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**CYCLICAL MECHANISMS  
IN THE US AND RUSSIA:  
WHY ARE THEY DIFFERENT?**

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This paper demonstrates that cyclical movements of major industrial market groups (durable and nondurable consumer products, equipment, materials and supplies) have important peculiarities in Russia and in the US. It allows a better understanding of business cycles in national economies determined with their specific structural features. Based on a statistical analysis of monthly indexes of industrial output (for Russia the relevant indexes were specially calculated by the author), one can conclude that in Russia the dynamics of industrial output do not dependent so much on demand but rather on supply of products. This is explained through both weak diversification of the Russian economy as well as its high degree of monopolization and exceptional role of imports in consumer and investment expenditures.

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## 1. Introduction

Business cycle issues have been studied for more than a century and not without great results. Ideas and methods of Arthur Burns and Wesley Mitchell were especially fruitful as they show a way to analyze business cycles systematically. Since then, hundreds and thousands of theoretical and empirical studies have been carried out. However, the last Great Recession put all economists into the necessity to even think more carefully about business cycles, their causes, mechanisms, and inevitabilities. In particular, it became clear that an economy is subject to some kind of “mutations”. After several decades an economy is not the same anymore (perhaps it has “matured”), but in some sense is a different one: interrelations of various sectors, aggregates and agents have changed. That is why currently economists do not know exactly whether, or to what extent, past scientific results are relevant for the present and future. Scientists are familiar with problems and questions, they wield formidable methods and instruments but they do not know all the answers including those they have acquired not so long ago. The only thing they can do – is to examine business cycles, their patterns and mechanisms once more (and hardly for the last time).

One of the main areas of empirical researches of business cycles is the study of cyclical fluctuations of various macroeconomic time-series. This tradition has begun by [Burns and Mitchell, 1946] and then continued in a great number of studies for the US ([Stock and Watson, 1998], [Stock and Watson, 2002], [Zarnowitz, 1973], [Zarnowitz and Braun, 1991], [McConnell and Perez-Quiros, 2000] (to name the most well-known) and for various other countries (for example, [Ellery et al., 2002] for Brazil; [Urasawa, 2008] for Japan; and many others; one can find an extensive bibliography on the issue in [Marcellino, 2006]).

At the same time, we have almost no information concerning Russian economic cycles. In the Communist’s era there was a politician decision that cyclical fluctuations of the Soviet economy are “not possible” and economists had no choice but to submit to this. However, more than twenty years after the collapse of the planned economy (what other proof of inevitability of cyclical drops is needed?) we still know very little on the subject. Certainly, there is a great need to fill this gap.

This paper starts with comparison of Russian and the US fluctuations of industrial output. We show that in the US various sectors of industry do not fluctuate synchronically during a business cycle but rather with some lags and leads relative to the all-economy cycle. We expect these leads and lags to be dependent on specific types of demand for different types of industrial goods. Hence, we test this idea using data for industrial output by major market groups

(materials and suppliers, equipment, durable and nondurable consumer goods) which definitely differ in their demand peculiarities.

The next section describes the sources for the US and Russian statistical data for industrial production (whilst FRS's indexes for US are well known, industrial time-series for Russia have been calculated by the author). Then, the main descriptive statistics of growth rates by major market groups and some results from correlation analyses are presented – separately for US and Russia. In Section 4 they are compared and discussed, whereas the final conclusions are contained in the last section.

## **2. Data**

### **2.1. US industry**

US statistics for industrial production allow distinguishing the following market groups:

- a) materials and nonindustrial supplies, or shortly MT hereafter (sum of B53000 and B54000 time series weighted by their value added);
- b) equipment, EQ (B52000);
- c) durable consumer goods, CD (B51100);
- d) nondurable consumer goods, CN (B51200)

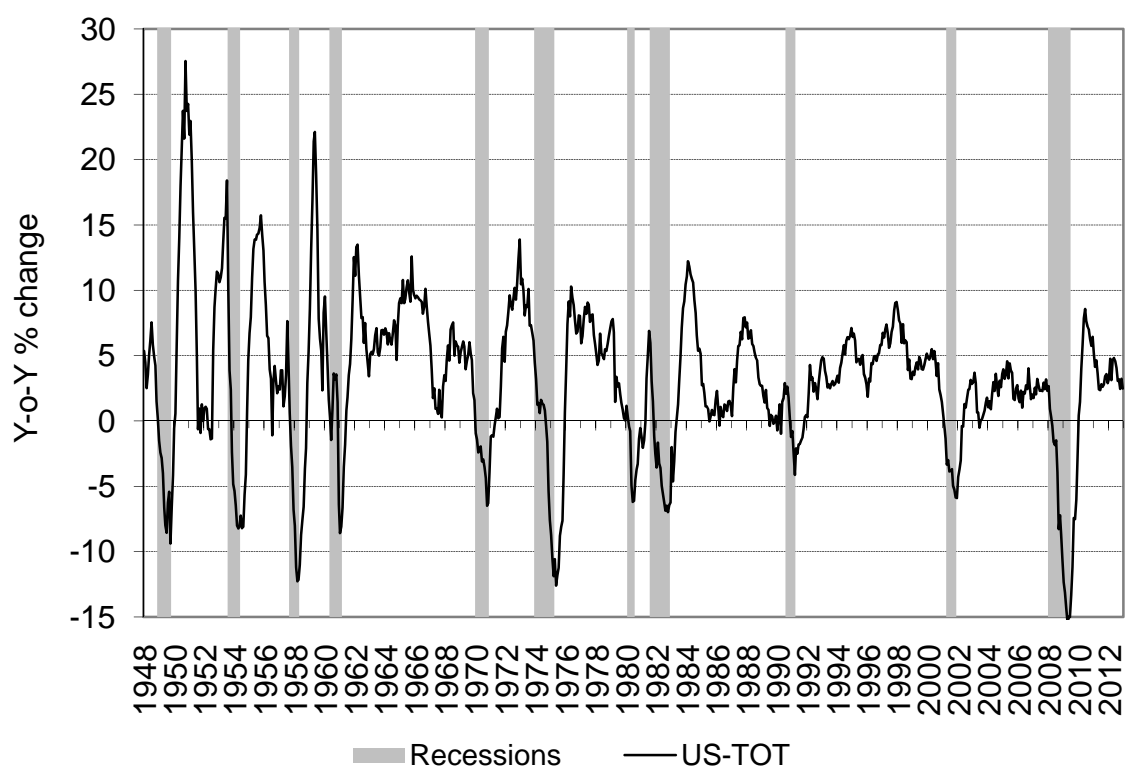
Using original (non-seasonally adjusted) monthly indexes for all of the mentioned market groups as well as for the industry as a whole we have calculated monthly year-over-year (Y-o-Y) growth rates for January 1948 – August 2009. Then we compare the trajectory of those rates with peaks and troughs dated by the NBER (these are plotted on Figure 1).

One may observe that during all post-war recessions (of which there were 11) the Y-o-Y % changes of industrial production were negative and the last recession was accompanied by a severe fall of output.<sup>1</sup> Furthermore, moments where the annual % change of total industrial output, while negative, started to increase, in most cases were either identical to the last recessionary month as classified by the NBER, or only differed from that by no more than one month.

In any case, it is evident that the fluctuations of industrial output are closely related to phases of the overall economic cycle. Therefore, one may confidently use annual % change of total industrial production as a reference series to investigate movements of different market groups across business cycles.

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<sup>1</sup> Periods in which industrial output fell (in a year-over-year comparison) while the NBER did not classify the US economy being in recession are very rare. The only important case is the industrial stagnation during the Korean War from August 1951 till July 1952. The NBER did not classify this episode as a recession because GDP growth while declining remained positive.



Source: FRS.

Fig. 1. US: Industrial Production Growth Rates, Total Industry  
(January 1948 – December 2012)

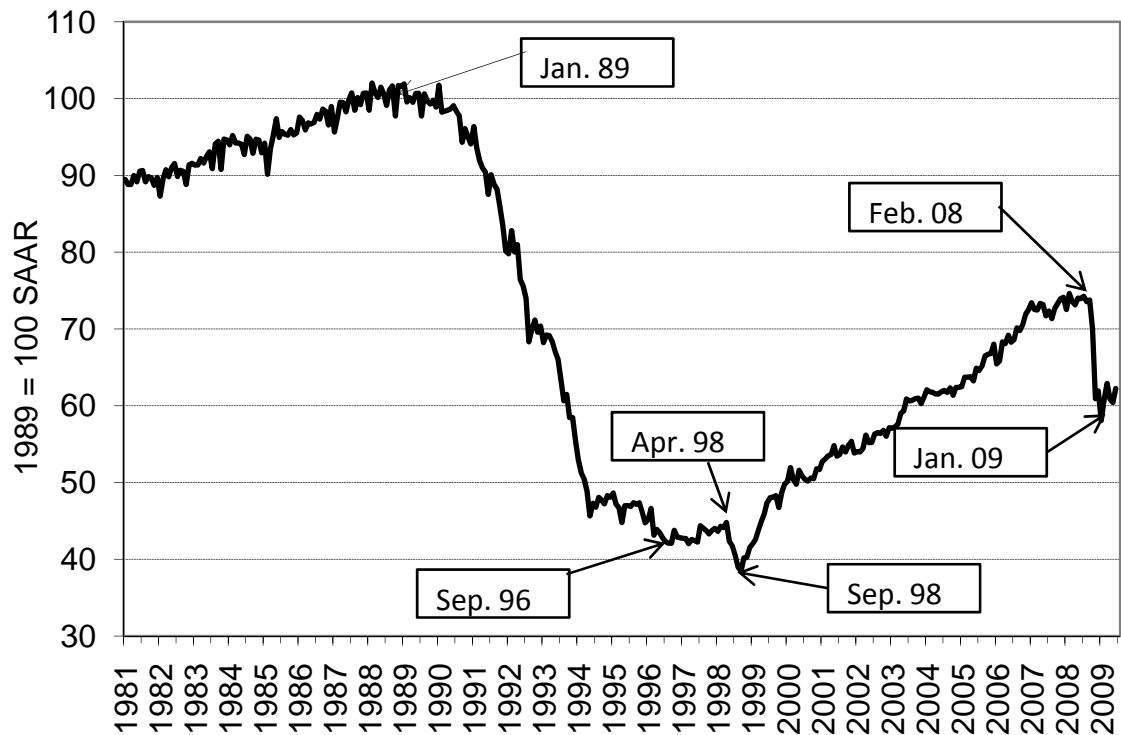
## 2.2. Russian Industry

Rosstat (Russian Statistical Office) only began to aggregate data on physical output of various industrial products into the total index of industrial production in 1992. Unfortunately there are no separate indexes for major market groups until now. That is why we have calculated those indexes ourselves using Rosstat's monthly data for physical output of 108 industrial goods since January 1981. The distribution of these goods by market groups is shown in Table 1. The dynamics of the base index (1989 = 100) for the total industry is plotted on Figure 2. Careful inspection of the index confirms its interpretability and reliability (see Appendices A and B for details). Hence, we use this index as well as the indexes for materials and suppliers, equipment, durable and nondurable consumer goods in this paper.

Table 1. Russian indexes of industrial production by markets groups

Markets groups	Code	Number of goods in a group	Weights in total industry, %		
			By number of goods	By sales in 1989	The US, by VA in 2011
Total Industry	TOT	108	100.0	100.0	100.0
Materials and supplies	MT	46	42.6	70.3	60.7
Equipment	EQ	25	23.1	7.4	12.1
Consumer durables	CD	13	12.0	4.0	5.6
Consumer nondurables	CN	24	22.2	18.3	21.6

Source: Rosstat; FRS. Author's calculations.



Source: Appendix A. Author's calculations.

Fig. 2. Russia: Total Industrial Production and Cyclical Turning Points (January 1982 – June 2009)

### 3. Results

#### 3.1. Results for the US

Some descriptive statistics for the US industrial growth rates by market groups are shown in Table 2.

Table 2. The USA Industrial Production, Y-o-Y % changes (January 1948 – December 2012)

Market Groups	Code	Average	Standard deviation	Minimum	Maximum	Max – Min
Total Industry	TOT	3.2	5.9	–15.4	27.5	43.0
Materials and supplies	MT	3.3	7.0	–16.5	38.6	55.2
Equipment	EQ	4.6	9.2	–23.3	46.8	70.1
Consumer durables	CD	3.8	11.1	–35.3	45.9	81.1
Consumer non durables	CN	2.3	2.9	–5.4	13.8	19.3

Source: FRS.

The range of industrial annual growth is considerable: Year-over-year growth varies from +27.5% (in October 1950) to –15.4% (in April 2009). There is a certain tendency towards reduced volatility of industrial output. It was especially large up until the 1960's and has decreased considerably after the mid 1980's.

Dynamics of materials and suppliers (MT) output resembles the dynamics of the total industry. This similarity can be explained by not only a considerable weight of materials and

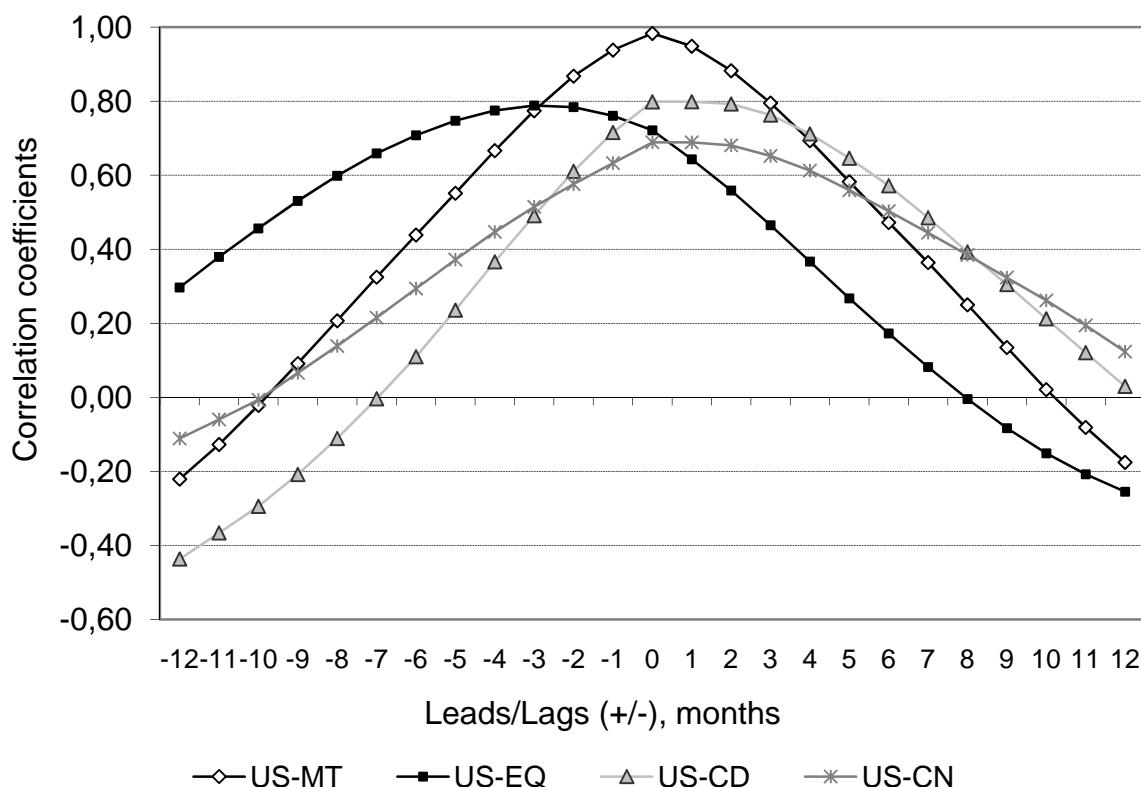
suppliers in the total industrial output (61%), but also by the specificity of demand for intermediate goods since these are produced in more or less ‘technological’ proportions to the gross industrial output. At the same time, figures from Table 2 show that fluctuations of materials and suppliers are somewhat more pronounced than those of the total industry: its peaks are slightly higher and its troughs somewhat lower. We expect that this results from the heightened sensitivity of this market group to exaggerated expectations (too high near peaks and too low near troughs). This may be the reason for excessive changes (positive or negative, respectively) of inventories which more definitely affect the changes of the output of materials and suppliers.

The main distinguishing feature of equipment production is even higher growth volatility and its lagging characteristic vis-à-vis the total industry. In our view it is tied to peculiarities of investment demands. During downturns it is quite common to seek to finish those projects which are close to be completed “at any cost” and on the other hand to reject new costly investment projects. The existence of decision-making lags often causes investments to still decline during the beginning of an expansion and to grow at the start of a recession.

The output of durable consumer goods is also considered to be highly volatile (even more so than the output of investment goods!). In some aspects household demand of such goods is similar to investment demand. For example, during the worsening of market condition, the acquisition of durable consumer goods can, without much trouble, be put aside for the time being. But from a point of view of cyclical dynamics, there are considerable peculiarities with respect to the demand of durable consumer goods as it does not lag behind the overall economic cycle, but rather leads it. It’s well known that in the US indicators on consumer expectations and sentiments are considered to be some of the most important leading indicators. The output of durable consumer goods is, most likely, lagging in relation to the first signs of change in *demand* for these goods, but in comparison with the overall industrial output it is likely to be slightly leading.

The output of nondurable consumer goods also leads industrial dynamics, but the most striking difference in this market group is its low volatility. The maximum growth rate of this group (+13.8%) was seen in February 1951, and the minimum (−5.4%) in May of 1975. Generalized volatility indicators (the difference between minimum and maximum or a standard deviation) here are approximately 2 times lower than for the total industry, or 4 times lower than for the durable consumer goods. Apparently, such low volatile rates are also defined by the peculiarities of demand: consumers are quite reluctant in lowering the levels of current consumption even during difficult economic periods but during the times of economic prosperity do not increase that amount considerably either.

The effects of leading and lagging can be studied more closely on the basis of pair correlations between the growth rates of the total industrial output and the growth rates of major market groups with different lags (see Figure3). These calculations confirm our basic propositions based on descriptive statistics.



Source: FRS. See tables for the time-series codes.

Fig. 3. The USA: correlations between growth rates of total industry and market groups' indexes with various lags (January 1948 – December 2012)

In particular, one can easily notice the synchronous nature of the growth rates for total industry and for materials and supplies. The coefficient of correlation between these indicators with zero lag equals 0.983, and it lowers monotonously in both directions with increasing lag size. The correlation coefficient for equipment reaches its maximum (0.788) with a 3 month lag. This means that production of investment goods is reacting to changes in economic conditions (either positive or negative) with a lag of around a quarter. We assume that this to a large extent is determined by a decision-making lag.

Also, there appears to be a moderate (1–2 months) lead of both durable and nondurable consumer goods. The maximum correlation coefficient for nondurable consumer goods (0.689) is reached with 0 and +1 lag (“plus” means leading, not lagging). This hardly differs from correlations for lag +2 (0.691). The maximum correlation for durable consumer goods (0.798) is reached at lag +1 but differs just slightly from those for lags 0 (0.798) and +2 (0.792).



Special note should be taken of an effect of “delayed demand” for durable consumer goods. The coefficients of correlation between the growth rates of this market group and total industrial output decrease alongside the lags, becoming negative at lag –7. After this point they continue to increase (in absolute value) and, as opposed to the remaining market groups, become statistically significant at large lags, however with a negative sign. The maximum correlation (–0.458) is reached at lag –13 (13 month delay). This means that there exists an inverse relation between the current growth rate, and the rate around a year ago. In other words, if a year ago the sales of durable consumer goods were low due to a poor overall economic situation, it on average can now be expected to be stronger since the “old” demand for durable consumer items is still alive.<sup>2</sup> It is interesting to notice that the effect of “delayed demand” is not significant for equipment; old investment demand does not survive.

### 3.2. Results for Russia

Based on our indexes of industrial output for Russia we calculated year-over-year growth rates for Russian industry as a whole and for the four highlighted market groups from January 1982 through June 2009. The results are presented in Table 3 and Figure 4.

*Table 3.* Russian Industrial Production, Y-o-Y % changes (January 1982 – June 2009)

Market Groups	Code	Average	Standard deviation	Minimum	Maximum	Max – Min
Total Industry	TOT	–0.7	8.9	–20.1	25.4	45.5
Materials and supplies	MT	–0.8	8.4	–20.6	24.0	44.6
Equipment	EQ	–3.9	19.1	–67.4	43.7	111.0
Consumer durables	CD	0.1	17.0	–65.2	54.8	120.1
Consumer nondurables	CN	0.6	11.3	–8.6	45.5	54.1

*Source:* Appendix A. Author’s calculations.

Immediately, it becomes apparent that the majority of trends seen in the United States are not visible in the case of Russia.

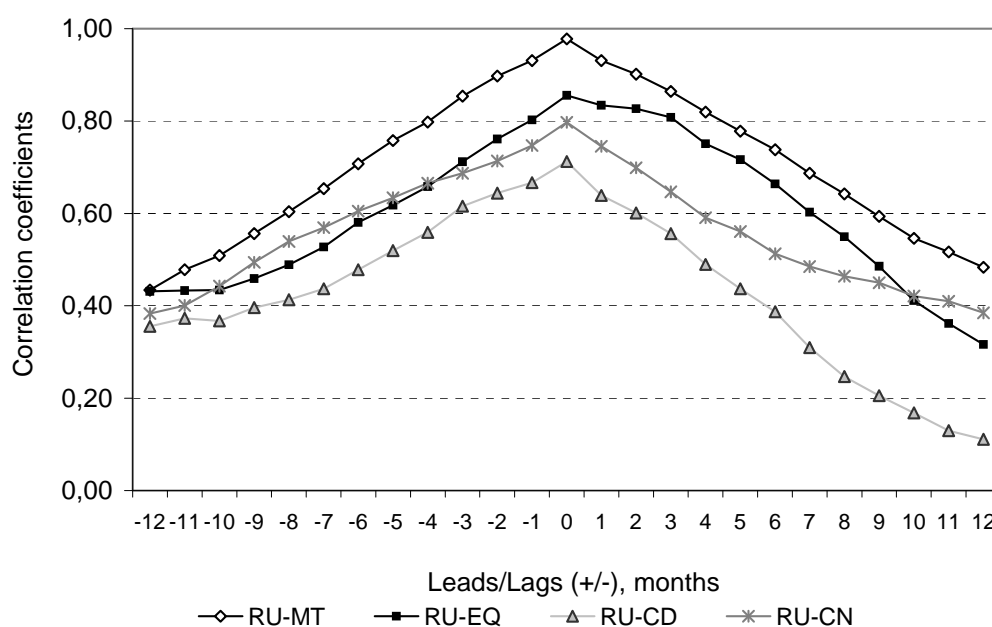
Despite the fact that the growth rates for total industry and for materials and supplies are closely tied, the volatility of the first is not lower but higher than that of the second (although not by much). This could be explained by the export orientation of Russian manufacturers of materials and supplies (which is less relevant for USA)<sup>3</sup> or by the inability of Russian companies to manage their inventories.

<sup>2</sup> For example, if one had to defer the purchase of a new refrigerator during a recession, then this will be bought as soon as the recession has ended. As a result, an above average number of refrigerators will be purchased (and produced): those which would have been bought anyway, as well as those which, in the absence of a recession, would have been bought during the previous period.

<sup>3</sup> This explanation “works” if the volatility of raw materials export is less than the volatility of raw materials production. We leave this topic for further research.

There is no clear tendency towards a decrease in volatility of output in Russia. The 2008–2009 recession is comparable, in terms of annual decline, to the years of transition (although this transition period continued for eight years in a row!). On the other hand an annual increase of the main market groups by 30–40% is not uncommon in Russia. This is especially true in the case of equipment as well as durable consumer goods.

In Russia, there seems to be no effects of leading and lagging of various market groups (see Figure 4). In particular, there are no lags connected with investment's decision-making process. There is neither a lead of durable consumer goods nor an effect of “delayed demand”. It is also worth mentioning that the correlations between market groups and total industry for large leads and lags (more than six months) are much higher in Russia than in United States. Paradoxically, this means a more inert behavior of companies and simultaneously more volatile dynamics of production in the Russian industry.



Source: Appendix A. Author's calculations. See tables for the time-series codes.

Fig. 4. Russia: correlations between growth rates of total industry and market groups' indexes with various lags (January 1982 – June 2009)

It's true that the volatility of nondurable consumer goods is lower than the volatility of equipment and durable consumer goods (just like in the United States). However, it is much higher in Russia than the volatility of materials and supplies (and of the total industry). In fact, volatility of nondurable consumer goods was so high that it raised doubts whether the calculations might contain an arithmetic error. Recalculations did not show any such errors. It showed, however, that output of some nondurable consumer goods, year-on-year grew quite frequently by tens or even hundreds (!) of percent.

For example, in January 2007 the aggregate index of nondurable consumer goods rose by 31% (year-on-year). Looking at the disaggregate data, the output of wines was 25 times higher than in January 2006, while the output of vodka was 260 times higher. Is it plausible that the demand for these goods rose by just as much? Of course not. The year before, the government attempted to implement an automated system for counting the production of alcoholic beverages. Due to its flaws, however, it paralyzed the production process at legal alcoholic establishments. Consequently, the following year's growth rates were colossal. As another example, in the same January 2007, output of sugar tripled on year-over-year basis. This could have been related to the diminishing demand for sugar by vineries in January 2006. However, that is not the explanation. At the beginning of 2006 there were no reductions in demand on sugar. In reality there was a deficit of sugar (this is evident from the fast rising of sugar prices during that period). Moreover, this deficit was world-wide in its nature and was caused by diminishing supplies from Brazil and Thailand.<sup>4</sup>

#### **4. Discussion**

Let us summa rize the results of our analysis of cyclical movements in the US and Russia.

In the US, production of goods largely depends on the dynamics of demand. Due to the fact that households try to uphold a regular volume of consumption, the output of nondurable consumer goods is not very volatile. The output of equipment and especially durable consumer goods fluctuates much more since, during the “hard times”, their purchases can be carried over to later periods (note that the effect of a “delayed demand” for durable consumer goods exists, while investment decisions start from scratch, without regard for the fact that earlier projects were suspended). Materials and supplies are practically synchronous with the total industry in the United States (which is natural, since the output of intermediate products is to a large extent defined by the dynamics of the final product) but are more volatile since the changes in production consumption are exasperated by the changes in inventories. Finally, the output of consumer products leads the total industrial cycle by 1–2 months (due to sensitivity of American consumers towards changes of economic situation) and the output of investment goods, by contrast, is lagging by approximately 3 months (most likely due to an existence of lags in making investment decisions).

Within the Russian industry, almost none of these cyclical mechanisms are found. What could be the reasons for this?

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<sup>4</sup> One additional factor for Russia was a reduction of sugar export from the Ukraine during that period. It was just before elections in the Ukraine and the authorities of the country were afraid to create a domestic deficit of this highly popular product.

In order to answer this question we first need to say a few words about a planned economy and its relation to business cycles (around one third of Russian industrial output series falls onto a period of agonizing Soviet economy of the 1980's). Many Russian economists (and not only with soviet background!) still believe that there are no cycles inside planned economies. Even though it is impossible to delve here into this issue, we will note that the thesis about lack of crises and nonexistent cyclical tendencies of planned economies has long been disproved (see for example [Ickes, 1986] for a survey of literature). It gives us reason to use Russian statistics for 1980's, not to ignore it.

It is also important to relate cyclical concepts with Russian transition period, which has defined the dynamics of Russian economy in the first half of 1990's. This recession is often referred to as a unique phenomenon, connected to the disintegration of the entire economic system, and therefore having nothing to do with business cycle developments. From our point of view, this thesis is based on an old misunderstanding, which confuses cyclicity with periodicity of an economic dynamics. In such paradigm, we can talk about economic cycles only if crises appear with more or less constant repetition (for instance every 10 years).<sup>5</sup> We have to state, however, that during the span of several decades of empirical studies, there has been no firm affirmation of such assertions. In reality, as a result of the academic research initiated by the Great Depression of the 1930's, cyclicity and periodicity are understood as evidently different concepts. One may remember the classical definition of a cycle in this context:

“Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; in duration business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar character with amplitudes approximating their own.” [Burns and Mitchell, 1946, p. 3]

According to these views, economic cycles are formed by a continuous change of non-periodic recessions and expansions, each of which has its own dominating driver and is interrupted by different kinds of positive or negative shocks (wars, sudden leaps of prices or currencies, new technologies, decisions of monetary authorities, etc.). From this point of view (which we find theoretically plausible and empirically productive) the transitional recession in Russia is to be seen as one of the prolonged phases of an economic cycle. There is no *apriori* evidence

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<sup>5</sup> One may also suppose that real economic dynamics is formed as a result of interference between several strictly periodical processes with various wave-lengths (each of these processes is caused by some periodical factor, such as: renewal of fixed capital, technological innovations etc.).

that the existence of a long transition period and strong structural changes will entail an inactivity of “the American type” cyclical mechanisms!

We also made additional calculations for Russian and the American time-series beginning from 1997 (i.e. for the years when the transitional effects, planning specificity aside, have failed). This resulted in basically the same results: in the United States the effects of leads and lags do exist,<sup>6</sup> in Russia, however, they are still absent; output of all types of goods fluctuates in a more or less synchronous fashion here. The output of nondurable consumer goods is not the least volatile but rather materials and supplies, which can be most likely explained by export orientation of Russia’s sector of raw goods. The events related to individual companies or narrow segments of the economy, often play an important, “macroeconomic” role.<sup>7</sup>

## **5. Conclusions**

In Russia, as opposed to the US, dynamics of industrial market groups’ output is dictated not so much by the movement of demand, but rather by fluctuations in supply. To a great extent this is connected to a high concentration of production at very large-scale establishments left over in Russia from the Soviet era. Another convincing factor is tied to a low financial firmness of the majority of Russian companies; during an expansion, almost all of them flourish, while during a recession they crumble at almost the same moment. The third and likely most important factor is that a considerable part of internal consumption in Russia (and not in the US) is met by imports. It is likely that movements of imported goods (and not goods produced in Russia) show all tendencies revealed in the US, but this issue is outside the scope of this paper.

Even though both Russian and the American economies are subject to general laws of cyclical development (alterations between phases of rises and falls, or of fast and slow growth) the mechanisms of realization of these laws definitely differ. These differences are determined, among other things, by structural peculiarities of the two economies. It means that a lot of business cycle concepts which have been tested on the base of the US economy are not universal and they could hardly be simply transferred onto other national economies. The specifics cyclical processes in various national economies should receive much more attention. Our future understanding of business cycles should be based on the results of such research.

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<sup>6</sup> The main difference within the US, however, is the absence of the effect of delayed demand of durable consumer goods. Most likely, this has to do with the fact that the latter part of 1990’s and the beginning of 2000’s turned out to be very stable years and almost no one had to tighten their budget spending on nondurables.

<sup>7</sup> Such was the case after the fire on the large Turkish owned TV factory in November 2005.

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## Appendix A. Russia: Indices of Industrial Production, 1989 = 100 AR

Months	TOT	MT	EQ	CD	CN	TOT	MT	EQ	CD	CN
	Not seasonally adjusted					Seasonally adjusted				
Jan-81	92.9	94.0	114.5	94.4	80.1	89.5	87.3	115.5	95.8	86.7
Feb-81	87.0	87.6	113.3	91.9	73.3	88.8	87.0	115.3	95.6	83.0
Mar-81	94.5	94.5	123.2	100.9	81.4	88.8	87.1	116.4	97.5	81.5
Apr-81	89.6	88.9	118.0	99.9	78.4	90.0	88.4	115.4	98.3	82.8
May-81	85.3	84.1	109.7	91.7	78.3	89.2	87.9	113.7	95.6	81.7
Jun-81	88.6	85.0	117.0	97.1	89.2	90.5	88.7	116.5	96.8	84.7
Jul-81	85.8	84.0	112.0	95.9	80.1	90.6	89.4	117.1	97.6	85.5
Aug-81	86.2	84.5	107.2	90.9	82.9	89.2	87.8	109.6	91.0	84.3
Sep-81	88.4	83.5	115.3	97.8	94.2	89.8	88.1	115.6	97.9	84.9
Oct-81	92.6	88.0	117.2	96.9	99.0	89.7	88.3	114.9	95.6	83.7
Nov-81	89.0	87.2	111.5	95.8	85.4	88.7	87.2	115.2	98.3	81.2
Dec-81	95.2	95.5	125.2	106.1	79.5	89.7	88.6	118.3	98.6	78.8
Jan-82	90.7	92.4	112.0	90.7	75.7	87.3	85.8	112.6	91.8	81.9
Feb-82	87.8	88.5	112.0	92.5	74.5	89.5	87.8	113.9	96.2	84.3
Mar-82	96.4	96.2	123.6	101.0	85.3	90.7	88.7	117.0	97.8	85.6
Apr-82	89.5	88.5	117.3	99.4	79.9	89.8	88.0	114.6	97.9	84.1
May-82	87.0	85.1	113.1	96.1	81.8	91.0	89.0	117.0	100.0	85.0
Jun-82	89.4	84.8	116.0	97.4	94.2	91.5	88.7	115.8	97.4	89.7
Jul-82	85.2	82.8	110.0	96.0	82.0	89.9	88.0	114.8	97.5	87.9
Aug-82	87.6	85.6	112.4	94.8	83.9	90.7	88.8	115.2	94.8	85.5
Sep-82	89.0	84.3	114.5	97.3	95.1	90.5	88.9	114.9	97.7	85.7
Oct-82	91.8	87.4	110.3	91.2	101.1	88.8	87.6	107.8	89.7	85.4
Nov-82	91.7	88.9	112.1	95.3	93.3	91.4	88.9	116.0	97.9	88.7
Dec-82	97.1	96.0	120.9	107.9	89.1	91.6	89.1	114.5	100.6	88.3
Jan-83	95.0	96.6	114.2	96.2	80.7	91.3	89.8	114.2	97.0	87.1
Feb-83	89.8	90.6	112.1	94.6	76.6	91.3	89.8	113.8	98.2	86.7
Mar-83	97.9	97.9	119.2	101.7	88.1	92.2	90.4	113.3	98.9	88.5
Apr-83	91.4	90.5	116.0	98.2	83.3	91.6	90.0	113.0	96.7	87.2
May-83	88.4	86.7	109.6	92.8	85.4	92.4	90.7	113.2	96.4	88.5
Jun-83	90.5	87.1	113.8	99.8	91.9	93.1	91.3	113.9	100.2	88.0
Jul-83	86.2	85.0	106.4	93.3	81.3	90.9	90.2	110.9	94.5	87.8
Aug-83	90.9	88.5	112.9	100.3	89.2	94.1	91.9	116.1	100.3	91.3
Sep-83	92.9	87.2	114.3	99.7	104.4	94.4	91.9	114.7	100.3	94.1
Oct-83	94.0	90.1	109.2	94.7	102.8	90.8	90.1	106.5	92.4	86.4
Nov-83	95.0	93.5	110.5	96.1	94.3	94.7	93.4	114.9	99.2	89.3
Dec-83	100.3	100.4	120.6	104.6	90.5	94.6	93.4	114.4	97.7	89.3
Jan-84	97.8	99.5	115.8	100.4	83.3	94.0	92.7	115.0	101.1	89.9
Feb-84	93.7	94.5	115.2	98.3	80.7	95.2	93.6	116.7	101.8	91.3
Mar-84	99.9	100.7	119.1	101.2	89.1	94.2	92.9	113.4	98.6	89.7
Apr-84	94.2	93.4	118.9	100.2	86.1	94.2	92.7	115.5	98.5	89.6
May-84	89.9	88.2	110.4	96.0	87.0	94.1	92.3	114.1	99.7	89.7
Jun-84	89.8	85.5	113.2	99.0	94.5	92.7	89.9	113.8	99.7	91.1
Jul-84	90.3	89.8	109.9	97.3	82.6	95.1	95.0	114.3	98.1	90.0
Aug-84	91.3	89.3	114.5	101.4	87.5	94.7	92.7	118.5	101.6	90.1
Sep-84	91.4	87.5	106.0	96.3	99.7	92.9	92.0	106.4	96.9	89.9
Oct-84	98.4	93.5	118.0	104.8	107.7	94.7	93.2	115.1	101.9	90.1
Nov-84	94.8	92.9	108.7	96.1	96.0	94.6	92.9	113.3	99.6	90.6
Dec-84	98.6	98.6	115.6	103.2	90.4	92.9	91.8	109.4	96.7	88.6
Jan-85	98.0	99.5	116.0	100.2	84.3	94.2	93.0	114.6	101.0	91.0
Feb-85	88.9	89.3	110.7	94.9	77.1	90.1	88.4	111.8	98.0	87.1
Mar-85	99.1	99.9	117.3	101.5	88.4	93.4	92.2	111.6	98.9	89.0
Apr-85	95.4	94.6	116.3	102.8	88.3	95.2	93.8	112.6	101.0	91.5
May-85	93.1	91.4	113.5	99.3	90.0	97.4	95.7	117.6	103.0	92.7
Jun-85	91.5	88.9	112.2	97.7	91.8	94.9	93.8	113.4	98.6	89.1
Jul-85	90.7	90.1	113.0	102.1	81.6	95.7	95.3	117.9	102.7	89.5

Aug-85	91.7	90.5	109.9	100.6	87.0	95.3	94.0	114.3	101.1	90.5
Sep-85	93.8	89.9	114.0	98.4	99.7	95.2	94.3	114.5	98.9	89.9
Oct-85	100.0	95.5	119.6	105.6	108.0	96.0	95.0	116.7	102.4	89.7
Nov-85	95.5	94.0	109.4	97.3	95.3	95.3	93.9	113.9	100.9	89.6
Dec-85	101.5	101.4	121.5	109.2	92.0	95.5	94.4	114.4	102.6	89.4
Jan-86	101.5	102.3	119.4	101.3	91.2	97.6	95.7	117.8	102.3	98.6
Feb-86	95.8	97.1	116.0	99.1	81.6	97.1	96.3	116.7	102.3	92.6
Mar-86	101.9	103.6	120.8	102.3	87.4	95.9	95.6	114.1	99.1	88.1
Apr-86	97.1	96.5	122.2	104.4	87.6	96.8	95.7	118.6	102.6	90.5
May-86	92.5	92.0	110.2	94.7	86.9	96.7	96.2	114.4	98.1	89.5
Jun-86	93.2	90.7	115.4	98.5	92.6	96.9	95.8	117.2	99.6	90.5
Jul-86	92.5	92.2	118.0	101.3	81.4	97.9	97.6	123.7	102.1	89.6
Aug-86	93.3	93.7	110.8	98.4	83.8	97.3	97.5	115.6	99.2	87.6
Sep-86	97.2	93.5	115.2	101.9	103.5	98.6	97.9	115.9	102.2	93.2
Oct-86	102.7	98.0	118.1	103.7	114.2	98.3	97.4	115.5	100.8	94.0
Nov-86	96.9	95.8	107.1	92.2	98.0	96.6	95.8	110.9	95.5	91.9
Dec-86	105.3	105.5	122.4	105.9	97.6	99.0	98.2	114.4	99.6	94.2
Jan-87	99.4	103.3	105.2	84.4	85.5	95.6	96.7	103.7	85.6	93.1
Feb-87	96.0	98.3	111.6	94.0	81.4	97.5	97.5	111.9	97.0	92.6
Mar-87	105.9	107.7	124.3	102.8	92.3	99.5	99.2	116.5	99.0	92.9
Apr-87	99.7	100.2	117.9	101.5	90.3	99.5	99.3	114.9	99.8	93.1
May-87	94.2	94.2	107.1	95.5	88.9	98.3	98.3	111.3	98.7	91.4
Jun-87	96.0	94.4	111.7	99.3	94.8	99.8	99.8	113.9	100.3	92.9
Jul-87	94.5	94.7	109.9	100.5	86.3	100.7	100.7	116.4	101.9	95.0
Aug-87	94.3	95.1	105.7	97.4	86.2	98.5	99.0	110.3	98.3	90.5
Sep-87	98.6	96.0	113.0	101.3	102.2	100.1	100.6	113.9	101.5	91.9
Oct-87	103.8	100.8	112.5	100.6	112.6	99.2	100.3	110.1	97.9	91.9
Nov-87	101.3	99.7	112.0	101.8	103.0	100.7	99.4	115.2	105.1	96.4
Dec-87	107.5	107.5	122.7	109.3	100.8	100.7	99.9	114.2	102.7	97.0
Jan-88	102.3	106.5	103.3	98.1	86.6	98.5	99.6	101.9	99.7	95.2
Feb-88	100.3	103.3	112.3	101.0	84.1	102.0	102.5	112.0	104.3	96.2
Mar-88	107.6	108.9	118.6	108.1	97.9	100.8	100.0	110.2	103.4	98.5
Apr-88	100.4	101.2	111.4	100.9	92.5	100.2	100.2	109.0	99.1	95.5
May-88	97.4	97.2	105.9	99.1	94.6	101.5	101.4	110.0	102.3	97.1
Jun-88	96.6	95.2	105.7	102.6	97.1	100.6	100.8	108.5	103.8	95.5
Jul-88	92.5	93.4	97.6	92.2	86.8	99.1	99.9	104.4	94.2	95.1
Aug-88	96.8	97.4	106.4	97.6	90.6	101.1	101.7	110.8	98.5	94.7
Sep-88	100.0	96.8	108.3	99.0	109.0	101.6	101.7	109.6	99.0	98.0
Oct-88	102.5	100.0	102.0	95.5	113.5	97.7	99.6	99.7	92.9	91.7
Nov-88	102.7	102.3	107.9	96.6	103.8	101.7	101.7	110.3	99.3	96.8
Dec-88	108.5	109.2	117.4	104.0	103.5	101.6	101.2	109.4	97.8	100.0
Jan-89	105.4	108.5	105.2	98.2	95.2	101.9	101.3	103.8	100.3	106.3
Feb-89	98.0	100.9	104.3	93.4	85.2	99.6	99.9	103.6	96.2	98.0
Mar-89	107.3	109.2	111.4	105.0	98.7	100.1	99.8	102.9	99.8	99.7
Apr-89	99.8	101.0	100.1	98.6	95.5	99.5	99.8	97.8	96.5	98.4
May-89	96.7	96.9	98.1	95.7	95.8	100.7	101.1	101.9	99.0	98.1
Jun-89	96.4	94.8	97.2	98.8	102.1	100.7	100.6	100.3	100.2	100.7
Jul-89	90.7	91.3	85.9	93.6	89.7	97.7	98.3	92.7	96.3	97.5
Aug-89	96.3	95.6	96.9	101.8	97.5	100.6	100.2	101.0	102.8	101.5
Sep-89	97.6	94.5	96.8	101.0	109.2	99.7	99.9	98.0	101.2	97.8
Oct-89	104.6	99.8	100.7	105.7	124.0	99.3	99.3	98.0	102.4	98.8
Nov-89	101.2	100.6	97.1	98.7	105.9	99.8	99.7	98.5	101.3	98.2
Dec-89	105.9	106.8	106.3	109.5	101.2	98.9	98.6	99.5	103.0	98.5
Jan-90	104.6	106.5	101.5	104.5	98.8	101.7	99.3	100.8	107.6	112.4
Feb-90	96.7	98.7	100.0	103.5	86.1	98.2	97.5	99.3	106.6	99.7
Mar-90	105.9	107.1	107.8	111.9	99.3	98.3	97.2	99.0	105.5	101.0
Apr-90	99.1	98.5	99.7	110.3	98.4	98.5	96.9	97.1	106.6	101.1
May-90	94.8	92.8	93.6	106.3	100.4	98.6	96.9	97.9	110.9	102.7
Jun-90	94.5	91.9	94.3	109.0	101.5	99.1	98.1	97.7	111.2	100.1
Jul-90	90.9	90.0	87.6	108.4	92.1	98.3	97.6	94.2	112.5	99.1



Aug-90	93.3	91.9	91.6	112.4	95.3	97.7	97.0	95.4	113.2	98.7
Sep-90	92.1	89.4	87.8	108.4	100.6	94.3	95.1	88.8	108.5	89.6
Oct-90	101.7	95.3	100.3	114.7	124.1	96.1	94.6	97.2	110.1	97.6
Nov-90	97.0	95.9	93.2	109.8	100.0	95.0	94.6	93.9	112.5	91.7
Dec-90	101.0	101.5	97.4	116.4	97.4	94.1	93.1	91.1	109.6	95.4
Jan-91	98.3	100.2	97.2	105.3	90.1	96.4	93.3	98.1	110.1	104.9
Feb-91	92.2	93.7	95.4	103.8	82.8	93.5	92.0	95.0	106.1	96.6
Mar-91	99.3	100.8	97.8	109.6	91.8	91.9	91.0	89.5	102.7	94.7
Apr-91	91.8	90.8	93.6	112.1	90.4	91.0	89.0	90.4	106.7	92.4
May-91	86.8	84.8	85.8	102.8	91.2	90.5	88.7	91.1	108.9	93.5
Jun-91	83.1	80.3	81.3	98.1	91.3	87.5	86.2	83.8	100.5	90.1
Jul-91	83.0	81.8	79.9	100.1	85.0	90.1	89.4	85.7	104.3	90.8
Aug-91	84.5	83.1	80.9	100.1	87.8	88.8	88.3	84.5	100.7	90.4
Sep-91	85.8	82.6	78.9	104.2	97.2	88.2	88.6	79.0	104.3	85.8
Oct-91	91.4	87.1	84.1	108.1	107.3	85.9	86.2	81.0	102.9	82.8
Nov-91	85.9	85.5	76.6	97.5	88.7	83.4	83.6	76.5	99.5	80.3
Dec-91	86.5	88.3	78.1	104.8	79.1	80.1	80.3	72.5	98.6	78.0
Jan-92	80.9	85.0	76.2	93.2	64.2	79.8	79.0	79.0	99.6	76.4
Feb-92	81.7	85.9	74.3	94.7	65.6	82.8	83.9	74.5	96.3	77.5
Mar-92	86.6	89.8	81.7	105.2	72.1	80.0	80.7	74.5	97.8	75.8
Apr-92	82.0	82.6	80.0	101.9	75.9	81.0	80.8	76.7	95.7	77.6
May-92	73.1	73.1	67.5	85.6	72.3	76.4	76.8	73.2	92.1	74.0
Jun-92	71.3	70.0	67.4	90.2	73.8	75.6	75.9	68.9	92.7	72.9
Jul-92	67.9	67.0	62.6	87.9	69.4	74.0	73.6	66.4	91.6	73.6
Aug-92	64.7	64.2	58.4	81.2	65.7	68.3	68.8	60.9	81.3	66.9
Sep-92	68.1	64.7	65.8	87.5	77.5	69.9	69.7	65.5	87.4	67.6
Oct-92	76.2	72.6	66.1	94.9	89.8	71.1	71.7	63.6	89.4	68.3
Nov-92	72.3	71.4	66.1	85.7	75.3	69.6	69.2	65.7	86.9	67.2
Dec-92	76.4	77.7	69.7	103.8	67.8	70.4	70.1	63.7	98.3	67.3
Jan-93	68.7	73.1	54.6	82.6	54.5	68.2	67.9	58.5	90.7	66.3
Feb-93	68.3	70.1	64.6	93.2	57.4	69.2	68.1	65.4	93.8	68.8
Mar-93	74.7	75.9	72.4	105.7	64.1	69.1	68.2	65.7	98.1	68.8
Apr-93	69.4	69.1	63.2	104.0	65.2	68.3	67.5	60.0	96.7	66.8
May-93	63.9	64.1	52.5	82.5	63.7	67.0	67.7	58.1	90.0	64.8
Jun-93	61.9	59.3	56.4	88.2	68.7	66.0	64.8	57.2	90.7	67.3
Jul-93	58.1	56.4	54.1	82.7	60.7	63.4	62.3	57.2	85.5	63.9
Aug-93	57.3	55.4	49.6	89.5	60.3	60.6	59.7	51.8	89.4	60.9
Sep-93	59.7	55.9	45.5	88.0	73.6	61.5	60.4	45.0	88.0	64.1
Oct-93	63.0	59.4	40.6	87.6	80.0	58.5	58.5	38.9	81.5	59.9
Nov-93	61.3	60.5	35.6	80.0	70.6	58.5	58.2	35.0	80.8	62.0
Dec-93	60.5	61.9	35.5	76.5	61.7	55.4	55.4	31.9	73.1	61.4
Jan-94	53.2	58.7	23.6	43.9	46.2	52.9	54.3	26.1	49.1	57.5
Feb-94	50.6	54.8	17.1	67.8	44.4	51.3	53.0	17.4	67.7	54.0
Mar-94	54.3	57.3	27.9	73.8	48.8	50.5	51.6	25.4	68.7	53.5
Apr-94	49.6	50.7	23.8	64.3	52.8	48.9	49.5	22.4	59.4	54.5
May-94	43.4	44.6	18.7	50.7	46.9	45.6	47.3	20.9	55.7	47.3
Jun-94	44.2	44.3	22.8	54.8	49.9	47.3	48.8	23.0	56.7	48.0
Jul-94	42.9	43.8	19.5	51.8	46.8	46.8	48.6	20.5	53.0	48.5
Aug-94	45.3	45.6	20.8	52.7	52.6	48.1	49.3	21.7	52.3	52.5
Sep-94	46.2	45.1	25.2	51.0	58.1	47.7	48.6	24.9	51.1	51.0
Oct-94	51.0	48.9	25.3	52.3	69.5	47.2	48.0	24.3	48.0	52.0
Nov-94	50.9	52.2	25.6	59.7	54.2	48.3	50.0	25.1	60.3	47.2
Dec-94	52.6	56.9	28.0	54.4	45.5	48.1	50.7	24.8	52.8	45.4
Jan-95	48.9	55.3	20.3	45.2	36.7	48.6	51.0	22.9	51.1	46.8
Feb-95	46.5	51.6	21.8	49.4	36.4	47.1	49.7	22.2	48.9	44.9
Mar-95	50.0	55.1	23.6	55.9	39.7	46.7	49.8	21.5	52.4	44.1
Apr-95	45.4	49.2	19.0	49.5	40.4	44.8	48.3	17.8	45.5	41.7
May-95	44.6	47.1	17.7	44.9	45.6	47.0	50.2	19.8	49.2	45.2
Jun-95	43.8	45.8	19.5	47.0	45.1	47.0	50.8	19.7	48.7	42.4
Jul-95	43.2	46.0	18.2	45.6	42.1	46.9	51.0	19.3	46.1	42.5

Aug-95	44.6	47.0	18.3	47.4	45.8	47.4	50.8	19.2	47.2	45.2
Sep-95	45.5	46.9	16.8	43.1	52.3	47.2	50.4	16.7	43.4	47.1
Oct-95	51.2	51.3	16.5	47.3	65.7	47.4	50.2	15.8	43.3	49.6
Nov-95	48.7	52.2	15.3	40.8	50.6	46.1	49.8	14.9	41.1	44.2
Dec-95	49.1	54.8	17.9	38.1	42.0	44.7	48.6	15.6	37.5	42.3
Jan-96	45.5	52.5	14.0	33.0	34.1	45.1	48.3	15.9	37.2	44.5
Feb-96	46.0	52.1	17.5	41.4	35.1	46.6	50.2	17.8	41.1	43.6
Mar-96	46.0	51.8	18.1	38.5	36.6	43.1	47.0	16.6	36.2	40.6
Apr-96	44.4	48.5	17.1	44.8	39.9	43.9	47.7	15.8	41.2	40.9
May-96	41.3	44.0	14.1	36.4	42.9	43.5	47.0	15.7	39.6	41.8
Jun-96	39.9	41.4	14.5	37.3	45.0	42.8	46.1	14.7	38.6	41.1
Jul-96	39.4	41.9	14.1	42.6	39.2	42.3	46.5	14.9	42.5	38.1
Aug-96	39.7	43.1	13.8	39.4	37.2	42.1	46.5	14.5	39.6	36.7
Sep-96	40.4	43.8	13.3	39.8	38.4	42.1	46.9	13.4	40.1	35.8
Oct-96	47.3	48.0	16.2	46.9	56.9	43.8	46.9	15.4	43.0	43.8
Nov-96	45.1	48.4	15.6	38.4	45.7	42.9	46.2	15.2	38.5	40.6
Dec-96	46.9	52.1	17.2	40.6	40.4	42.8	46.2	15.0	40.5	41.1
Jan-97	43.1	50.8	12.9	37.2	27.1	42.7	46.7	14.7	41.8	35.9
Feb-97	42.2	48.6	14.7	40.7	28.9	42.7	46.7	14.8	40.3	35.9
Mar-97	44.8	51.2	16.1	42.1	32.4	42.0	46.5	14.9	39.6	35.5
Apr-97	43.0	47.2	17.6	45.0	36.5	42.6	46.7	16.3	41.5	37.0
May-97	40.4	43.4	14.9	39.7	39.4	42.4	46.3	16.4	42.9	37.7
Jun-97	39.6	40.5	16.0	39.6	46.0	42.2	45.0	16.4	40.8	40.9
Jul-97	41.8	42.4	15.8	46.7	48.6	44.4	46.9	16.7	46.4	45.7
Aug-97	41.5	43.0	15.5	46.3	45.1	44.1	46.3	16.3	46.9	44.9
Sep-97	41.7	43.5	16.2	47.0	44.2	43.7	46.4	16.4	47.5	43.1
Oct-97	46.6	47.9	16.8	50.8	52.7	43.3	46.7	15.9	46.8	41.5
Nov-97	45.7	48.1	16.8	45.8	48.5	43.8	45.9	16.4	45.8	44.0
Dec-97	48.2	52.7	17.8	46.8	43.2	44.0	46.9	15.6	47.0	44.2
Jan-98	44.0	50.1	14.3	40.7	33.2	43.6	46.2	16.2	45.2	44.4
Feb-98	43.7	48.6	14.9	40.2	37.3	44.3	46.8	15.0	40.0	45.8
Mar-98	47.0	50.9	15.3	46.8	45.1	44.2	46.4	14.3	43.9	48.3
Apr-98	45.1	47.2	16.3	48.2	47.9	44.8	47.0	15.1	44.8	47.7
May-98	40.4	41.6	12.4	35.1	48.3	42.4	44.3	13.5	37.6	45.7
Jun-98	39.4	39.6	12.5	37.3	50.2	41.7	44.0	12.8	38.2	43.8
Jul-98	38.5	39.0	11.5	31.2	49.3	40.5	42.8	12.1	31.1	45.2
Aug-98	36.8	38.4	12.5	32.2	41.3	39.0	41.1	13.1	32.6	41.6
Sep-98	36.6	38.4	11.9	28.2	41.5	38.5	40.8	12.0	28.4	42.0
Oct-98	43.1	43.9	14.6	35.7	53.1	40.2	42.7	13.7	33.0	43.0
Nov-98	41.9	45.1	14.3	38.7	41.2	40.2	43.1	14.0	38.5	38.1
Dec-98	45.4	50.5	16.9	37.1	38.9	41.6	45.2	14.9	37.5	39.7
Jan-99	42.2	48.0	13.2	36.1	33.1	42.0	44.6	14.9	39.9	44.2
Feb-99	41.9	45.3	15.7	41.8	39.3	42.6	43.9	15.9	41.8	47.8
Mar-99	46.7	49.8	17.2	44.7	47.3	43.8	45.5	16.2	41.9	49.3
Apr-99	45.1	46.0	17.5	46.0	52.4	44.9	46.1	16.4	43.0	51.6
May-99	43.9	44.3	15.4	41.2	54.4	45.9	47.1	16.8	44.0	51.3
Jun-99	45.0	43.3	17.0	44.4	63.3	47.4	47.9	17.5	45.3	55.2
Jul-99	46.0	44.5	16.3	45.4	64.1	48.0	48.6	17.1	45.5	57.9
Aug-99	45.6	47.0	16.1	41.3	52.8	48.1	50.0	16.6	41.4	53.8
Sep-99	45.9	47.6	17.1	43.6	51.3	48.3	50.5	17.1	43.7	53.1
Oct-99	50.0	51.6	16.8	39.9	59.3	46.7	50.1	15.6	37.1	49.0
Nov-99	50.5	54.2	17.7	45.0	50.9	48.7	51.8	17.2	44.5	47.8
Dec-99	54.2	57.7	20.2	48.9	55.4	49.8	51.8	18.0	49.8	56.2
Jan-00	50.2	55.0	16.0	40.1	48.1	50.1	51.3	18.3	44.3	63.4
Feb-00	50.9	54.9	18.6	45.3	49.8	51.9	53.4	18.9	45.9	59.9
Mar-00	53.6	57.2	19.7	49.9	54.1	50.4	52.5	18.8	46.7	55.5
Apr-00	49.8	52.1	19.3	47.4	54.0	49.8	52.4	18.3	44.6	52.9
May-00	49.4	50.7	17.9	45.1	57.9	51.6	53.7	19.5	48.4	54.7
Jun-00	48.6	48.4	19.2	48.4	60.9	50.9	53.4	19.8	49.3	53.6
Jul-00	48.6	49.6	18.7	47.4	57.3	50.4	53.8	19.3	47.6	51.7

Aug-00	47.9	50.4	20.6	51.2	48.5	50.2	53.2	21.0	50.3	49.5
Sep-00	48.2	50.7	19.2	50.3	49.8	50.6	53.6	18.9	49.6	51.9
Oct-00	53.9	55.3	20.3	52.3	62.8	50.5	53.6	18.6	48.5	52.5
Nov-00	53.7	56.4	18.9	48.8	58.3	51.8	53.9	18.6	48.0	55.2
Dec-00	56.0	60.3	20.0	41.6	56.9	51.7	54.5	18.1	42.6	57.1
Jan-01	52.7	59.3	15.8	43.1	44.1	52.7	55.7	18.2	48.2	57.1
Feb-01	51.7	56.7	17.9	46.9	47.1	53.1	55.5	18.7	48.1	56.4
Mar-01	56.6	60.7	19.3	51.2	57.4	53.5	56.0	18.5	48.1	58.3
Apr-01	53.6	55.5	19.7	50.3	60.7	53.6	55.9	18.8	47.6	59.9
May-01	52.5	53.8	16.7	46.0	63.2	54.8	56.8	18.1	49.9	60.4
Jun-01	51.2	51.7	17.4	46.6	64.0	53.4	56.7	17.9	47.6	57.1
Jul-01	52.0	52.8	17.1	47.5	63.7	53.7	56.8	17.2	47.5	57.9
Aug-01	52.4	54.4	19.9	51.5	58.2	54.6	57.2	19.9	49.5	59.3
Sep-01	51.8	53.8	21.0	49.0	57.2	54.0	56.6	20.5	47.5	59.2
Oct-01	58.6	59.0	22.5	56.2	72.0	54.8	57.2	20.4	51.9	60.5
Nov-01	57.5	59.6	21.0	50.9	65.3	55.4	57.2	20.7	49.6	61.7
Dec-01	58.0	61.5	20.3	50.7	61.5	53.8	55.9	18.6	51.8	60.7
Jan-02	53.7	59.4	17.1	48.2	47.5	54.0	56.1	20.0	54.9	60.6
Feb-02	52.5	56.5	18.0	51.3	50.9	54.0	55.5	19.1	53.3	60.9
Mar-02	57.4	60.9	19.6	53.3	60.4	54.4	56.4	18.8	50.4	61.4
Apr-02	56.0	58.2	19.3	57.4	62.1	56.2	58.7	18.4	54.5	62.0
May-02	52.7	53.8	17.2	46.9	64.4	55.2	56.7	18.5	51.5	62.6
Jun-02	52.9	52.1	18.3	50.2	70.7	55.2	57.0	18.7	51.6	63.9
Jul-02	54.7	54.0	19.6	54.3	71.7	56.3	57.7	19.4	54.2	65.7
Aug-02	54.6	55.4	19.1	58.1	64.8	56.5	58.0	19.0	55.0	65.6
Sep-02	54.5	56.0	19.4	55.8	62.7	56.4	58.7	18.8	52.9	63.7
Oct-02	60.6	61.3	21.4	55.3	74.8	56.8	59.5	19.5	50.7	62.8
Nov-02	58.3	61.3	19.1	44.6	65.5	56.0	59.0	18.8	43.0	61.2
Dec-02	61.4	65.8	20.9	45.2	64.4	57.1	60.0	19.4	45.6	62.8
Jan-03	56.3	62.8	17.0	41.3	50.8	57.1	59.7	20.4	48.1	64.3
Feb-03	55.5	60.4	18.5	45.2	54.1	57.3	59.4	20.0	47.4	64.9
Mar-03	60.6	65.0	21.9	55.7	60.3	57.6	60.4	21.0	53.1	61.6
Apr-03	58.7	60.9	23.2	57.7	64.8	59.0	61.3	22.3	55.5	65.6
May-03	56.6	58.3	21.1	47.5	66.6	59.3	61.4	22.5	52.8	66.0
Jun-03	58.4	58.8	21.2	52.2	73.4	60.9	64.0	21.2	53.7	67.3
Jul-03	59.0	59.0	22.8	57.6	74.0	60.6	62.7	22.2	57.8	68.4
Aug-03	58.9	60.2	21.9	59.0	68.5	60.7	62.9	21.5	55.5	68.9
Sep-03	59.4	60.4	23.8	62.2	69.1	60.9	63.2	23.1	58.0	68.4
Oct-03	65.0	65.0	25.1	62.9	81.2	61.0	63.3	22.9	57.2	67.8
Nov-03	62.9	65.2	22.9	53.7	72.0	60.3	63.0	22.4	50.5	66.6
Dec-03	65.6	68.4	25.6	60.7	71.9	61.1	62.6	24.0	60.5	69.5
Jan-04	60.9	67.0	20.1	58.8	54.1	62.1	64.0	24.7	70.3	68.2
Feb-04	59.9	65.4	21.9	59.2	54.4	61.8	64.5	23.9	62.4	65.3
Mar-04	64.8	68.4	25.5	68.5	65.8	61.7	63.6	24.5	65.8	67.5
Apr-04	61.2	63.7	25.4	68.2	64.5	61.5	63.8	24.3	66.4	66.0
May-04	58.8	61.0	23.4	60.3	64.3	61.5	64.0	24.6	67.1	64.8
Jun-04	59.3	59.1	26.9	68.4	71.0	61.8	64.1	26.4	70.6	66.1
Jul-04	60.3	60.7	26.7	69.5	70.1	62.0	64.3	25.9	70.0	65.3
Aug-04	60.0	60.6	26.0	75.8	67.6	61.7	63.1	25.5	71.8	67.9
Sep-04	61.1	60.6	24.6	76.6	74.1	62.3	63.4	24.0	70.7	71.5
Oct-04	65.3	64.6	22.6	73.9	83.2	61.4	63.2	20.7	66.4	68.8
Nov-04	65.3	65.9	23.9	77.8	77.1	62.4	63.7	23.2	71.5	70.3
Dec-04	66.9	69.7	23.9	79.5	70.8	62.4	64.0	22.4	78.0	68.0
Jan-05	60.9	67.2	16.3	56.3	55.5	62.5	64.5	20.5	69.2	70.2
Feb-05	61.7	66.2	23.2	67.2	58.9	63.7	65.4	25.3	70.5	70.8
Mar-05	66.7	70.9	25.0	71.1	66.5	63.7	66.0	24.2	68.9	68.6
Apr-05	63.3	65.6	25.2	68.7	68.5	63.8	65.7	24.3	68.0	70.8
May-05	60.6	61.9	22.9	62.9	70.3	63.2	64.6	23.8	69.3	71.8
Jun-05	62.3	60.6	28.0	74.5	79.7	64.9	65.4	27.1	77.8	75.1
Jul-05	62.9	61.6	25.2	70.0	81.5	64.6	64.9	24.4	70.5	76.9

Aug-05	63.4	64.1	24.6	78.8	73.1	65.2	66.5	23.9	75.3	73.5
Sep-05	65.4	64.3	24.9	88.6	80.9	66.5	67.3	24.4	81.1	76.4
Oct-05	70.8	69.0	26.6	90.6	91.2	66.7	67.9	24.6	80.0	75.0
Nov-05	70.2	70.4	26.5	90.1	82.4	66.8	68.3	25.5	81.2	73.9
Dec-05	72.8	75.0	27.8	105.7	75.3	68.0	69.2	26.1	102.4	71.7
Jan-06	63.3	71.1	19.1	60.8	51.9	65.4	68.6	24.6	76.8	65.9
Feb-06	63.7	68.2	24.6	72.1	60.6	65.8	67.4	26.8	75.6	72.7
Mar-06	71.4	74.6	27.6	75.0	76.1	68.3	69.5	26.9	73.4	78.7
Apr-06	67.5	69.9	27.7	67.4	74.4	68.1	69.8	26.8	67.1	77.7
May-06	66.5	67.6	26.8	66.5	78.1	69.2	70.2	27.6	72.5	80.5
Jun-06	65.6	65.0	29.5	67.8	82.0	68.3	69.7	28.3	71.4	78.1
Jul-06	66.8	66.9	27.4	70.7	81.6	68.6	70.3	26.5	71.4	77.6
Aug-06	68.3	69.0	30.0	74.4	79.9	70.1	71.4	29.0	72.0	80.7
Sep-06	68.8	67.9	29.2	78.1	86.3	69.8	71.3	28.5	71.2	80.0
Oct-06	74.9	72.2	31.6	89.3	99.5	70.6	71.3	29.2	77.2	81.3
Nov-06	75.8	74.8	32.6	87.0	94.4	71.9	72.7	31.3	77.7	83.4
Dec-06	77.5	78.4	31.5	80.0	92.3	72.5	72.6	29.3	76.8	87.2
Jan-07	70.6	75.7	24.4	77.7	68.0	73.4	73.4	32.1	100.2	87.2
Feb-07	70.1	73.6	29.3	83.2	70.6	72.5	72.8	31.8	87.3	84.6
Mar-07	75.7	78.5	32.1	76.7	82.1	72.5	73.2	31.6	75.9	85.1
Apr-07	72.6	73.7	30.9	91.4	80.7	73.3	73.7	29.9	91.2	84.9
May-07	70.5	71.8	30.5	81.8	79.1	73.2	74.3	31.3	88.1	81.9
Jun-07	69.1	68.7	32.2	75.6	83.9	71.7	73.1	30.8	80.5	80.5
Jul-07	70.5	70.0	32.5	84.9	84.7	72.3	73.4	31.4	85.3	81.1
Aug-07	69.7	69.7	31.9	87.4	81.0	71.3	71.9	30.5	85.2	81.8
Sep-07	71.7	69.2	33.3	88.2	93.4	72.7	72.7	32.5	80.1	85.6
Oct-07	77.8	73.9	35.8	98.6	105.3	73.3	73.2	33.0	83.5	85.7
Nov-07	78.0	75.6	36.7	100.8	99.0	73.9	73.6	35.3	89.6	86.8
Dec-07	79.0	79.3	38.8	98.3	89.9	74.1	73.7	36.1	94.6	84.5
Jan-08	69.5	75.9	26.2	70.0	62.1	72.5	73.8	34.8	91.5	80.1
Feb-08	72.1	75.4	32.1	92.4	70.9	74.6	74.7	35.0	97.7	84.7
Mar-08	76.7	79.0	34.2	97.8	80.2	73.6	73.7	33.9	97.2	83.2
Apr-08	72.4	73.1	37.6	98.8	77.9	73.1	73.0	36.4	97.6	82.4
May-08	71.5	71.5	34.2	99.6	80.4	74.0	73.8	34.8	106.6	83.4
Jun-08	71.4	69.4	35.0	92.9	89.2	73.9	73.4	33.4	99.8	86.0
Jul-08	72.4	69.8	34.9	105.7	90.4	74.2	73.1	33.9	105.8	86.7
Aug-08	71.9	70.7	33.8	98.1	86.3	73.6	72.8	32.2	96.0	87.2
Sep-08	72.8	68.8	32.6	114.8	95.0	73.8	72.4	31.8	104.3	86.7
Oct-08	74.3	69.5	29.0	108.7	103.5	70.0	68.9	26.7	91.2	84.2
Nov-08	64.3	60.0	20.4	81.9	94.7	60.9	58.5	19.5	72.7	82.8
Dec-08	66.0	64.4	20.8	75.8	87.9	61.9	60.0	19.2	73.1	82.2
Jan-09	55.6	60.6	8.5	24.3	62.3	58.1	58.9	11.4	32.0	80.5
Feb-09	58.6	61.7	11.3	44.9	68.9	60.8	61.2	12.4	47.6	82.3
Mar-09	65.5	68.1	15.8	52.5	78.3	62.9	63.6	15.8	52.3	81.2
Apr-09	60.2	61.3	15.9	48.5	76.3	60.9	61.3	15.5	47.5	80.9
May-09	58.4	58.7	12.9	39.4	79.8	60.4	60.5	13.1	42.0	83.0
Jun-09	60.2	59.2	13.6	41.6	86.7	62.2	62.5	12.9	45.1	83.9

Source: Author's calculations. See Appendix B for details.

## Appendix B. Calculation of composite indices of industrial production for major market groups: Russia, 1981–2009

**Step 1.** For each product  $I$  from our sample the basic index

$$IP_{t_B}^i(t) = 100 \frac{q^i(t)}{\bar{q}^i(t_B)}$$

Is calculated. Here  $q^i(t)$  is an output of production month  $t$  in physical units (sets, tons, meters, etc.);  $t_B$  is the basic year;  $\bar{q}^i(t_B)$  is average monthly output of product  $i$  in the basic year (also in physical units).

**Step 2.** Using products' indices  $IP_{t_B}^i(t)$  is a weighted average for the total industry and each of the four distinguished market groups, MG (MT - Materials and supplies; EQ – Equipment; CD - Consumer durables; CN - Consumer nondurables) is calculated:

$$\overline{IP}_{t_B}^{MG}(t) = \frac{\sum_{i \in G} \omega_{t_B}^i IP_{t_B}^i(t)}{\sum_{i \in G} \omega_{t_B}^i}$$

Here  $\omega_{t_B}^i$  is the weight of product  $I$  which is equal to the value of sales of this product during the basic year (in whole sale prices, without sales tax); and sums are calculated for all products included in a market group (see Table B-1 for classifications used for products by market groups).

**Step 3.** Using X-12 ARIMA procedure from the “Demetra” program we adjusted all five composite indices (total industry and four market groups) for calendar and seasonal factors (see Appendix A for indices with and without adjustments).

Our monthly time-series for 108 industrial products are from January 1981 through June 2009 (Rosstat's classifications were revised at the moment and construction of comparable time-series became impossible). The data before January 1992 were taken from Rosstat's internal (unpublished) bulletin, “Main indicators of industry” (“Основные показатели работы промышленности”). From January 1992 we used official information on physical output of products from the Rosstat's Central Statistical Data Base as well as from the data base collected by E. Baranov and V. Bessonov. The statistics for sales in 1989 (the basic year) were taken from another of Rosstat's internal (unpublished) bulletins, “Average wholesale prices, costs and incomes from production of the main industrial products” (“Средние оптовые цены, себестоимость и рентабельность производства важнейших видов продукции”).

The list of 108 industrial products is shown in Table B-1.

Table B-1. List of Industrial Products

Industrial Product	Промышленная продукция	MG	Weight
Electric power generation	Электроэнергия	MT	16599.0
Heat power generation	Теплоэнергия	MT	5893.0
Crude oil	Нефть (включая газовый конденсат)	MT	13396.9
Gas, natural	Газ естественный	MT	4857.3
Coal	Уголь	MT	4687.0
Iron ore	Железная руда (товарная)	MT	788.5
Cast iron	Чугун	MT	1103.8
Steel	Сталь	MT	364.2
Rolled steel	Готовый прокат черных металлов	MT	11492.1
Steel pipes and tubes	Трубы стальные	MT	29901.1
Coke, 6%	Кокс 6% влажности	MT	453.2
Steam turbines	Турбины паровые	EQ	145.4
Gas turbines	Турбины газовые	EQ	90.2
Diesel engines and diesel generators	Дизели и дизельгенераторы	EQ	641.2
Electrical engines	Эл. двигатели и электромашины крупные	EQ	439.2
Metal cutting machine	Металлорежущие станки	EQ	1954.1
Forging and pressing machines	Кузнечно-прессовые машины	EQ	421.0
Spinning machines	Прядильные машины	EQ	88.1
Weaving looms	Ткацкие станки	EQ	182.9
Electrical traveller cranes	Краны мостовые электрические	EQ	84.3
Automobile cranes	Краны на автомобильном ходу	EQ	209.9
Bulldozers	Бульдозеры	EQ	400.2
Motor-driven graders	Автогрейдеры	EQ	102.6
Excavators	Экскаваторы	EQ	603.0
Scrapers	Скреперы	EQ	43.0
Railroad diesel locomotives	Тепловозы магистральные	EQ	30.2
Railroad electric locomotives	Электровозы магистральные	EQ	190.4
Railroad freight cars	Вагоны грузовые магистральные	EQ	485.8
Railroad passenger cars	Вагоны пассажирские магистральные	EQ	95.0
trolley buses	Троллейбусы	EQ	54.4
Trucks	Грузовые автомобили	EQ	4627.8
Automobiles	Легковые автомобили	CD	3438.7
Buses	Автобусы	EQ	393.5
Trailers and semi-trailers	Прицепы и полуприцепы автомобильные	EQ	497.1
Tractor trailers	Тракторные прицепы	EQ	287.8
Rolling bearings	Подшипники качения (без велосипедных)	MT	1164.6
Tractors	Тракторы	EQ	2316.8
Combine harvesters	Комбайны зерноуборочные	EQ	879.3
Gasoline	Бензин автомобильный	MT	2458.6
Diesel oil	Дизельное топливо	MT	3633.2
Fuel oil	Мазут топочный	MT	2597.6
Synthetic ammonia	Аммиак синтетический	MT	476.5
Sulfuric acid	Серная кислота в моногидрате	MT	190.7
Soda ash	Сода кальцинированная 100%	MT	177.6
Hydrate of sodium	Сода каустическая 100%	MT	237.6
Fertilizers	Минеральные удобрения	MT	3434.2
Synthetic rubber	Каучуки синтетические	MT	2007.2
Pesticides	Хим. средства защиты растений 100%	MT	408.6
Synthetic resins and plastics	Синтетические смолы и пластмассы	MT	2199.6
Chemical fibers and threads	Волокна и нити химические	MT	1639.8
Tires	Автошины	MT	2710.8
Feed protein	Белок кормовой микробиологический	MT	666.5
Logging	Деловая древесина	MT	5423.5
Sawmill products	Пиломатериалы	MT	2878.1
Plywood	Фанера клееная	MT	414.9
Chipboards	Древесностружечные плиты	MT	396.4
Wood fibre boards	Древесноволокнистые плиты	MT	317.1
Cellulose pulp	Целлюлоза товарная	MT	1304.3

Paper	Бумага	MT	1779.4
Carton	Картон	MT	859.2
Cement	Цемент	MT	1668.4
Roofing slate	Шифер	MT	341.7
Asbestos tubes	Трубы и муфты асбоцементные	MT	97.3
Bricks	Кирпич строительный	MT	894.0
Reinforced concrete building products	Сборные железобетонные конструкции	MT	3075.4
Soft roofing materials	Мягкие кровельные материалы и изол	MT	246.1
Wall tiles, ceramic	Керамические плитки, стеновые	MT	49.5
Refrigerators and freezers, household-type	Холодильники и морозильники бытовые	CD	472.2
Washing machines, household-type	Машины стиральные бытовые	CD	349.3
Vacuum cleaners	Электропылесосы	CD	74.7
Tape-recorders	Магнитофоны	CD	462.8
Videotape-recorders	Видеомагнитофоны	CD	136.4
Radio receiving sets	Устройства радиоприемные	CD	340.9
TV sets	Телевизоры	CD	1345.7
Sewing machine, household-type	Машины швейные бытовые	CD	150.9
Motorcycles and scooters	Мотоциклы и мотороллеры	CD	516.2
Bicycles, adults	Велосипеды (без детских)	CD	131.1
Synthetic detergents	Синтетические моющие средства	CN	510.6
Laundry soap	Мыло хозяйственное	CN	129.2
Toilet soaps	Мыло туалетное	CN	176.4
Clocks, household-types	Часы бытовые	CD	580.2
Cotton fabrics	Хлопчатобумажные ткани	MT	5777.0
Linen fabrics	Льняные и пенькоджутовые ткани	MT	722.5
Wool fabrics	Шерстяные ткани	MT	3593.6
Silk fabrics	Шелковые ткани	MT	1485.6
Nonwoven fabrics	Нетканые материалы типа тканей	MT	436.9
Socks	Чулочно-носочные изделия	CN	597.1
Knitted garments	Трикотажные изделия	CN	2119.6
Shoes	Обувь	CN	2675.0
Carpets and rugs	Ковры и ковровые изделия	CD	358.5
Meats, incl. sub-products	Мясо (включая субпродукты 1 категории)	CN	5207.2
Sausages	Колбасные изделия	CN	3113.4
Butter	Масло животное	CN	2033.4
Cheese	Сыры и брынза жирные	CN	537.3
Milk and milk products	Цельномолочная продукция	CN	3935.1
Sugar, granulated	Сахар-песок	CN	3478.7
Vegetable oil	Масло растительное	CN	743.5
Bread and products	Хлеб и хлебобулочные изделия	CN	3486.2
Confectionery products	Кондитерские изделия	CN	3726.5
Macaroni and products	Макаронные изделия	CN	447.5
Margarine and products	Маргариновая продукция	CN	203.3
Non-alcoholic beverages	Безалкогольные напитки	CN	547.6
Canned fruits and vegetables	Фруктоовощные консервы	CN	1098.4
Canned meats	Мясные консервы	CN	249.9
Vodka and products	Водка и ликеро-водочные изделия	CN	522.4
Grape wine	Вино виноградное	CN	767.1
Beer	Пиво	CN	527.9
Cigarettes	Папиросы и сигареты	CN	1012.5

*Note:* We use the following notations here: MG – market group; MT – Materials and supplies; EQ – Equipment; CD – Consumer durables; CN – Consumer nondurables.

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В статье выявляются особенности динамики производства товаров промежуточного, инвестиционного и потребительского назначения в экономиках США и России, что позволяет подступиться к пониманию механизмов формирования экономических циклов в их страновой специфике. На основе статистического анализа разработанных автором для России индексов физических объемов промышленного производства делается вывод о том, что в России динамика выпуска промышленных товаров по-прежнему в значительной степени определяется не спросом, а предложением продукции. Это связывается со слабой диверсификацией российской экономики, высокой степенью ее монополизации и значительной ролью импорта в удовлетворении потребительского и инвестиционного спроса.



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