MACROECONOMIC PROBLEMS

A Theoretical Model of the Relationship between Value Added Elements and End Product

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Abstract—This paper focuses on the development of a theoretical scheme describing the transformation of primary incomes into end consumption and savings in the Russian economy. This scheme is basically a system of interrelated tables reflecting the distribution of primary incomes across the institutional sectors and their further reallocation and use. The scheme makes allowances for the specific features of the Russian economy and existing statistics. In terms of methodology, it is coordinated with the interindustry balance in current buyer prices and, from the theoretical standpoint, describes the connection between Quadrant II and Quadrant III of the balance. Therefore, the proposed system of tables is treated in the paper as Quadrant IV of the interindustry balance. The theoretical scheme is used by the authors as a necessary basis for constructing an empirical model of the relationship between value added and end product, which will be published in the next issue of this journal.

Statement of the Problem

At the macrolevel, the elements of gross value added (GVA) represent the major items of economic agents' primary incomes, while the elements of end product—the items of expenditures on end consumption and savings. Therefore, we suggest that we should consider modeling the relationship between the elements of GVA and end product as the problem of describing the process of transformation of the primary incomes into expenditures on end consumption and savings. The transformation of incomes into expenditures is mediated by a fairly complicated process of financial resources reallocation across institutional sectors, which is to be taken into account.

Modeling of the above relationships poses the problem of coordination of end expenditures and incomes of economic agents. The analysis of income-expenditure coordination is especially important when designing government macroeconomic policy scenarios and monitoring the policy impacts on various sectors of the Russian economy. Moreover, it is especially important to conduct this kind of analysis when modeling and prognosticating the end demand structure, because it enables one to "mate" its preset (by means of a forecast or scenario) structure and financial results of the production process [1, p. 15].

The selected problematic is explicitly related to the interindustry balance of production and distribution of products and services [2], as it may be understood as the task of modeling its Quadrant IV intended to reflect the relationship between the primary incomes and end expenditures in an economy.

In the modern Russian economic theory and practice, there is a need for a model that would serve as the most important tool for analyzing the coordination of the economic agents' primary incomes and expenditures on end consumption and capital formation. This model should be capable of describing the process of reallocation of financial resources obtained as a result of the current production activity as well as the transformation of these resources into elements of end demand. The necessary requirement to this model is coordination of its methodology with those sources of statistics that describe the production process in the current period and contain some information on the economic agents' incomes and expenditures. In other words, it is worthwhile to ensure the methodological integrity of the model with the system of national accounts (SNA), whose basic components are national accounts [3–5] and interindustry balance. At the same time, since interindustry balance contains detailed information on material flows characterizing the current production process as well as data on the primary incomes from production and end demand, we suggest integrating (in terms of methodology) the model with interindustry balance in the first place.

The problem of integrating macroeconomic data on material and financial flows in a country's economy has long been attracting attention of the Russian economists. As regards the Soviet economy, some important aspects of this problem were studied in the works by B.L. Isaev [6], V.D. Belkin, V.V. Ivanter, A.Yu. Geronimus, N.N. Konstantinov, A.G. Sem'yaninov [7, 8, 9], E.V. Detneva, A.G. Terushkin [10], and other authors [11]. In 1975–1980, the USSR Gosplan research institute to was developing under the direction of F.N. Klotsvog a model for long-term planning of financial proportions on the basis of an interindustry balance [12]. The original ideas of this work were partially applied to the environment of the Russian economy in the publication [13]. Original balance constructions of experimental nature related to macroeconomic description of financial flows are presented in a paper of A.R. Belousov and

E.A. Abramova [1], and A.V. Suvorov's monograph [14]. However, a thorough investigation of the above works has revealed that their authors set close yet different tasks as compared to the one set in this paper.

We may say that nobody has yet proposed a detailed description of the mechanism for reallocation of economic agents' incomes and their transformation into end expenditures. Therefore, of special research interest is the development of a model that would describe theoretically the process of transformation of the primary incomes into end consumption and savings. Here, under a theoretical model we understand a detailed scheme reflecting the reallocation of incomes by major items among the aggregated agents. Of course, this scheme should make allowances for the specific features of the Russian economy and existing statistics. The rationale for the development of a theoretical scheme is also the need for a conceptual framework for subsequent feeding of the model with actual statistical data characterizing the reallocation process.

Some Methodological Features of SNA

The proposed theoretical scheme describing the relationship between GVA and end product elements, or Quadrants II and III of the interindustry balance, is based on a statistical system which, in its turn, is based on the national accounts and interindustry balance. Although both sources of statistical information are components of SNA, a number of indicators differ in terms of methodology as well as calculating techniques, which entails lack of data consistency among the sources. In this connection, let us concentrate on analyzing their methodology and revealing the "discrepancies."

An interindustry balance is a reflection of the SNA production, generation and use of income, and capital transactions accounts. At the same time, interindustry balance contains information on the existing system of interindustry production relations, specific features of value added generation, intermediate and end demand at the level of industry groupings of goods and services [15, p. 186]. The balance structure may be presented as three quadrants containing information on the expenditures of the institutional sectors on intermediate consumption (Quadrant I), end consumption (Quadrant II), and flows of primary incomes from production (Quadrant III). As to the current research objectives, of greatest interest is the structure of Quadrants II and III, therefore we shall look at them in more detail.

Quadrant III of the interindustry balance reflects the GVA structure. The rows of this quadrant show the four basic components of value added: compensation of employees, gross profit, gross mixed incomes, and net other taxes on production. Note that net other taxes are divided into taxes and subsidies respectively, the latter being deducted from value added, because they are paid to the producer so as to support certain business activi-

ties, and do not reflect any increase in the production costs. Financial intermediation services indirectly measured (FISIM) are included as a separate row (with the minus sign) into Quadrant III. This indicator represents the indirectly measured difference between property incomes (interest, dividends, etc.) received by financial intermediaries and the interest they pay to their creditors [15, p. 200]. In fact, FISIM are part of the financial intermediaries' profit as giving loans is their major activity. However, according to the interindustry balance methodology, this indicator is incorporated into intermediate consumption, and, as the costs of FISIM are part of gross profit, this indicator is deducted from GVA as a separate row to avoid double counting.

The compensation of employees indicator serves to reflect the remuneration of labor in the current period received by employees either in money form or in kind. In addition to wages as such (of course, after income tax), this indicator comprises all the charges on the payroll, which are referred to in statistics as social contributions. They include the charges to the Pension Fund, Social Insurance Fund, Federal Fund for Compulsory Medical Insurance (CMI), and Regional Funds for CMI; the rest is transferred to the federal budget. It is a common practice now to call charges on the payroll in the aggregate as consolidated social tax (makes up 26.2% of the payroll). One should point out that the methodology of calculating the compensation of employees indicator in the system of input-output tables is different from the one used in national accounts. Thus, in interindustry balance, compensation of employees includes the officially accounted labor remunerations only and does not include concealed wages. On the contrary, in the national accounts, the compensation of employees indicator comprises concealed wages that "are determined by the balance method as the difference between the total expenditures on all the households' needs, including the increase in their financial assets, and formally registered incomes" [5, p. 16]. While analyzing the source statistical information, the authors have found out that apart from concealed wages the compensation indicator of the interindustry balance (as compared to national accounts) does not count the wages earned by Russian citizens abroad. Thus, compensations of employees in the interindustry balance are only formally registered wages paid to the individuals on the Russian territory regardless of their citizenship.

The gross profit indicator reflects part of the value added left in the corporate sector after deducting the expenditures related to compensation of employees and net taxes on production. It is important to note that the gross profit item includes the incomes from the current production activity only, therefore it does not account for property incomes. We shall also note that gross profit is calculated before corporate income tax. Like labor compensation, the methodology of calculating gross profit items in the interindustry balance is different from that of the national accounts. The concealed wages not counted in the compensation of employees

item in the interindustry balance is incorporated into the gross profit indicator. This specific methodology may be explained by the fact that gross profit is determined by the balance method as the difference between GVA and the remaining elements of the latter.

Closely related to gross profit in terms of content is the gross mixed income (GMI) indicator, which also reflects the incomes from entrepreneurial activity in the reporting period, though in the household sector. This indicator includes incomes of self-employed household members, individuals who work for unincorporated businesses, etc. Note that it is rather difficult to statistically distinguish gross mixed incomes from gross corporate profits; therefore, the separate data on these flows appears in the national accounts with a two-year delay relative to the period they describe; the data on the sum of these indicators obtained as the difference between GVA and its other elements are published with a one-year delay.

We should point out that Quadrant III of the interindustry balance reflects the elements of value added in basic prices only. Basic price, or producer price, differs from the market price, or buyer price, in that it does not include any tax, transportation, or trade markups. An industry's value added is calculated as difference between the producers' incomes from product sales and their material costs (i.e. at the stage of production), therefore it does not include any of the above markups by definition and, hence, is measured in basic prices. However, one should bear in mind that the aggregate GVA in an economy as a whole includes the value added of the trade and transportation industries. Moreover, the aggregate value added comprises net other taxes on production. They include net taxes related to the use of production factors (first of all, corporate property taxes, vehicle owners taxes, land taxes, etc.), as well as license fees and so on. Thus, if one wishes to measure GVA in market prices, one only has to add the net taxes on the products used in intermediate and end consumption.

The product dimension of the end demand structure presented by Quadrant II of interindustry balance can be described both in producer and buyer prices. However, the sums by all types of goods and services that characterize the values of basic elements of end product in the economy as a whole are always presented in market prices, because the trade and transportation markups are included into the production costs of the respective "net" industries, while, according to the methodology applied since 1998, the net taxes on products are singled out as a separate line in Quadrants II and III.

Basic elements of end product reflected by the columns of Quadrant II are expenditures on end consumption of households, public institutions, and non-profit institutions serving households; gross fixed capital formation, changes in inventories, net acquisition of valuables, export, and import taken with the minus sign. Note that in the interindustry balance, the import prod-

ucts in consumer prices are not differentiated by end demand elements. Therefore the expenditures of institutional sectors on consumption and investment reflect the consumption of domestic and import products simultaneously. The import article singled out into a special column reflects the costs of import used by all the residents both for end and intermediate consumption.

In terms of theory, the methodology of calculating the basic elements of end product in the interindustry balance is coordinated with the national accounts. Nevertheless, practice shows that even in this case the real data in the above sources may differ in the content-wise similar articles, and sometimes these differences might be serious. It is pertinent to note here that the interindustry balance and national accounts are not consistent regarding the changes in inventories indicator. For example, in 2003, this indicator amounted in the interindustry balance to 262274.4 mln. rubles [2], while in the integrated table of national accounts published in 2005 ñ to 300424.0 mln rubles [5]. One cannot say that the absolute value of the difference is really high, still, relative to the value of the changes in inventories indicator, the divergence amounts to 12.7%, which is rather high. In general, the inventory dynamics is referred to the category of indicators that are difficult to measure statistically, which can in part explain the inaccuracies in these data. However, taking into consideration the fact that both national accounts and interindustry balance are integral parts of SNA and are calculated by the same statistical agency—Rosstat, the issue of this information inconsistency deserves special analysis and explanation on the part of the developers of the respective data sources.

As it is known, the system of accounts that describe the process of economic reproduction during the specified year is published, as a rule, in several annual issues of the yearbook "National Accounts", the data by analogous items in books published in different years being sometimes considerable different. The reason for this is the gradual specification of data by Rosstat. Thus, the information for 2003 was first published in the national accounts of 2005, while the specified data - in the book issued in 2006. The system of input-output tables for 2003 was also published in 2006. Since, according to [15], all the interindustry balance indicators are adjusted to the target figures of national accounts, then those interindustry balance indicators that refer to economy as a whole should be precisely the same as the analogous indicators in the specified national accounts. Nevertheless, analysis of statistical information presented in these sources shows that, e.g., the interindustry balance data for 2003 are strongly inconsistent with that of the national accounts published in 2006, but better (though not completely) coordinated with the accounts of 2003, which were published in 2005. Thus, in the yearbook published in 2005, the indicator of gross profit for 2003 amounted to 4,04 trillion rubles, while in that of 2006 ñ to 3,53 trillion rubles, i.e. high are

both absolute and relative values of the difference. This means that since the published systems of input-output tables are not further refined in contrast to national accounts, one cannot refer to these sources as coordinated.

The cited examples show that even within the framework of SNA there is neither methodological unity, nor coordination of factual information, which makes analysis rather complicated. In reality, the problem of source statistical data consistency is much more acute because, if one is trying to attach to the SNA a model that specifies the process of income redistribution among economic agents, one needs attracting additional data sources, mainly the Balance of Money Incomes and Expenditures (BMIE).[1] population and the "Finance" section of the Russian Statistical Yearbook (RSY) [17]. It is easy to see that the data in these sources is usually even less coordinated with the SNA. At the same time, it is often impossible to find out whether the data inconsistencies are due to application of different indicator calculation methodologies (as in the case of wages, for example) or other reasons, since there are no detailed descriptions of Rosstat's methodology used for developing the respective sources.

Schematic Diagram of the Theoretical Model

It seems helpful to combine the schematic diagram of the theoretical model with Quadrants II and III of the interindustry balance, so the development of a distribution model that would link these quadrants can be interpreted as an attempt to construct Quadrant IV of the interindustry balance. However, the distribution mechanism is rather complex by nature, which is why it would not be reasonable to represent it within the framework of one quadrant only. Unfortunately, the fact that the available statistical information is limited and inconsistent imposes serious constraints on the possibilities of giving a detailed description of the dynamics of the reallocated financial flows. However, one can ignore these constraints in a sense when constructing a theoretical model, which allows one to make a detailed description of the redistribution mechanism. When modeling the process of transformation of the primary incomes into end demand and savings at the empirical level, one should proceed from the basis formed by a detailed theoretical scheme of this process. This scheme is needed even if it cannot be completely fed in with freely available statistics, since the scheme describes the redistribution process in the way it works in reality. On this basis, we should note that detailed representation of the redistribution process as mechanism of correlating the interindustry balance Quadrants II and III implies unfolding Quadrant IV into a system

of tables that would consistently describe the transformation of financial flows mediating the economic reproduction process.

Like interindustry balance, this system of tables reflecting the redistribution of financial resources should specify the generation and use of income accounts as well as primary incomes redistribution and secondary redistribution of incomes accounts, though in a somewhat different context. Interindustry balance specifies primary incomes from production and end demand by "net" industry, while the suggested system of tables—by economic agents. Therefore it is necessary to introduce a classification of aggregated agents, or institutional sectors. We suggest singling out households, public sector, financial and non-financial enterprise sector. We should underscore that the examined model also suggest singling out the "rest of the world" sector in an implicit form. This is reflected in the fact that this model incorporates the financial flows arising from the interactions between the residents and "ROW". Nevertheless, it does not seem appropriate to give a full-fledged description of "ROW" in a model aimed at analyzing the coordination of incomes and expenditures of agents in the national economy. After all, the incomes and expenditures arising from international economic activity of countries interacting with the Russian economy are determined not only by the flows that may be incorporated into the system of tables under consideration, and therefore do not have to be balanced. As a rule, in similar models, the ROW accounts are either balanced using the current transactions balance (as in the national accounts), or, if one has included the flows recorded in the account of operations with capital and financial instruments of the RF trade balance, ñ using the item "net errors and omissions" (i.e. zero, in theory). This representation of "ROW" is not in line with the objectives of the present paper. As regards the issues related to the deficit (surplus) of the trade balance, this is a separate topic, and it is not analyzed in this paper.

The accepted classification of institutional sectors is basically the same as the one used in the integrated table of national accounts, however, it implies dividing the corporations sector into two non-homogeneous categories—financial and non-financial enterprises. Within the framework of the public sector, including state authorities as well as publicly owned enterprises, we shall set aside the Central Bank of Russia (CBR). This can be justified by the need to analyze the impact of monetary and currency policies on income redistribution. Note that the enterprises that refer to the category of non-profit institutions serving households are included into the corporate sector (as in the national accounts).

In principle, it would be appropriate to also set aside the trade and transportation enterprises in the corporate sector. The specific feature of enterprises of the trade and transportation industries that calls for analyzing

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[1] Our source of BMIE in this paper was publications [16] and working materials offered by the Center for Macroeconomic Analysis and Short-Term Forecasting at the Institute of Economic Forecasting, Russian Academy of Sciences.

Table 1. Schematic Diagram of the Income Redistribution Mechanism

		1	2	3					4
			Economic agents						
A		GVA Elements in Basic Prices (Quadrant III of Interindustry Balance)	Distribution of Primary Incomes from Production and Net Revenues among Economic Agents	–					–
		Net Taxes on Products							
		Net Earnings from the Rest of the World							
B		0	Redistribution of Primary Incomes within the Economy	–					Elements of End Demand in Buyer Prices (Quadrant II of Interindustry Balance)
C	Economic Agents	–	Diagonal Matrix of Disposable Incomes in the Reporting Period	Indebtedness at the Beginning of the Reporting Period	Change of Indebtedness during the Reporting Period	Indebtedness at the End of the Reporting Period	Adjusted Disposable Income, Its Distribution into End Expenditures and Savings		Distribution of End Expenditures by Elements of End Demand

them separately is the fact that the incomes of these industries form the trade and transportation markups respectively, used to convert (of course, taking also into account the tax markup) the basic prices into buyer prices. Thus, setting aside the trade and transportations sectors might be useful, for example, in analyzing the market price dynamics. Nevertheless, at the current stage of Russian statistics development, it is hardly possible to provide for these details when feeding in the theoretical scheme with actual data, therefore these enterprises will be incorporated into the group of non-financial enterprises in our scheme.

Let us look at the schematic diagram of the proposed model presented in Table 1. This model is based on the two balances: balance of GDP by income source and by use; balance of incomes and expenditures of economic agents.

The balance of GDP by income source and by use implies coordination of value added as a measure of the end product created in the reporting period and expenditures on the consumption of value added. As we noted, GVA in economy as a whole includes trade and transportation markups as well as net other taxes on production but does not include net taxes on products.

Since end expenditures in economy as a whole are usually indicated in market prices, the balance of GDP calculated by income and expenditure methods may be presented as equality of the sum of GVA (VA) and net taxes on products (NPT) sum: expenditures on households' consumption (C_{hh}), public sector (C_g), investment expenditures (I) and difference between export (Ex) and import (Im). Taking into account that the costs of import are incomes of "ROW", it would be more logical to present the GDP balance as:

$$VA + NPT + Im \equiv C_{hh} + C_g + I + Ex. \qquad (1)$$

Note that according to the SNA methodology, the expenditures on end consumption and savings reflect the use not only of the domestic but also import products. Therefore, deducting imports from the left and right parts of the identity (1) enables one to obtain the identity in market prices of GVA and expenditures on end domestic product minus the costs of import in intermediate consumption, which, in fact, is the balance between production and use of domestic goods and services.

Since the model in focus is designed to describe the relationship between the primary incomes and end

expenditures, the necessary condition for it to be realistic is balancing the incomes and expenditures of economic agents. Here, balanced should be only the incomes and expenditures of economic resident agents, since it is apparent that the formation of "ROW" financial resources cannot be described by this model. Being the residents' income from current production activity, value added does not comprise all of their incomes in the reporting period. The expenditures on end consumption and savings, in their turn, do not have to be necessarily equal to the incomes of economic agents, since a normally operating economy, as a rule, saves, apart from capital accumulation, additional financial resources. Moreover, in addition to expenditures on end consumption and savings, there also other expenditures in an economy.

For economy as a whole, the balance of incomes and expenditures can be written as:

$$VA + NPT + PI^+ + Tr_f^+$$
$$\equiv C_{hh} + C_g + I + PI^- + Tr_f^- + NCr, \tag{2}$$

where PI^+ and PI^- incomes from property; Tr_f^+ and Tr_f^- ñ current transfers received from the rest of the world, or transferred to the rest of the world; NCr ñ net lending (if positive), or net borrowing (if negative). Incomes from property and current transfers from abroad are incomes (or expenditures if transferred to the rest of the world) of the reporting period, but are not related to current production activity, and therefore are not reflected in GVA and end expenditures. Nevertheless, they should be taken into account when describing the financial flows mediating the economic reproduction process. Net lending (borrowing) is part of the savings made in the reporting period that are not spent on fixed capital formation, increase in inventories, or acquisition of valuables. Note that the balance (2) is true not only for the economy as a whole but also for every institutional sector. However, when writing down the balance of incomes and expenditures for the sectors, the identity (2) should be somewhat modified. In sectoral balances, one should include incomes from property and current transfers reflecting not only the relations with "ROW", but also with other economic resident agents. In other words, the specified flows should describe here the redistribution of financial resources both between the domestic economy and ROW, and within the explored economic system.

Thus, when modeling the correlations of Quadrants II and III of the interindustry balance understood as describing the process of transformation of primary incomes into end expenditures and savings, there is a need in "expanding" the above quadrants to incorporate the types of incomes and expenditures of institutional sectors in the reporting period not reflected in these quadrants. Let us illustrate, using the schematic diagram of the explored model given in Table 1, the corre-

lation between the "expanded" quadrants represented by Sections A1 and B4.

The basis of Section A1 of the schematic diagram is formed by summary (by "net" industries) indicators of Quadrant III of the interindustry balance, which describe the GVA elements in economy as a whole. Moreover, this section shows net taxes on products as well as net incomes from property and current transfers received from the rest of the world. Thus, Section A1 is a column vector reflecting all the incomes received by domestic economy in the reporting period in buyer prices. Note that net incomes from property and current transfers from abroad are, strictly speaking, the elements of redistribution, however, within the framework of the given model that claims of describing the relationship between incomes and expenditures of residents only, this indicator is referred to the section of disposable primary incomes in the domestic economy in the reporting period.

Section A2 illustrates the distribution of primary incomes from production and incomes received from the rest of the world among economic agents. In the majority of statistical constructions and models (including national accounts), primary income flows from production are assigned to a specific economic agent. At the same time, the charges (e.g., taxes) to be transferred by an aggregated agent to other agents because of obtaining an income of certain type are usually shown on the income redistribution account together with other payments. However, for example, the social contributions and taxes connected with compensation of employees are paid before the household have received the income flow under consideration. In this case, the redistribution of the wage flow in some way precedes receiving this income. Including these charges at the stage of primary income distribution allows one to distinguish them from other resources redistributed in the economy. It is especially important when, for some reasons, the aggregated agent has not received enough means to finance its expenditures and liabilities. In this situation, the agents lacking financial resources have the opportunity to finance part of their expenditures by accumulating debt on mandatory payments. Russian practice knows many examples when even big businesses have not repaid their tax debts to the state budget for years. But it is possible to finance current expenditures through accumulating debt on mandatory payments only when receiving an income flow precedes paying out the charges on this income. In case of wages, the situation is just the opposite; therefore the households do not have an opportunity to borrow money through delaying the mandatory payments charged on the payroll.

After the distribution of primary incomes is complete, they are partially reallocated across the institutional sectors within the economy under consideration, which is reflected in Section B2. Since, if one looks at the income flows reallocated within the economy, the

money inflow of one agent is equal to the outflow from other agents, the balance by all the redistribution items is zero. This fact is illustrated in the schematic diagram as symbolic zero column-section B1.

Section C2 contains information on the sums by row of Sections A2 and B2 (in the SNA terminology) representing the disposable incomes of aggregated agents. For the sake of convenience in representing the system of tables in focus, the disposable incomes are reflected as diagonal matrix.

Section C3 deserves special attention. Within this Section, the aggregated agents' disposable incomes are divided into end consumption, gross savings and net lending (borrowing). Thus, Section C3 gives information on whether an institutional sector had enough disposable incomes in the reporting period to finance its expenditures on consumption and savings. Let us emphasize that Section C3 also reflects the agents' carryover indebtedness of the previous periods, which they will have to repay sooner or later (maybe, partially). Reflecting the previous periods indebtedness establishes a dynamic link between the systems of tables describing the movement of financial flows in adjacent years. Important is the information on outstanding indebtedness, because it may be used to predict an increase in disposable incomes for creditors and respective decrease—for debtors during the following periods.

The economic agents' end expenditures on consumption and savings formed in Section C3 are reallocated by basic elements of end demand in Section C4 whose upper bordering sums are the row sums of elements of the interindustry balance Quadrant II. Note that the elements of Quadrant II related to foreign trade (export and import) are not described separately in Section C4, as import costs are included into end expenditures on consumption and savings and export is not financed by residents. Thus, the proposed system of tables fully describes the relationship of Quadrants II and III of the interindustry balance as the process of formation, distribution and redistribution of primary incomes within the economy among the aggregated agents, and, in some way, in time (by means of reflecting the outstanding indebtedness and savings).

Sections A1, A2 of the schematic diagram. Having characterized the process of transformation of primary incomes into end consumption and savings on the basis of the theoretical model schematic diagram, let us have a closer look at its most important sections and describe their structure in detail.

In Table 2, which itemizes sections A1, A2 of the schematic diagram, the detailed information is given on the distribution of primary incomes from production and from abroad. Let us consider them separately.

As we have already noted when describing the schematic diagram, the wages are distributed among several agents before being paid out to the employees. Part of the payroll is transferred to the government bodies as

physical persons' income tax and consolidated social tax (CST) (to the Pension Fund, Social Insurance Fund, Federal and territorial Funds for Compulsory Medical Insurance (CMI), and part of CST transferred to the federal budget). Apart from the governmental funds, there are also non-governmental funds for social insurance which also receive part of the payroll money. In Table 2, the transfer of the respective share of the wages to the non-governmental funds is presented as an increase in the resources of the financial enterprise sector.

The gross profit in Table 2 is divided into two non-homogeneous flows—hidden wages and gross profits as such at the disposal of the businesses. This division allows one to take into account the specific features of interindustry balance and national accounts in defining the gross profit indicator, and to most accurately reflect the distribution of this money across the sectors. Since hidden wages are not reflected by the enterprises and organizations as compensation of employees (which makes it necessary to calculate this indicator indirectly), they are not subject to mandatory charges, so the whole income flow gets to the households sector. Gross profit as such, or gross profit by the national accounts methodology, is distributed between financial and non-financial corporations as well as enterprises in public property financed from the budget. Note that in Section A1 the profit is shown before paying the corporate profit tax.

Being an income of individual entrepreneurs, gross mixed income (GMI) is fully referred to the households sector. Strictly speaking, all the households must pay taxes on all the physical persons' incomes, including revenues from entrepreneurial activity. However, in reality, it is practically impossible to oblige physical persons to pay tax on mixed income. In this sense, GMI is fairly close to concealed wages as it represents the incomes of households only.

Other taxes and subsidies on production are referred to the state authorities accounts because they represent the revenues and expenditures of the state budget. Other taxes on production, mainly the taxes paid by the companies for having in their ownership land, buildings, constructions, for conducting financial and capital transactions, for polluting the environment, license fees, and the tax paid by vehicle owners [18, p. 231–232], are levied at the stage of production of goods and services, and are therefore incorporated into GVA and producers' costs. Therefore, other taxes on production are shown in the model only as an increase in the state income but not deducted from producers' incomes. In a similar way, other subsidies on production, or subsidies received by enterprises from state institutions due to using production factors [4, p. 17], are reflected with the minus sign in the sector of state institutions but not added to the producers' incomes, being included into the incomes at the stage of production.

Table 2. Structure of Sections A1 and A2 of the Schematic Diagram

Row No.	Incomes in Economy as a Whole	Column No. 1 Households	Column No. 2 State Authorities, without CBR (Public Sector)	Column No. 3 CBR (Public Sector)	Column No. 4 Non-Financial Enterprises (NFE) (Corporations)	Column No. 5 Financial Enterprises (FE) (Corporations)
1	Quadrant III of Interindustry Balance — Compensation of Employees (by Interindustry Balance Methodology)	Compensation of Employees minus Physical Persons Income Tax and CST	(a) physical persons income tax; (b) social contributions, to federal budget and off-budget funds	–	–	Contributions to Non-Governmental Social Insurance Funds
2	Gross Profit (by Interindustry Balance) — Concealed Wages	Concealed Wages	–	–	–	–
3	Gross Profit (by Interindustry Balance) — Gross Profit (by National Accounts)	–	Gross Profit of Public Enterprises	Gross Profit of CBR	Gross Profit of Non-Financial Enterprises	Gross Profit of Financial Enterprises
4	Gross Mixed Income	Gross Profit of Non-Corporate Businesses	–	–	–	–
5	Other Taxes on Production	–	Other Taxes on Production	–	–	–
6	Other Subsidies on Production	–	Other Subsidies on Production	–	–	–
7	FISIM			–		FISIM
8	Net Taxes on Products	–	Net Taxes on Products		–	–
9	Incomes from Abroad — Received — Incomes from Property from ROW	Incomes from Property Received by Households from ROW	Incomes from Property Received by State Authorities from ROW	Incomes from Property Received by CBR from ROW	Incomes from Property Transferred from NFE to ROW	Incomes from Property Received by FE from ROW
10	Incomes from Abroad — Transferred	Incomes from Property Transferred from Households to ROW	Incomes from Property Transferred from State Authorities from ROW	Incomes from Property Transferred from CBR to ROW	Current Transfers Received by NFE from ROW	Incomes from Property Transferred from FE to ROW
11	Current Transfers from ROW — Received	Current Transfers Received by Households from ROW	Current Transfers Received by State Authorities from ROW	Current Transfers Received by CBR from ROW	Gross Profit of Non-Corporate Businesses	Current Transfers Received by FE from ROW
12	Current Transfers from ROW — Transferred	Current Transfers from Households from OW	Current Transfers from State Authorities to ROW	Current Transfers from CBR to ROW	Current Transfers from NFE to ROW	Current Transfers from FE to ROW
13	Sum of Rows 1–12	Primary Income of Households	Primary Income of State Authorities without CBR	Primary Income of CBR	Primary Income of NFE	Primary Income of FE

Notes: In Tables 2–4, marked with grey are the flows taken with the minus sign; ROW—rest of the world.

We have shown above that ensuring the comparability of GVA and end demand in the economy as a whole, requires incorporating net taxes on products into the primary incomes sections. Among the most important taxes on products, one should mention VAT, excises, and taxes on imported goods and services. Subsidies on products are paid to the producers in proportion to the amount or costs of the goods and services produced. Since gross profit is calculated with regard to net taxes on products, the latter are shown in Table 1 in a way similar to other taxes on production, i.e. only as an increase in the revenues of government bodies (without decreasing the producers' incomes).

Apart from production incomes on the territory of the country in focus, Table 2 reflects net revenues from abroad. Incomes from property received from or paid out as a result of interactions with the rest of the world include interest on deposits and loans given earlier, on securities, dividends, rental incomes, etc. Property incomes reckoned on the state authorities account also include the flows related to servicing the foreign debt and receiving incomes on foreign countries debts to Russia. Current transfers received from or paid out to the rest of the world include the charges to international organizations, humanitarian or technical aid, and other moneys voluntarily transferred across national borders.

Table 2 shows as resulting balance the primary incomes of the domestic economy sectors from production and from abroad. The primary incomes from Table 2 are transferred to Table 3, which reflect the redistribution of primary incomes among the aggregated resident agents.

Section B2 of the schematic diagram. The basis of Section B2 (Table 3) is formed by current transfers reallocated among the residents of the economy in consideration. The current transfers here include social allowances in money form, income taxes (apart from charges on payroll), property taxes, and other current transfers (excluding those received from/paid out to the rest of the world). Social allowances in money form are non-repayable payments made primarily by state institutions to the households sector exclusively. They include pensions, stipends, various types of social aids, etc. An insignificant part of this flow consists of the allowances paid by corporations to their staff. Note that part of social allowances is made by state agencies in kind, the money assessment of this flow being comparable to social allowances in money form.

Nevertheless, in kind allowances are not considered in the table because they do not bring money income to households. Expenditures of the public sector related to making in kind allowances are reflected in the end demand of this sector (Table 5). By the way, it is also the reason why the model does not account for capital transfers—the latter, being nonrepayable transfers of property rights on assets (apart from cash and inventories), do not change the disposable incomes of the aggregated agents.

The most important items of tax transfers reflected in Table 3 include tax on corporate profit (for legal persons) and property (for physical and legal persons). Note that part of CBR profits must be transferred every year to the state budget, therefore this payment (though it is not a tax) is included in the model as tax on legal persons' profits.

The "Other Current Transfers" item reflects mainly the insurance premiums and compensations, fees, voluntary charges and gifts of no capital character. At the same time, this item includes only the flows transferred by resident sectors to one another.

Finally, incomes from property excluding those received from or paid out to the rest of the world, first of all, interest on deposits in commercial banks, on credits provided by commercial banks to population and corporations at market rate, or by Central Bank to commercial banks at refinancing rate, dividends, rents, and commission charges. Incomes from property also include payments on servicing the domestic state debt and private debts (for example, bond yields).

Table 3 shows as balancing item the disposable incomes of the aggregated agents in question. Disposable incomes are also reflected as elements of the diagonal matrix presented in Section C2 and then transferred to Section C3 (Table 4).

Section C3 of the schematic diagram. Section C3 (Table 4) is the most interesting in the whole system of tables of the proposed theoretical model because it has principal distinctions from SNA. As we noted, national accounts reflect mainly the movements of material and financial flows related to the outcomes of current production activity. At the same time, the accounts do not reflect the financial flows that are not connected directly to production outcomes. As a consequence, there is consistency between the savings economic resident agents have available after financing their expenditures on end consumption and fixed capital formation, accumulation of valuables, material stock, and net moneys received by the economy by the current transactions account of the balance of payments of the Russian Federation. Let us comment on this. It follows from the above balances (1) and (2) that the item "net lending/borrowing" is calculated as the sum of net exports, net current transfers from abroad and net property incomes from abroad:

$$NCr \equiv (Ex - Im) + (Tr_f^+ - Tr_f^-) + (PI^+ - PI^-). \quad (3)$$

In terms of content, this item is the difference between the disposable incomes and expenditures on consumption and savings, i.e. part of the income saved by economic agents as financial resources (securities, cash, etc.) It is not difficult to understand that saving less expenditures on capital accumulation (let us refer to them as net savings) may in reality be not equal to the balance of the current transactions account.

The reason for this may be the credit emission mechanism enabling the bank system to "generate"

Table 3. Structure of Section B2 of the Schematic Diagram

Row No	Redistribution Items		1 Households	2 State Authorities, without CBR (Public Sector)	3 CBR (Public Sector)	4 Non-Financial Enterprises (Corporations)	5 Financial Enterprises (FE) (Corporations)
13	Row 13 of Table 2		Primary Income of Households	Primary Income of State Authorities without CBR	Primary Income of CBR	Primary Income of NFE	Primary Income of FE
14	Incomes from Property (except those received from/transferred to ROW)	Received	Incomes from Property Received by Households from Other Sectors	Incomes from Property Received by State Authorities from Other Sectors	Incomes from Property Received by CBR from Other Sectors	Incomes from Property Received by NFE from Other Sectors	Incomes from Property Received by FE from Other Sectors
15		Transferred	Incomes from Property Transferred from Households to Other Sectors	Incomes from Property Transferred from State Authorities (without CBR) to Other Sectors	Incomes from Property Transferred from CBR to Other Sectors	Incomes from Property Transferred from NFE to Other Sectors	Incomes from Property Transferred from FE to Other Sectors
16	Social Allowances in Money Form		Social Allowances Received from State Authorities and Corporations	Social Allowance Paid to Households	–	Social Allowances Paid to Households	Social Allowances Paid to Households
17	Other Current Transfers (except those received from/transferred to ROW)	Received	Other Current Transfers Received by Households from Other Sectors	Other Current Transfers Received by State Authorities from Other Sectors	–	Other Current Transfers Received by NFE from Other Sectors	Other Current Transfers Received by FE from Other Sectors
18		Transferred	Other Current Transfers from Households to Other Sectors	Other Current Transfers from State Authorities (without CBR) to Other Sectors	–	Other Current Transfers from NFE to Other Sectors	Other Current Transfers from FE to Other Sectors
19	Taxes on Income (except compensation of employees) and Property		Property Tax	(a) Corporate Profit Tax; (b) Property Tax; (c) Part of CBR Profit Transferred to the Budget, etc.	Part of CBR Profit Transferred to the Federal Budget	Tax on Profit and Property of NFE	Tax on Profit and Property of FE
20	Sum of Rows 13–19		Disposable Income of Households	Disposable Income of State Authorities without CBR	Disposable Income of CBR	Disposable Income of NFE	Disposable Income of FE

Table 4. Structure of Section C3 of the Schematic Diagram

Row No	Economic Agents		6 Row 20 of Table 3 (transposed)	7 Outstanding Indebtedness at the Beginning of the Reporting Period	8 Repayment of Previous Period Indebtedness in the Reporting Period	9 Debt Increase in the Reporting Period	10 Outstanding Indebtedness at the End of the Reporting Period	11 Sum of Columns 6, 8, 9	12 Difference of Columns 13 and 11	13 End Expenditures on Consumption and Savings
21	Households		Disposable Income of Households	Outstanding Indebtedness (at the Beginning of the Period) of Households	Repayment of Credits, Loans, and Other Debts	Attraction of New Credits, Loans, and Other Debts by Households	Outstanding Indebtedness (at the End of the Period) of Households	Adjusted Disposable Income of Households	Net Savings of Households	End Expenditures of Households on Consumption and Savings
22	Public Sector	State Authorities, without CBR	Disposable Income of State Authorities without CBR	Outstanding Indebtedness (at the Beginning of the Period) of State Authorities without CBR	Repayment of Credits, Loans, and Other Debts by State Authorities without CBR	Attraction of New Credits, Loans, and Other Debts by State Authorities without CBR	Outstanding Indebtedness (at the End of the Period) of State Authorities without CBR	Adjusted Disposable Income of State Authorities without CBR	Net Savings of State Authorities without CBR	End Expenditures of State Authorities without CBR on Consumption and Savings
23		CBR	Disposable Income of CBR	Outstanding Indebtedness (at the Beginning of the Period) of CBR	Repayment of Credits, Loans, and Other Debts by CBR	Attraction of New Credits, Loans, and Other Debts by CBR	Outstanding Indebtedness (at the End of the Period) of CBR	Adjusted Disposable Income of CBR	Net Savings of CBR	End Expenditures of CBR on Consumption and Savings
24	Corporations	NFE	Disposable Income of NFE	Outstanding Indebtedness (at the Beginning of the Period) of NFE	Repayment of Credits, Loans, and Other Debts by NFE	Attraction of New Credits, Loans, and Other Debts by NFE	Outstanding Indebtedness (at the End of the Period) of NFE	Adjusted Disposable Income of NFE	Net Savings of NFE	End Expenditures of NFE on Consumption and Savings
25		FE	Disposable Income of FE	Outstanding Indebtedness (at the Beginning of the Period) of FE	Repayment of Credits, Loans, and Other Debts by FE	Attraction of New Credits, Loans, and Other Debts by FE	Outstanding Indebtedness (at the End of the Period) of FE	Adjusted Disposable Income of FE	Net Savings of FE	End Expenditures of FE on Consumption and Savings

Table 5. Structure of Section C4 of the Schematic Diagram

Row No	Economic Agents		Column No 14 — End Expenditures	Quadrant II of Interindustry Balance — Expenditures on End Consumption — 15 Households	16 State Institutions (Model Classification) on Collective Services	17 on Individual Goods and Services	18 Non-Profit Institutions Serving Households	19 Gross Fixed Capital Formation	Changes in Inventories — 20 Producers	21 Commerce	22 Consumers	23 Net Acquisition of Valuables
21	Households		End Expenditures of Households	Expenditures of Households on End Consumption	–	–	–	Purchase and Repair of Housing	–	–	Changes in Inventories of Consumers	Balance of Jewelry Purchases by Population
22	Public Sector	State Authorities, without CBR	End Expenditures of State Authorities without CBR	–	Expenditures of State Authorities without CBR on Collective Services	Expenditures of State Institutions (without CBR) on Individual Goods and Services	Expenditures of Non-Profit Institutions Serving Households (without CBR) on Individual Goods and Services	Gross Fixed Capital Formation by Public Enterprises	Changes in Inventories at Public Enterprises	–	–	–
23		CBR	End Expenditures of CBR	–	–	–	–	Gross Fixed Capital Formation by CBR	–	–	–	Net Increase of Precious Metal Reserves
24	Corporations	NFE	End Expenditures of NFE	–	–	–	–	Gross Fixed Capital Formation by NFE	Changes in Inventories at NFE	–	–	–
25		FE	End Expenditures of FE	–	–	–	–	Gross Fixed Capital Formation by FE	–	–	–	–

money. In other words, the credit expansion mechanism gives the opportunity of increasing financial resources in the economy that may be used by economic agents to finance their current expenditures. One should stress that loans by (both domestic and foreign) credit institutions to other sectors do not diminish their own disposable incomes but increase the disposable incomes of the borrowers in the current period. Extinction of obligations taken by economic agents in the previous periods diminishes, in its turn, the disposable incomes of the debtors but does not increase the creditors' incomes, since the returned incomes are not included into the profits of credit institutions. Thus, the disposable income calculated in the national accounts does not give a complete picture of the resources really available to the economic agents in the reporting period.

On this basis, one the disposable incomes of the sectors in consideration, on the whole, agree with those calculated in the national accounts, yet they should be adjusted by the value of net increase in the debt. To reflect the dynamics of the net increase in the debt, Section C3 shows the previous period debt liquidation items and reporting period debt increase items separately. These items take into account the loans provided in the reporting period by the sectors to one another as well as the return payments on the loans of the previous periods excluding interest payments on the credits. They also reflect the repayment of the delayed and accumulation of new debts by enterprises and organizations on mandatory payments to the state budget and off-budget funds, as well as payments to their sectors. Apart from the above, these items include the moneys earned by corporations and state agencies from primary security flotation (stocks and bonds), or paid to retire debt instruments and buy out the company stocks from the stockholders. Moreover, one must include in the outstanding liabilities of the previous periods into the debts of the enterprises of the corporate and public sector on wage payments, whose amount was relatively high in 1990s.

Note that the reflected in Section C3 flows take into account not only the interactions of the resident sectors with one another, but also with the rest of the world. Therefore, one must take here into account the direct and portfolio investments, international credits and loans, retirement/accumulation on not timely received export returns, etc. Apart from changes in net liabilities, Table 4 also shows the amounts of outstanding indebtedness at the beginning and end of the reporting period.

Thus, taking into accounts the changes in the sectors' debts, the balance of incomes and expenditures can be represented as the identity:

$$VA + NPT + PI^+ + Tr_f^+ + L^+$$
$$\equiv C_{hh} + C_g + I + PI^- + Tr_f^- + L^- + NS, \tag{4}$$

where L^+ and L^- ñ accumulation and retirement of the debt respectively. Then the balancing item of net savings (NS) can be written as:

$$NS \equiv (Ex - Im) + (Tr_f^+ - Tr_f^-)$$
$$+ (PI^+ - PI^-) + (L^+ - L^-). \tag{5}$$

The adjustments made allow one to pass over from the disposable income item used in the national accounts (Y^d) to the adjusted (taking into account the changes in the indebtedness) disposable income. (Y_c^d) [2], reflecting more completely the real incomes available to the economic agents in the reporting period. The relationship between these concepts may be illustrated by the formula:

$$Y_c^d \equiv Y^d + (L^+ - L^-). \tag{6}$$

According to the construction, the net savings item reflects the difference between the adjusted disposable income and expenditures on end consumption and savings.

Section C4 of the schematic diagram. The distribution of economic agents end expenditures by basic items of the end product is reflected in Section C4 of the proposed theoretical model (Table 5). We should stress that Table 5 sets the correlation of the money available not with all the components of Quadrant II of interindustry balance. For example, it is the rest of the world that finances the export expenditures, and for the domestic economy they are the revenues included into gross profits and intermediate consumption. Expenditures on domestic and import goods are divided by end demand elements, therefore the money spent by residents on import are included into Quadrant II, into these elements.

Households spend the disposable money on all the components of end demand (of course, without export). In the national accounts, it is conventional to separate the households' expenditures on end consumption and their consumption as such. These indicators differ by the amount of in kind transfers received by the population from the state and non-profit institutions serving households. And since in interindustry balance it is conventional to single out the households' expenditures on end consumption, the value of in kind transfers must be included into the expenditures on end consumption of the agent subsidizing the households. We should point out that it is a common practice to include into the households' expenditures on end consumption the money spent on purchasing durable goods for domestic needs. However, the costs of buying a house or apartment, or complete overhaul are not included into end consumption but referred to gross accumulation of fixed capital (together with the costs of purchasing goods with production or entrepreneurial purposes).

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[2] National accounts also use the concept of adjusted disposable income, however, it has a principally different meaning.

Taking into account the fact that one can conduct production activity within a household; their expenditures also incorporate the costs of increase in inventories.

In kind social transfers make up almost a half of state institutions' expenditures on end consumption. In the interindustry balance, this indicator is referred to as expenditures on individual goods and services. The main item of expenditures on collective services are the costs of defense and military forces, public administration, law enforcement, off-budget funds, enterprises and organizations providing services to the agricultural sector [15, p. 204]. Since the state institutions sector also comprises the enterprises and organizations financed from the state budget, the disposable income of this sector is also spent on capital and stock formation.

By definition, the corporate sector does not spend any financial resources on end consumption, only on fixed capital and stock formation.

The item of net acquisition of valuables contains information on the purchase costs less asset sales obtained as a means of value conservation. As there is not enough information to fully determine this figure, net acquisition of valuables is reflected only to the amount of the increase of the state reserves of precious metals and stones (referred to the CBR account) and balance of purchases (sales) of jewelry by the population (referred to the households account) [15, p. 209].

The proposed system of tables gives a detailed description of the transformation process of economic agents' primary incomes into end expenditures and net savings as well as ensures the connection between Quadrants II and III of the interindustry balance. For the sake of convenience, the applied methodology of distinguishing the financial flows in the model is close to that of SNA. The most significant difference between the developed model and national accounts is the reflection of economic agents' net liabilities, their dynamics, which allows one to adjust the estimates of economic agents' disposable incomes in order to approximate these estimates to the amounts of money that they can actually spend on end consumption and savings. Moreover, the financial flows reallocated between the domestic economy and the rest of the world are shown not in the redistribution section but in the section of distribution of primary incomes and net revenues from abroad. This reflection of financial flows gives a clearer picture of the financial resources (not including net attracted funds through increasing liabilities) available in the domestic economy in the reporting period. We should also note that, unlike national accounts, the presented system of tables readily illustrates the relationship of incomes and expenditures, and its methodology is in full accord with that of the interindustry balance.

Unfortunately, at the present stage, it does not appear possible to feed in the developed model with data on the basis of freely accessible statistics. The main reason for that is the fragmentation of data and lack of coordination among the statistics sources. We noted earlier that there is lack of coordination between national accounts and interindustry balance, from the standpoint of this model construction. Even less coordinated are they with the Balance of Money Incomes and Expenditures (BMIE) and other data sources. As to filling in the model with data, Section C3 is the most problematic because net liabilities are not included into national accounts. The information available in alternative statistical sources is not sufficient. The most complete evidence on the dynamics of net liabilities is available only concerning the relations with the rest of the world in the RF balance of payments. However, the problem of consistency of national accounts and balance of payments is even more acute, particularly because the balance of payments is drawn up in dollars. Moreover, some difficulties arise when one attempts to differentiate the corporate sector into financial and non-financial enterprises, since more or less complete information is available only on banks. Nevertheless, the theoretical model may be useful, first, as a system describing the process of incomes transformation into end expenditures and savings, second, as conceptual framework for improving the statistics on the interactions of macroeconomic financial flows, and, third, as a basis for constructing empirical models of the relationship between the GVA elements and end product.

* * *

Thus, we have developed a theoretical scheme that provides a detailed description of the transformation of the Russian economy institutional sectors' primary incomes represented as GVA elements into end expenditures, or end product elements, and net savings. The scheme is basically a system of tables, which is novel as compared to the ones proposed by other researchers, which describe the actual process of redistribution of primary incomes and their use for end consumption and savings. The most important distinctive feature of this scheme is the attempt to incorporate into the process of redistribution of aggregated agents' financial resources the dynamics of net liabilities, which pre-supposes refinement of the indicators of the agents' disposable incomes taking into account the repayment of debts of the previous periods and attraction of new financial resources at the expense of increasing liabilities in the reporting period. Taking the dynamics of liabilities into account allows one to ensure the dynamic relationship between the adjacent time periods. The proposed theoretical scheme may be useful because, first of all, it reveals, when modeling the relationships between GVA elements and end product, the need to account for certain articles of incomes and expenditures not included into value added and end demand, for example, incomes from property and transfers received from or paid to the rest of the world, and net savings. Moreover, the proposed scheme designates the lines of improvement of the statistical toolkit so as it could better reflect the dynamics of macroeconomic financial flows that are rather frugally presented in the existing sources.

On the basis of the theoretical scheme, the authors have built an empirical mathematical model enabling one to quantitatively describe the relationships between GVA elements and end product over the time interval 1995–2003. Its description and results are to be published in the next issues of the journal in the authors' paper "Empirical Model of the Relationship between the Elements of Value Added and End Product in the Russian Economy".

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