP PER CAPITA IN INTERWAR BALTICS

	Lithuania					Latvia					Estonia				
	Real GDP index, 1937=100	GDP at const. 1937 prices, mill. LTL	Real GDPpc index, 1937=100	GDPpc at 1937 const. prices, LTL	GDPpc in Int$$_{1990}$$	Real GDP index, 1935=100	GDP at const. 1935 prices, mill. LVL	Real GDPpc index, 1935=100	GDPpc at 1935 const. prices, LVL	GDPpc in Int$$_{1990}$$	Real GDP index, 1938=100	GDP at const. 1938 prices, mill. EEK	Real GDPpc index, 1938=100	GDPpc at 1938 const. prices, EEK	GDPpc in Int$$_{1990}$$
1919	39.1	756.5	50.4	384.0	1016.6	40.4	460.6	53.4	311.2	1481.0	56.0	375.7	59.6	353.1	1600.0
1920	45.5	881.3	58.8	448.3	1186.7	45.7	521.1	54.8	319.8	1521.8	51.8	347.6	54.9	325.5	1475.2
1921	54.6	1057.7	70.1	534.8	1415.8	52.9	602.3	60.2	351.1	1670.5	59.8	401.2	62.3	369.1	1672.6
1922	59.7	1154.6	75.8	577.9	1530.0	54.5	620.9	59.6	347.6	1654.3	63.7	427.3	65.4	387.6	1756.3
1923	71.7	1387.2	87.0	663.3	1755.8	63.5	724.1	68.4	399.1	1899.0	69.9	469.0	71.3	422.2	1913.2
1924	70.4	1363.2	81.7	622.7	1648.5	65.7	749.2	70.0	408.3	1942.7	69.5	466.4	70.6	418.0	1894.5
1925	70.4	1362.8	80.6	614.8	1627.6	71.1	810.7	75.1	438.1	2084.6	74.9	502.4	75.9	449.8	2038.3
1926	65.2	1262.6	73.8	562.5	1489.1	72.0	820.2	75.5	440.3	2095.2	74.5	500.2	75.6	447.9	2029.6
1927	66.7	1290.7	74.5	567.9	1503.4	74.4	847.6	77.5	452.0	2150.8	75.0	502.9	76.1	450.8	2042.8
1928	67.2	1300.5	74.1	565.1	1495.9	74.9	853.6	77.5	452.3	2152.5	75.1	503.8	76.2	451.5	2046.2
1929	71.6	1386.7	78.1	595.6	1576.7	82.2	936.8	84.7	494.0	2350.8	77.5	520.2	78.7	466.3	2113.2
1930	76.5	1480.3	82.5	629.0	1665.0	89.1	1015.9	91.4	533.2	2537.2	83.8	562.1	85.0	503.6	2282.2
1931	77.8	1506.2	83.0	632.8	1675.3	81.8	931.9	83.4	486.3	2314.2	80.0	537.1	81.1	480.2	2176.2
1932	80.0	1548.2	84.3	643.1	1702.5	81.3	926.0	82.3	480.4	2285.9	77.7	521.0	78.4	464.6	2105.3
1933	81.9	1585.4	85.3	650.7	1722.6	89.2	1016.6	89.9	524.6	2496.3	80.8	542.4	81.4	482.4	2186.3
1934	86.2	1668.3	88.8	677.1	1792.6	97.7	1113.6	98.1	572.1	2722.4	87.2	584.8	87.6	519.2	2353.0
1935	92.3	1786.0	94.1	717.9	1900.4	100.0	1139.6	100.0	583.4	2776.1	87.4	586.6	87.7	519.7	2355.0
1936	94.7	1833.7	95.7	729.7	1931.7	101.1	1152.3	100.8	587.8	2797.0	92.6	621.4	92.8	549.9	2492.1
1937	100.0	1935.5	100.0	762.6	2018.7	110.0	1253.3	109.2	636.9	3031.0	101.2	679.1	101.4	600.6	2721.7
1938	102.9	1991.5	101.9	777.2	2057.4	113.3	1291.2	111.6	651.2	3098.9	100.0	671.0	100.0	592.5	2684.9
1939	98.2	1901.4	96.2	733.9	1942.7	113.9	1298.4	112.0	653.2	3108.4	102.6	688.5	101.9	603.8	2736.1
1940	101.7	1969.2	86.0	656.2	1737.1	110.0	1253.7	108.3	631.8	3006.4	102.5	687.7	103.4	612.5	2775.8

Sources: Tables 2.2, C.1, C.2, C.3. Benchmark estimates in international dollars from A. Klimantas and A. Zirgulis, ''A new estimate of Lithuanian GDP for 1937: How does interwar Lithuania compare?'', *Cliometrica* 14, no. 2 (May 2020): 227–281; Z. Norkus et al., ''Benchmarking Latvia's economy: a new estimate of gross domestic product in the 1930s'', *Cliometrica*, 2022, and Appendix A; population data from Table F.1.

Table E.2: GDP AND GDP PER CAPITA IN OCCUPIED LITHUANIA

	Real GDP index, 1990=100	GDP at constant 1990 prices, million roubles	Real GDP per capita index, 1990=100	GDP per capita at 1990 constant prices, roubles	GDP per capita in Int$$_{1990}$$
1937	17.0	2707.8	24.9	1066.9	1864.0
1938	17.2	2737.8	25.0	1068.4	1866.7
1939	17.5	2779.6	25.1	1072.8	1874.4
1940	19.0	3016.1	23.5	1005.0	1755.9
1941	16.8	2672.3	21.7	930.4	1625.5
1942	14.4	2288.6	19.8	847.6	1480.9
1943	12.5	1987.3	17.2	735.0	1284.1
1944	10.0	1582.9	14.2	609.6	1065.0
1945	11.8	1867.5	17.7	755.8	1320.5
1946	14.0	2217.0	21.3	911.4	1592.3
1947	17.1	2721.5	26.0	1111.2	1941.3
1948	18.7	2966.6	27.8	1190.3	2079.6
1949	20.1	3189.4	29.3	1255.5	2193.6
1950	21.3	3377.1	30.7	1315.5	2298.3
1951	21.9	3478.7	31.6	1350.7	2359.9
1952	22.8	3622.4	32.6	1394.3	2436.0
1953	24.9	3956.3	35.5	1517.0	2650.4
1954	25.1	3979.0	35.6	1523.6	2662.0
1955	24.9	3948.9	35.1	1502.3	2624.8
1956	27.0	4286.3	37.7	1614.1	2820.1
1957	30.2	4790.0	42.0	1796.7	3139.1
1958	32.2	5119.8	44.5	1904.5	3327.5
1959	35.2	5591.2	47.8	2045.4	3573.6
1960	37.0	5879.3	49.5	2116.0	3696.9
1961	38.3	6077.6	50.3	2152.5	3760.6
1962	38.5	6122.0	50.0	2138.0	3735.4
1963	41.5	6585.8	53.1	2271.8	3969.1
1964	44.9	7127.5	56.8	2428.3	4242.5
1965	48.2	7652.7	60.2	2575.4	4499.6
1966	52.3	8305.3	64.5	2761.0	4823.8
1967	57.1	9068.5	69.6	2978.8	5204.3
1968	59.9	9514.2	72.2	3090.2	5398.9
1969	63.5	10078.6	75.7	3238.7	5658.4
1970	66.8	10609.8	78.8	3371.3	5890.1
1971	69.7	11076.7	81.3	3478.8	6077.8
1972	72.8	11571.3	84.1	3596.2	6283.0
1973	75.6	12014.2	86.5	3699.6	6463.7
1974	77.4	12290.2	87.7	3751.7	6554.7
1975	81.1	12882.5	91.2	3900.7	6815.0
1976	83.5	13263.3	93.0	3980.4	6954.3
1977	85.4	13567.9	94.3	4036.3	7051.9
1978	87.8	13943.6	96.3	4118.0	7194.7
1979	86.7	13770.6	94.4	4039.7	7057.9
1980	85.8	13636.4	92.9	3972.7	6940.8
1981	89.3	14179.0	95.8	4098.4	7160.4
1982	90.5	14382.9	96.3	4121.3	7200.5
1983	93.2	14802.9	98.2	4202.3	7342.0
1984	98.5	15640.6	102.8	4400.0	7687.4
1985	99.7	15835.3	103.5	4428.4	7737.0
1986	101.4	16112.5	104.6	4476.6	7821.3
1987	101.3	16088.8	103.4	4425.6	7732.1
1988	103.9	16511.3	105.1	4496.8	7856.5
1989	105.0	16671.6	105.1	4497.9	7858.5
1990	100.0	15884.1	100.0	4278.4	7475.0
1991	96.6	15337.4	96.8	4140.6	7234.2
1992	80.1	12729.3	80.4	3440.3	6010.6
1993	71.5	11363.2	72.1	3085.6	5391.0
1994	69.5	11034.9	70.5	3017.4	5271.7
1995	68.7	10918.5	70.3	3008.6	5256.4

Sources: Tables 2.1, D.3, D.4, D.5. Benchmark estimates in international dollars from B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 186; population data from Table F.1.

Table E.3: GDP AND GDP PER CAPITA IN OCCUPIED LATVIA

	Real GDP index, 1990=100	GDP at constant 1990 prices, million roubles	Real GDP per capita index, 1990=100	GDP per capita at 1990 constant prices, roubles	GDP per capita in Int$$_{1990}$$
1937	28.6	3256.1	38.7	1654.8	3081.5
1938	29.9	3405.7	40.2	1717.6	3198.5
1939	28.6	3253.7	38.3	1637.0	3048.3
1940	27.9	3181.4	37.5	1603.3	2985.5
1941	25.8	2937.4	36.3	1552.6	2891.1
1942	22.9	2611.9	33.9	1451.4	2702.7
1943	22.1	2518.8	32.6	1394.2	2596.2
1944	17.4	1977.8	28.1	1200.9	2236.3
1945	19.6	2238.1	34.5	1473.7	2744.3
1946	22.2	2534.3	36.2	1549.9	2886.0
1947	25.5	2904.8	38.0	1625.9	3027.6
1948	29.0	3307.2	41.3	1767.0	3290.5
1949	31.0	3534.0	43.8	1874.4	3490.4
1950	33.1	3771.4	46.7	1998.6	3721.7
1951	34.6	3940.5	48.6	2080.2	3873.6
1952	36.0	4103.0	50.3	2153.0	4009.2
1953	37.1	4229.3	51.3	2195.9	4089.1
1954	40.0	4556.6	54.6	2333.3	4344.9
1955	40.2	4578.8	54.0	2311.4	4304.2
1956	42.6	4847.1	56.1	2401.7	4472.3
1957	44.9	5117.7	58.3	2492.0	4640.4
1958	47.0	5357.9	60.4	2584.4	4812.5
1959	51.7	5884.5	65.8	2812.8	5237.8
1960	54.8	6237.1	68.7	2940.7	5475.9
1961	57.5	6552.0	71.2	3043.7	5667.7
1962	56.2	6403.9	68.6	2935.4	5466.1
1963	59.4	6766.0	71.5	3060.3	5698.6
1964	64.9	7398.3	77.2	3301.9	6148.5
1965	69.1	7872.5	81.2	3474.3	6469.6
1966	72.0	8199.8	84.0	3591.3	6687.6
1967	78.2	8910.6	90.5	3872.1	7210.4
1968	82.6	9414.1	94.7	4051.5	7544.4
1969	84.7	9646.6	96.2	4116.9	7666.2
1970	89.5	10192.6	101.0	4320.4	8045.2
1971	92.4	10521.0	103.5	4427.3	8244.2
1972	94.1	10714.1	104.6	4472.3	8327.9
1973	97.1	11057.1	107.0	4577.0	8522.9
1974	99.0	11277.8	108.2	4627.4	8616.8
1975	102.3	11651.7	110.9	4743.9	8833.8
1976	104.3	11879.4	112.4	4807.6	8952.3
1977	104.3	11877.9	111.7	4779.7	8900.5
1978	103.4	11777.9	110.2	4715.1	8780.1
1979	103.2	11757.9	109.7	4692.0	8737.1
1980	105.0	11960.1	111.3	4761.7	8867.0
1981	106.9	12180.0	113.0	4834.5	9002.4
1982	106.7	12157.9	112.3	4803.4	8944.6
1983	109.3	12445.5	114.3	4888.2	9102.5
1984	112.9	12858.2	117.3	5018.7	9345.5
1985	112.9	12857.5	116.6	4985.7	9284.0
1986	115.7	13177.3	118.5	5068.4	9438.1
1987	113.0	12869.7	114.6	4899.8	9124.0
1988	113.2	12896.2	113.6	4859.5	9049.0
1989	110.3	12564.9	110.1	4710.6	8771.8
1990	100.0	11391.3	100.0	4277.4	7965.0
1991	92.3	10512.6	92.7	3966.2	7385.5
1992	77.4	8817.1	78.8	3372.6	6280.2
1993	68.0	7743.0	70.6	3020.7	5625.0
1994	67.0	7630.0	70.8	3026.9	5636.4
1995	66.9	7619.8	71.7	3066.3	5709.8

Sources: Tables 2.1, D.4. Benchmark estimates in international dollars from B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 186; population data from Table F.1.

Table E.4: GDP AND GDP PER CAPITA IN OCCUPIED ESTONIA

	Real GDP index, 1990=100	GDP at constant 1990 prices, million roubles	Real GDP per capita index, 1990=100	GDP per capita at 1990 constant prices, roubles	GDP per capita in Int$$_{1990}$$
1937	22.9	1690.6	31.8	1495.2	2677.0
1938	23.8	1759.4	33.0	1553.5	2781.3
1939	22.9	1690.0	31.5	1481.9	2653.1
1940	23.5	1735.2	32.8	1545.6	2767.2
1941	19.0	1400.4	28.4	1334.8	2389.7
1942	18.1	1339.9	28.3	1330.7	2382.4
1943	17.3	1276.7	27.6	1300.2	2327.8
1944	13.3	978.8	22.7	1066.5	1909.5
1945	18.1	1339.7	31.5	1483.5	2656.1
1946	20.1	1485.5	33.6	1582.4	2833.1
1947	23.4	1727.2	37.1	1744.3	3123.0
1948	25.8	1905.0	39.4	1856.1	3323.2
1949	27.0	1991.1	41.2	1940.5	3474.3
1950	28.7	2122.8	43.5	2048.3	3667.2
1951	29.8	2199.3	44.0	2071.6	3709.0
1952	30.8	2273.2	44.6	2098.8	3757.6
1953	31.4	2315.7	44.5	2092.8	3746.9
1954	32.3	2387.6	44.9	2114.9	3786.5
1955	34.2	2525.0	46.9	2206.7	3950.9
1956	37.2	2744.0	50.4	2369.8	4242.8
1957	39.5	2919.3	52.9	2491.1	4460.0
1958	42.5	3136.1	56.1	2640.4	4727.2
1959	45.5	3362.6	59.5	2798.5	5010.3
1960	48.7	3599.3	63.1	2970.9	5318.9
1961	51.1	3772.5	65.4	3079.4	5513.3
1962	52.1	3846.5	65.8	3098.0	5546.5
1963	55.6	4106.2	69.3	3261.9	5840.0
1964	59.4	4386.7	73.0	3434.9	6149.8
1965	63.3	4675.7	76.8	3611.8	6466.5
1966	65.5	4833.4	78.5	3693.5	6612.8
1967	70.0	5166.1	83.2	3916.9	7012.6
1968	74.0	5463.4	87.2	4104.0	7347.8
1969	75.7	5591.8	88.3	4156.7	7442.0
1970	79.1	5840.3	91.3	4294.1	7688.1
1971	83.3	6154.4	95.0	4469.5	8002.1
1972	83.2	6141.7	93.7	4410.5	7896.5
1973	85.9	6345.1	95.9	4513.0	8079.9
1974	88.1	6508.6	97.5	4589.4	8216.8
1975	91.0	6721.0	99.9	4702.1	8418.6
1976	93.9	6933.5	102.4	4816.3	8623.0
1977	94.3	6966.5	102.1	4803.8	8600.5
1978	93.6	6911.4	100.6	4733.2	8474.2
1979	94.7	6989.9	101.2	4760.4	8522.9
1980	98.2	7248.1	104.3	4906.6	8784.6
1981	96.6	7133.4	101.9	4795.0	8584.8
1982	97.0	7159.1	101.5	4777.8	8554.0
1983	100.1	7395.0	104.2	4901.4	8775.3
1984	102.6	7576.4	106.0	4989.0	8932.2
1985	100.9	7453.0	103.6	4875.2	8728.3
1986	103.9	7672.4	105.9	4981.4	8918.6
1987	103.7	7657.8	104.8	4933.5	8832.7
1988	104.9	7746.0	105.4	4959.3	8879.0
1989	106.3	7846.4	106.3	5003.7	8958.4
1990	100.0	7384.1	100.0	4705.7	8425.0
1991	88.6	6543.6	89.1	4191.1	7503.6
1992	61.6	4550.3	63.1	2968.0	5313.9
1993	53.5	3949.6	56.2	2643.4	4732.7
1994	53.1	3920.4	57.0	2680.6	4799.3
1995	50.6	3737.2	55.3	2601.3	4657.3

Sources: Tables 2.1, D.5. Benchmark estimates in international dollars from B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 186; population data from Table F.1.

Table E.5: EXISTING AND ADJUSTED 1990-2024 GDP PER CAPITA

	MPD version 2023, original data in Int$$_{2011}$$			MPD version 2023 data in Int$$_{2011}$$, adjusted with World Bank-Eurostat indices			Adjusted figures, converted into Int$$_{1990}$$		
	LTU	LVA	EST	LTU	LVA	EST	LTU	LVA	EST
1990	13809	15806	17247	14037	13078	13033	8806	8205	8176
1991	12999	13775	15351	13218	11485	12051	8292	7205	7560
1992	10241	9411	13214	10419	7904	9675	6537	4959	6069
1993	8621	8439	12207	8770	7660	9357	5502	4806	5870
1994	7830	8704	12070	7969	7960	9402	4999	4994	5899
1995	8299	8709	12881	8294	7998	10005	5203	5018	6277
1996	8794	8947	13548	8789	8298	10655	5514	5206	6685
1997	9593	9773	15075	9590	9122	12184	6016	5722	7644
1998	10382	10430	15593	10382	9791	12836	6513	6143	8053
1999	10336	10708	15335	10336	10144	12744	6484	6364	7995
2000	10807	11310	16807	10794	10823	13961	6771	6790	8759
2001	11607	12104	17697	11593	11657	14894	7273	7313	9344
2002	12491	13015	18589	12476	12629	16004	7827	7923	10040
2003	13918	14142	19772	13906	13826	17328	8724	8674	10871
2004	14996	15371	20804	14987	15136	18618	9402	9495	11680
2005	16418	17070	22519	16411	16940	20509	10296	10627	12867
2006	17916	19129	24579	17912	19143	22645	11237	12009	14207
2007	20138	21042	26178	20139	21219	24473	12634	13312	15353
2008	20880	20342	24429	20879	20746	23279	13099	13015	14604
2009	17983	17582	20538	17980	18084	19912	11280	11345	12492
2010	18664	17140	20713	18664	17641	20445	11709	11067	12826
2011	20243	18428	21997	20243	18428	21997	12699	11561	13800
2012	21305	19970	22784	21305	19970	22784	13366	12528	14294
2013	22286	20582	23204	22286	20582	23204	13981	12912	14557
2014	23273	21169	23983	23273	21169	23983	14600	13280	15046
2015	23969	22179	24474	23969	22179	24474	15037	13914	15354
2016	24887	22913	25196	24887	22913	25196	15613	14375	15807
2017	26318	23894	26662	26318	23894	26662	16511	14990	16726
2018	27631	25040	27596	27631	25040	27596	17335	15709	17313
2019	28986	25859	28506	28986	25859	28506	18184	16222	17883
2020	28972	25453	28262	28972	25453	28262	18176	15968	17730
2021	30557	26739	30499	30557	26739	30499	19170	16775	19134
2022	30863	27220	30067	30863	27220	30067	19362	17077	18863
2023				30544	28059	28432	19162	17603	17837
2024				31214	28253	28177	19582	17725	17677

Sources: MPD version 2023 and GDP per capita at constant prices from The World Bank, *World Development Indicators*, Accessed on July 9, 2024, Washington, D.C, 2024.
Adjustment procedures: accepting MPD version 2023 post-2011 figures as valid, 1990-2010 data extrapolated using GDP per capita in at constant prices from World Bank WDI, taking 2011 figure as base. 2022-2024 extrapolated from *Eurostat Database*, Accessed on August 2, 2025, 2025. For rationale behind this procedure, see 57 and Figure 2.2 in Chapter 2.

APPENDIX F

Population and GDP per capita in Int$$_{2011}$$

Mid-year population calculated by taking an average of the beginning and end of the year values. *Sources: Lietuvos statistikos metraštis*, 1924-1939 editions, pages on population; Anušauskas, *Lietuva 1940-1990*, 219; Misiunas and Taagepera, *The Baltic states*, 15–16; Bērziņš and Bambals, *Latvijas armija*, 93; S. Vaitekūnas, *Lietuvos Respublikos gyventojai (1918–1940)*, in Visuotinė lietuvių enciklopedija, 2016; S. Vaitekūnas, *Lietuvos gyventojai pasaulio gyventojų metais*; *Lietuvių enciklopedija*, vol. XV (Boston: Lietuvių enciklopedijos leidykla, 1968), 55; Meškauskas, *Lietuvos ūkis, 1940-1990*, 252; S. Buchaveckas, ''1942 m. Lietuvos gyventojų surašymas'', vol. XIII, Visuotinė lietuvių enciklopedija (Vilnius: Mokslo ir enciklopedijų leidybos centras, 2008); J. Braslauskas, ''Okupacinė darbo prievolių politika Lietuvoje 1941-1944 metais'', *Lietuvos istorijos studijos*, no. 15 (2005): 56; V. Stravinskienė, ''Demografiniai pokyčiai Lietuvoje 1944–1989 m. (statistinis aspektas)'', *Lietuvos aukštųjų mokyklų mokslo darbai. Istorija* 103, no. 3 (2016): 33–35; V. Stravinskienė, ''Lenkų repatriacija į Lenkiją 1944–1947 metais'', *Lietuvos aukštųjų mokyklų mokslo darbai. Istorija* 63, no. 3 (2006): 40; A. Anušauskas, *Lietuvių tautos sovietinis naikinimas 1940-1958 metais* (Vilnius: Lietuvių tautinis kultūros fondas, 1996), 337; *Lietuvos TSR Liaudies ūkis 1960 m.* (Vilnius: CSV, 1961), 18; Statistics Lithuania, *Statistics Lithuania*; Statistics Latvia, Riga, December 2024; Statistics Estonia, Tallinn, December 2024; *Lietuvos TSR Liaudies ūkis 1980*, 10; *Lietuvos TSR Liaudies ūkis 1985*, 3; *Lietuvos statistikos metraštis 1989*, 11; *Statistische Berichte für das Ostland 1942 nr. 7–8*, 283; S. Vaitekūnas, *Lietuvos gyventojai sovietinės okupacijos metais (1944–1990)*, in Visuotinė lietuvių enciklopedija, 2018; The World Bank, *World Development Indicators 2024*; Vidzemes Augstskola,

Baltic 100; Barkāns, *Padomju okupantu*; U. Salo, ''Eesti kaitseväe valmisolek sõjaks ja vastupanuvõimalused 1939. aastal'' (master's thesis, 2005); Pärn, *Nõukogude Liidu*; Kaitseväe peastaap, *Ajalugu*; Lsm.lv, *Padomju karabāzu izvietošana 1939. gadā – Latvijas okupācijas ievads*, 2022; Z. Norkus et al., ''The population size of Lithuania (within contemporary borders) between 1897 and 1914'', *Journal of Baltic studies* (Portland) 51, no. 4 (2020): 587–609; P. Gaučas, ''Lietuvos gyventojų skaičius 1897–1914 m.'', *Lietuvos TSR aukštųjų mokyklų darbai*, no. Geografija 19 (1983): 87 I. Mežs, ''Latvijas iedzīvotāji: esošie, iecerētie un zudušie'', ed. G. Krūmiņš, Turbulence kā virzītājspēks: Latvijas cilvēki un tautsaimniecība 150 gados (Riga: Jumava, 2025), 185; Tiit, *Eesti rahvastik*, 26

adjustments made for war-time and immediate post-war population changes.
[a]permanent Soviet garrisons added to the totals of 1940.01 and 1941.01, hence influencing the mid-year figures (20,000 in Lithuania, 29,568 in Latvia, 25,000 in Estonia).
[b]due to major territorial changes in 1939, Lithuania's figure for this year is a weighted average of 3 months with a population of 2575.4 million, 6 months with 2421.6 million and 3 months with 2945.3 (which includes 20,000 Soviet soldiers garrison), see *Statistikos biuletenis 1939 no. 3 (185)*, 91.

GDP per capita in international 2011$ was calculated by converting the figures in international 1990$ (Table 3.2) to international 2011$ using the standard 1.594 conversion rate from page 12 in the original *MPD version 2023* paper. Post-2011 data is identical to *MPD version 2023* database figures.

Table F.1: MID-YEAR POPULATION OF THE BALTIC STATES, 1913-2024

	Lithuania	Latvia	Estonia
1913	3057.1	2275.0	1164.0
1919	1969.8	1480.0	1064.0
1920	1966.0	1629.5	1067.8
1921	1977.5	1715.7	1087.1
1922	1997.8	1786.1	1102.4
1923	2091.5	1814.4	1110.8
1924	2189.1	1835.1	1115.6
1925	2216.6	1850.5	1117.0
1926	2244.5	1862.7	1116.8
1927	2272.8	1875.3	1115.6
1928	2301.5	1887.0	1115.7
1929	2328.3	1896.3	1115.7
1930	2353.5	1905.4	1116.1
1931	2380.0	1916.2	1118.4
1932	2407.4	1927.6	1121.5
1933	2436.5	1938.0	1124.3
1934	2463.7	1946.5	1126.4
1935	2487.8	1953.5	1128.9
1936	2513.0	1960.4	1130.0
1937	2538.1	1967.7	1130.7
1938	2562.5	1982.8	1132.5
1939	2590.9[a,b]	1987.6[a]	1140.4[a]
1940	3001.0[a]	1984.3[a]	1122.7[a]
1941	2872.4[a]	1892.0[a]	1049.2[a]
1942	2700.0	1799.6	1007.0
1943	2703.8	1806.6	981.9
1944	2596.8	1646.9	917.8
1945	2470.9	1518.6	903.1
1946	2432.5	1635.2	938.7
1947	2449.2	1786.6	990.2
1948	2492.3	1871.6	1026.3
1949	2540.3	1885.4	1026.1
1950	2567.2	1887.0	1036.4
1951	2575.5	1894.3	1061.6
1952	2598.0	1905.7	1083.1
1953	2608.0	1926.0	1106.5
1954	2611.5	1952.9	1128.9
1955	2628.5	1981.0	1144.2
1956	2655.5	2018.2	1157.9
1957	2666.0	2053.7	1171.9
1958	2688.2	2073.2	1187.8
1959	2733.5	2092.0	1201.6
1960	2778.6	2121.0	1211.5
1961	2823.6	2152.7	1225.1
1962	2863.4	2181.6	1241.6
1963	2899.0	2210.9	1258.9
1964	2935.2	2240.6	1277.1
1965	2971.5	2265.9	1294.6
1966	3008.1	2283.2	1308.6
1967	3044.4	2301.2	1318.9
1968	3078.9	2323.6	1331.2
1969	3112.0	2343.2	1345.2
1970	3147.1	2359.2	1360.1
1971	3184.1	2376.4	1377.0
1972	3217.7	2395.7	1392.5
1973	3247.5	2415.8	1406.0
1974	3275.9	2437.2	1418.2
1975	3302.7	2456.1	1429.4
1976	3332.2	2471.0	1439.6
1977	3361.5	2485.1	1450.2
1978	3386.0	2497.9	1460.2
1979	3408.8	2506.0	1468.3
1980	3432.6	2511.7	1477.2
1981	3459.7	2519.4	1487.7
1982	3489.9	2531.1	1498.4
1983	3522.6	2546.0	1508.7
1984	3554.7	2562.0	1518.6
1985	3575.9	2578.9	1528.8
1986	3599.3	2599.9	1540.2
1987	3635.4	2626.6	1552.2
1988	3671.8	2653.8	1561.9
1989	3706.5	2667.4	1568.1
1990	3712.6	2663.2	1569.2
1991	3704.1	2650.6	1561.3
1992	3700.1	2614.3	1533.1
1993	3682.6	2563.3	1494.1
1994	3657.1	2520.7	1462.5
1995	3629.1	2485.1	1436.6
1996	3601.6	2457.2	1415.6
1997	3575.1	2432.9	1399.5
1998	3549.3	2410.0	1386.2
1999	3524.2	2390.5	1390.2
2000	3499.5	2367.5	1397.0
2001	3470.8	2337.2	1388.1
2002	3443.1	2310.2	1379.4
2003	3415.2	2288.0	1370.7
2004	3377.1	2263.1	1362.6
2005	3322.5	2238.8	1354.8
2006	3269.9	2218.4	1346.8
2007	3231.3	2200.3	1340.7
2008	3198.2	2177.3	1337.1
2009	3162.9	2141.7	1334.5
2010	3097.3	2097.6	1331.5
2011	3028.1	2059.7	1327.4
2012	2987.8	2034.3	1322.7
2013	2957.7	2012.6	1318.0
2014	2932.4	1993.8	1314.7
2015	2904.9	1977.5	1314.0
2016	2868.2	1959.5	1314.4
2017	2828.4	1942.2	1316.1
2018	2801.5	1927.2	1320.6
2019	2794.1	1913.8	1325.1
2020	2794.9	1900.4	1329.5
2021	2800.8	1884.5	1330.9
2022	2831.6	1879.4	1348.8
2023	2871.9	1881.8	1366.2
2024	2888.1	1871.9	1360.5

Sources: see Section text above.

Table F.2: SHARE OF URBAN POPULATION IN TOTAL, 1913-2022

	Lithuania	Latvia	Estonia		Lithuania	Latvia	Estonia
1913	15.9%	37.7%		1970	49.4%	60.7%	64.9%
				1971	50.6%	61.4%	65.5%
1919				1972	51.9%	62.1%	66.0%
1920	14.8%	24.2%	31.0%	1973	53.2%	62.8%	66.5%
1921	14.8%	26.9%	30.6%	1974	54.4%	63.5%	67.1%
1922	14.8%	30.8%	30.5%	1975	55.7%	64.2%	67.6%
1923	15.2%	32.3%	30.8%	1976	56.9%	64.8%	68.1%
1924	15.6%	33.1%	31.1%	1977	58.0%	65.5%	68.6%
1925	15.6%	34.0%	31.5%	1978	59.2%	66.1%	69.1%
1926	15.6%	34.2%	32.0%	1979	60.2%	66.7%	69.5%
1927	15.5%	34.6%	32.5%	1980	60.8%	67.1%	69.7%
1928	15.4%	35.1%	33.6%	1981	61.5%	67.4%	69.9%
1929	15.4%	35.7%	34.7%	1982	62.1%	67.7%	70.1%
1930	15.3%	36.1%	34.3%	1983	62.8%	68.0%	70.3%
1931	15.3%	36.1%	34.5%	1984	63.5%	68.3%	70.6%
1932	15.2%	36.0%	32.1%	1985	64.5%	68.6%	70.8%
1933	15.1%	36.0%	32.5%	1986	65.4%	68.8%	71.0%
1934	15.1%	36.0%	33.0%	1987	66.2%	68.9%	71.2%
1935	15.1%	36.0%	33.4%	1988	67.0%	69.1%	71.4%
1936	15.1%	35.9%	33.7%	1989	67.2%	69.2%	71.4%
1937	15.1%	35.8%	34.2%	1990	67.3%	69.3%	71.2%
1938	17.0%	35.6%	34.9%				
1939	21.0%	35.6%	34.9%	1991	67.5%	69.2%	71.0%
1940	22.8%	33.8%	34.4%	1992	67.5%	68.9%	70.9%
				1993	67.4%	68.8%	70.7%
1941	22.5%	35.3%	35.7%	1994	67.3%	68.9%	70.5%
1942	22.1%	30.4%	36.1%	1995	67.3%	68.8%	70.3%
1943	22.1%	31.6%	35.8%	1996	67.2%	68.7%	70.1%
1944	19.7%	34.8%	37.0%	1997	67.2%	68.6%	69.9%
				1998	67.1%	68.5%	69.7%
1945	18.2%	32.2%	36.3%	1999	67.0%	68.2%	69.5%
1946	20.4%	32.9%	33.7%	2000	67.0%	68.1%	69.4%
1947	22.6%	37.5%	37.4%	2001	66.9%	67.9%	69.2%
1948	24.8%	40.2%	41.3%	2002	66.8%	67.8%	69.1%
1949	27.0%	42.1%	46.5%	2003	66.7%	67.8%	69.0%
1950	28.7%	43.8%	47.9%	2004	66.6%	67.9%	68.9%
1951	29.8%	46.0%	48.7%	2005	66.6%	68.0%	68.7%
1952	30.9%	45.7%	49.6%	2006	66.7%	68.0%	68.6%
1953	32.1%	47.0%	50.3%	2007	66.8%	67.9%	68.5%
1954	33.2%	48.2%	51.1%	2008	66.8%	67.8%	68.4%
1955	34.3%	48.6%	52.2%	2009	66.8%	67.8%	68.2%
1956	35.5%	51.2%	53.3%	2010	66.8%	67.8%	68.1%
1957	36.6%	51.7%	54.4%	2011	66.7%	67.9%	68.0%
1958	37.7%	51.7%	55.3%	2012	66.9%	67.9%	68.0%
1959	38.6%	52.6%	56.3%	2013	67.0%	67.9%	68.1%
1960	39.5%	52.9%	57.5%	2014	67.1%	68.0%	68.3%
1961	40.4%	53.7%	58.3%	2015	67.2%	68.0%	68.5%
1962	41.4%	54.5%	59.1%	2016	67.4%	68.0%	68.6%
1963	42.4%	55.3%	59.8%	2017	67.5%	68.1%	68.8%
1964	43.4%	56.0%	60.6%	2018	67.7%	68.1%	69.0%
1965	44.5%	56.8%	61.3%	2019	67.9%	68.2%	69.1%
1966	45.5%	57.6%	62.1%	2020	68.0%	68.3%	69.2%
1967	46.5%	58.4%	62.8%	2021	68.2%	68.4%	69.4%
1968	47.5%	59.2%	63.6%	2022	68.5%	68.5%	69.6%
1969	48.5%	59.9%	64.3%	2023			

Sources: see Section text above. Missing data interpolated.

Table F.3: GDP PER CAPITA IN THE BALTIC STATES in Int$$_{2011}$$

	Lithuania	Latvia	Estonia
1913	2601.4	3763.4	3280.5
1919	1620.5	2360.8	2550.4
1920	1891.6	2425.7	2351.5
1921	2256.9	2662.8	2666.2
1922	2438.8	2636.9	2799.6
1923	2798.8	3027.0	3049.7
1924	2627.7	3096.7	3019.8
1925	2594.4	3322.8	3249.0
1926	2373.7	3339.7	3235.2
1927	2396.4	3428.3	3256.3
1928	2384.4	3431.0	3261.6
1929	2513.3	3747.2	3368.4
1930	2654.0	4044.4	3637.8
1931	2670.4	3688.9	3468.8
1932	2713.7	3643.7	3355.8
1933	2745.8	3979.0	3484.9
1934	2857.3	4339.5	3750.7
1935	3029.3	4425.0	3753.9
1936	3079.1	4458.4	3972.4
1937	3217.8	4831.4	4338.5
1938	3279.5	4939.6	4279.7
1939	3096.7	4954.7	4361.3
1940	2783.9	4775.5	4417.7
1941	2591.0	4608.4	3809.2
1942	2360.6	4308.1	3797.5
1943	2046.9	4138.4	3710.5
1944	1697.6	3564.6	3043.7
1945	2104.9	4374.4	4233.7
1946	2538.1	4600.3	4515.9
1947	3094.5	4826.0	4978.0
1948	3314.9	5245.0	5297.2
1949	3496.6	5563.6	5538.0
1950	3663.5	5932.4	5845.5
1951	3761.6	6174.6	5912.2
1952	3883.0	6390.7	5989.6
1953	4224.7	6518.0	5972.5
1954	4243.2	6925.8	6035.7
1955	4183.9	6860.8	6297.7
1956	4495.2	7128.9	6763.0
1957	5003.7	7396.8	7109.3
1958	5304.0	7671.1	7535.2
1959	5696.4	8349.1	7986.5
1960	5892.8	8728.6	8478.4
1961	5994.4	9034.3	8788.2
1962	5954.3	8713.0	8841.2
1963	6326.8	9083.6	9308.9
1964	6762.6	9800.7	9802.7
1965	7172.4	10312.6	10307.5
1966	7689.2	10660.0	10540.8
1967	8295.6	11493.4	11178.1
1968	8605.9	12025.7	11712.3
1969	9019.4	12219.9	11862.5
1970	9388.8	12824.0	12254.8
1971	9688.1	13141.3	12755.4
1972	10015.2	13274.7	12587.0
1973	10303.1	13585.5	12879.4
1974	10448.2	13735.1	13097.6
1975	10863.0	14081.1	13419.2
1976	11085.2	14270.0	13745.1
1977	11240.7	14187.3	13709.2
1978	11468.3	13995.5	13507.9
1979	11250.3	13926.9	13585.5
1980	11063.6	14134.0	14002.7
1981	11413.7	14349.8	13684.2
1982	11477.5	14257.7	13635.0
1983	11703.2	14509.5	13987.9
1984	12253.8	14896.7	14237.9
1985	12332.8	14798.8	13913.0
1986	12467.1	15044.3	14216.3
1987	12325.0	14543.7	14079.3
1988	12523.2	14424.1	14153.2
1989	12526.4	13982.2	14279.7
1990	11915.2	12696.2	13429.5
1991	11531.3	11628.8	12005.6
1992	9580.9	7904.3	9674.5
1993	8681.6	7660.0	9357.0
1994	7968.6	7959.9	9402.2
1995	8299.5	8709.1	12881.3
1996	8793.7	8947.3	13547.7
1997	9592.6	9773.5	15074.8
1998	10382.1	10429.8	15593.0
1999	10336.4	10707.7	15335.1
2000	10806.9	11309.7	16807.0
2001	11606.7	12103.8	17696.6
2002	12490.6	13015.5	18589.1
2003	13917.5	14142.1	19771.7
2004	14995.8	15371.2	20803.8
2005	16417.9	17069.7	22518.5
2006	17916.1	19128.7	24578.8
2007	20138.5	21042.4	26177.9
2008	20879.8	20342.2	24429.0
2009	17983.3	17582.1	20538.0
2010	18663.8	17140.2	20713.4
2011	20243.0	18428.0	21997.0
2012	21305.0	19970.0	22784.3
2013	22285.7	20581.9	23204.1
2014	23273.2	21168.5	23982.8
2015	23968.8	22179.4	24473.7
2016	24886.8	22913.0	25196.2
2017	26318.0	23893.8	26661.6
2018	27631.5	25039.9	27596.4
2019	28986.1	25858.6	28505.6
2020	28971.8	25453.1	28261.6
2021	30557.0	26738.6	30499.2
2022	30863.3	27220.3	30067.4
2023	30544.5	28059.3	28432.0
2024	31214.0	28253.0	28177.3

Sources: converted from Table 3.2 using Int$$_{1990}$$ to Int$$_{2011}$$ conversion ratio of 1.594. See page 12 in the MPD version 2023 paper.

APPENDIX G

Price indices & GDP at current prices

Table G.1: PRICE INDICES IN LITHUANIA, 1937=100

	Cost of living	General	Overall[a]	Crops	Livestock	Agricultural[b]	Industrial	Construction
1919	251.7	304.0	277.9	244.6	272.0	258.3	274.5	290.3
1920	755.2	912.0	833.6	733.9	816.0	775.0	823.6	870.9
1921	1258.7	1520.0	1389.4	1223.1	1360.1	1291.6	1372.7	1451.5
1922	125.9	152.0	138.9	122.3	136.0	129.2	137.3	145.2
1923	155.7	188.0	171.8	151.3	168.2	159.8	169.8	179.5
1924	184.8	211.1	197.9	174.2	193.8	184.0	195.5	206.8
1925	201.2	226.8	214.0	254.5	216.7	235.6	203.3	200.0
1926	189.9	208.1	199.0	210.6	200.0	205.3	203.2	188.1
1927	189.5	209.0	199.3	234.8	191.7	213.3	197.2	179.7
1928	182.6	208.6	195.6	242.4	181.3	211.8	193.5	172.9
1929	179.0	201.2	190.1	172.7	195.8	184.3	189.0	169.5
1930	159.7	167.9	163.8	127.3	206.3	166.8	177.5	164.4
1931	149.3	146.2	147.7	119.7	166.7	143.2	150.5	154.2
1932	126.3	119.0	122.7	107.6	97.9	102.7	120.4	132.2
1933	109.2	100.0	104.6	90.9	89.6	90.2	104.2	106.8
1934	101.8	94.5	98.2	86.4	81.3	83.8	98.6	98.3
1935	90.9	82.4	86.6	72.7	68.8	70.7	88.0	88.1
1936	90.7	85.6	88.2	75.8	83.3	79.5	90.6	83.1
1937	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1938	101.9	100.5	101.2	92.4	106.3	99.3	101.4	106.8
1939	107.3	105.3	106.3	95.5	112.5	104.0	107.5	111.9
1940	136.6	140.0	138.3	147.0	143.8	145.4	152.0	142.4

Sources: D. Micuta, ''Lietuvos finansai 1918-1928'', 2nd ed. (reprint from 1930), Pirmasis nepriklausomos Lietuvos dešimtmetis (Kaunas: Šviesa, 1990), 180; *Ostland in Zahlen* (Riga: Reichskommissar für das Ostland, 1942), 140; G. Vaskela, *Annual price indices for 1924-1939 in Lithuania (1913=100)*, 2011; G. Vaskela, *The monthly cost of living index in 1913 and 1923 to 1940*, 2011; *Statistikos biuletenis* 1924 and 1940 issues, pages on prices; 1919-1922 data is very approximate.

[a] Average between cost of living and general indices;

[b] Average between crops and livestock indices.

Table G.2: PRICE INDICES IN LATVIA, 1935=100

	General	Crops	Livestock	Agricultural[a]	Industrial
1919	5.0	4.9	4.2	4.5	6.0
1920	36.8	35.8	30.8	33.3	44.4
1921	268.6	261.3	224.5	242.9	323.9
1922	141.4	137.5	118.2	127.8	170.5
1923	146.0	151.1	149.1	150.1	167.3
1924	150.6	169.3	152.7	161.0	171.5
1925	146.0	162.5	183.6	173.1	163.9
1926	136.8	153.4	178.2	165.8	160.2
1927	139.1	158.0	192.7	175.3	161.5
1928	148.3	156.8	223.6	190.2	156.8
1929	137.9	140.9	181.8	161.4	152.9
1930	117.2	139.8	158.2	149.0	138.4
1931	97.7	103.4	94.5	99.0	119.6
1932	97.7	84.1	54.5	69.3	109.5
1933	96.6	89.8	76.4	83.1	102.1
1934	95.4	103.4	89.1	96.3	100.2
1935	100.0	100.0	100.0	100.0	100.0
1936	104.6	100.0	141.8	120.9	105.2
1937	129.9	117.0	201.8	159.4	145.2
1938	129.9	122.7	245.5	184.1	142.9
1939	135.6	140.9	241.8	191.4	150.9
1940	160.9	245.5	289.1	267.3	207.1

Sources: M. Skujenieks, *Latvija 1918.-1928. gados* (Riga: Valsts statistiskās pārvalde, 1928), 56; *Ostland in Zahlen* (Riga: Reichskommissar für das Ostland, 1942), 57; 1919-1921 data is very approximate.

[a] Average between crops and livestock indices.

Table G.3: PRICE INDICES IN ESTONIA, 1938=100

	General wholesale	Food wholesale	Agricultural	Industrial wholesale	Transport and communications	Cost of living	Cost of living food	Overall[a]
1919	27.6	24.9	31.5	31.6	10.5	18.8	24.7	23.2
1920	71.6	64.7	81.7	82.0	27.3	48.9	64.1	60.2
1921	119.9	108.4	137.0	137.4	45.7	81.9	107.3	100.9
1922	113.0	102.1	129.1	129.5	58.1	87.7	101.1	100.4
1923	114.0	108.5	130.1	123.2	58.1	98.3	118.7	106.2
1924	116.0	116.0	142.8	115.8	56.1	90.6	109.4	103.3
1925	124.0	125.5	152.6	120.0	77.8	97.3	116.8	110.6
1926	114.0	117.0	128.1	113.7	79.9	96.4	116.8	105.2
1927	114.0	116.0	136.9	112.6	81.0	95.5	110.9	104.7
1928	121.0	124.5	151.6	116.8	81.0	101.8	118.8	111.4
1929	117.0	120.2	135.9	115.8	81.0	106.4	124.8	111.7
1930	102.0	102.1	108.6	109.5	85.1	94.5	102.0	98.3
1931	91.0	95.7	85.4	95.8	86.2	90.9	89.1	91.0
1932	83.0	88.3	64.4	85.3	85.1	85.5	79.2	84.2
1933	85.0	90.4	69.4	85.3	82.0	80.0	76.2	82.5
1934	85.0	83.0	72.0	87.4	82.0	79.1	75.2	82.0
1935	84.0	80.9	75.8	87.4	82.0	80.0	76.2	82.0
1936	91.0	91.5	87.1	90.5	90.0	89.1	88.1	90.0
1937	101.0	98.9	98.7	102.1	97.8	94.5	95.0	97.8
1938	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1939	103.0	103.2	103.2	102.1	102.4	101.8	102.0	102.4
1940	125.0	120.2	120.2	128.4	124.3	123.6	118.8	124.3

Sources: Eesti arvudes 1937 (Tallinn: RSK, 1937), 230; *Kogu statistilisi andmeid Eestist* (Tallinn: Põllutööministeeriumi statistika osakond, 1921), 124; M. Klesment, ''Eesti majandusarengu dünaamika näitajaid sõdadevahelisel perioodil'', *Tuna* (Tallinn) 38, no. 1 (2008): 29; Z. Norkus et al., *Monthly Cost of Living Index in Estonia, 1919-1939*, 2022; Z. Norkus et al., *Monthly Wholesale Price Index in Estonia, 1919-1939*, 2022; *Eesti majandus 1938* (Tallinn: Eesti Pank, 1938), 124; *Ostland in Zahlen* (Riga: Reichskommissar für das Ostland, 1942), 103; *Eesti 1920-1930* (Tallinn: RSK, 1931), 291; 1919-1921 data is very approximate.

[a] Average between general wholesale and cost of living indices.

Table G.4: VALUE-ADDED AND GDP AT CURRENT PRICES IN LITHUANIA

	Currency	Agriculture, forestry, fishing	Industry	Construction	Services	GVA	GDP at market prices
1922	Litas	780.1	128.6	48.9	541.8	1499.4	1554.2
1923	Litas	1070	297.6	97.9	772.1	2237.7	2319.5
1924	Litas	1193.3	334.3	139.2	869.4	2536.2	2628.9
1925	Litas	1557	273.6	126.8	951.4	2908.7	3015
1926	Litas	1285.2	238.6	103	824.7	2451.5	2541.2
1927	Litas	1252.6	288.2	110.2	872.8	2523.8	2616.1
1928	Litas	1244.8	242.6	118.2	885.3	2490.9	2582
1929	Litas	1203.1	271.6	99.7	923.3	2497.8	2589.1
1930	Litas	1161.7	290.5	115.2	841	2408.4	2496.4
1931	Litas	1000.5	268.1	109.1	784.5	2162.2	2241.3
1932	Litas	721.8	224.1	79.5	660.1	1685.5	1747.1
1933	Litas	648.8	197.3	66	583.9	1495.9	1550.6
1934	Litas	652	194.3	43.8	575.4	1465.4	1519
1935	Litas	563	203.5	41.2	559	1366.8	1416.8
1936	Litas	634.5	232.7	49.4	585.5	1502	1557
1937	Litas	823	279.7	68.2	696.3	1867.2	1935.5
1938	Litas	850.3	291.8	78.6	726.2	1947	2018.2
1939	Litas	931.3	226.4	86.6	707.4	1951.6	2023
1940	Litas	1193.4	347.4	137.8	1039	2717.6	2816.9
1990	Soviet rouble	3500	4196.1	1454.5	6733.5	15884.1	

Sources: this thesis and B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 186

Table G.5: VALUE-ADDED AND GDP AT CURRENT PRICES IN LATVIA

	Currency	Agriculture, forestry, fishing	Industry	Construction	Services	GVA	GDP at market prices
1922	Lats	257.8	121.9	25.5	397.7	803	861.8
1923	Lats	359.8	163.6	28	463.4	1014.8	1089.1
1924	Lats	376.7	180.5	30.5	503.4	1091.2	1171.1
1925	Lats	460.8	189.8	30.8	520.2	1201.6	1289.6
1926	Lats	437.5	189.4	29.4	502.7	1159	1243.9
1927	Lats	475.7	207.4	29.3	526.4	1238.8	1329.5
1928	Lats	504.1	211.1	35.9	580.4	1331.5	1429.1
1929	Lats	459	232.3	37.3	579.7	1308.3	1404.1
1930	Lats	446.2	236.1	43.2	520.8	1246.3	1337.5
1931	Lats	280.2	174.2	28.7	395.6	878.7	943.1
1932	Lats	209.7	145.3	23	375.3	753.3	808.5
1933	Lats	277	178.9	21.7	395.9	873.4	937.4
1934	Lats	356.5	203.3	24.8	413.8	998.4	1071.5
1935	Lats	383.4	216.5	23.6	438.3	1061.8	1139.6
1936	Lats	464.6	238.8	30	474.4	1207.8	1296.2
1937	Lats	656.4	374.6	43.8	630.3	1705.1	1830
1938	Lats	795.8	393.5	42.5	643	1874.8	2012.1
1939	Lats	829.2	418.7	50	658.6	1956.6	2100
1940	Lats	968.6	566.8	57.4	769.9	2362.7	2535.8
1990	Soviet rouble	2000	3190.8	818.2	5382.3	11391.3	

Sources: this thesis and B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 186

Table G.6: VALUE-ADDED AND GDP AT CURRENT PRICES IN ESTONIA

	Currency	Agriculture, forestry, fishing	Industry	Construction	Services	GVA	GDP at market prices
1919	Mark (kroon)	3976.8 (39.8)	851.8 (8.5)	75.8 (0.8)	4879 (48.8)	9783.4 (97.8)	10040.8 (100.4)
1920	Mark (kroon)	12520.2 (125.2)	2847.9 (28.5)	197.5 (2)	8936.1 (89.4)	24501.7 (245)	25146.3 (251.5)
1921	Mark (kroon)	24864.3 (248.6)	6415.3 (64.2)	336.9 (3.4)	16180 (161.8)	47796.5 (478)	49053.9 (490.5)
1922	Mark (kroon)	23936.4 (239.4)	7298.5 (73)	321.9 (3.2)	17263 (172.6)	48819.9 (488.2)	50104.2 (501)
1923	Mark (kroon)	24424.5 (244.2)	8961.8 (89.6)	1064.6 (10.6)	19930.8 (199.3)	54381.6 (543.8)	55812.3 (558.1)
1924	Mark (kroon)	27648 (276.5)	8385.7 (83.9)	298 (3)	19192.5 (191.9)	55524.1 (555.2)	56984.8 (569.8)
1925	Mark (kroon)	33520.9 (335.2)	8534 (85.3)	607.7 (6.1)	21420.4 (214.2)	64083 (640.8)	65768.9 (657.7)
1926	Mark (kroon)	26817 (268.2)	8667 (86.7)	630.7 (6.3)	20640.2 (206.4)	56754.9 (567.5)	58248 (582.5)
1927	Mark (kroon)	29856 (298.6)	8055.8 (80.6)	247.5 (2.5)	20759.7 (207.6)	58918.9 (589.2)	60469 (604.7)
1928	Kroon	310.7	85.8	8.5	228.6	633.6	650.3
1929	Kroon	286.2	92.8	8.4	233.4	620.8	637.1
1930	Kroon	259	91.7	7.1	215.3	573	588.1
1931	Kroon	189.2	78.6	5.2	194.8	467.8	480.2
1932	Kroon	146	61.9	4.4	171.1	383.5	393.6
1933	Kroon	165.1	68.8	4.4	168.9	407.3	418
1934	Kroon	177.1	86.8	4.7	179.7	448.3	460.1
1935	Kroon	175.7	91	6.8	186.8	460.3	472.4
1936	Kroon	194.7	117.8	9.1	217.6	539.3	553.4
1937	Kroon	248.5	140.8	14.7	251.8	655.7	673
1938	Kroon	250.1	132.1	14	257.6	653.8	671
1939	Kroon	258.7	144.5	16	269.4	688.5	706.7
1940	Kroon	279.4	183.7	18.4	348.3	829.8	851.6
1990	Soviet rouble	1250	2203.4	818.2	3112.5	7384.1	

Sources: Tables 2.2, C.1, C.2 and C.3, G.1, G.2 and G.3 and B. Bolotin, ''The Former Soviet Union as Reflected in National Accounts Statistics'', ed. S. Hirsh, MEMO 3: In Search of Answers in the Post-Soviet Era (Washington, D.C.: IMEMO, 1992), 186