



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

Russian Journal of Economics 1 (2015) 130–153

Russian
Journal of
Economics

www.ruje.org

Economic Fluctuations in Russia (from the late 1920s to 2015)

Sergey Smirnov

National Research University Higher School of Economics, Moscow, Russia

Abstract

In many respects, the historical trajectory of the Russian economy during the XX century has been a terra incognita until now. As for official statistics, at least three important reasons can be given for this. First, many relevant indicators were either not measured or were kept secret and never published. Second, Russia (as the RSFSR) was a part of the USSR, and statistics for the RSFSR were much less prevalent than for the USSR as a whole (historical changes in Russia's borders also require special consideration). Third, an ideological dogma implied the absence of inflation in the planned Soviet economy; therefore, all deflators (if any) were underestimated, and all aggregates in constant and/or comparable prices were overestimated (as were the corresponding growth rates). As for the unofficial historical estimates, most of them were focused on the USSR, not on the RSFSR; therefore, there is a considerable risk in using them as a proxy for historical indicators of the Russian Federation.

Hence, our first aim was to construct statistical time series that might be useful in describing the long-term trajectory of the Russian (the RSFSR and/or the RF) economy. Using previously unpublished data stored in Russian archives, we attempted to extend them as far back as possible; in fact, most of the series began in the late 1920s.

Our second aim was to denote periods of growth and contraction in the Russian economy and to reveal the economic factors that caused changes in trajectory. Periods of contraction during the era of the planned economy were of special interest for us. We found that recessions had occurred, not only in the market but also in the planned Russian economy (of course, with a significant remark that contractions in the planned economy were much rarer but evidently more destructive).

© 2015 Non-profit partnership "Voprosy Ekonomiki". Hosting by Elsevier B.V. All rights reserved.

JEL classification: E32, N14.

Keywords: economic history, economic crises, planned economy, Russia.

E-mail address: svsmirnov@hse.ru.

Peer review under responsibility of Voprosy Ekonomiki.

<http://dx.doi.org/10.1016/j.ruje.2015.11.002>

2405-4739/© 2015 Non-profit partnership "Voprosy Ekonomiki". Hosting by Elsevier B.V. All rights reserved.

1. Introduction

What does one mean by the word “Russia?” Several medieval principalities? The pre-revolution Russian Empire? The Union of the Soviet Socialist Republics (the USSR)? The post-Soviet Russian Federation (the RF)? In fact, it can mean all of these things in the proper context. However, as modern Russia in its current borders is the only economic and political reality, the economic history of just this territory is of special interest. Paradoxically, we know more about the historical macroeconomic trajectories of the Russian Empire (Gerchuk, 1926; Varzar, 1928; Kafengaus, 1994; Goldsmith, 1961; Gregory, 2003a; Bokarev, 2006; Suhara, 2006; Markevich and Harrison, 2011) or the USSR (Bergson, 1961; CIA, 1963, 1971, 1990; JEC, 1962, 1973, 1976, 1982, 1990, 1993; Moorsteen and Powell, 1966, Davies et al., 1994; Harrison, 2002; and others)¹ than we do about the contemporary RF. In fact, Russia is a country with a nearly unknown economic history.

One of the main reasons for this lack of knowledge of Russia’s economic history is that systematic and comparable historical time series are unavailable. This situation was caused by some inherent features of the Soviet statistical system, particularly its focus on data for the entire USSR, the ubiquity of indicators important to Marxist economic theory and communist propaganda but not for conventional economic analysis (e.g., on the Marxist “theoretical basis” the service sector was almost fully ignored), very poor information on prices and deflators, a small number of regularly published indicators (because of a comprehensive regime of secrecy), etc. Of course, there was a long Western tradition of high-quality research on the Soviet economy². As a result, the most important methodological aspects for a more-or-less reliable recalculation of Soviet statistics into conventional Western standards were clarified, and a solid statistical foundation for empirical investigation of the USSR was built. The trouble is the inadequacy of using historical time series for the entire Soviet Union as an undisputed proxy for the Russian Soviet Federative Socialist Republic (the RSFSR), which had the same borders as the RF for decades (the RSFSR was a part of the USSR from 1922 until 1991).

Several interrelated publications by Ponomarenko, Kuboniwa and Rosefelde also introduced a set of historical time series for the RSFSR, including real GDP growth rates for 1961–1990 (see, in particular, Kuboniwa, 1997; Ponomarenko, 2002; Rosefelde and Kuboniwa, 2003). Their estimations are in line with the Bergson—CIA methodological approaches and use considerable internal (unpublished) information by Rosstat (Federal State Statistics Service). No academic researcher could ever dream of improving on or repeating their recalculations of Soviet statistical data for the RSFSR into the now commonly-used SNA format. However, this dataset also has two serious shortcomings. First, it depends heavily on the official Soviet volume indices for agriculture, retail trade and certain other sectors, and these indices are most likely overstated because of the underestimation of official deflators (see Rosefelde, 2003 for a keen criticism of the initial Soviet statistics and Western

¹ See Smirnov (2012) for a survey.

² In the West, the word “Russia” is often applied to the USSR. Strictly speaking, this is no more justified than using the word “England” for “Great Britain” or “Great Britain” and “the United Kingdom” as full synonyms.

estimates computed from them). And, second, this dataset tells us nothing about the many intriguing periods of Russian economic history, e.g., collectivization, industrialization, WW2 and the immediate post-war years.

Hence, our first aim was to construct statistical time series that might be useful to describe the long-term trajectory of the Russian economy (the RSFSR's and the RF's economies successively).³ It was not an easy task to select historical information for Russia in its present-day borders. However, the real trouble was the fact that during the entire Soviet period a significant amount of detailed economic information was collected through centralized Soviet ministries, and not all important statistical indicators were published (or even calculated) at the regional level.⁴ Hence, estimating indicators such as historical GDP is an arduous task (many specially designed statistical sources that did not exist in the Soviet Union are required), and it may be fully impossible to construct historical high-frequency (monthly and quarterly) time series. In this paper, we attempt to meet a less ambitious challenge, namely, to construct long-term *annual* time series for several of the *most important* sectors of the Russian economy. In Section 2, we attempt to trace them back as far as possible; in fact, most of them began in the late 1920s.

Our second goal was to trace Russia's continuous historical macroeconomic trajectory (the RSFSR *and* the RF), to denote periods of growth and contraction in the Russian economy and to reveal the economic factors that caused changes in the trajectory (see Section 3). Periods of contraction during the era of the planned economy were of special interest because even now many think that economic recessions caused by economic reasons are impossible in a planned or command economy. We tested this idea against long-term statistics. In Section 4, we summarize.

2. The Data

2.1. Official data in natural (physical) units for the RF and the RSFSR

An ideological dogma in the USSR held that inflation simply could not exist in a planned economy. Because all prices in the Soviet Union were under strict government control and were very seldom raised officially, it was even possible to believe this dogma. The methodological trick is now well known: the Soviet Central Statistical Administration (CSA) compared prices only for strictly unchanged products. Because price increases were prohibited without explicit government permission, official statistics usually showed no or very low price increases. However, if a producer modified (even slightly) its product, then the government considered this product to be completely new; the State Price Committee permitted a new (usually higher) price, while the CSA never compared it with the price of the old (unmodified) product. Hence, there was some inflation in reality but none in statistics.⁵

³ Hereafter, we shall use "Russia" as a synonym for the Russian Federation (the RF) and/or the Russian Soviet Federative Socialist Republic (the RSFSR).

⁴ This is especially true for the defence and military statistics. There is no real foundation for splitting these kind of data into time series for the RSFSR and for "all other" regions of the USSR.

⁵ See Harrison (1998) for interesting analyses.

This does not mean that all of the Soviet “volume indices” are completely useless (much of the research mentioned above has used them successfully), but here we — arbitrarily to some extent — decided to limit ourselves to indicators in natural (“physical”) units. This decision has meant an absence of long time series for trade (retail and wholesale) and for fixed investments in our set of indicators. The only exception to this rule was the Y-o-Y rate for industry; for this sector we used indices calculated from data with physical units and from official data in “fixed-year list-prices” (we provide arguments for this below).

More specifically, we compiled the following time series, most of which come from the late 1920s to the first half of 2015 (see Table 1).

It must be kept in mind that several changes occurred to the RSFSR/RF’s borders during these decades. The most important are:⁶

- the exclusion of Kazakhstan and Kyrgyzstan from the RSFSR in 1936 (they received the highest possible status of a “Union Republic” in the regional structure of the USSR). Therefore, we *excluded* the data for these territories from the official data for the RSFSR for the years through 1936;
- the transfer of Crimea from the RSFSR to the Ukrainian Soviet Socialist Republic in 1954. Therefore, we *excluded* the data for Crimea from the official data for the RSFSR for the years through 1954. In 2014, Crimea was returned to the RF, but official statistics for previous years still do not include it;
- from 1940 to 1956, the Karelo-Finnish Soviet Socialist Republic had the highest status of a “Union Republic.” Before 1940 and after 1956 it had the status of an “Autonomous Republic” in the regional structure of the RSFSR. Therefore, we *added* the data for the Karelo-Finnish Soviet Socialist Republic to the official data for the RSFSR for 1940–1956 period;⁷

Table 1

Main official Russian macroeconomic indicators, by sector.

Sectors of Economy	Units	Period*
<i>Industry</i>		
Index of industrial production, official	1960 = 100	1929–2015
<i>Agriculture</i>		
Livestock inventory	Million head	1927–2014
Grain production [†]	Million tonnes	1928–2014
Grain area planted	Million hectares	1925–2014
<i>Transportation</i>		
Railroad freight transportation	Million tonnes	1928–2015
<i>Residential construction</i>		
New completions, state organizations and establishments	Million sq. meters	1946–2014
New completions, population [×]	Million sq. meters	1980–2014

Notes: * until the first half of 2015; † the method of estimation radically changed in 1953; × workers and employees for 1946–1980.

Source: see Appendix B for details.

⁶ There were also several minor changes to the borders between the RSFSR and other “Union Republics.” Their macroeconomic outcomes are close to zero.

⁷ In 1940, as a result of the 1939–1940 war, the area of the Karelo-Finnish Soviet Republic expanded slightly as some territories (Vyborg and several others) were ceded from Finland to the USSR. There is no necessary statistical information to make this amendment, but it is definitely negligible for macroeconomic indicators.

- in 1945 (as a result of WW2), the Kaliningrad Region in the West and South Sakhalin (with several Kuril Islands) in the East were incorporated into the RSFSR. The economic role of these territories is not negligible (according to Rosstat, it may be up to 1% of GDP). Unfortunately, any correction is impossible because there is no information on economic conditions in these regions prior to their accession to the USSR as parts of the RSFSR. Thus, we can only suppose that the growth rates for certain macroeconomic indicators were overstated for 1945, but not to a great extent.

Our main sources of official data were:

- databases from Rosstat’s website (www.gks.ru);
- annual statistical yearbooks for the USSR and the RSFSR; other (non-periodic) official statistical handbooks;⁸
- documents never published by the Soviet Central Statistical Administration (CSA) and by other agencies of the Soviet government; those documents are now stored in the Russian State Economics Archive (RGAE).

For all compiled time series and their detailed sources, see Appendices A and B.

2.2. *Alternative index of industrial production for the RSFSR and the RF, post-1960*

The alternative index of industrial production (1960 = 100) is calculated using the geometric means of Y-o-Y percent changes, which, in turn, were calculated from base indices published by several independent (non-government) researchers (see Table 2). All of these authors estimated their indices as a weighted average of technical base indices, one index per industrial product (its output is in physical units). The authors used various weights and various sets of goods. The total number of products varied from 100 to more than 200, but all of them were non-military. Therefore, strictly speaking, the aggregated indices are not for “total industry” but only non-military or civilian products. The role of military production for the official index of industrial production is unknown.⁹

Table 2

Alternative annual indices of industrial production for Russia.

Source	Period	Number of products
Suhara (2000)	1961–1997	100
Ponomarenko (2002)	1961–1990	117
Alekseev (1994) and Alekseev et al. (1996)	1976–1994	222
Smirnov (2013a)	1981–1992	108
Baranov and Bessonov (1999) [†]	1990–2006	126
Baranov and Bessonov (1999) [†]	1995–2010	236

Note: [†] time series were kindly supplied by the authors for our research.

⁸ Scanned copies of most of them can be found at the privately-owned website <http://istmat.info/statistics>.

⁹ Needless to say, this is a very intriguing issue, but it is also very special and highly complex. We doubt that enough information has ever existed to split—in a meaningful manner—the historical data on military expenses and military production in the USSR between the RSFSR and all other regions of the Soviet Union. On the role of the defence or military sector in the USSR, see Simonov (1996) and Gregory (2003b). The current situation in the RF is described in Balashov and Martianova (2015).

3. Economic Dynamics in Russia, from the late 1920s to 2015

3.1. Main Annual Indicators Trajectories

The long-term trajectories for the main Russian macroeconomic indicators are shown in Figure 1.¹⁰ A few brief comments are naturally required.

Industrial Production. The official index of industrial output begins in 1929 and ends in 2015; the alternative index begins in 1960 and ends in 2010. As the official Y-o-Y % changes are quite close to the alternative estimates in recent years, there is currently little interest in any alternative figures (that is why our mean alternative index ends in 2010). However, this was not the case prior to 1991. At that time, the official Y-o-Y rates were calculated using the list prices from some fixed year (initially, the 1926/27 fiscal year, then the 1953 calendar year, etc.). As there was some permanent (unknown) inflation in reality, the official industrial rates were too high. A comparison with the mean alternative index for the 30 years from 1961 to 1990 indicates an average overshoot of 2.0–2.5 percentage points. On the whole, the official index rose five times during this period, while the mean alternative index rose 2.5 times.¹¹ On the other hand, the two time series of rates moved in a more-or-less synchronized manner during this period (the correlation coefficient is 0.94). This means that for past periods, one may use not only alternative indices but also the official index to date decelerations and accelerations of industrial trends.

The most definitive declines in industrial production took place in 1942, 1945–1946, 1979, 1989–1996, 1998, 2009 and 2015.

Agriculture. We used livestock inventory as a main indicator to characterize total activity in the Russian agricultural sector.¹² Large declines in this inventory are clearly connected to the periods of “hard times” in Russian economic history. The most significant reductions (more than 5% in a year) in livestock inventory took place in:

- 1928–1932: collectivization.¹³ The rural population slaughtered more than half of their private livestock. It is well known from many “non-statistical” sources (including memories and witnesses) that the main driver of this drop was a strong unwillingness to turn over private livestock to “collective farmers”^{14,15}; another serious reason was a deficit of feed for horses and cattle;
- 1941–1942: the first two years of the war between the USSR and Nazi Germany: a considerable amount of Russian territory was temporarily lost;

¹⁰ We also attempted to create a semi-log scale and charts for Y-o-Y % changes, but charts for absolute levels are more distinct. Other types of diagrams are available from the author upon request.

¹¹ If one views the Soviet statistics as an “instrument of propaganda”, one would agree that its effectiveness was quite high: for each “unit” of output produced by industrial establishments during 1961–1990, the statistical system created just another “unit”. As a result, in 1990, the total “official” index was twice the (more realistic) “unofficial”.

¹² As supplementary indicators for agriculture, we also used time series on grain production and on grain area planted. It is worth noting that the average harvest after 2000 (slightly more than 80 million tonnes) is roughly equal to the average harvests of the 1960s, while the area planted is 1.7 times less. Is any other proof as to the ineffectiveness of the Soviet planned economic system needed?

¹³ See Davies and Wheatcroft (2009) for excellent research on this period.

¹⁴ See, for example, Lopatin and Lopatina (2009, pp. 22, 30, 84 et seq.).

¹⁵ According to www.merriam-webster.com, a collective farm [or “kolkhoz” in Russian] is “a farm... formed from many small holdings collected into a single unit for joint operation under governmental [and the Communist Party’s] supervision.” Collectivization in the USSR was a highly coercive process.

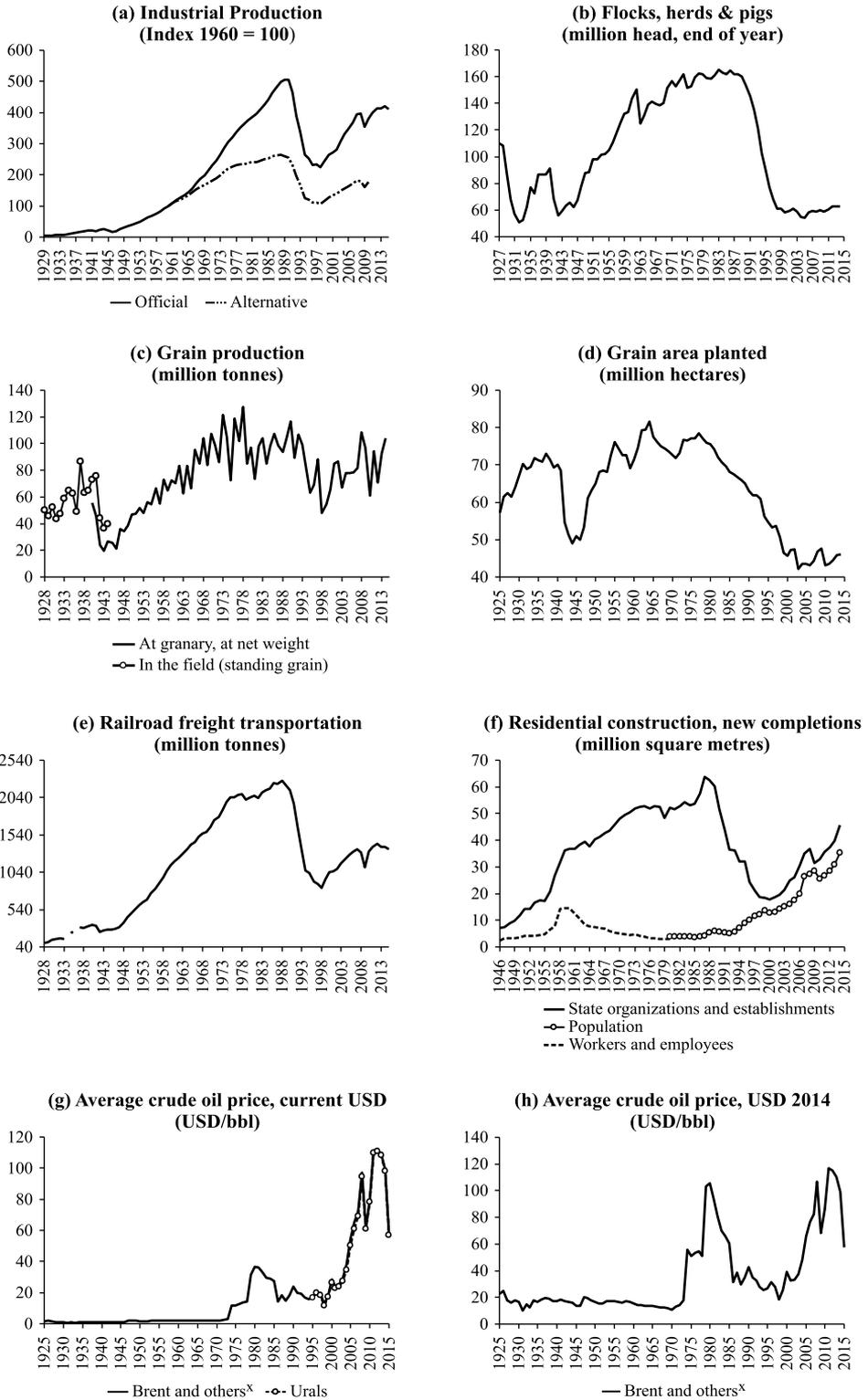


Fig. 1. Main annual indicators for the RF and the RSFSR.

Note: ^x Brent since 1984, US Average through 1944, Arabian Light for 1945–1983.

Sources: Appendix A; BP; Reuters.

- 1936, 1946, 1963 and 1975: the years of crop failures;¹⁶ the number of pigs was the most volatile because their owners preferred to eat them in lieu of feeding them;
- 1987–2000: a prolonged transition period in the animal industry; the appearance of a high volume of meat imports that had never previously occurred;
- 2003–2005: high exports of grain against the backdrop of low crop yields brought high fodder prices; low-producing livestock were slaughtered.

Residential construction. In 1950, average per capita urban floor space in the RSFSR was only 6.4 square meters. Evidently, there was a great need for housing. However, in a planned economy, because limits to production were set by supply rather than by demand, residential construction was at a very low level for years until special enactment No 931 was approved by the Central Committee of the Communist Party and the Soviet Government on July 31, 1957. This had an immediate effect: by 1958, the Y-o-Y increase in new residential completions made by workers and employees exceeded 80%. In the following years, new completions made by state organizations and new completions made by the total population (workers and employees up to 1980) usually moved in opposite directions. They became more or less synchronized only after 2000.

Railroad freight transportation. The volume of railroad freight transportation is an indicator that is definitely well synchronized with the level of economic activity in Russia.¹⁷ Ordinarily its growth is highly monotonic; a decline in railroad freight transportation always indicates serious problems in the Russian economy.

Crude oil prices. Many believe that the Russian economy is highly dependent on the international oil market (as was the Soviet economy prior to 1991).¹⁸ The annual time series of international prices for Russian oil (“Urals”) began just recently in 1995, but the trajectory of the Russian oil market is very close to the trajectories for other types of oil, which means that we can use historical prices for international oil types as a proxy for the Urals price. It can be assumed that high or rising oil prices were positive for the Russian economy, while low or declining prices were negative.

The years of decline in absolute terms for all indicators under consideration are highlighted in Figure 2 with dark gray circles.

Unfortunately, it is impossible to reasonably combine all of these indicators into a single composite: a) the indices are available for different time periods and have different omissions (usually in the 1930s); b) some indices are flows (e.g., industrial output), others are stock (e.g., livestock inventory); and, most importantly, c) there is no information about potential “weightings” for the components; the only thing we may be aware of is that these weightings have changed significantly since the end of the 1920s. Therefore, all we can do is carefully trace the trajectories for all of the indicators, look for their contractions and then—based on qualitative analysis—attempt to identify years with overall contractions, or contractions of the whole economy.

¹⁶ The 1963 crop failure was the first time grain was imported to the USSR for many decades.

¹⁷ This may even be a leading one because the transportation of raw materials—not other goods—has been the main specialization of Russian railroads. Surely, the leading effect may not be observable with annual data but can be seen by examining more frequent data (e.g., monthly). See Smirnov (2013b) and Macheret (2015).

¹⁸ See Kuboniwa (2014) and the references herein for the most important details.

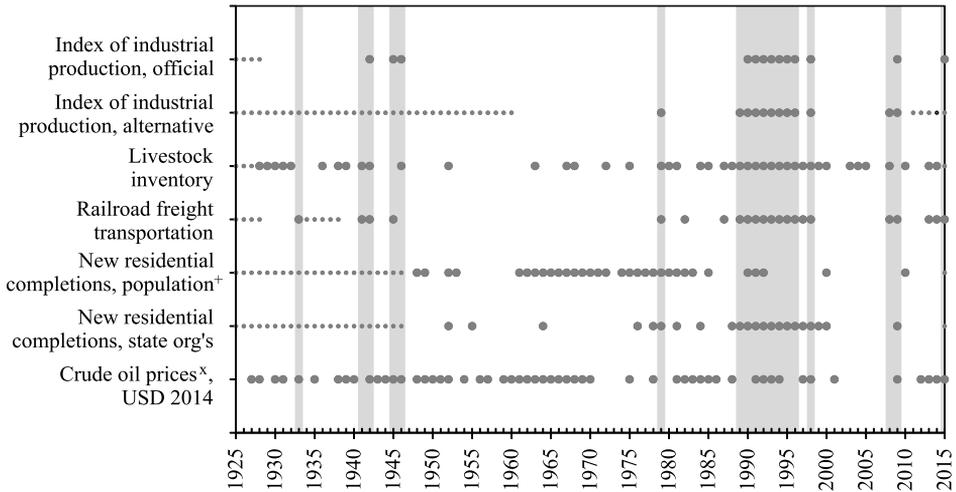


Fig. 2. Main Russian macroeconomic indicators: years of contraction*.

Notes: * gray columns—the years of overall economic recession; dark gray circles—the years of negative or zero growth rate of a particular indicator; small circles—data not available; + workers and employees for 1946–1980; * Brent since 1984, Arabian Light for 1945–1983, US average through 1944.

Sources: Appendices A and B.

3.2. Overall Contractions in the Russian Economy

In the late 1920s and early 1930s, Russia was shaken by the controversial processes of collectivization and industrialization. As mentioned above, these years were very destructive for the Russian animal industries: the livestock inventory in 1932 was only 46% of the 1927 level. On the other hand, the results for the crop output from the Russian agricultural sector were not as bad. The total grain area planted in 1932 was 12% higher than in 1928, and grain production was only 5% lower. Despite this, there was a great famine in Russia in 1932 and 1933, with up to several million victims.¹⁹ Because total grain production was not as low in 1931 and 1932, the cause of the famine could only be found in the Soviet government's decisions. The most popular idea (almost an “official” one) connects the requisition of crops from individual rural households with the needs of rapid industrialization (supposedly, the grain was exported, and the earnings were spent on industrial equipment).²⁰ Indeed, the growth rates for industry in the RSFSR were very high during the first and the second economic plans (1929–1937): always double-digit and sometimes approximately 20% or more per year. Of course, the official figures were based on list prices from the fiscal year 1926/27 and may be overstated to an unknown extent. In any event, they were usually high, with one important exception: the growth rate was only 5% in 1933. This is in stark contrast to the preceding and subsequent years; it is also

¹⁹ The famine was no less serious in the current territories of Kazakhstan and especially Ukraine, but here we focus on Russia only.

²⁰ Other researchers emphasize great losses while gathering the harvest due to the low level of agricultural technology and the high level of irresponsibility on the part of newly established collective farmers. See Zhuravlev (2012).

near the level of the differences between the official and the alternative industrial indices caused by inaccurate deflators in the official statistics, as it can be observed in the 1960s and later years.

Therefore, it is quite plausible that real industrial growth was close to zero or even negative in 1933. Russia's railroad freight transportation volume also fell in 1933 (decline had been very rare before WW2). We therefore hypothesize that the total level of economic activity in the RSFSR declined during 1933 and that the first crisis in the planned economy took place sometime that year. The famine in rural areas, the very low (or even negative) growth in industry and declining railroad freight transportation can all be considered arguments for this proposition.²¹ The roots of this crisis were in the Soviet government's economic policy concerning the agricultural sector, as well as in the low world prices for grain exports by the USSR.²²

The next economic contraction occurred in 1941 and 1942, which was obviously related to the destruction caused by the war and temporary losses of territory (Soviet statistics did not account for economic output in the territories occupied by Germany). The agricultural sector was most heavily damaged: livestock inventory dropped by 25% in 1941 and by 19% in 1942; grain production decreased by 18% in 1941 and by 47% in 1942.²³ Railroad freight transportation fell 3% in 1941 and 27% in 1942. Lastly, according to official data, industrial production grew by only 4% in 1941 and declined by 9% in 1942.²⁴ We therefore have strong evidence that the total output of the Russian economy did contract in 1941, especially in 1942.

During the next two years (1943–1944), strong economic growth was observed as the territories previously occupied by Germany were returned to Soviet control and the production of military goods expanded greatly. However, by the end of the war and shortly after, a more or less ordinary post-war crisis began. A considerable number of military goods and ammunition were no longer needed, and their excessive production had to be cut. Therefore, industrial production dropped by 16% in 1945 and by 22% in 1946.²⁵ The drought of 1946 had an additional negative effect on the Russian economy. Grain production declined by 17% in 1946 (after a 6% decline in 1945), and livestock inventory declined

²¹ Detailed analyses in Davies (1996) do not contradict this thesis.

²² These low prices were the main channel of influence that the Great Depression in the US and certain other industrialized countries had on the Soviet economy. By that time, the USSR had largely decoupled from the world economy. All other economic interconnections were weak, with the exception of “imports of brains” (see Korneychuk (2015) for interesting details).

²³ And by an additional 18% in 1943. Total grain production in 1943 was only 36% of 1940 production.

²⁴ The growth of 1941 may be overestimated because of incorrect deflators. On the other hand, this disturbance is probably less than usual because price controls were evidently stricter during the war years. In any case, the industrial production of the RSFSR was much more dynamic than in the USSR as a whole (a drop by 2% in 1941 and by 21% in 1942). There are two reasons for this: a) the loss of territories (in percent) for the USSR was much greater than for the RSFSR, as all the Soviet republics in the West of the USSR (Ukraine, Belarus, Moldova, the Baltic States) were totally occupied, and their contribution to the total output of the USSR was equal to zero (a decline of 100%); b) a number of large industrial plants were moved from the western regions of the USSR to the eastern regions of the RSFSR during the first months of the war. Their output in the new locations expanded the industrial production of the RSFSR.

²⁵ It's impossible to split the official index of industrial production into military and civilian parts. Hence, common sense would dictate that a significant decrease in military production took place, but several hypotheses about civil production are possible.

by 6%. Railroad freight transportation grew by 5% in 1946, but there had been a decline of 1% in 1945.

The post-war expansion that began in 1947 was long and pronounced. Growth rates were very high in the late 1940s and through the first half of the 1950s (often approximately 15–20% annually for industrial production and railroad freight transportation). They then began to slow and 25 years later dropped to a level of 2–3%. It is possible that they could have slowed further and quite quickly, but in 1974, the world price for crude oil (Russia's main export item) grew 3.5 times as a result of OPEC actions (from USD 3.3 to USD 11.6 per barrel). This price increase gave the Russian economy a respite but only until the end of the 1970s.²⁶

In 1979, the second post-war crisis took place: industrial production fell by 0.4%,²⁷ livestock inventory by 0.2%, grain production by 33%, railroad freight transportation by 4% and new residential completions by 6–7%. The crisis of 1979 was that of the planned Russian economy as a system. First, constraints had appeared on the supply side; up to this moment the main resources of the Russian economy had ceased growing rapidly (e.g., the ratio of the urban population to the total population had almost reached its “saturation point” and the growth of this labor force, which was more productive than the rural one, had dramatically slowed down; the grain area planted was nearing its maximum potential, etc.). Second, there were no major incentives on the demand side. While a number of relatively modern plants for chemicals, electronics, automobiles and other industries had been introduced during the previous two decades, there was no large incremental demand for these products.²⁸ And third, there was little incentive to have an active business position for either individuals or organizations. Career advancement for individuals was very slow. For organizations, the largest part of their profits (not just taxes!) was withheld from them by the state. The Kosygin–Lieberman reforms implemented in 1965 to encourage private initiative and responsibility had been exhausted by the early 1970s. By the late 1970s, all previous discussions about them had been completely forgotten.

The crisis of 1979 was quite acute, but it was not too deep or too long. OPEC raised oil prices 2.3 times (up to USD 31.4 per barrel) and saved the Soviet planned economy at that time, but it never returned to rapid growth. As the price of oil decreased, military expenses for the war in Afghanistan went up, and no structural problems of the planned economy were solved, the Russian economy was therefore experiencing a long period of stagnation. From 1980 to 1988,

²⁶ The factors for the long decline in Russian growth rates were discussed by Easterly and Fisher (1995) and Rosefielde and Kuboniva (2003).

²⁷ Measured by the average alternative index. The official data give +3% (the minimum for all years since 1947).

²⁸ It must be kept in mind that there is some specificity in the concept of “demand” under the planned economy. For example, in 1971, the first assembly line at the largest Soviet automobile plant was implemented; at the end of 1973, the whole plant was completed. Total production of automobiles in 1974 (1 million) turned to be roughly 4 times larger than in 1970 (0.26 million). Does this mean that demand for automobiles was fulfilled? Of course not. The number of automobiles per capita in Russia was many times lower than in the U.S. or European countries; those who wanted to buy an automobile had to wait two or three years for permission or to buy one immediately at the black market. But there was no “demand” for production of more automobiles from those in the USSR who were responsible for investment decisions; they thought they had produced “enough” for the population. The output of automobiles in the planned Russian economy never exceeded 1 million by more than 16%, while there were zero automobile imports.

the growth rate in the alternative index of industrial production was never higher than 1.5–1.7%;²⁹ the average annual growth rate for railroad freight transportation was only 1.3%; and the livestock inventory stopped increasing at all. After oil prices were halved in 1986 (to USD 14.4 per barrel), the situation became much worse. A burst of enthusiasm came after the accession of Mikhail Gorbachev in 1985, but his reforms were poorly thought out and inconsequential; in some respects, they unsettled the Soviet financial system.

From 1989 to 1991, the first wave of the Great Russian Depression came. Industrial production decreased by 12% during these three years;³⁰ railroad freight transportation dropped by 13%; livestock inventory was down by 10%; new residential completions made by state organizations declined by 30%, etc. Monetary reform was unsuccessful in 1991; the financial system became unbalanced, and there was an overall deficit of consumer goods.

At the end of 1991, the USSR collapsed as a unified whole, and the Soviet planned economic system came to an end. Russia began to exist as an independent state within the boundaries of the RSFSR. The new government initiated serious pro-market economic reforms. These reforms were based on ideas proposed by the IMF and included liberalization of prices, liberalization of foreign trade, privatization of state enterprises and several structural reforms. The reforms were neither consistent, nor easily accepted; there was a strong lobby against them.

The second wave of the Great Russian Depression (the so called “transition crisis” or the regeneration of a market economy) lasted from 1992 to 1996. For these five years, industrial production contracted by 50%;³¹ livestock inventory fell by 48%; railroad freight transportation declined by 47%; and new residential completions made by state organizations were down by 45%. Taken together, the two waves of the Great Russian Depression were much more damaging than the American Great Depression of the 1930s. For example, in the United States, the maximum decrease in industrial output (using annual statistics) was 47% (from 1929 to 1932); in Russia, this indicator was 56% (from 1988 to 1996).

There were three main reasons for this drop. The first was the distorted structure of the Russian economy. Since it had been destroyed by the planning system, the output of military goods and certain low quality products was too high. In a market economy, without a single planning (decision-making) center, there would be no reason to produce these goods in the same quantities. Therefore, the production volumes for large numbers of goods had to be reduced. The second reason for the sharp decline was the low competitiveness of most sectors of the Russian economy; strong competition from imported goods and services displaced large numbers of Russian goods (import competition was quite new to Russian producers). The third reason was that Russian owners and managers had no experience in seeking consumers and suppliers, exporting, receiving bank loans, setting prices for their own products, etc. In the planned economy every

²⁹ With only one exception: in 1986 it was equal to 2.8%.

³⁰ If measured by the alternative index. The official industrial index began to decrease in 1990; it fell by 8.1% during 1990–1991.

³¹ Official statistics became much more reliable after the USSR; there is no need for alternative estimates after 1991.

establishment had all of these parameters fixed by the Central Planning Agency. During the transition period, Russians gained all of this market knowledge, but this learning proved quite costly. The absence of market experience was probably the most important factor in the transition crisis. For this reason, output of non-military and highly competitive Russian goods also declined (e.g., oil production declined 49% between 1988 and 1996).

During the transition period, a large number of state plants were privatized; market laws were adopted; a new budget system and banking sector were built; economic agents accumulated initial market experience, and the risk of reestablishing communism diminished.³² The Russian economy had reached its low point, and there was nowhere to go but up. Therefore, in 1997, after eight years of continuous decrease that had seen Russian economic output cut in half, there was a brief period of recovery.

This first recovery of the Russian post-planning era was fully disrupted in November 1998. First, the world crisis, which began at the end of 1997 in Southeast Asia, caused foreign capital outflows from all emerging markets, and Russia was no exception. Second, as the world economy slowed and global demand for crude oil lessened, oil prices declined to USD 10–11 per barrel (much less than was required to fulfill the Russian budget). Therefore, the international exchange reserves of the Russian Central Bank were exhausted, and the federal budget was unable to service the government's debt. Under these circumstances, there were two important decisions: the Russian government declared a default on its bills and bonds, and the Russian Central Bank stopped adhering to a fixed exchange rate regime.³³ As a result, several of the largest Russian commercial banks went bankrupt, many individuals and non-financial companies lost their money, and the Russian ruble was devalued four times over a period of just months. In 1998, real GDP fell by 5.3%, industrial production by 4.8%, railroad freight transportation by 5.9%, etc. As the base level was not especially high, there was little room for decline, and the contraction in 1998 was much less than during the transition period. In any case, at its lowest point, the total output of the Russian economy fell back to levels of the early 1960s.

The strong devaluation of the ruble generated the process of substituting imports with domestic goods and services. This factor became the most important driver for the recovery in 1999 and 2000. Later, the output of the Russian economy was driven by rapidly rising oil prices and increased oil exports. Since 2004, the main “locomotive” for the Russian economy has been the rise in household expenditures backed by fast-growing personal incomes and a large expansion of personal credit. In 2007, oil prices were slightly under USD 80–90 per barrel, and domestic demand grew by 10–12% per year. The high dependency of the Russian economic growth on rapidly increasing oil prices and unsecured consumer loans increased worries of overheating in the economy. The drastic decline in inventories during the Russian crisis of 2008–2009 proved this hypothesis to be true.

The 2008–2009 recession came to Russia through the world financial markets, which were shaken by the Lehman Brothers' bankruptcy. From the end of

³² The political risk of restoring communism and returning to a planned economy existed until the presidential elections in the middle of 1996, which is when Boris Yeltsin won a new 4-year term.

³³ To the “crawling peg” regime, according to the IMF's classification, to be precise.

2007 to September 2008, there was an illusion that the Russian economy—with its enormous (more than half a trillion dollars) and still growing foreign exchange reserves, surplus federal budget and oil prices at more than USD 100 per barrel—might be a safety haven in a stormy world economy. Oil prices drop to one-third of their prior level (to USD 38 per barrel in December, 2008), massive capital outflow and difficulties in access to global financial markets proved this dream to be an illusion. The overheating of pre-crisis domestic demand and a lack of skill in managing inventories resulted in a significant decline in production. In 2009, real GDP declined by 7.8%, industrial production by 9.3%, new residential completions made by state organizations declined by 14.6%, and railroad freight transportation fell 15% (after a 3% decline in 2008).³⁴

After the recovery in 2010–2011, it became clear that the old pattern of Russian growth, which was based on high and continually increasing oil prices, would not return. With nearly stable domestic oil production and nearly stable (and still very high!) world oil prices, no other driver for the Russian economy appeared. Capital outflow remained high; the competitiveness of goods (except for crude oil and certain other raw materials) remained low; most regional budgets experienced deep deficits; the ratio of bad debts to banks' assets increased; (ineffective) government companies obtained an unreasonably inflated role; inflation continued to be significant (6–8% per year), which prevented the Central Bank from lowering high interest rates; the investment climate for private businesses (foreign and domestic) became worse, etc. As a result, dismal stagnation occurred in 2012 and 2013.

Since the spring of 2014, Western financial sanctions connected with the Ukrainian crisis, related Russian self/anti-sanctions and—several months later—a steep decline in oil prices have put the Russian economy on the threshold of a new recession (or, rather, stagflation, because inflation has risen to double-digit levels). Most experts predict a contraction in real Russian GDP of up to 4–5% in 2015. This recession will hardly be deeper, as no significant inventories have been accumulated. However, the period without steady economic growth in Russia may really be quite prolonged.

Table 3 shows all nine recessions for the Russian economy over the past 88 years (1928–2015).³⁵

4. Conclusion

In this paper, we compiled several important annual time series for the RSFSR and the RF in physical units and corrected them for territorial changes. This allowed us to trace the trajectory of the Russian economy (the economy of the RSFSR and the RF) from the late 1920s up to the present time. Although we did not estimate historical GDP for Russia, (Russian data on trade and services are very incomplete and unreliable for the Soviet period, and data on foreign trade are completely unavailable), we could discern the periods of economic expansion and the years of contraction using information previously stored in archives.

³⁴ As the deep crisis in Russia began only at the end of the third quarter of 2008, and there had been previous overheating, there was not enough time to make the 2008 annual growth rates negative for most other indicators.

³⁵ Here we count the two waves of the Great Russian Depression as separate ones.

Table 3

Russian Recessions and Their Causes, 1928–2015.

Years of contraction	Causes of contraction
1933	Destruction of the agricultural sector caused by the “total collectivization” policy. Low world prices for Russian raw exports.
1941–1942	Destruction of assets due to the war. Temporary loss of territory.
1945–1946	Cuts of not required any longer military production. The drought of 1946.
1979	Exhaustion of extensive factors, including the conversion of the population from rural to (more productive) urban. Significant introduction of modern industrial equipment during the two previous decades; no connection between final demand and investment decisions. Weak incentives to grow and to develop for individuals and organizations.
1989–1991	The first wave of the Great Russian Depression (the death throes of the planned economic system). All structural problems of the late Soviet planned economic system were aggravated by vague reforms and decreasing oil prices. Unbalanced financial system and overall deficit of consumer goods.
1992–1996	The second wave of the Great Russian Depression (the transition from a planned to a market economy). The complete absence of “market experience”, distorted structure of the economy, low competitiveness of Russian goods and services and incompleteness of market reforms resulted in the Russian economy’s output declining by roughly half.
1998	The Russian economy was affected by the Southeast Asian financial crisis. Intensive foreign capital outflow and a decline of Russian oil prices to USD 10–11 per barrel, forced default on treasury bills and bonds, bankruptcy of several of the largest commercial banks, loss of money by many economic agents, contraction in total output by approximately 5% and devaluation of the ruble by a factor of 4.
2008–2009	After the Lehman Brothers’ bankruptcy in September 2008, Russian banks and companies were nearly cut off from global financial markets, massive capital outflow began from Russia and other emerging markets and oil prices fell to one-third of their pre-crisis levels. Overheating of pre-crisis domestic demand and a lack of skill in managing inventories resulted in a significant decline in production.
2015–?	Consistent quelling of entrepreneurial spirit and excessive administrative pressure on business paved the way for the recession triggered by the mutual sanctions from the West and especially by the radical drop in oil prices. At the moment, any positive drivers for economic growth are not very obvious.

In total, there were nine recessions in the Russian economy (two of them merged as two successive “waves” of the Great Russian Depression—the first just before the collapse of the USSR and the second immediately following). Four contractions took place during the 63-year period of the planned economy; one was a transitional crisis (it lasted for five years); the last four occurred during the modern—more-or-less ordinary—market Russian economy during its 24-year history.

Evidently, contractions of output under the planned Soviet economy occurred less frequently than under market conditions. Until the very end, they were also less profound. We believe this is because in a market economy, any economic agent will pay for his own (or someone else’s) errors in the near future; mistaken actions will soon have consequences. On the contrary, in a planned economy, the consequences of erroneous decisions may be contained through new commands and directives, but there will be an inevitable “default” in the end. If one does not correct one’s errors regularly, then he will hardly be successful when a difficult new situation arises.³⁶

³⁶ A considerable amount of economic literature is dedicated to this period of Russian economic history (e.g., see Aslund (2013) for its description).

We strongly believe that the main reason for the depth and endurance of the transitional crisis in the first half of the 1990s was simply an “ossification” of the Soviet planning system with all of its mechanisms and proportions: because there was no political will to adjust it gradually, it finally broke off completely. Therefore, in our judgment, the steep drop during the two waves of the Great Russian Depression is due entirely to the Soviet command system. We consider the risk of a sharp decline after a long period of stable growth as a special risk for planned economies.³⁷

Of course, good or bad decisions made by monetary and non-monetary authorities are significant not only for Russia but also for many other nations. For example, one may argue that too many years of low interest rates in the mid-2000s caused the American Great Recession of 2008; one may even blame the U.S. Federal Reserve System for this expensive misstep. However, for the command Soviet economy, the centralized decision-making process was of critical importance. In this context, one may remember not only the collectivization but also the industrialization in the 1930s, the campaign for developing virgin lands initiated by Nikita Khrushchev (the Soviet leader in 1953–1964), the construction of the Baikal-Amur Railroad (a 30-year project begun in 1972) and so on. Mega-projects were always the focus of the Central Planning Agency, and the trajectory of the Soviet economy was determined by their success or failure to a much greater extent than in any market economy with its millions of “decision-making centers”. Highly centralized decision-making, an aspiration to concentrate the production of any good at only a few giant establishments and sometimes politically or ideologically (not purely economically) motivated decisions protected the Soviet economy from remarkable contractions for decades. However, was its far lower ability to self-adjust not simply the other side of the same coin?

The role of internal imbalances and external shocks (especially from world oil markets) were also significant, especially as Russia became more open to the world, not only through markets for goods and services but also through financial markets. The crises of 1998 and 2008–2009 were definitely provoked by external processes. The crises of 1933, 1989–1991 and 2015 were made deeper by low oil prices, and the crisis of 1979 was softened and even stopped by rising oil prices, but the roots of all four of these recessions were inside Russia, not outside.

New rounds of research on the cycles of economic activity in planned (command) economies are definitely on the agenda. As for Russia, our paper has created a fair statistical basis for them.

Acknowledgements

The author is grateful to Mark Harrison, Iaan Venter and the anonymous reviewers for helpful comments on earlier drafts of the paper and to Eduard Baranov and Vladimir Bessonov for providing historical information for their indices. The support from the Basic Research Program of the National Research University Higher School of Economics is also gratefully acknowledged.

³⁷ One may remember China in this context.

References

- Alekseev, A. V. (1994). Alternative estimates of Russian economic growth. *EKO*, 11, 94–108 (In Russian).
- Alekseev, A. V., Kiselyov, A. V., & Kuznetsova, N. N. (1996). Long-run tendencies in Russian economic growth. *EKO*, 1, 108–126 (In Russian).
- Åslund, A. (2012). *How capitalism was built: The transformation of Central and Eastern Europe, Russia, and Central Asia* (2nd ed.). N. Y.: Cambridge University Press.
- Balashov, A., & Martianova, Ya. (2015). Re-industrialization of the Russian economy and the development of military-industrial complex. *Voprosy Ekonomiki*, 9, 31–44 (In Russian).
- Baranov E. F., & Bessonov, V. A. (1999). Indices of industrial production (January 1990–december 1998). *Promyshlennost Rossii*, 3, 4–12 (In Russian).
- Bergson, A. (1961). *The real national income of Soviet Russia since 1928*. Cambridge, MA: Harvard University Press.
- Bokarev, Yu. (2006). Growth rates of industrial output in Russia from the late XIX to the early XX century. *Ekonomicheskii Zhurnal*, 1, 158–190 (In Russian).
- CIA (1963). *Index of civilian industrial production in the USSR, 1950–1961* (CIA/RR ER 63-29). Central Intelligence Agency. Washington, DC: U.S. G.P.O.
- CIA (1971). *Indexes of Soviet industrial production, 1950–70* (Intelligence Report ER IR 71-11). Central Intelligence Agency. Washington, DC: U.S. G.P.O.
- CIA (1990). *Measuring Soviet GNP: Problems and solutions. A Conference Report*. Central Intelligence Agency. Washington, DC: U.S. G.P.O.
- Davies, R. W., Harrison, M., & Wheatcroft, S. G. (Eds.) (1994). *The economic transformation of the Soviet Union, 1913–1945*. Cambridge: Cambridge University Press, 1994.
- Davies, R. W. (1996). *Crisis and progress in the Soviet economy, 1931–1933*. London: Macmillan.
- Davies, R. W., & Wheatcroft, S. G. (2009). *The years of hunger: Soviet agriculture, 1931–1933* (Rev. ed.). N. Y.: Palgrave Macmillan.
- Easterly, W., & Fischer, S. (1995). The Soviet economic decline. *World Bank Economic Review*, 9, (3), 341–371.
- Gerchuk, Ya. P. (1926). Index numbers of the physical volume of industrial production computed by Konyunktumnyi Institute. *Ekonomicheskii byulleten Konyunktumnogo Instituta*, 2, 12–20 (In Russian).
- Goldsmith, R. W. (1961). The economic growth of tsarist Russia 1860–1913. *Economic Development and Cultural Change*, 9 (3), 441–475.
- Gregory, P. (2003a). *Economic growth of the Russian empire (the late XIX – early XX centuries). New estimates and calculations*. Moscow: ROSSPEN (In Russian).
- Gregory, P. (2003b). Soviet defence puzzles: Archives, strategy and underfulfilment. *Europe–Asia Studies*, 55 (6), 923–937.
- Harrison, M. (1998). Prices, planners, and producers: An agency problem in Soviet industry, 1928–1950. *Journal of Economic History*, 58 (4), 1032–1062.
- Harrison, M. (2002). *Accounting for war: Soviet production, employment, and the defence burden, 1940–1945* (2nd ed.). Cambridge, MA: Cambridge University Press.
- JEC (1962). *Dimensions of Soviet economic power. Part II: The measure of production*. Joint Economic Committee. Washington, DC: U.S. G.P.O.
- JEC (1973). *Soviet economic prospects for the seventies*. Joint Economic Committee. Washington, DC: U.S. G.P.O.
- JEC (1976). *Soviet economy in a new perspective*. Joint Economic Committee. Washington, DC: U.S. G.P.O.
- JEC (1982). *USSR: Measures of economic growth and development, 1950–80*. Joint Economic Committee. Washington, DC: U.S. G.P.O.
- JEC (1990). *Measures of Soviet gross national product in 1982 prices*. Joint Economic Committee. Washington, DC: U.S. G.P.O.
- JEC (1993). *The former Soviet Union in transition*. N. Y.: M.E. Sharpe.
- Kafengauz, L. B. (1994). *Evolution of industrial output of Russia (From the last third of the XIX century to the 1930s)*. Moscow: Epiphany (In Russian).
- Korneychuk, B. (2015). The role of foreign participation in Soviet industrialization: An institutional view. *Voprosy Ekonomiki*, 9, 109–123 (In Russian).
- Kuboniwa, M. (1997). Economic growth in post-war Russia: Estimating GDP. *Hitotsubashi Journal of Economics*, 38 (1), 21–32.

- Kuboniwa, M. (2014). The impact of oil prices, total factor productivity and institutional weakness on Russia's declining growth. *RRC Working Paper Series*, 49.
- Lopatin, L. N., & Lopatina, N. L. (2009). *The collectivization and dispossession: Testimony of witnesses and documents*. Kemerovo: Axioma (In Russian).
- Macheret, D. (2015). The dynamics of railway cargo transportation as a macroeconomic indicator. *Ekonomicheskaya Politika*, 10 (2), 133–150 (In Russian).
- Markevich, A., & Harrison, M. (2011). Great war, civil war, and recovery: Russia's national income, 1913 to 1928. *Journal of Economic History*, 71 (3), 672–703.
- Moorsteen, R., & Powell, R. (1966). *The Soviet capital stock, 1928–1962*. Homewood, IL: R. D. Irwin.
- Ponomarenko, A. N. (2002). *Russia's national accounts in retrospect, 1961–1990*. Moscow: Financy i Statistika (In Russian).
- Rosefelde, S. (2003). The riddle of post-war Russian economic growth: Statistics lied and were misconstrued. *Europe–Asia Studies*, 55 (3), 469–481.
- Rosefelde, S., & Kuboniwa, M. (2003). Russian growth retardation then and now. *Eurasian Geography and Economics*, 44 (2), 87–101.
- Simonov, N. S. (1996). *The military-industrial complex of the USSR from the 1920s to the 1950s*. M.: ROSSPEN (In Russian).
- Smirnov, S. V. (2012). *Industrial output and economic cycles in the USSR and Russia, 1861–2012*. (Working Paper WP2/2012/04). Moscow: National Research University Higher School of Economics (In Russian).
- Smirnov, S. V. (2013a). *Cyclical mechanisms in the US and Russia: Why are they different?* (Working Paper WP2/2013/01). Moscow: National Research University Higher School of Economics.
- Smirnov, S. V. (2013b). *Cyclical patterns of railroad freight transportation (RFT) in Russia*. Paper presented at CIRET/KOF Workshop on Sectoral Dimensions in Economic Cycles, Zurich, October 4–5.
- Suhara, M. (2000). An estimate of Russian industrial production: 1960–1990. *Voprosy Statistiki*, 2, 55–63 (In Russian).
- Suhara, M. (2006). *Russian industrial growth: An estimate of a production index, 1860–1913*. (Working Paper No. 05–03). Tokyo: College of Economics, Nihon University.
- Varzar, V. (1928). *Index of physical volume of consumption of the USSR for forty years*. Unpublished manuscript. Russian State Historical Archive. F. 1607. Op. 1. D. 59 (In Russian).
- Zhuravlev, S. (2012). The 1932–1933 famine: False and real causes. *Expert*, 1, 45–46 (In Russian).

Appendix A. Main Russian Macroeconomic Indicators, 1928—2015*

Years	Index of industrial output		Agriculture				Residential construction, new completions			Rail-road
	Official	Alternative	Livestock inventory	Grain production, at granary	Grain production, in the field	Grain area planted	State organizations & establishments	Total population	Workers & employees	Freight transportation
	Y-o-Y % change		million head	million tonnes		million hectares	million square metres			million tonnes
1928	na	na	108.0	50.0	50.0	61.4	na	na	na	88.6
1929	20.0	na	87.0	na	45.5	64.0	na	na	na	107.1
1930	22.0	na	68.0	na	52.5	67.2	na	na	na	133.7
1931	18.0	na	57.0	na	43.4	70.2	na	na	na	144.9
1932	15.0	na	50.7	47.5	47.5	69.0	na	na	na	151.2
1933	5.2	na	52.5	na	58.8	69.5	na	na	na	150.2
1934	19.2	na	62.1	na	65.1	71.9	na	na	na	na
1935	22.7	na	77.2	na	62.5	71.2	na	na	na	219.9

(continued on next page)

Appendix A (continued)

Years	Index of industrial output		Agriculture				Residential construction, new completions			Rail-road
	Official	Alternative	Livestock inventory	Grain production, at granary	Grain production, in the field	Grain area planted	State organizations & establishments	Total population	Workers & employees	Freight transportation
1936	28.7	na	72.2	na	48.9	70.8	na	na	na	na
1937	11.2	na	86.6	70.4	86.4	73.1	na	na	na	299.3
1938	12.1	na	86.6	na	63.0	71.4	na	na	na	295.3
1939	17.2	na	86.5	na	64.9	69.2	na	na	na	317.5
1940	10.5	na	91.1	55.6	73.0	70.1	na	na	na	333.9
1941	3.8	na	68.5	45.5	75.9	68.5	na	na	na	322.7
1942	-8.9	na	55.7	24.0	44.0	54.6	na	na	na	236.8
1943	17.5	na	59.5	19.8	36.3	51.4	na	na	na	265.7
1944	13.2	na	63.4	26.9	39.8	48.9	na	na	na	271.0
1945	-15.6	na	65.8	25.4	na	50.9	na	na	na	268.3
1946	-21.7	na	62.0	21.2	na	50.0	7.0	na	2.5	282.9
1947	19.3	na	67.6	35.7	na	53.3	7.3	na	3.3	302.1
1948	24.2	na	77.9	34.2	na	61.0	9.0	na	3.3	370.9
1949	18.7	na	87.9	38.9	na	63.2	9.8	na	3.3	439.3
1950	19.9	na	88.3	46.8	na	64.9	11.9	na	3.6	498.2
1951	15.4	na	98.3	47.5	na	68.2	14.1	na	4.3	547.9
1952	10.9	na	97.9	51.9	na	68.6	14.1	na	4.3	597.6
1953	11.2	na	101.5	48.2	na	68.2	16.5	na	4.3	638.7
1954	12.9	na	102.1	56.3	na	72.5	17.5	na	4.5	677.7
1955	11.7	na	105.1	54.7	na	76.2	17.1	na	4.7	761.7
1956	9.6	na	110.6	66.5	na	74.4	20.9	na	6.6	819.9
1957	9.0	na	117.9	54.9	na	72.7	26.6	na	7.7	891.5
1958	9.1	na	125.6	72.9	na	72.5	31.6	na	14.2	970.3
1959	11.0	na	132.2	64.9	na	69.1	36.3	na	14.5	1061.3
1960	8.8	na	133.1	72.6	na	71.4	36.7	na	14.6	1140.7
1961	8.1	8.2	143.3	70.3	na	74.5	36.9	na	12.4	1193.8
1962	9.0	6.3	150.6	83.1	na	79.2	38.4	na	10.6	1236.7
1963	8.1	5.3	124.9	62.8	na	79.4	39.4	na	8.4	1285.0
1964	6.0	5.6	130.8	83.2	na	81.6	37.7	na	7.7	1350.0
1965	7.2	5.2	139.1	66.3	na	77.6	40.2	na	7.3	1415.8
1966	8.4	6.7	141.5	95.6	na	76.1	41.3	na	7.1	1441.3
1967	9.9	6.2	139.6	84.8	na	74.9	42.6	na	6.8	1514.9
1968	8.1	5.1	138.7	103.8	na	74.3	43.6	na	5.9	1558.9
1969	6.9	4.2	140.2	83.9	na	73.5	45.9	na	5.4	1585.3
1970	8.0	4.4	151.8	107.4	na	72.7	48.1	na	5.0	1648.2
1971	7.6	4.2	156.5	98.8	na	71.8	49.5	na	4.6	1736.6
1972	6.4	4.3	152.7	86.0	na	73.1	50.3	na	4.4	1782.6
1973	7.3	4.9	157.0	121.5	na	76.6	51.9	na	4.6	1879.0
1974	7.8	5.7	161.7	105.1	na	76.5	52.5	na	4.3	1979.8
1975	7.2	4.5	151.5	72.4	na	77.0	52.9	na	4.0	2039.8
1976	4.9	3.2	152.9	119.0	na	77.2	52.0	na	3.3	2041.5
1977	5.4	1.8	159.5	101.6	na	78.4	52.7	na	3.3	2072.2
1978	4.5	1.4	162.2	127.4	na	77.0	52.4	na	3.1	2090.6
1979	3.0	-0.4	161.9	84.8	na	75.9	48.4	na	2.9	2010.2
1980	3.0	1.7	159.1	97.2	na	75.5	52.1	4.0	2.9	2047.9
1981	2.9	0.8	158.6	73.8	na	74.1	51.5	3.9	na	2065.3

(continued on next page)

Appendix A (continued)

Years	Index of industrial output		Agriculture				Residential construction, new completions			Rail-road
	Official	Alternative	Livestock inventory	Grain production, at granary	Grain production, in the field	Grain area planted	State organizations & establishments	Total population	Workers & employees	Freight transportation
1982	2.7	0.7	161.4	98.0	na	72.0	52.7	3.9	na	2032.9
1983	3.8	1.6	165.0	104.3	na	70.7	54.3	3.8	na	2110.5
1984	3.8	1.6	163.2	85.1	na	69.7	53.2	3.9	na	2134.8
1985	3.7	1.5	162.0	98.6	na	68.1	53.6	3.7	na	2165.0
1986	4.8	2.8	164.8	107.5	na	67.5	57.4	3.9	na	2236.0
1987	3.6	0.8	161.9	98.6	na	66.7	63.8	4.2	na	2228.0
1988	3.8	0.6	161.8	93.7	na	66.0	62.6	5.2	na	2261.0
1989	1.4	-1.4	160.1	104.8	na	64.9	60.3	5.9	na	2205.0
1990	-0.1	-2.2	153.6	116.7	na	63.1	51.6	5.5	na	2140.0
1991	-8.0	-8.9	145.3	89.1	na	61.8	44.0	5.4	na	1957.3
1992	-16.0	-14.9	135.1	106.9	na	61.9	36.6	4.9	na	1640.1
1993	-13.7	-14.4	121.2	99.1	na	60.9	36.2	5.6	na	1347.8
1994	-21.6	-26.1	102.7	81.3	na	56.3	32.1	7.1	na	1058.2
1995	-4.6	-5.2	90.4	63.4	na	54.7	32.0	9.0	na	1028.0
1996	-7.6	-8.6	77.0	69.2	na	53.4	24.3	10.0	na	911.5
1997	1.0	0.1	67.6	88.5	na	53.6	21.2	11.5	na	887.2
1998	-4.8	-4.2	61.3	47.8	na	50.7	18.6	12.1	na	834.8
1999	8.9	9.2	61.2	54.6	na	46.5	18.3	13.7	na	947.4
2000	8.7	8.1	58.3	65.4	na	45.6	17.7	12.6	na	1046.8
2001	2.9	4.5	59.2	85.1	na	47.2	18.6	13.1	na	1057.5
2002	3.1	3.4	60.8	86.5	na	47.4	19.7	14.2	na	1083.7
2003	8.9	6.2	58.6	67.0	na	42.1	21.3	15.2	na	1160.9
2004	8.0	5.5	54.9	77.8	na	43.6	24.9	16.1	na	1221.2
2005	5.1	3.2	54.0	77.8	na	43.6	26.0	17.5	na	1273.3
2006	6.3	5.0	57.9	78.2	na	43.2	30.6	20.0	na	1311.6
2007	6.8	5.4	59.4	81.5	na	44.3	34.9	26.3	na	1344.6
2008	0.6	-0.8	59.0	108.2	na	46.7	36.7	27.4	na	1304.4
2009	-10.7	-9.9	59.9	97.1	na	47.6	31.3	28.5	na	1108.8
2010	7.3	9.5	59.0	61.0	na	43.2	32.9	25.5	na	1312.0
2011	5.0	na	60.3	94.2	na	43.6	35.5	26.8	na	1381.7
2012	3.4	na	62.9	70.9	na	44.4	37.3	28.4	na	1421.1
2013	0.4	na	62.9	92.4	na	45.8	39.8	30.7	na	1381.2
2014	1.7	na	62.8	103.8	na	46.1	45.8	35.2	na	1375.0
2015*	-2.7	na	na	na	na	na	na	na	na	1350.0

Note: na—not available; *—first half of the year at annual rate.

Sources: see Appendix B.

Appendix B. Statistical Sources for the Main Russian Macroeconomic Indicators

Below we use the following translations from Russian into English:

- Dinamika i geografiya gruzovogo dvizheniya na putyakh soobshcheniya SSSR—Dynamics and geographical distribution of freight transportation in the USSR;

- Narodnoe khozyaystvo RSFSR (or SSSR)—National economy of the RSFSR (or the USSR);
- Posevnye ploshchadi SSSR. Statisticheskiy sbornik—USSR: Areas planted. Statistical digest.
- Rossiyskiy statisticheskiy ezhegodnik—Russian statistical yearbook.
- Selskoe khozyaystvo, okhota i okhotnichie khozyaystvo, lesovodstvo v Rossii—Agriculture, hunting and forestry in Russia
- Selskoe khozyaystvo SSSR. Ezhegodnik—Agriculture in the USSR. Yearbook.
- Sotsialisticheskoe stroitel'stvo SSSR. Statisticheskiy ezhegodnik—Socialist construction of the USSR. Statistical yearbook.
- SSSR—strana sotsializma. Statisticheskiy sbornik—The USSR is a country of socialism. Statistical digest.
- Transport i svyaz v SSSR. Statisticheskiy sbornik—Transportation and communication in the USSR. Statistical digest.
- Tsentral'naya baza statisticheskikh dannykh (TSBSD)—Centralized Base of Statistical Data (CBSD);
- Rossiyskiy gosudarstvennyy arkhiv ekonomiki (RGAE)—Russian State Archive of the Economy.

The sources for each indicator are placed in a table—one table per indicator; some methodological comments are also made if necessary. The information stored in the RGAE was initially “secret” or “top secret”, but since 1956, the same indicators have been published in official statistical yearbooks.

B.1. Index of industrial production, official

The official index of industrial production (1960 = 100) is in fact not fully official. We calculated it using published official Y-o-Y percent changes (if available) or Y-o-Y percent changes that, in turn, were calculated using official base indices (with various bases) or values of industrial production in list-prices (also with various bases). We took 1960 as a base to have a time-series comparable with the alternative index of industrial production.

Years	Source: Title / Archive and Code	Page(s)
1929–1932, 1946–1965	National Economy of the RSFSR in 1965. Moscow: Statistika, 1966	46–47
1933–1936*	National Economy of the USSR in 1963. Moscow: Statistika, 1965	110
1938–1945, ex. 1941	RGAE 1562-33-2903	59–60, 64
1941	RGAE 1562-329-1488	18–19
1966–1975	National Economy of the RSFSR in 1975. Moscow: Statistika, 1976	45
1976–1980	National Economy of the RSFSR in 1980. Moscow: Finansy i Statistika, 1981	50
1981	National Economy of the RSFSR in 1985. Moscow: Finansy i Statistika, 1986	55
1982–1985	Rosstat, CBSD	–
1986–1991	Russian Statistical Yearbook. 1994. Moscow: Goskomstat Rossii, 1994	296
1992–2014	Rosstat's website (Section: Official statistics / Entrepreneurship / Industrial production)	–

Note: * as a rough estimate we used data for the whole USSR for these years.

B.2. Livestock Inventory

We added the total number of cattle, sheep, goats and pigs. Almost continuous time series, beginning with 1927, are published in only one source; more recent and fully comparable data may be taken from the CBSD held by Rosstat. The “holes” for almost 90 years are 1928 and 1938. We succeeded in patching the hole in 1928 and substituted the average of 1937 and 1939 for 1938.

Years	Source: Title / Archive and Code	Page(s)
1927–1989, ex. 1928 & 1938	Agriculture, Hunting and Forestry in Russia, 2013. Moscow: Rosstat, 2013	90–91
1928*	RGAE 1562-41-66	297
1938 ⁺	Not available	–
1990–2014	Rosstat, CBSD	

Note: * incl. Crimea & excl. the Karelo-Finnish Soviet Socialist Republic; + we used the average for 1937 and 1939.

B.3. Grain production

According to the present methodology (in use since 1953) the garnered grain is counted (at the granary at net weight). According to the “old” methodology, the harvest is estimated in the field (standing grain). It is no surprise that the “old” methodology gave higher numbers than the “present”; the surprise is that according to Rosstat, for 1928 and 1932, both methodologies gave equal volumes. Therefore, one may doubt whether Rosstat’s re-estimations for the 1920s and the 1930s were made properly; in practice, this also means that one cannot use “old” data to interpolate “new” data. For this reason we preferred to use both time series in parallel (one for the “present” methodology, another—for the “old” one).

Years	Source: Title / Archive and Code	Page(s)
<i>At granary</i> <i>(new methodology)</i>		
1928, 1932, 1937, 1940–2012	Agriculture, Hunting and Forestry in Russia, 2013. Moscow: Rosstat, 2013	74
2013–2014	Rosstat, CBSD	–
<i>In the field</i> <i>(old methodology)</i>		
1928, 1932–1944	RGAE 1562-329-1409	1–2, 8
1929–1931	Agriculture in the USSR. Yearbook, 1935. Moscow: Selhozgiz, 1936	270–271

B.4. Grain area planted

The grain area planted was counted by the Soviet statistical system beginning in 1925. This indicator is more or less comparable through time. Some minor problems were connected with corn grain of milky-wax ripeness, which was included in total grain for several years in the second part of 1950s and excluded for all other years. We had to make our own estimates of this factor for 1956–1957

using information for the USSR as a whole; the correction was approximately 1.5% of the total area planted in the RSFSR.

Years	Source: Title / Archive and Code	Page(s)
1925–1926*	Agriculture in the USSR, 1925–1928. Moscow: Stat. Izdatelstvo TsSU SSSR, 1929	220
1927	Socialist Construction of the USSR. Statistical yearbook, 1934. Moscow, Soyuzorguchet, 1934	178, 190
1928, 1932, 1945, 1950–1956 ^x	USSR: Areas Planted. Statistical Digest, 1957. Vol. 1. Moscow: Gosstatizdat, 1957	20–21
1929–1931	Agriculture in the USSR. Yearbook, 1935. Moscow: Selhozgiz, 1936	245–247
1933–1940	RGAE 1562-329-1409	1–2, 8
1941–1944	RGAE 1562-329-1490	157–158
1946–1949 ⁺	RGAE 1562-329-3871	90, 316
1957 ^x	National Economy of the RSFSR in 1958. Moscow: Gosstatizdat, 1959	223
1958–1965	National Economy of the RSFSR in 1965. Moscow: Statistika, 1966	190–191
1966–1969	National Economy of the RSFSR in 1969. Moscow: Statistika, 1970	152–153
1970–1974	National Economy of the RSFSR in 1975. Moscow: Statistika, 1976	164–165
1975–1980	National Economy of the RSFSR in 1980. Moscow: Finansy i Statistika, 1981	134–135
1981–1984	National Economy of the RSFSR in 1985. Moscow: Finansy i Statistika, 1986	116
1985–1989	National Economy of the RSFSR in 1990. Moscow: Respublikanskiy informatsionno-izdatel'skiy tsentr, 1991	418
1990–2014	Rosstat, CBSD	–

Notes: * data are lowered 1.5% to be comparable with information from latter sources; ⁺ areas planted in Crimea are estimated as 0.5 million of hectares (average for 1945 and 1950); ^x 1955–1957 data are corrected for corn grain of milky-wax ripeness.

B.5. New Residential Completions

Historical information on residential construction is less available than on other sectors of the Russian economy, at least those considered here. Publication of the RSFSR's data on new residential completions began in 1946; we could not find any previous information, even in unpublished documents stored in archives. Our hypothesis relates this to the fact that the main goal of economic policy during the Soviet period was the creation of large-scale industrial establishments, especially those which were specialized in producing machines and equipment (capital goods). The communist and Soviet authorities paid far less attention to the production of consumer goods and to residential construction (it even seems that for years the Soviet statistics simply did not count the new houses built by collective farmers, which were the majority of the houses in rural areas). As the official figures for total new residential construction consist of different components for different years, we decided not to use them at all. Instead, we chose three time series: one for state organizations and establishments (it is roughly comparable for all years) and two for the population: for workers and employees up to 1980 and for the total population beginning in 1980 (we hope that the trajectories of the latter two are similar).

Years	Source: Title / Archive and Code	Page(s)
<i>State organizations & establishments* and (or) Population⁺</i>		
1946–1956	National Economy of the RSFSR in 1958. Moscow: Gosstatizdat, 1959	344
1957–1960	National Economy of the RSFSR in 1965. Moscow: Statistika, 1966	381
1961–1967	National Economy of the RSFSR in 1967. Moscow: Statistika, 1968	366
1968–1969	National Economy of the RSFSR in 1970. Moscow: Statistika, 1971	327
1970–1974	National Economy of the RSFSR in 1975. Moscow: Statistika, 1976	339
1975–1979	National Economy of the RSFSR in 1980. Moscow: Finansy i Statistika, 1981	230
1980–1984	National Economy of the RSFSR in 1985. Moscow: Finansy i Statistika, 1986	246
1985–1990	National Economy of the RSFSR in 1990. Moscow: Respublikanskiy informatsionno-izdatel'skiy tsentr, 1991	203
1991–2014	Rosstat, CBSD	–

Notes: * including non-agricultural cooperatives; + workers & employees up to 1980.

B.6. Railroad Freight Transportation

Railroad statistics for the RSFSR were openly published up to the mid-1930s and after 1958 with more than a 20-year gap in between. We found almost all necessary information in unpublished documents stored in archives. Unfortunately, at the moment, we still have three holes: 1934 and 1936–1937. It makes it impossible to say anything reasonable about the dynamics of railroad freight transportation during the second 5-year plan (1933–1937) but it is enough to detect the contraction in 1933.

Years	Source: Title / Archive and Code	Page(s)
1928–1931	Dynamic and Geographical Distribution of Freight Transportation in the USSR, 1928–1931. Moscow: TsUNHU SSSR, 1932	12–13
1932	Socialist Construction of the USSR. Statistical Yearbook, 1934. Moscow: Soyuzorguchet, 1934	263–264
1933	Socialist Construction of the USSR. Statistical Yearbook, 1935. Moscow: Soyuzorguchet, 1935	400–401
1934	Not available	
1935	The USSR is a Country of Socialism. Statistical Digest, 1936. Moscow: Soyuzorguchet, 1936	188–189
1936–1937	Not available	
1938–1939	RGAE 1884-61-82	37, 124
1940, 1945–1955	RGAE 1562-33-2515	31
1941–1944	RGAE 1562-33-3445	380
1956–1957	National Economy of the RSFSR in 1958. Moscow: Gosstatizdat, 1959	355
1958–1962	National Economy of the RSFSR in 1962. Moscow: Gosstatizdat, 1963	369
1963–1964	National Economy of the RSFSR in 1964. Moscow: Statistika, 1965	321
1965–1970	Transportation and Communication in the USSR. Statistical Digest. Moscow: Statistika, 1972	113
1971–1975	National Economy of the RSFSR in 1975. Moscow: Statistika, 1976	309
1976–1980	National Economy of the RSFSR in 1980. Moscow: Finansy i Statistika, 1981	193
1981–1985	National Economy of the RSFSR in 1985. Moscow: Finansy i Statistika, 1986	202
1986–1989	National Economy of the RSFSR in 1989. Moscow: Resp. inf.-izd. centr., 1990	618
1990–2014	Rosstat, CBSD	–