

Three-Sector Structure of the National Economy of Russia

I.Sh. Khasanov

doctor of economic sciences, professor of general economic disciplines KFU
a Kazan Federal University, Kazan, 420008, Russia
ilgizarkhasan@mail.ru

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Abstract

The main objective of the article is to determine the changes in the income and expenditure of the national economy of Russia from 1961 to 2009. To solve this problem, the author applied research methodology of the economic system - a three-sector static equilibrium income and expenses using a statistical system of national accounts. As a result, on the basis of the methodology found an association between income and expenditure of the three sectors (economic activities) of the national economy: the production of products and services for production purposes, the production of consumer goods and production of financial and credit services.

Keywords: static equilibrium in the economy, the structure of the national economy, sectors of economy, gross domestic product, income and expenses.

1. Introduction

The most important principle of positive functioning of the economic system is a balance: between production and consumption, trade and monetary circulation, aggregate supply and demand; revenues and expenditures; material and personal factors of production, consumption and accumulation; sectors producing capital and consumer goods, manufacturing products and providing services, transformational and transactional sectors, exports and imports, trade and balance of payments and other areas of economic life. Under equilibrium author understood balanced interaction (transaction) between the separate spheres of the national economy, contributing to its growth.

Methodological principle of equilibrium in the study of the economic system has led many scientists to develop various static models of economic development. During the XX century, many economists analyzed the problem of static economic system. Most scientists understand economic statics as equilibrium theory of national economy or static economy, that is economy in a state of equilibrium [Schumpeter J., 1908; Schumpeter J., 1912], [Jevons St. W., 1911], [Walras L., 1988], [Marshall A., 1910], [Clark J.B., 1899; Clark J.B., 1922], [Pareto V., 1909], [Fisher I., 1892], [Seligman E., 1905], [Tanssig F., 1923], [Cassel G., 1918], [Oppenheimer Fr., 1922; Oppenheimer Fr., 1911], [Streller R., 1926], [Badge S., 1925]. Analysis of the economic problems in normal conditions, that is in equilibrium is static in nature.

Consideration of the equilibrium state of the economic system has led scientists to study the interaction of individual elements of which it is composed. Study of equilibrium of the economic system means designing circuits for establishing equilibrium of its elements. The main objective is the optimal economic statics analysis of the structure and interaction of the elements of the national economy, the achievement of the overall proportion and balance of the economy.

2. The Equilibrium Structure of the National Economy of Russia on Income and Expenditure

The national economy is characterized by many macroeconomic indicators, but most important of which are the gross output of products and services (GO) gross domestic product (GDP), the accumulation of real and financial assets, net lending (+) / net borrowing (-). The above macroeconomic indicators are interrelated with each other. If the absolute value of GDP taken for 10,000 currency units or 10000⁰/₀₀₀, in a formalized way, gross output of products and services can be represented by the following equation:

$$c(c' + c'') + v + m = w,$$

where: w - gross output at market prices; c' - material costs or intermediate consumption; c'' - depreciation (depreciation cost of capital); v - workers wages (including taxes and insurance deductions, hidden wages); m - gross

profit and net mixed income (including taxes on products, net taxes on production and non-tax payments).

We have calculated the structure of gross output and gross domestic product of Russia for 50 years (for the period from 1961 to 2009). The resulting calculations for some years can be summarized as follows:

$$1961 \text{ year: } 11306c' + 4484v + 4410m = 20200w$$

$$1970 \text{ year: } 11884c' + 4554v + 4235m = 20673w$$

$$1982 \text{ year: } 12177c' + 4363v + 3945m = 20485w$$

$$1991 \text{ year: } 9857c' + 4367v + 4818m = 19042w$$

$$2008 \text{ year: } 9379c' + 4562v + 4775m = 18716w,$$

$$2009 \text{ year: } 9828c' + 5174v + 3932m = 18934w,$$

Gross domestic product at market prices is defined as the difference between gross output at market prices (w) and intermediate consumption (c'), for example, in 2009:

$$18934w - 8934c' = 10000vvp \quad (894c'' + 5174v + 3932m),$$

where: vvp - gross domestic product at market prices (actual).

On the basis of the national accounts statistics were calculated gross domestic product of the Russian Federation by three methods (production, generation of income and end-use) for years 1961-2011. We determined the structure of gross domestic product (GDP) by three methods as following equations:

- The production method: $c'' + v + m (m' + n') = vvp;$

- Method of income: $c'' + v + m (n' + n'' + p) = vvp;$

- By end use: $\Delta c' + (c'' + \Delta c'') + (v + \Delta v) + m/x + o + r = vvp,$

where : n' - net taxes on products or indirect taxes (VAT, excise duties and import-export duties); n'' - net taxes on production or direct taxes; p - net income and net mixed income; $\Delta c'$ - increase in inventories; $\Delta c''$ - capital formation; Δv - consumed part of gross income and net mixed income of employed workers; m/x - part of gross income and net mixed income institutional units earmarked for the purchase of financial assets; x - number not zero, which divide the gross profit and net mixed income for consumption and accumulation; o - rest of the money (different income and transfers) or "idle money"; r - a statistical discrepancy.

Using these schemes in market prices, was calculated the GDP by the formation of primary income (distribution method). In this case, GDP is defined as the sum: $c'' + v + m (n' + n'' + p) = vvp.$

$$1961 \text{ year: } 1106c'' + 4484v + 4410m(1989n' + 41n'' + 2380p) = 10000vvp;$$

$$1970 \text{ year: } 1211c'' + 4554v + 4235m(1306n' + 107n'' + 28226p) = 10000vvp;$$

$$1982 \text{ year: } 1692c'' + 4363v + 3945m(1865n' + 113n'' + 1967p) = 10000vvp;$$

$$1991 \text{ year: } 815c'' + 4367v + 4818m(364n' + 80n'' + 4374p) = 10000vvp;$$

$$2008 \text{ year: } 663c'' + 4562v + 4775m(1508n' + 514n'' + 2753p) = 10000vvp.$$

$$2009 \text{ year: } 894c'' + 5174v + 3932m(1254n' + 390n'' + 2280p) = 10000vvp.$$

According to statistical data through the use of GDP in 1961-2009 years was used in the following areas (Table 1):

$$c'' + v + \Delta v + \Delta c' + \Delta c'' + m / x + o + r = vvp.$$

Table 1: Structure of Gross Domestic Product of Russia from 1991 to 2011

Year	Gross output w	Intermediate consumption c'	Gross domestic product vvp	Gross fixed capital formation (c'' + $\Delta c''$)	Change in working material capital $\Delta c'$	Final consumption expenditure (v + Δv)	Rest of the money (the difference of income and transfers) o	Net lending (+) / net borrowing (-) m/x	statistical discrepancy r
1	2(3+4)	3	4(5+6+7+8+9+10)	5	6	7	8	9	10
1961	20200	10200	10000	1597	417	8028	*	58	-100
1970	20673	10673	10000	2028	390	7524	*	71	-13
1982	20485	10485	10000	2471	459	6909	-50	129	82
1991	19042	9042	10000	2323	1301	6119	*	28	229
1998	18331	8331	10000	1615	-119	7620	468	199	217
1999	18242	8242	10000	1439	44	6812	387	1318	0
2008	18716	8716	10000	2192	361	6537	309	602	-1
2009	18934	8934	10000	2144	-271	7466	431	304	-74

Symbols in the table: * - statistics for that year are not available.

Based on the structure of Russia's GDP, we can write the equation of exchange or balance income and expenditure, for example on the following data:

$$1961 \text{ year: } 1106c' + 4484v + 4410m(1989n' + 41n'' + 2380p) = 417\Delta c' + 1597(c'' + \Delta c'') + 8028(v + \Delta v) + 58m/x + o - 100r;$$

$$1970 \text{ year: } 1211c'' + 4554v + 4235m(1306n' + 107n'' + 28226p) = 390\Delta c' + 2028(c'' + \Delta c'') + 7524(v + \Delta v) + 71m/x + o - 13r;$$

$$1982 \text{ year: } 1692c'' + 4363v + 3945m(1865n' + 113n'' + 1967p) = 459\Delta c' + 2471(c'' + \Delta c'') + 6909(v + \Delta v) + 129m/x - 50o + 82r;$$

$$1991 \text{ year: } 815 c'' + 4367v + 4818m(364n' + 80n'' + 4374p) = 1301\Delta c' + 2323(c'' + \Delta c'') + 6119(v + \Delta v) + 28m/x + o + 229r;$$

$$2008 \text{ year: } 663c'' + 4562v + 4775m(1508n' + 514n'' + 2753p) = 361\Delta c' + 2192(c'' + \Delta c'') + 6537(v + \Delta v) - 1m/x + 602o + 309r;$$

$$2009 \text{ year: } 894c'' + 5174v + 3932m(1254n' + 390n'' + 2280p) = - 271\Delta c' + 2144(c'' + \Delta c'') + 7466(v + \Delta v) - 74m/x + 304o + 431r.$$

3. Sector Research Methodology of the Economic System

The modern world and the national economy dividing into markets, areas, scopes, industry activities, sector institutional units and other segments. An important methodological principle study of the global economy is a sector specific approach, which is a form of expression system methodology. Not by chance the world economic theory has practical realization in the development of an international system of national accounts, in which the initial and basic categories are sector institutional unit and type of economic activity.

World economic science is on the long road from research transactions between two units of social reproduction (by K.Marx), between the three departments of production and consumption (by M.I. Tugan-Baranovsky) between the sectors producing capital and consumer goods, savings and investment, aggregate demand and supply (by D.Keynes) between transformational and transactional sectors of the national economy (by D. North and J.Wallis) and the transition to the study of mega transactions between the real and financial sectors of the world economy and between different segments of the global economic system (production and consumption, saving and accumulation, etc.). With the help of statistical data of the international system of national accounts recorded inter sector transactions (from Latin transaction means interaction) undertaken in the global and national economic system. The author of the article was made division of the national economy in the context of the three groups of industries (sectors): industries producing capital goods and production services to organizations (W_1); industries producing consumer goods and services to the public (W_2) and industries, rendering financial services (banking, insurance, investment and other) to organizations and people (W_3) (Table 2).

Table 2: The revenues from the implementation of the gross output of products and services in the context three sectors of the Russian economy (for the period from 1998 to 2009).

Year	Sectors: W_1 W_2 W_3 W	Proceeds from sales of the gross output W	Proceeds from the sale of residents of gross output in the domestic market W'	Export revenues of residents E	Expenditure on imports of residents I	Balance of income / expenditure on exports and imports $(e - i)$	statistical discrepancy R	Gross domestic product vpp
1	2	3 (4+7+8)	4	5	6	7(5-6)	8	9
1998	W_1	10209	8879	2846	1637	1209	121	1878
	W_2	7916	8358	272	808	-536	94	7916
	W_3	206	210	4	10	-6	2	206
	W	18331	17447	3122	2455	667	217	10000
2008	W_1	11457	10243	2944	1729	1215	-1	2741
	W_2	6647	6942	146	442	-295	0	6647
	W_3	612	621	12	21	-9	0	612
	W	18716	17806	3102	2191	911	-1	10000
2009	W_1	11015	9939	2584	1465	1119	-43	2081
	W_2	7609	8011	177	549	-372	-30	7609
	W_3	310	323	12	24	-12	-1	310

	W	18934	18273	2773	2038	735	-74	10000
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Gross domestic product may also be represented by final use. Feature of this method is that the distribution and redistribution of income is used by institutional units to the ultimate goals of consumption and accumulation. Define their constituent elements and the actual quantity. Then was calculated element structure of gross output and gross domestic product of Russia by end-use in the context of the three products sectors for the period 1998 to 2009 (Table 3).

Table 3.: Areas of spending cash proceeds from the sale of the gross output by three sectors of the Russian economy for the period from 1998 to 2009.

Year	Gross output W	Consumption of products and services by organizations of the group I industries (sector A)			Consumption of products and services by organizations of the group II industries or the final consumption expenditures of the population (sector B) W₂ (v+Δv)	Consumption of products and services by organizations of the group III industries (sector C) or net lending (+) or net borrowing(-) W₃ m/x	Cash balances of money "Idle money" o	Statistical discrepancy r
		Including		Total W₁ (c'+c''+Δc)				
		Intermediate consumption (for reimbursement of material costs) c'	Gross accumulation of the fixed capital c''+Δc					
1	2(5+6+7+8+9)	3	4	5 (3+4)	6	7	8	9
1998	18331	8331	1496	9827	7620	199	468	217
1999	18242	8242	1483	9725	6812	1318	387	0
2000	18322	8322	1870	10192	6128	2157	-155	0
2001	19031	9031	2195	11226	6582	797	471	-45
2002	18687	8687	2003	10690	6873	515	562	47
2003	18792	8792	2081	10873	6813	799	336	-29
2004	18601	8601	2088	10689	6688	969	255	0
2005	18582	8582	2006	10588	6621	937	432	4
2006	18685	8685	2137	10822	6553	962	310	38
2007	18884	8884	2426	11310	6580	517	342	135
2008	18716	8716	2553	11269	6537	602	309	-1
2009	18934	8934	1873	10807	7466	304	431	-74

4. Results

Let' refer to the data in Tables 2 and 3. The calculated data of the tables allow to formalize the exchange of goods in the three sectors of the natural-real and monetary terms, as well as to balance income and expenditure in the national economy. As an example, we use the appropriate values for the year 1998.

Total revenues from the sale of the gross output of the three sectors were:

- i. $8879w_1^1(c_1^1+v_1^1+m_1^1)+1209[w_1^2(c_1^2+v_1^2+m_1^2)-w_1^3(c_1^3+v_1^3+m_1^3)]+121r_1=10209w_1$
- ii. $8358w_2^1(c_2^1+v_2^1+m_2^1)-536[w_2^2(c_2^2+v_2^2+m_2^2)-w_2^3(c_2^3+v_2^3+m_2^3)]+94r_2=7916w_2$
- iii. $210w_3^1(c_3^1+v_3^1+m_3^1)-6[w_3^2(c_3^2+v_3^2+m_3^2)-10w_3^3(c_3^3+v_3^3+m_3^3)]+2r_3=206w_3$

$$(I+II+III) 17447w_1^1(c_1^1+v_1^1+m_1^1)+667[w_1^2(c_1^2+v_1^2+m_1^2)-w_1^3(c_1^3+v_1^3+m_1^3)]+217r_3 = 18331w$$

$$\text{Total expenditure on final consumption of products and services sectors accounted for three (I+II+III): } 18331w = 9827w_1 [8331c'+1496(c''+\Delta c'+\Delta c'')] + 7620w_2(v+\Delta v) + 199w_3(m/x) + 468o + 217r$$

Hence we can write the system of equations of revenues and expenses and natural-real value for the year 1998:

$$I. 8879w_1^1(c_1^1+v_1^1+m_1^1)+1209[w_1^2(c_1^2+v_1^2+m_1^2)-w_1^3(c_1^3+v_1^3+m_1^3)]+121r_1 =$$

$$= 9827w_1[8331c'+1496(c''+\Delta c'+\Delta c'')] + 121r_1 + 261o_1 = 10209w_1$$

$$II. 8358w_2^1(c_2^1+v_2^1+m_2^1) - 536[w_2^2(c_2^2+v_2^2+m_2^2) - w_2^3(c_2^3+v_2^3+m_2^3)]+94r_2 =$$

$$= 7620w_2(v+\Delta v) + 94r_2 + 202o_2 = 7916w_2$$

$$III. 210w_3^1(c_3^1+v_3^1+m_3^1) - 6[w_3^2(c_3^2+v_3^2+m_3^2)-w_3^3(c_3^3+v_3^3+m_3^3)]+2r_3=$$

$$= 199w_3(m/x) + 2r_3 + 5o_3 = 206w_3$$

5. Conclusion

Transactional approach to the study of the economic system revealed the real and natural- cash proportion and balance between incomes and expenses in the three major sectors of the national economy: the sector producing capital goods and industrial services providing to organizations (sector B), sector producing consumer goods and providing services to population (sector A) and sector providing financial services to organizations and population (sector C). Figure 1 presents data on the percentage of sectors A, B and C in a total volume of Russia's GDP (in percent).

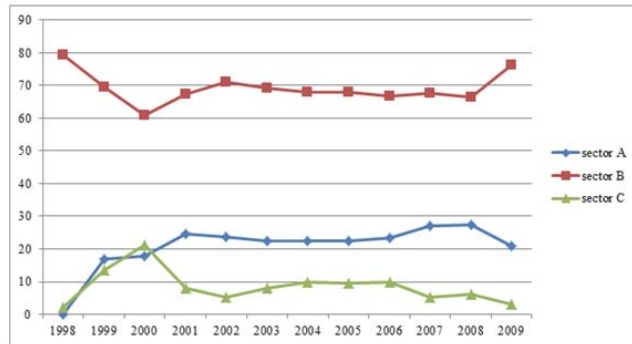


Fig. 1. Share of sectors A, B and C in the consumption of Russia's GDP.

Indicators (Table 3 and Figure 1) shows, that the financial sector has a small share in the national economy. Consequently, there is a decline in the share of the financial sector in the national economy of Russia.

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