A. Tatarinov

Subnational Accounting: Problems of Development and the Use in Regional Terms

Moscow
2005
The paper considers possibilities for systematic design of regional economic accounts in Russia. Basing on the analysis of international regional economic accounting standards and experiences of their design in developed countries, the paper suggests tasks of developing regional accounting in the country and presents the research into informational possibilities for that. Numerous specific examples demonstrate possibilities for the use of the economic accounting system in regional analysis.

*JEL Classification*: C82, R15.

Editors: *Glavatskaya N.*, *Mezentseva K.*
Page setting: *Yudichev V.*

*The research and the publication were undertaken in the framework of CEPRA (Consortium for Economic Policy, Research and Advice) project funded by the Canadian Agency for International Development (CIDA).*

ISBN 5-93255-175-5

5, Gazetny per., Moscow, 125993 Russia
Tel. (095) 629-67-36, Fax (095) 203-88-16
E-MAIL – info@iet.ru, WEB Site – http://www.iet.ru
Content

Introduction .................................................................................................................. 5

1. International standards of regional economic accounts ........................................ 10
   1.1. The role of regional economic accounts in the UN SNA ................................ 10
       1.1.1. Methodological problems .................................................................... 10
       1.1.2. Information problems .......................................................................... 12
   1.2. Regional accounts of the European Union .................................................... 13
       1.2.1. Regional territory and nomenclature of the territorial units ................... 14
       1.2.2. Units and residence ............................................................................. 15
       1.2.3. The structure of accounts .................................................................... 17
       1.2.4. Methods of regionalization of economic operations while calculating ESA indicators ................................................................. 17
       1.2.5. Gross domestic product per region ....................................................... 20
       1.2.6. Households accounts .......................................................................... 20

2. Overseas regional economic accounts design experiences ..................................... 22
   2.1. Regional accounts in the United Kingdom: realization of the 1995 ESA principles. ................................................................. 22
       2.1.1. Macroeconomic aggregates .................................................................. 23
       2.1.2. Gross fixed capital formation ................................................................. 30
       2.1.3. Household accounts ............................................................................ 32
       2.1.4. Regional government accounts .............................................................. 39
   2.2. Subnational accounts in Canada ..................................................................... 44
       2.2.1. Composition of regional accounts .......................................................... 49
       2.2.2. Computation of provinces and territories’ gross domestic product .......... 50
       2.2.3. Economic accounts of provinces ............................................................ 53
   2.3. Evaluation of overseas experiences ................................................................. 54
3. Avenues of development of the regional economic accounting system and improving computations of regional macroeconomic indicators in Russia

3.1. The contemporary state of design of macroeconomic indicators on the subnational level in the Russian Federation

3.2. The existing informational resources for developing regional accounts

3.3. The proposed structure of subnational economic accounts: the matrix approach

3.4. Avenues of improving computation of subnational macroeconomic indicators

Conclusion

Supplement Examples of using subnational economic accounts for the purpose of regional analysis in Russia

E1. Assessment of structural effects on the Kaliningrad Oblast economy

E1.1. Experimental assessment of indicators of the input-output model; for Kaliningrad Oblast

E1.2. Assessment of economic effects

E1.3. Assessment of overall scope of non-observed (unregistered) sector of the economy

E2. Modeling tourism impacts on regional economy

E2.1. General description of the Sochi matrix models

E2.2. Tourism multipliers

E2.3. SAM based assessments of tourism economic impact

Bibliography
Introduction

Nowadays, most developed countries pay an increasing attention to research in the sphere of regional macroeconomics and subnational economic accounts. In a general form, one can refer to two major reasons for the development of regional accounting systems in different countries.

First, the designing of regional accounts is generated by the need for carrying out an *interregional analysis*, whose consumers are largely central economic agencies. The respective data are most often employed to develop the economic policy of a central government and in particular various interregional economic equalization programs.

This reason plays a particularly important role for countries with considerable territorial disparities in the level of economic development and production structure and, sometimes, in the institutional structure. The UN SNA Guidelines particularly emphasizes the presence of such disparities as a main reason for designing regional accounts. However, in the countries with relatively minor territorial disparities in their indicators of economic growth, there exists an objective need for the assessment of a contribution of single territories to the national economy. Sometimes, this need may also be generated by non-economic (for example, political) reasons. Besides, the absence of substantial interregional disparities today does not mean they would not emerge in the future. So, the computation of a territorial (regional) component of economic processes is much-needed for any country, whose economic territory is structured into regions. Notwithstanding this, the structure of indicators of regional accounts should be aimed at an adequate reflection of the territorial structure of a national economy, while the level of specification of the indicators should be determined by a set of tasks that face the national government.

Second, the function of regional accounts is to secure decision-making in the *regional development* area.

In this case, the regional accounts system plays the same role as the system of national accounts does, i.e. it forms an instrument of macroeconomic analysis on the regional level, with regional public administration bodies being the main consumer demanding its design.
It is evident that in this case the structure of regional accounts depends on the requirements of having the most comprehensive analysis of ongoing processes in every single regional economy. Ideally, the view of a region as a separate economic organism requires designing a comprehensive set of accounts that would reflect all stages of reproduction in its economic territory. Nowadays, because of various reasons, no country worldwide is in possession of such a system of regional accounts.

Any contemporary economy is in need for regional accounts of both types. In federal states, as a rule, a regional administration’s need in regional accounts is much greater than in unitary states. Because of the growing decentralization in the economy management area, these distinctions are reducing gradually, vs. the intensification of the need for a design of regional accounts over time.

In Russian Federation, the central and regional governments share an objective need for regional accounts. Given the central administration has clearly identified objectives and particularly those in the inter-budgetary relations area, and formulated general requirements to their informational provision, on the regional level, in spite of some progress, there still exists a significant uncertainty in this area. Besides, the economic and institutional disparities between RF regions produce an unequal need for the structure of an informational backup for the decision making process in different regions.

Configuring an optimal interbudgetary relations system in Russia provokes a heated debate, as it also concerns the task of fostering regional macroeconomic and financial statistics on the regional level. The employment of regional macroeconomic indicators to solve the problem currently forms one of the basic reasons of the interest in designing regional economic accounts in the Russian Federation.

Decision making in the interbudgetary relations sphere employs macroeconomic indicators for the purpose of assessing tax capacity.¹ Such an approach is based on computation of tax capacity index (TCI) and constitutes an indirect assessment of taxpayers’ potential tax obligations under certain assumptions.

The method of representative tax system (RTS) is the alternative to TCI. The method is based on forecasting potential tax revenues across regions by means of extrapolation of the current tax base by types of taxes.

Employed for decision-making on shaping interbudgetary relations, each of these approaches to assessment of tax capacity displays its advantages and shortcomings and if it is not enough, today most Russian experts believe in the method of assessing tax capacity basing on macroeconomic indicators as the most preferred way to solve the problem. However, the current accuracy and comprehensiveness of the indicator of gross regional product (GRP) used for the respective computations do not allow to argue its full adequacy in its existing form.

In any case, the Russian Federation is in need for a regional accounts system that should form a part of the System of National Accounts capable of serving as an instrument of the interregional analysis of the national economy and, as such, it should satisfy regional governments’ need for fostering their regional economies. It can also be noted that development of regional accounts will contribute to improvement of the system of national accounts, which is still nascent in the Russian Federation.

Basing on the analysis of the international standards of regional economic accounts and experiences of their designing in the developed countries, the present research formulates tasks of developing a regional accounting and assessment of macroeconomic indicators of the subnational level in the country. In addition, the authors consider the existing informational capacities, avenues of design and employment of regional accounts in Russia.

This research comprises three chapters and supplements.

The first chapter analyses the international standards of regional accounts, a contemporary concept and system of concepts of regional accounting given in the UN SNA. The authors consider in a greater detail the European Union regional accounting methodology, international standards of regional accounting formulated in the 1995 European System of National and Regional Accounts (ESA). Notwithstanding consid-

---

erable distinctions in the state structure and level of socio-economic development between the EU countries-participants, due to their flexibility and universality, the given standards are used (or inculcated) in all the EU countries.

In the second chapter, the authors present a detailed evaluation of experiences of designing regional accounts in two countries, which hold leading positions in this area. The British system of regional accounts is based on the 1995 ESA standards and Eurostat recommendations. The design of regional accounts of Canada is carried out on the basis of national standards. In spite of certain distinctions in approaches to assessment of the indicators of regional accounts, their compositions do not essentially display much difference. What they have in common is a broad employment of indirect methods of assessment of the indicators, which ensures a completeness of the indicators and a high degree of their integration into the system of national accounts. The UK and Canadian assessment methods of regional macro-economic indicators can be successfully applied in Russia.

In the third chapter of this research, the authors analyze the current methodology of computation of regional macroeconomic indicators in Russia. Basing on an analysis of the informational resources available and foreign experiences, they suggest an approach to the building of the system of regional economic accounts in Russia. The authors propose at the first stage to design regional accounts in the matrix form. Such an approach has proved to be credible in the conditions of the information shortages. As well, the matrix presentation intensifies the analytical value of accounts by allowing building static impact models on their basis. This chapter considers an example of building the subnational matrix accounts for the city of Sochi.

The supplements comprise examples of design of separate subnational accounts and their employment in the regional analysis. To exemplify a regional level exercise in this respect, the authors refer to a calculation of indicators of individual accounts of Kaliningrad Oblast and assessment of indicators of the regional input-output table. The table underlies computations of basic multipliers as well as assessment of the scope of the shadow economy in the region. Accounts of the city of Sochi exemplify economic accounts of the subnational level. Basing on their matrix of regional accounts, the authors computed an
assessment of the role of tourism in the city’s economy, as well as the impact of tourism on the regional development.

The author would like to acknowledge Dr. Kam Yu and Dr. A. Baldwin for their assistance and consultations.
1. International standards of regional economic accounts

1.1. The role of regional economic accounts in the UN SNA

In the UN SNA regional accounts are considered one of the avenues of application of the national accounting methodology for special purposes\(^3\). It is noted that regional accounts are of a particular importance to the countries with considerable interregional disparities in the economic and social development. This means that the countries with no such disparities in place do not need to design regional accounts. However, the 1993 SNA Manual notes that regional accounts form a useful economic policy analysis instrument. So, proceeding from its needs and possibilities, this or that country should decide for itself to design or not regional accounts.

We believe that such an approach to regional economic accounts depends primarily on the availability of a number of methodological and informational problems associated with their building.

1.1.1. Methodological problems

A complete set of accounts can be built for an institutional unit, economic sector or for a national economy as a whole. By contrast with the national economy, the regional economy cannot be presented as a sector of the economy or a group of resident institutional units.

First, by contrast to the national economy, there are, at least, two groups of institutional units, whose center of economic interest cannot be linked to a given single region. The 1993 SNA attribute to this group of units the companies with entities located in different regions (“multiregional companies”) and national institutional units.

An identification of the regional residence for institutions that form a part of multiregional companies, in principle, can be solved. However, this does not solve problems of regional attribution for a multiregional company on the whole, because not all its operations can be deter-

\(^3\) See System of National Accounts 1993. XIX. Application of the integrated framework to various circumstances and needs. I. Regional accounts.
mined in relation to the institution. The 1993 SNA Manual directly notes that even in the case of physically localized operations, as such output, it is necessary to make an assessment of intra-corporation flows between institutions situated in various regions. For an array of other operations exercised by multiregional companies, e.g. receipt of incomes from operations with estate and those with financial instruments, the regional attribution is impossible in principle. So, multiregional companies cannot be presented in the national accounting in the form of a group of regional institutional units. Therefore, the balance-sheet items of the majority of operations for multiregional corporations cannot be identified on the regional level.

The Manual particularly emphasizes that multiregional corporations in the region’s economy cannot be considered by analogy with multinational corporations in the economy of a single country, in spite of the availability of a certain similarity between these enterprises. The fundamental distinction lies with the fact that multinational corporations’ branches situated in the territory of this or that country practically in all cases appear independent legal entities and, notwithstanding the non-market nature of intra-corporation deals can be considered as full-fledged institutional units. As concerns registration of single regional establishments of a multinational corporation, it does not appear mandatory, and it is seldom practiced.

Regional attribution of the national institutional unit appears to be a more complicated issue, as in this case the distribution of the focus of its economic interest between regions is doubtful even from the theoretical perspective. Some economic operations associated, for example, with sales of services or paying compensation of employees may be localized, while, some others, for example, the federal government paying interest on the public debt, are impossible to be distributed across regions. As a result, one can consider an introduction of some kind of an extraregional “national sector”.

Second, so far the regional level is concerned, an uncertainty in application of some macroeconomic categories to it forms a methodological barrier to the design of a comprehensive set of accounts on the noted level.

Regional and national economies differ by their functions, and a concept of a system of regions in a certain country being a complex of

---

interacting economies involves a great deal of conventionality. Because of this, some economic operations that play an important role in building the System of National Accounts are either not identified, or have some other contents on the regional level. This is particularly true, so long as operations with “the Rest of the World” are concerned. By their economic contents, operations with goods and services are close enough to the national level. So, given the respective information is available, trade operations (export, import) can be fixed for a region in the respective account.

Financial assets denominated in a national currency, except the regional government’s official obligations are not strictly tied to this or that region. Because of this, the possibility of definition of consolidated regional debt as a sum of external liabilities accumulated by residents of a given region is doubtful.

Consequently, should all interregional commercial and financial flows be registered and a consolidated balance of assets and liabilities for the region as an integral subject be designed, one may not consider it as a complete analogue to the respective document of the national level.

In conjunction with this the question arises as to whether it is appropriate to transfer a complete set of standard accounts designated for the institutional sector or national economy as a whole to the regional level. As designing regional accounts is a very costly exercise, one needs to be sure that the acquired information would enjoy a full demand. It is yet more important to have the economic contents of the computed indices of regional accounts clear enough. Only in this case can they form a valuable instrument of regional and interregional economic analysis and a basis for taking managerial decisions.

1.1.2. Information problems

The building of regional accounts appears constrained by a limited amount and, in many cases, by the absence of reliable information, associated with. As a rule, an its is of the assessing of goods, services and financial flows between regions that poses the greatest problems. As external goods and services flows, as a rule, are more significant for regional economic systems than for national economies, it is evident that a lack or absence of such information forms a substantial barrier to the building of regional accounts.
The main obstacle to an accurate registration of external commercial operations of a region is the absence of the respective transport statistics data. The Manual emphasizes it as a critical of the practical building of regional accounts currently faces.

The problem of regional attribution of single entities of multiregional companies also has an informational dimension, because there are no complete data on the companies’ operations on the regional level.

As well, a substantial problem is the access to regional information of operations with financial assets. Particularly, the currently effective Russian standard accounting procedures make it impossible to build a balance of regional assets and liabilities in compliance with the 1993 SNA and the Government Finance Statistics Manual, 2001.

However, in spite of the above-mentioned problems associated with the building of regional accounts, even their abridged system appears rather a useful instrument of an analysis of a regional economy. While conducting an analysis of interregional disparities in the countries where they are fairly great, the regional accounts data are most valuable. According to the 1993 SNA Manual, it is recommended to particularly use such regional accounts indicators as GDP per capita, disposable income, and household consumption.

1.2. Regional accounts of the European Union

The 1995 European System of Accounts presently appears a solitary example of the current international standard of regional accounts. A full name of the given document is “European System of National and Regional Accounts”, alias ESA\(^5\) as its acronym.

The given Manual pays relatively little attention to regional accounts. Nevertheless, this Manual comprises all fundamental bidding concepts and regulations the EU members are bound to follow while designing their regional accounts.

As the UN SNA Manual, the 1995 ESA likewise considers regional accounts as one of avenues of specification of accounts of the national economy on the whole. The set of recommended regional accounts is limited, due to a number of conceptual complexities.

---

1.2.1. Regional territory and nomenclature of the territorial units

A regional economy is considered to be a part of a national economy, while a regional territory is believed to form a part of the economic territory of a country. However, an aggregate of regional territories is unequal to the economic territory of a country, as the latter comprises regional territories and “extra-regio” territory.

The regional territory comprises:
1) a part of geographical territory of a country (region);
2) any free zones, including bonded warehouses and industrial enterprises under customs control in the region;

An extra-regio territory consists of parts of an economic territory of the country, which cannot be directly related to a region. Such a territory comprises:
   a) the national airspace, territorial waters and continental shelf, which is situated in the international waters, but is subject to the law of a given country;
   b) overseas territorial enclaves of a given country;
   c) mineral deposits in the international waters located beyond the boundaries of the country’s continental shelf and developed by its resident units.

The European Union has designed a nomenclature of territorial units for statistics – NUTS, which provides for a uniform approach to the territorial division of the EU economic territory. So, NUTS appears a territorial classification the EU countries employ in to form their territorial accounts.

NUTS appears a hierarchic classification, which comprises five levels, including three regional levels (NUTS 1-3) and two local ones (NUTS 4–5). In practice, in the EU countries, the levels of territorial units are linked, in one way or another, to the administrative-territorial division net. In the EU-15, there are 77 regions falling under the higher level (NUTS 1), while 206 ones form the NUTS 2 group, –over 1,000 regions -NUTS 3.

However, due to the current distinctions in the scope of territory, population and the state structure, the regions of the same level, but from different countries, are not quite equal. For example, in Germany the federal lands play the role of NUTS 1, while in Austria such lands fall under the NUTS 2 group of regions. In the United Kingdom, the county (a NUTS 2 or even NUTS 3 region) forms a basic administrative-territorial unit. So, in Germany the regions of the first level present ad-
ministrative (public) entities while, for example, in Austria and in the United Kingdom they are just statistic accounting units.

Moreover, the availability of the basic statistics and level of development of regional accounts are unequal even across the 15 “old” EU participants. This is why an interregional comparison of the basic indicators of regional accounts in EU-15 is conducted across 160 regions that mainly fall under the NUTS 2 level, with the exception of Germany regions (lands) and the United Kingdom’s regions (standard regions), which are attributed to the NUTS 1 level. After joining the EU, new participants will have to adjust their statistics on the whole and regional in particular to the 1995 ESA requirements.

The concept of regional territory stipulated in the 1995 ESA, plays a key role for identification of borders of a regional economy and regional residence.

1.2.2. Units and residence

Regional economy draws a distinction between two types of units. One is a local kind-of-activity unit (local KAU). It is used for the analysis of processes of production and employment of goods and services. The second type is an institutional unit. The institutional unit has an independent right to possess assets and products, to assume obligations and make economic decisions on its own behalf. So far the institutional unit is concerned, there exists a full set of accounts including the balance of assets and liabilities, or it could be built otherwise.

The local KAU is a geographically localized part of the institutional unit that exercises only one or largely a sole kind of activity. The institutional unit may consist of one or several local KAU=s (institutions) that are situated within one or several territories. So, in principle, the regional residence of the local KAU can be determined unambiguously.

The local KAU (establishment) does not form an independent legal entity and cannot possess assets or take any obligations, nor a full set of accounts is not set for it, except for the case when the local KAU and the institutional unit coincide (i.e. the institutional unit comprises a local KAU).

However, as the local KAU is considered a basic independent unit of the regional economy, the purposes of regional accounting necessitate registration of all its external production flows. More particularly, in com-

---

6 Local kind-of-activity unit, local KAU is called establishment in the 93 SNA.
pliance with the ESA recommendation, one should register such flows to and from other local KAU of this particular institutional unit that are situated in other regions, i.e. nonresident units in respect to a given region. Due to the importance of this information for regional accounts, ESA strongly recommends to include mutual supplies between local KAU=s that fall under the same institutional unit in the computation of its output.

Both ESA and the 1993 SNA Manual note that the context of regional accounts allows singling out two types of institutional units: regional (“uniregional”) and multiregional units. The concept of residence for regional accounts coincides with the concept of SNA residence on the whole. So, as the focus of economic interest of regional institutional units can be found in a given region, they are considered to be residents.

According to ESA the group of regional institutional units consists of: households; corporations whose local KAU=s are situated only in one region; government and public administration agencies; at least, a part of the social security system; various nonprofit institutions that render their services to households.

All economic operations by regional institutional units are related to the region, which appears to be the focus of their economic interest. So far as households are concerned, it is a common knowledge that the focus of their economic interest rests upon the region where their members live, rather on the one than where their jobs are located.

Multiregional institutional units are those ones whose focus of economic interest can be found in more than one region. They comprise corporations, nonprofit organizations that render their services to households and some institutional units with the nationwide scope of operations, such as the central government, corporations-monopolists or quasimonopolists, represented by the national railway, electric and infrastructure companies.

The 1995 ESA admits that some economic operations of multiregional institutional units cannot be attributed to any region. This concerns distributive and financial operations. The balancing items of multiregional units consequently cannot be unambiguously determined for them on the regional level.

Both ESA and SNA Manual emphasize that building a full set of accounts for regions poses a real problem that requires theoretical solution, rather than an issue of a more or less accurate approximation in the
course of distribution of multiregional units' economic operations across regions. A fundamental impossibility to build a full set of accounts for regions in the SNA and ESA framework is determined by the impossibility to build a full set of accounts for the local KAU=s (institutions).

1.2.3. The structure of accounts

Due to the above reasons, the ESA regional accounts system is limited with the following accounts:

a) regional industry aggregates on production activities:
   (1) gross value-added;
   (2) compensation of employees;
   (3) employment;
   (4) employees;
   (5) gross fixed capital formation.

b) gross domestic product per region (GDPR);

c) regional household accounts.

1.2.4. Methods of regionalization of economic operations while calculating ESA indicators

As some economic operations cannot be linked to this or that region, ESA focuses primarily on operations associated with output. It is recommended to employ three methods of calculation of these or those regional indicators.

1) “Bottom-up” method is based on aggregation of the respective indicators of regional units of all kinds. It is suggested that the aggregate of regional values of an indicator should be consistent with its national value.

2) “Top-down” method is a distribution of the national amount of the indicator across regions by this or that means. The application of this particular method does not require selection of resident units, because the distribution is exercised across regions, rather than units.

Both methods have their merits and demerits. The “bottom-up” method operates directly with genuine data, rather than indirect ones. That it is recommended to employ it in all cases when necessary information is available. It should be noted, however, that once used it, as a rule, generates a difference between an aggregate of assessments of...
regional values of the indicator and its national value. By contrast, the “top-down” method suffers no such shortcoming, but reliability of regional assessments computed on its basis is substantially lower and depends on an employed disaggregation procedure and quality of weight factors.

Mixed method is a combination of the two above-mentioned methods. It is this method, which is usually employed in practice, as the “bottom-up” method can be seldom used in its pure form. The basic aggregates based on the primary data of the local units are most often computed only for regions of the first level (NUTS 1). In this case a computation for regions of the second and third level can be made by means of “top-down” method.

Data of the local KAU forms the main information source for calculation of regional sectoral aggregates. While calculating regional indicators, which characterize production (output, intermediate consumption, gross value-added), one employs data of the local units that are resident of a given region.

A common principle of distribution of gross fixed capital formation across regions in ESA is based on property (as it was noted for the accounts of the national level). Multiregional corporations’ fixed assets fall under the regions where local units that use them are located. The principle of national accounts is also used in the case of leasing of fixed assets. In the case of operational leasing they are attributed to the region of their owner, while in the case of financial one – to the region of the unit that uses these funds.

If the information is available only on the level of a kind-of-activity unit that consists of several local units, one recommends indicators, such as compensation of employees or employment, available for distribution of a necessary indicator across regions.

Generally, the regional attribution (residence) of the local KAU can be found fairly simply, except for some activities, such as, according to ESA, construction, transport and communication, and financial mediation.

Table 1 describes peculiarities of computation of the basic aggregates across regions for the listed in ESA activities.
Table 1
Characteristics of Macroeconomic Indicators Regionalization Methods in ESA

<table>
<thead>
<tr>
<th>Type of operation</th>
<th>Local KAU to which production operations are linked</th>
<th>Distribution of gross output</th>
<th>Distribution of capital assets in the course of computation of gross fixed capital formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Construction object (site)</td>
<td>Region of residency of local KAU</td>
<td>Region of residency of local KAU, except for mobile equipment (e.g. construction cranes), which falls under the region of residency of the central link of KAU</td>
</tr>
<tr>
<td>Transport, including:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>land(^{*)} and water</td>
<td>Unit of basing of equipment</td>
<td>Region of residency of the local KAU</td>
<td>Region of residency of the local KAU</td>
</tr>
<tr>
<td>Pipeline</td>
<td>Unit that operates a pipeline network</td>
<td>Region of residency of the local KAU</td>
<td>Region of residency of the local KAU</td>
</tr>
<tr>
<td>Rail and air</td>
<td>Regionalization of national aggregates by the “bottom-up&quot; method is recommended:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− compensation of employees between regions wherein the latter work;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− gross operating surplus – between the regions, in proportion to the value of the indicator that characterizes the intensity rate of operations of the respective kind of transport</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Unit responsible for control over means of communciation</td>
<td>−</td>
<td>Region of residency of the local KAU</td>
</tr>
<tr>
<td>Financial intermediation</td>
<td>Regionalization of national aggregates by the “bottom-up&quot; method is recommended:</td>
<td>−</td>
<td></td>
</tr>
<tr>
<td></td>
<td>− compensation of employees between local KAUs wherein the latter work;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− gross operating surplus of credit institutions – between local KAUs in proportion to the amount of loans and deposits;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− gross operating surplus of insurance institutions – between local KAUs in proportion to the amount of insurance premiums collected;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− gross fixed capital formation – across regions in proportion to the increment in the capital assets (mostly buildings) value</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{*)\) except rail and pipeline transport.
Whilst regional output and gross value-added across types of operations are computed at basic prices, the gross fixed capital formation is assessed in purchasing prices.

1.2.5. Gross domestic product per region

In ESA, gross domestic product per region (GDPR) forms the regional equivalent of GDP. This indicator “is valued at market prices by adding the regionalized taxes less subsidies on products and imports to values added per region at basic prices”\(^8\). The sum of GDPRs of all the regions and those of extra-regio territories computed at market prices forms the amount of a nation’s GDP.

In the EU practice, assessments of regional GDPs are based upon the respective values of national GDPs. Whereas the ESA standards find themselves at the stage of permanent introduction, a considerable number of assumptions are used. As a rule, “national values are divided up among regions in line with the regional shares of national gross value-added”\(^9\).

In most cases, gross value-added is used for this particular purpose. It is computed by factor value, but because of accessibility of information, some EU countries employ gross value-added at market prices. Furthermore, in cases when structured data are used for a given calendar year, the structure of the gross value added of the last year as of which it is available is used.

1.2.6. Households accounts

Accounts of income distribution and redistribution for the household sector in ESA are designed on the regional level only. Because of practical considerations, it is proposed to limit their number with two accounts:

1) allocation of primary income account;
2) secondary distribution of income account.

The purpose of the accounts is a computation on the gross basis of two indicators that appear critical for assessing household’s income in a region – that is, the balance of primary income and disposable income.

\(^8\) European System of Accounts..., 1996, p.254.
These accounts are based upon data on household’s resident for the given region, while the number of physical individuals that are members of resident households equals to the number of the population in the region.

Regional residency of households and their members in ESA is found according to the same rules as at the national level. The exception is students and patients of medical institutions that have arrived from other regions of the country, and consequently they are considered residents of the region if they have stayed there for over a year.

The ESA regional accounts allow two assumptions regarding households that own non-corporate enterprises and/or second housing in other regions.

In the event a household owns a non-corporate enterprise in another region, the enterprise is viewed as a resident of the region of its location (a conditional resident unit). Accordingly, the mixed income computed on the sectoral basis is considered a part of the mixed income of the region where the enterprise is located. The mixed income included in the account of distribution of primary household incomes across regions equals to the sum of all the mixed incomes the household - resident of the region receives, regardless of a region where the income was produced.

Land and/or the second housing owned by a given household and located in another region are also considered conditional resident units of the region in which they are located. Accordingly, tenants pay rental payments to this particular conditional unit. Should the owner use the second housing for his own consumption, the rental costs are fixed as an export of services from the region where the housing is located to the region of its owner’s residence. As in the case of mixed income, the income generated at this particular juncture would likewise differ from the one registered with the account of distribution of households’ primary incomes.
2. Overseas regional economic accounts
design experiences

2.1. Regional accounts in the United Kingdom: realization of the 1995 ESA principles

The UK regional accounts exemplify the regional accounts basing on the 1995 ESA standards. The accounts are designed for the regions that match the European levels NUTS 1, NUTS 2 and NUTS 3.

The British regional accounts system comprises a) macroeconomic aggregates of output and value-added and its components in terms of factor costs, regional Gross Domestic Product (GDP), among others; b) gross fixed capital formation; c) the household sector accounts; d) accounts of the public administration sector.

The methodology employed for computation of the indicators is based upon the ESA recommendations and methodological recommendations on regional accounts published by Eurostat in 1999–2000\(^\text{10}\).

In UK, there are 12 regions of NUTS 1 level, 37 sub-regions of the NUTS 2 level, and 133 ones of the NUTS 3 level\(^\text{11}\). The territory of England is divided into 9 regions (Government Office Regions) NUTS 1, while Scotland, Wales and the Northern Ireland form another three NUTS1 regions, with the Northern Ireland forming a NUTS 2 sub-region. Other sub-regions form either separate administrative-territorial units, or their groups. More specifically, in England, NUTS 3 are formed by single counties, their groups, London boroughs, etc.

Traditionally, the British regional statistics label NUTS 1 as regions, while NUTS 2 is usually attributed to the sub-regional level and NUTS 3 to the local one (local areas). We therefore hereinafter will adhere to this terminology.

Regional accounts are not conducted for territorial units of a level lower than NUTS 3, i.e. at the local level. Overall, the UK statistical agency singles out 443 territorial units of the NUTS 4 level and over 11,000 ones at the NUTS 5 level.


\(^{11}\) Regional trends 36, 2001, p.241.
The indicators computed across regions do not cover the whole volume of the national output and incomes. Some volume of economic operations falls within the extra-regio part of the economy, which embraces “the economic activity that may not be attributed to any specific region”\textsuperscript{12}. This category comprises the continental shelf, oil and gas fields, the British diplomatic missions and troops located overseas. Accordingly, the extra-regio activity comprises all kinds of operations carried out on given objects. The proportion of extra-regio territory in the national value-added indicator varies from year to year within the range of 1.5\% and 2.5\%.

\textbf{2.1.1. Macroeconomic aggregates}

\textit{a) General comments}

The main macroeconomic indicator that characterizes a given regional economy is the one of regional gross value-added (RGVA). Until 2003 the British regional accounts were based upon the regional GDP indicator that was computed in current basic prices\textsuperscript{13}. Since indicators of regional accounts in UK are published solely at basic prices\textsuperscript{14}, all the comments to published tables note that indicators of regional GDP at basic prices are equivalent to those of RGVA. Starting from 2003, all the published regional GDP indicators computed at basic prices are put in the British regional accounts as RGVAs, which fully complies with the ESA standards and the Eurostat methodological recommendations on regional accounts (see “Regional accounts methods – Gross value-added and gross fixed capital formation by activity”, 1999).

A direct computation of regional GDPs by the ESA methodology, i.e. at market prices that include net taxes on products, appears complicated in UK due to complexities associated with the regionalization of taxes on, and subsidies for products. Because of that, to have regional GDP indicators comparable with other EU members, one applies the

method of distribution of GDP across regions in proportion to their share in the national GVA value.

The main provisions of the regional GDP computation methodology at basic prices or RGVA terms were published in December 2000. They fall under the group of indicators of the regional (NUTS 1) level, while computations for the sub-regional (NUTS 2) and local (NUTS 3) levels are made chiefly on the basis of this particular methodology, albeit with some modifications and periodical amendments.

The main method of computation of RGVA used in the British regional accounts is a distributional method that exists practically in the form in which it has been formulated in SNA–93. The income-based computation was employed as a main one, because the regional information for its realization appears more accessible vis-à-vis the final consumption or production methods.

The computation of RGVA implies the account of the following incomes:
- Compensations of employees;
- Mixed income;
- Gross operating surplus;
- Non-market capital consumption;
- Rental income;
- Holding profit;
- Financial intermediation services indirectly measured (FISIM);
- Net taxes on production.

The “top-down” and “down-up” approaches are employed to compute the noted components of RGVA as per the ESA recommendations.

RGVA values are published in current prices, i.e. they include the impact of inflation, which complicates the analysis of trends, while regional indices necessary to re-compute dynamic series into comparable prices are presently absent in UK, except for Scotland, for which RGVA values are computed, first, by production method and, second, in comparable prices. These data are published quarterly.

The concept of residence in the British regional accounts matches the one stipulated in the 1995 ESA guidelines.

b) Assessment of RGVA elements

Compensation of employees accounts for a greatest proportion of value-added (roughly as much as 65% nationwide and 60 to 70%
across regions of the first level). Compensation of employees comprise salaries in cash and in kind paid to an employee over a given reported period. In practice, this particular GVA component is formed by salaries and wages and other compensations, including social contributions, and it is computed by two components – that is, compensations paid to civilian employees and those to the military staff.

According to the ESA methodology, compensation of employees should be computed in regional accounts according to the household members’ job locations. Hence, they fall under the RGVA of the region where the employer is located and compensation is paid. However, historically, in UK, RGVA assessments were conducted basing on households’ residency, which was related to the reliability of the respective data\(^{15}\). Consequently, there occurred considerable distortions in RGVA assessments on London and South-Eastern and Eastern England where migrants account for a considerable share of workforce.

The assessment of the amount of compensation of employees according to the principle of residency for the economy on the whole is conducted on the basis of tax data (1% sample). A relatively small number of records that cannot be fixed with regions are distributed in proportion of already distributed values, except for those on the compensation of employees data in the agrarian sector which are subject to an individual assessment basing on the data of the Ministry of Agriculture, Fisheries and Food (MAFF), rather than the Inland Revenue, to be consequently added to the overall assessments.

Assessment of distribution of compensation of employees across industries is conducted on the basis of data collected from several sources: namely, the official data of the Ministry of Agriculture, Fisheries and Food, Short Term Employment Survey (STES), New Earnings Survey (NES), Annual Business Inquiry (ABI), Labour Force Survey (LFS).

*Gross profit and mixed income* in 2001 roughly accounted for 35%\(^{16}\) of the nation’s gross value-added, while their proportion across regions varied from 32% (North-East) to 40% (the Northern Ireland). As long as the extra-regio part of VA is concerned, the 2001 proportion of gross profit and mixed income was estimated at the level of 93%\(^{17}\).


\(^{16}\) Including net taxes on production (see: Regional trends 38, 2003).

\(^{17}\) Regional trends 38, 2003, t.12.3.
The regional breakdown of mixed income generated in the agrarian sector is made basing on the official data of the Ministry of Agriculture, Fisheries and Food (MAFF), and the data are strictly linked to the respective assessments of the national "Input-Output" matrix.

As for other sectors, their assessments are made on the basis of data generalized by the Inland Revenue basing on tax returns filed by individual entrepreneurs and broken down by regions and types of operations.

While assessing profit and other incomes equaled to it, the British also consider both private and public corporations’ trade and production profits. Regional assessments are made separately for three types of companies: that is, corporations, partnerships, and public market units. Gross profit in the agrarian sector is assessed basing on the official data of MAFF, while in the processing sectors- on the basis of the ABI data and the national "Input-Output" matrix. As for other kinds of operations, the assessment is made by means of disaggregation of the national data with the use of the STES and NES survey data. While assessing the crown corporations’ gross profit, the administration assumes the indicators are proportional to total assessments of gross profit across regions.

To assess non-market capital consumption, the British regional accounts have data sources classified by the principal type of operations of a given non-market unit. The characteristics of the sources in question are given in Table 2.

<table>
<thead>
<tr>
<th>Non-market capital consumption data source</th>
<th>Type of non-market capital consumption</th>
<th>Data source used to calculate regional estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defense related</td>
<td>Defense related</td>
<td>Number of UK armed forces by region</td>
</tr>
<tr>
<td>Education related</td>
<td>Education related</td>
<td>Capital expenditure on universities by region</td>
</tr>
<tr>
<td>Health care related</td>
<td>Health care related</td>
<td>Number of hospital beds by region</td>
</tr>
<tr>
<td>Roads related</td>
<td>Roads related</td>
<td>Total road length by region</td>
</tr>
<tr>
<td>Finance related</td>
<td>Finance related</td>
<td>Employment in SIC92 industries J and K</td>
</tr>
<tr>
<td>Public administration and defense (other)</td>
<td>Public administration and defense (other)</td>
<td>Number of civil servants by region</td>
</tr>
</tbody>
</table>

Table 2

**Holding profit** is computed individually by each given sector. In the sector for non-commercial institutions that services households it is assessed in proportion to assessments of mixed income, while for corporations – in proportion to assessments of gross profit.

Regional assessments of holding profit in the agrarian sector are made on the basis of the official data of MAFF, while holding profit of the oil and gas sector falls under the extra-regio territory category.

**Financial Intermediation Services Indirectly Measured (FISIM)** are measured not by single industries, but by singling them out from an aggregate value of regional VA. Regional assessments of FISIM are computed on the basis of the national data. Until 2003 it was the number of the employed that was used as the respective indicator for the computation, while since 2003 it was substituted by the amount of compensation of employees in financial mediation across sectors of the economy. The measurement was conducted for the sake of ensuring the compatibility between regional FISIM computations and those on financial mediation on the whole.

The amount of rental incomes of local administrations for England as a whole, Scotland and Wales is assessed in the frame of the National Accounting System (название сверить). The breakdown by regions of England (Scotland and Wales are considered as the NUTS 1 – level regions) is conducted on the basis of data provided by the Department of Environment, Transport and the Regions (DETR), where, basing on local authorities’ reports, the Housing Revenue Accounts are compiled. In the Northern Ireland, the housing services of local administrations are provided by the Northern Ireland Housing Executive that falls under the category of public corporations and is accounted accordingly.

The executive agency that deals with rental incomes generated from the crown estate is the Crown Estate Commissioners (CEC) that has also become public corporation since 1995.

Rental incomes generated by public corporations are computed directly on the basis of the data each corporation is bound to submit. Should public corporation operate in more than one region, its rental income is distributed across regions in proportion to the quantity of their population.

Regional assessments of rental incomes generated by financial and non-financial corporations from all the sectors, except for the agrarian
sector, are computed basing on income data across regions subject to
collection and submission by DETR, while assessments of rental in-
comes generated in the agrarian sector are made on the basis of data
provided by the MAFF.

Rental incomes households generate from the housing rent, includ-
ing presumptive costs for rent for individuals residing in their own pri-

cate houses, are assessed for each region by multiplying average
prices in a given region by the quantity of houses available.

Regional values of *taxes on production* are assessed by each tax in-
dividually with the use of the most adequate regional indicator: some
kinds of activities employ the gross value indicator in this respect, while
other – the number of the employed.

The excise levy on means of transportation that is not computed by
means of a single indicator makes an exception in this respect: first, the
value of the excise levy due for each unit of means of transportation of a
given type is multiplied by the number of means of transportation of this
type registered as of particular date. The product is multiplied by the
proportion of means of transportation of the given type used in produc-
tion, which is subject to a separate assessment. The final value consti-
tutes the regional assessment of the excise levy on means of transpor-
tation.

c) the nature of data published and assessment of accuracy of com-
putations

The regional value-added accounts (regional GDP at basic prices)
are published by the Office for National Statistics (ONS) in a number of
official printed issues and posted on the ONS official Homepage on the
Internet. The regional information is not published in the annual UK Na-
tionalAccounts issue, *alias* the Blue Book.

A special section entitled “Regional Accounts” can also be found in
an annual ONS statistical collection entitled “The Regional Trends”. The
most recent 2003 issue contains the following RGVA tables\(^9\):

- RGVA across the country and regions, including the extra-regio ter-
ritory, between 1991 and 2001;
- RGVA per capita as per cent of the average one nationwide (exclu-
sive of the extra-regio territory) between 1996 and 2001;

\(^9\) In current basic prices, across the NUTS 1 regions; Tables 12.1-12.5 are assessed bas-
ing on the data on a region of the employees’ residency.
the 2001 RGVA by income components (compensation of employees and gross profit and mixed income, including net taxes on production) across the country and its regions, including the extra-regio territory;

the 2001 RGVA per capita as per cent from the average one nationwide (exclusive of the extra-regio territory);

RGVA by enlarged sectors (15 ones) nationwide and across regions (exclusive of the extra-regio territory between 1996 and 2000);

RGVA nationwide and across regions, including the extra-regio territory, between 1996 and 2001, computed on the basis of the data on a region of the employees’ residency.

The ONS has published its assessments of RGVA and analytical papers in its “Economic Trends” monthly over the past 50 years. The publication, as a rule, centers on methodological and analytical issues, allowing, at the same time, for a considerable volume of statistical data in its every issue.

In addition, a more detailed information of the amount and structure of RGVA can be purchased from the ONS London-based Customer Contact Center.

The official publications of regional accounts note that the accuracy of the published regional assessments cannot be as great as the one of published national accounts.

The RGVA assessments in part are based upon selective surveys and thus appear dependent on a sample volume. This means, in particular, that the lower a given region is ranked, the higher the probability of making mistake is.

Despite the aforementioned employment of current prices for RGVA assessment, analytical papers draw cross-regional comparisons between RGVA dynamics. However, in the event regional price indices differ substantially from the national ones, such an analysis may generate erratic conclusions. That is why for the purpose of analysis one should employ assessments of regional inflation growth rates values.

The dual approach to assessment of RGVA – that is, basing on employees’ residency or the data linked to the job – remains questionable. While the balance of the inter-regional pendulum migration does not appear close to zero in all the regions and, furthermore, external cash flows associated with compensation of employees are not balanced
everywhere, a number of regions witness considerable differences between RGVA assessments received on the basis of different approaches to employees’ compensation of employees. For instance, the 2001 assessments differ substantially, as long as three English regions are concerned: namely, London, East and South-East. While London is a net consumer of external workforce, the RGVA assessments computed on the basis of residency in London appeared lower by £ 22, 147 mln. (13.6%) vis-à-vis those based on jobs. By contrast, in the workforce donor regions of East and South-East the residency-based assessments proved to be greater by £ 10, 647 mln. (14.2%) and 11, 500 (9.0%), than job-based ones, respectively.

In the event RGVA computations are conducted by means of distributional method and basing on employees’ residency, in a number of regions, results would differ substantially from the RGVA assessments computed by other means and particularly by production method currently employed by most EU countries. Plus, it is fairly difficult to provide a sound justification for the final indicator precisely matching the standard stipulated in NAS, as it comprises the external balance of factor incomes (compensation of employees).

2.1.2. Gross fixed capital formation

The first assessments of GFCF across a comprehensive circle of industry branches at the subnational level were first published in UK by ONS in October 2003. Prior to that the Agency has been publishing an indicator entitled “Gross Domestic Capital Accumulation” that covered a limited number of industries. Upon the transition to the ESA standards the British national accounts witnessed the number of assets included in the GAFC assessment expand. The GAFC data published in the wake of the modification consequently contained revised assessments over the period between 1995 and 1997.

The GAFC assessments over the period between 1995 and 2000 published in 2003\(^2\) are based chiefly on the Annual Business Inquiry which began to be held regularly since 1998. That is why the regular GAFC assessments across the SIC92 comprehensive circle of industries have been made available since early 2005.

The GAFC assessment methodology is fully compatible to the ESA recommendations and meets their requirements.

Regional and subregional (NUTS 2) assessments are conducted individually by enlarged SIC industries.

The regional and subregional assessments are computed largely by means of “top-down” by distributing the national GAFC value by each industry branch between NUTS 2 in proportion to values of the indicators employed. The latter are represented, as a rule, by indicators of the number of the employed and gross value-added (specifically for the agrarian sector). As long as a number of industries are concerned (kettle-breeding, mining sector), the information is available on the regional or subregional levels.

The ONS materials present the GAFC indicators nationwide on the whole and across all the industries and extra-industry components over the period between 1998 and 2000, while in sectoral terms, there also are the data available over the period between 1995 and 1997. The assessments are made in current purchaser prices.

Underlying the published assessments are subregional (NUTS 2) GAFC values, while regional (NUTS 1) ones are computed by aggregating the former ones.

By their definition, subregional assessments reflect GAFC by production units that are residents of a given subregion. The aforementioned brief review of the subregional GAFC assessment methodology by sectors and extra-sectoral components implies that the given assessments form just a fairly trustworthy approximation to authentic GAFC values in subregions.

The major cause for the error lies with information: theoretically, with the complete data on all the resident units, including establishments, it becomes possible to compute accurate GAFC values. The UK methodology is dominated by the “top-down” indicator regionalization methods, with the indices assessed basing on selective survey data (such as RGVA) being frequently used as the respective indicators. That is why one can suggest that the regional GAFC assessments are less accurate than the RGVA ones.

---

2.1.3. Household accounts

a) General comments

The household sector comprises households that reside both in traditional houses and establishments. The latter account for some 1.5% of the British population and include the citizens residing, for instance, in retirement homes, etc. In addition, this sector also comprise individual enterprises (self-employed individuals) and, what forms the specificity of the British national accounts, non-profit institutions serving households (NPISHs), represented by charity organizations and most universities, among others\(^{22}\).

ONS publishes assessments of the household sector incomes\(^{23}\) for regions (NUTS 1) and subregions (NUTS2), while the household incomes for the local level (NUTS 3) are also subject to publication, albeit periodical one.

The household sector accounts comprise slightly modified accounts of the distribution of primary incomes and the secondary distribution of incomes compiled in a single table. In addition, there are data on spending on individual consumption by types of such spending.

The noted set of accounts currently designed in UK is recommended by the ESA95 standards. In addition, the British regional and subregional accounts appear fully compatible to the household accounts of the UK national accounts.

The balance of primary incomes and the households’ disposable income are computed and published for each region in current prices. The consumption of the NPISHs’ fixed capital, which forms a part of gross profit, is also computed in current prices.

The household sector’s incomes that fall under the extra-regional territory by number of their components differ from those used to compute RGVA, with the main difference lying with compensation of employees to those employed at gas- and oil-producing enterprises located in the continental shelf, which in this particular case is attributed to the regions of their residency.

---


\(^{23}\) A.Linacre. Regional, sub-regional and local area household income. – Economic Trends, May 2002.
It should be noted that overall the computation of households’ regional and subregional incomes is based upon the principle of residency, rather than jobs their members hold. The household is considered to be resident if the center of its economic interest is located in a given region, which in the British regional accounts means the existence of a housing. Thus, for the UK citizens residency is determined by the region where their housing is located.

b) **Methodology and sources of the assessment of the households’ gross disposable income**

The structure of the household incomes of the UK regional accounts is given in *table 3*.

*Table 3*

**Incomes in the Households Sector**

<table>
<thead>
<tr>
<th>Balance of primary incomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compensations of employees</strong></td>
</tr>
<tr>
<td>– salaries and wages</td>
</tr>
<tr>
<td>– employers’ social security contributions</td>
</tr>
<tr>
<td><strong>Gross mixed income</strong></td>
</tr>
<tr>
<td><strong>Net income from estate</strong></td>
</tr>
<tr>
<td>– interest received</td>
</tr>
<tr>
<td>– corporate income distributed</td>
</tr>
<tr>
<td>– land rental payments received</td>
</tr>
<tr>
<td>– income from estate due to owners of insurance policies</td>
</tr>
<tr>
<td><strong>less:</strong></td>
</tr>
<tr>
<td>– interest paid by the household sector</td>
</tr>
<tr>
<td>– land rental payments effected</td>
</tr>
<tr>
<td><strong>Pensions</strong></td>
</tr>
<tr>
<td>– paid from private pension plans</td>
</tr>
<tr>
<td>– public pensions and widow allowances</td>
</tr>
<tr>
<td>– public pensions paid by programs without creating pension plans</td>
</tr>
<tr>
<td><strong>Other social benefits</strong></td>
</tr>
<tr>
<td>– social security benefits</td>
</tr>
<tr>
<td>– local benefits and education stipendiums</td>
</tr>
<tr>
<td><strong>Gross profit and incomes equaled to it</strong></td>
</tr>
<tr>
<td>– presumptive rental income from living in one’s own house</td>
</tr>
<tr>
<td>– consumption of NPISH fixed assets</td>
</tr>
<tr>
<td><strong>Other net incomes</strong></td>
</tr>
<tr>
<td>– other current transfers</td>
</tr>
<tr>
<td>– insurance premiums not associated with life insurance</td>
</tr>
<tr>
<td>– social contributions conditionally due</td>
</tr>
</tbody>
</table>

---

Gross disposable income

*Balance of primary incomes*  
less:  
*Income and wealth taxes*  
– Income taxes  
– other taxes  
*Employers’ social security contributions*  
– employers’ contributions to the national insurance funds  
– employers’ other contributions on social security  
*Employees’ social security contributions*  
– employees’ contributions to the national insurance funds  
– employees’ other contributions on social security  
*Social security contributions paid by those working beyond the employment arrangements and idle individuals*  
*Other current transfers paid by the household sector*  
*Insurance premiums not associated with life insurance*  
*Social allowances paid by the households sector*

---

**Balance of primary incomes**

*Compensations of employees.* The informational basis of computation of salaries and wages is the database for computation of regional GVA and tax authorities’ information that enable one to assess the employers’ social security contributions.

The latter comprise three basic components: national insurance, pension contributions and other social security contributions. The components are assigned across regions according to the following data:

- receipts to the national security system;
- assessments of employment in the public sector resulting from a workforce survey;
- assessments of salaries and wages resulting from the computation of GDP.

*Gross mixed income* of enterprises that form a household component is assessed on the basis of an approach employed in the computation of the regional residency-based GVA, with slight corrections being introduced in the course of verification of the respective results against national values.

The housing rent is assessed on the basis of the cost of housing households own in each region.

*Interest received* is assessed for each individual region on the basis of the data of personal income survey the tax agency holds.
Dividends and withdrawals of capital invested in partnerships form the distributed corporate income. On the regional level this particular income item is assessed basing on investment income across regions and the partnerships’ regional incomes.

*Land rent* that accounts for just a meager part of the net income from estate is distributed across regions in proportion to the quantity of their population.

*Income from estate due to owners of insurance policies* is presently assessed using the compensation of employees indicator as a regional indicator, however, the selection of the most suitable assessment method has not been complete as yet.

The distribution across regions of each of the three categories of *pensions* presented in *table 3* is made basing on the tax authorities’ information.

The computation of the value of *other social benefits* on the subnational level requires the use of over 20 various indicators and data sources. More specifically, it implies the use of such data as the unemployment level, quantity of population, as well as the information from local administrations of the amount of allowances and stipends paid. As in many other cases, this requires the series equalization methods.

*Gross profit and incomes equaled to it.* The main component of this particular income category is presumptive income the owners of housing generate from “housing services” they receive. The assessment of the presumptive rental income generated by their living in their own houses is the product of multiplication of prices averaged by regions by the number of houses available.

*Other net income* is assessed basing on the ABI data and regional assessments of expenditures on insurances received from the Family Expenditure Survey, data provided by the Interior Ministry and Department of Transport, which are consequently distributed across regions in proportion to the number of population of local territorial units (NUTS 3).

*Gross Disposable Income*

Gross disposable income constitutes the balance of resources and their consumption in the household sector. *Income and wealth taxes* are computed basing on the data of given local tax authorities and agencies responsible for registration of means of transportation.
Employees’ contributions to the national insurance funds are distributed across regions on the basis of the data of a 1% sample of all the insurance records, with account of the population numbers. Employees’ other contributions to social insurance are assessed basing on the sectoral workforce surveys data. Social security contributions paid by those working beyond the employment arrangements and unemployed are distributed across regions basing on the data of mixed income that are received in the course of assessment of a regional GVA.

c) Individual consumption

Regional assessments of expenses on individual consumption complement the data on the gross disposable income of the household sector, and together they form a comprehensive set of current accounts of this particular sector. Regrettfully, differences in the level of the statistical error do not allow to fully draw comparisons between them in practice. Assessments of individual consumption in UK are designed by expenses categories with the use of the Classification of Individual Consumption by Purpose (COICOP). The structure of the Classification was defined in ESA and appears the basic one for all the EU members.

Let us briefly review data sources and methodology of the assessment of expenses on individual consumption.

Family Expenses Survey. Regional assessments by the main part of categories of expenses are computed on the basis of information received from FES. The latter is an annual selective survey the National Statistics Office holds across all the regions nationwide. The assessments of expenses are based upon households’ average weekly spending by regions, while the assessments of expenses per capita are used to receive an aggregate amount of expenses by each category by regions. To compensate for small values of the sample by regions, the FESs data are transformed into proportions of aggregate expenses nationwide and become subject to the three-year moving mean.

Other sources. Other categories of spending on individual consumption are assessed on the basis of FES either because the given survey does not duly take them into account, or because there exist more reliable data sources, such as:

- actual and presumptive housing rent, which is assessed using the regional GVA methodology;
- purchasing of means of transportation for all the regions, except for the Northern Ireland, is based upon registration of new automobiles, while the assessments on the Northern Ireland are drawn basing on the local statistical agency’s data, that is discounted by 10%, to take into account a lower price levels for means of transportation in this particular part of the country;
- expenses on gambling and totalizator are distributed across regions in proportion to the number of their population aged over 15;
- educational expenses are formed by payments to universities and schools. While the information on payments to universities is published, local authorities provide data on spending on schooling. Thus, this particular category of personal consumer expenses can be assessed directly for each individual region;
- Expenses on social protection comprise those designated to fund supporting services to the elderly, handicapped and other needy groups. As the expenditures on assistance to the elderly constitute the greatest component under this category, regional assessments of this expenditure category are computed in proportion to the number of population over 60 for each region.

Consumer spending generated in the UK by non-residents. Such an assessment is made individually. It is consequently added to the respective categories of residents’ spending, to have the aggregate amount of consumer spending in the country. The non-residents’ share in consumer spending made in the country’s territory accounts for some 3.5%. The main source of the assessment of the non-residents, including students, tourists, diplomats and military’s, consumer spending, are sample surveys, of which the biggest one is an international passenger survey.

NPISH consumer expenses. This particular type of consumer spending comprises two components: 1) the universities’ expenditures are published and can be directly attributed to these or those regions; 2) other kinds of NPISHs’ spending are assessed on the basis of the indicator of the number of employed in sectors 91.2 (Trade Unions Operations) and 91.3 (Other Public Associations’ Operations).

The UK residents’ spending overseas. This particular category of expenses accounts for some 2.5% of all the consumer spending by resident households in UK. As in the case of assessing non-residents’
spending, it is sample surveys, of which the major one is the in-ternational passenger survey, that likewise form sources of information.

d) The nature of the published data and assessment of accuracy of computations

The household sector regional accounts indicators are published in UK by ONS in its annual “Regional Trends” and periodically in “Eco-nomic Trends”. As well, they are available in a more detailed form on request.

The 2003 Regional Trends cite the latest assessments of both households’ incomes and spending as of 1999. Gross disposable income of the household sector is given by regions (NUTS 1) in the enlarged structure of incomes, including gross profit, gross mixed income, compensation of employees, net income from estate, other social benefits, and net other income.

A more detailed income structure over the noted period by sub-regions (NUTS 2) and local units (NUTS 3) was published in the May 2002 issue of Economic Trends.

Expenses on individual consumption over the period between 1997 and 1999 were also published by regions (NUTS 1) in the 2003 Regional Trends issue in two tables on aggregate areas of expenses.

The 1999 income and spending data published in 2003 are consid-ered preliminary. The tables of consumer spending contain aggregate spending by regions, including that by resident households and non-residents. The spending aggregate constitutes an indicator known as “Consumer Spending in UK” that is given in the aggregate breakdown by main areas of expenses.

In addition, the document provides the resident households’ ex-penses and those by NPISH, but exclusive of non-residents’ expenses. The aggregate of these expenses forms the “Aggregate Consumer Ex-penses”.

As in the case of other regional accounts, the accuracy of final as-sessments of households accounts indicators likewise appear dependent on the quality of the original data and methods of regionalization of national indicators. In addition, the accuracy of assessments of regional accounts of the household sector proves to be substantially lower than the national accounts data, and there is no full comparability between the income distribution accounts and indicators of expenses on individ-
ual consumption. This happens because, as it was already noted, there exist considerable differences between the level of accuracy of assessment by single components of these or those accounts.

2.1.4. Regional government accounts

a) General comments

The regional-level government accounts are presently experimentally designed in UK, and they have not been yet introduced to the standard set of regional accounts. The regional accounts of the government sector were first published in 2003\textsuperscript{25}.

In its recently published complete version\textsuperscript{26} the set of accounts of the sector includes six tables:
1. Gross value-added, intermediate consumption and output
2. Components of the gross adjusted disposable income
3. Gross fixed capital formation
4. The governmental investment grants
5. The primary income distribution account
6. The secondary income distribution account

In this list tables 5 and 6 represents the final form of the governmental regional accounts, while other tables complement and specify the contents of regional accounts. All the tables are built on the subregional level (NUTS 2), individually for the central government and local administrations. In addition, consolidated accounts were built that consolidate public administration agencies of all the tiers.

In UK, the central government consists of the following agencies:
- The UK Home civil service.
- The Northern Ireland civil service
- Independent committees appointed by the government (known as quangos).
- Armed forces.
- The National Health System (NHS) staff, except for those employed in NHS Trusts that are public corporations and as such fall within the sector for non-financial corporations.


The local administrations consist of:

- London borough administrations;
- Urban district administrations;
- English county administrations;
- English district administrations;
- Wales and Scotland territorial unity administrations;
- The police authority of England, Wales, and Scotland;
- The fire brigade authority of England, Wales, and Scotland;
- The Northern Ireland county councils;
- Other organizations in charge of garbage collection, public transport, etc.

Most organizations that form a component of the local authority fall under a single local territorial unit’s (NUTS 2) competence, while some other operate in more than one territorial unit. Because of this, while assessing indicators of regional accounts, the respective division is made in proportion to the number of employed by these organizations or, in some cases, in proportion of the number of the local populace.

b) **Gross value-added, intermediate consumption and output of the sector for public administration agencies on the regional and subregional levels.**

The British regional accounts assess the **output of the sector for public administration agencies** in the same manner as the national accounts do, i.e. basing on costs of production of services.

The composition of costs includes the following components:

- compensation of employees;
- taxes on production;
- fixed capital consumption;
- intermediate costs.

The first three elements form gross value-added. The assessment of regional and subregional indicators of the public administration agencies sector is made individually by each of the noted elements.

In most cases, assessments of output elements of local administrations can be made on the basis of data on their affiliated organizations, except for the cases when a regionalization of indicators on the basis of this or that indicator is made.
In most cases, regional and subregional assessments of output elements of the central government are computed by distributing indicators with the use of particular ones across territorial units.

The distinctive feature of these computations is that they are conducted with account of the budget expenditure structure and the classification of the civil service, as the structure of departments of the central government does not necessarily correspond to the structure of budget expenditure guidelines. Hence, coordination of the latter with the regional structure of output in a given sector by elements requires application of a fairly sophisticated computation procedure.

c) *The primary income distribution account of the sector for public administration agencies.*

The structure of the subregional primary income distribution account is given in *table 4.*

<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>Gross operating surplus</th>
<th>Taxes on products</th>
<th>Other taxes on production</th>
<th>Less subsidies paid</th>
<th>Interest received</th>
<th>Distributed income of corporations</th>
<th>Property income attributed to insurance policy holders</th>
<th>Rent</th>
<th>Resources, Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>The United Kingdom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>England</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUTS 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NUTS 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extra-regio territory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The rest of the world</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27 It is designed for the central government, local public administration agencies and the consolidated government in value and relative indices, in absolute and per capital equivalents.

Regionalization of national values of each type of receipts is conducted individually, with special research being undertaken with regard to some items, while the others are distributed with the use of indicators available, such as regional GVA, employment in the financial sphere, etc.

*Interest payments* by the central government to itself, and those by households to the central government are assigned across regions in proportion to the number of their local populace.

As concerns most *taxes* and VAT in particular, the government first produces assessments on the regional level. They are based on the sample household spending survey data and then are subject to distribution across subregional units (NUTS 2) with the use of the local government agencies' data.

The regional distribution of *subsidies* is made with then use of such regional indicators as the number of train departures, the number of employed (by the health care and educational sectors), the population number, etc.

For the purpose of regionalization of *distributed income of corporations* earned by the sector for public institutions one employs the data on the number of individuals employed in privatized companies and the number of populace.

*d) The account of secondary distribution of incomes of the government sector (Table 5)*
Table 5
The Regional Account of the Secondary Distribution of Incomes Earned
(Government Sector)

<table>
<thead>
<tr>
<th>RESOURCES (secondary distribution of incomes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance of primary incomes (gross)</td>
</tr>
<tr>
<td>The United Kingdom</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USES (secondary distribution of income)</th>
<th>GROSS DISPOSABLE INCOME</th>
<th>Redistribuition of income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social benefits other than social transfers in kind</td>
<td>Net non-life insurance premiums</td>
<td>Current transfers within general government</td>
</tr>
<tr>
<td>GROSS ADJUSTED DISPOSABLE INCOME</td>
<td>Social transfers in kind</td>
<td>GROSS ADJUSTED DISPOSABLE INCOME</td>
</tr>
<tr>
<td>The United Kingdom</td>
<td>England</td>
<td>NUTS 1</td>
</tr>
</tbody>
</table>
The major part of indicators of the regional and subregional level is computed by distributing national or regional values across territorial units.

The regionalization of personal income tax is made on the basis of the same methodology as the one used for completing households’ accounts. For the purpose of regionalization of corporate taxes one employed the amount of gross profit as the respective indicator. The windfall tax was assessed for sub-regions (NUTS 2) on the basis of the data of the turnover and number of individuals employed by the companies on which it was imposed.

To assess social insurance contributions and social benefits on the subregional level, one uses the methodology employed for designing regional accounts of the household sector. The indicator of insurance premiums (exclusive of life insurance) is distributed across sub-regions in proportion to the number of those employed in the insurance sector.

e) Assessment of accuracy of computations.

Proceeding from the analysis of methods and sources of information employed for designing regional and subregional accounts of the sector for public administration agencies, one can draw a conclusion that the trustworthiness of the computations is generally comparable to other elements of subregional accounts.

However, as the subregional assessment of most indicators that form the government output (especially in the part of the central government) is made by "top-down" means, in general the accuracy of the computations by the sector for public administration agencies, in our view, appears somewhat lower vis-à-vis other UK regional accounts.

### 2.2. Subnational accounts in Canada

Canada exemplifies a country to which assessing regional accounts indicators are particularly important, which can be explained both by its size and a considerable level of autonomy of its territorial elements.

Canada consists of 10 provinces and 3 territories, with the provinces maintaining considerable powers in the economic and political areas. That is why individual indicators of subnational accounts in the country were designed in parallel with computations of the national account indicators, and a separate program of designing the provinces and territories accounts’ was launched in 1981.
The first subnational accounts were those of revenues and expenditures and they comprised GDP components. From the very beginning they were based upon definitions and concepts of the national accounting system and replicated the structure of the accounts, albeit they were built on the basis of more limited informational resources, because a great part of statistical observation at the time failed to ensure data representation on the national level. Besides, the composition of the accounts in question lacks a fundamentally critical element – that is, interregional trade flows which were later included in the system of Canada’s subnational accounts.

The next series of subnational accounts that comprised the regions’ (provinces and territories) accounts and those of municipal entities was based upon the design of "Input-Output" tables for provinces and territories.

The design of the national input-output table in Canada has been underway annually from 1961 to date. The national input-output tables are developed in accordance with the 1968 UN National Accounting System recommendations and those of 1993 in a rectangular (product-industry) structure. In the Canadian National Accounts System, an important role is granted to the input-output table as an instrument of control over the quality of computation of the whole system of indicators. More specifically, it forms the basis of computation of GDP by revenues and expenditures on the whole and both in current and constant prices – in sectoral terms. As well, the noted tables are used to build structural analytical models of the national economy.

Tables of output, intermediate costs and final consumption without regard to interregional trade flows were designed in 1974, 1979, 1984 and 1990. Whereas the accounts were built upon rather an incomplete informational basis, their comparability with the national i-o table, as well as the comparability provinces’ individual accounts to each other was not duly secured.

The first experimental system of regional input-output tables based on the SNA methodology for all the provinces and territories was developed as of 1996, while its complete integration into the national ac-

---

counts took place a year later, upon implementation of the Project to Improve Provincial Economic Statistics (PIPES).

Hence, the building of the regional input-output tables plays a critical role in Canada’s regional accounting.

Canada’s regional economic accounts had a substantial impulse in their development in the mid-1990s, when the government set a task of ensuring a full integration of the national and regional statistics by three major SNA components on a regular annual basis. Those components were 1) revenues and expenditures; 2) regional GDP, and 3) Input-Output tables.

The main reason underlying the revision of the regional accounts system was the need for a substantial improvement of the informational provision of the whole system of interbudgetary relations. The regional accounts data on the volume of sales of goods and services and the respective taxes had to be employed for the sake of an optimal redistribution of revenues from the sales tax. As well, agreements on assignment of revenues to, and expenditures from budgets between the federal government and provincial ones likewise were to be based on the noted data.

A fundamentally new role assigned to regional accounts required a substantial enhancement of the quality and contents of economic information on the subnational level. That is why the noted PIPES was launched, whose principal mission was to ensure that the level of reliability of the provincial statistics and its comparability at the national level would match requirements put by the decision making in the interbudgetary relations system area.

To achieve this particular objective, the government revised numerous statistical observation programs conducted by the Statistics Canada and launched programs of new surveys. Another avenue of the work became ensuring the Agency’s access to a series of documents stored in administrative databases, such as the corporate tax data.

The main objective of the transformations in the frame of the PIPES program became to enhance the reliability of the statistical base on the whole and to equalize the quality and reliability of collected statistics between provinces and territories. Thanks to the integration of the Agency’s own statistical observations and departmental information, it
became possible to substantially improve both the comprehensiveness and reliability of the collected information at a relatively low cost.

To improve its statistical observations, the Agency has revised the structure of its business surveys and introduced the Unified Enterprise Survey (UES). By contrast to the earlier existing system of observations in the frame of which there had existed two types of respondents – that is, institutions and corporations or public administration bodies, with UES in place, the object of all observations became a unified statistical unit - an enterprise. Enterprises are divided into complex ones (about 10,000 of them) that consist of more than one legal entity and simple (a. 3 mln. of them) enterprises that represent a sole legal entity and consist of one or several institutions.

Surveys by these particular types of enterprises imply different approaches. As far as complex enterprises (that secure more than a half of the nation’s GDP) are concerned, the object of the statistical survey are their financial documents, including balance sheet, and the respective information is collected with account of their organizational structure, i.e. by single institutions with account of their geographical location.

To complement the above, the Agency conducts a sample survey by a number of indicators. The survey is based on a sample that comprises roughly as many as 22,000 enterprises that form a part of complex enterprises. These data is employed for assessment of input and output across industries and territorial units, interregional goods flows and other indicators.

Finally, the survey on simple enterprises is conducted on the basis of samples of different volumes, depending on a given sector. The data on simple enterprises are collected as fully as possible from administrative sources, while only when necessary, the survey itself serves as a complementary source.

The information collected from all the four sources (the administrative and the other three ones) is integrated by means of specially designed procedures.

To form a unified database for all the surveys in the country, the government has commissioned the Agency to create the Business Register that reflects the basic structure of the surveys. The Register comprises only those enterprises that have the employed workforce on their
payroll. The implementation of the Business Registration System by the Canada Customs and Revenue Agency (CCRA) enabled the government to integrate both registers in such a way, so that every enterprise would receive a uniform registration code. Presently the Canada Statistics Agency’s register comprises a. 2 mln. enterprises.

In parallel with the above, the country accomplished the transition from the 1980 Standard Industry Classification to the North-American Industry Classification System (NAICS).

Other innovations and modifications in the statistical accounting area introduced along with the Business Register comprise a more detailed description and coding of operational structures and large enterprises. That appeared particularly important, especially providing they operate in more than one territorial unit, as in this case there arises the problem of linking their output indicators to this or that province or territory.

In addition to the improvement of the current enterprise surveys, there also appeared new ones that became focused on collecting information local administrations’ (municipal entities and small settlements) expenditures, to fully account all the expenditures in all administrative-territorial units in the country.

Despite the fact that computations of all the indicators of Canada’s national accounts are based on the 1993 UN SNA methodology, it should be noted that the given methodology to a significant extent has failed to mirror the methodology of computation of these particular indicators on the subnational level as well as main subnational accounting concepts. Because of that, the Agency approved a number of methodological provisions that ensured a complete regional linking of all main indicators to regions. More specifically, this concerns the adoption of provisions on the Outside Canada territories that involve the national economic activity located overseas (embassies and military deployed overseas), regionalization of financial services, accounting operations by head offices of multi-regional corporations, regional linking of sea natural resources, the federal government expenditures, and multi-regional construction projects.
2.2.1. Composition of regional accounts

Regional accounts designed and published by the Statistics Canada constitute an integral part of the National Accounting System. In addition to regional and interregional Input-Output tables, the composition of the published provinces’ economic accounts also comprises revenues and expenditures of the government sector and incomes and spending of the household sector, as well as assessments of provincial GDPs.

The issue that publishes the provincial accounts designed by the Statistics Canada in the most complete form is the annual Provincial Economic Accounts\(^\text{30}\). It comprises the following tables highlighting the provinces’ performance indicators:

- GDP by income;
- GDP by expenditure;
- GDP price indices computed basing on price indices by kinds of expenditures;
- Government revenues and expenditures, including those of the consolidated government (the public agencies sector), federal government, provincial governments, and local administrations;
- There follows a series of tables that specify revenues to and expenditure guidelines of the given sector:
  - Revenues and expenditures of pension funds;
  - Direct taxes;
  - Indirect taxes;
  - Revenues from investment;
  - Transfers to households;
  - Government subsidies and capital transfers;
  - Intergovernmental transfers;
- sources and distribution of households' incomes;
- table of provinces’ main economic performance indicators.

In addition to the above accounts designed and published on the national level, statistical bodies and other departments, usually provincial finance ministries, annually and quarterly publish provinces’ economic accounts.

---

2.2.2. Computation of provinces and territories’ gross domestic product

In this section, we are going to consider main methods and sources of the data employed to assess provincial GDPs in terms of industry branches. Whereas an analysis of information sources and computation methods of all the indicators of the Canadian regional accounts system requires a great deal of space, we shall limit ourselves with consideration of GDP as an indicator that appears to be of a particular interest, as long as the computation of interbudgetary transfers in Russia is concerned.

In Canada, the computation of provincial GDPs is conducted at factor cost, i.e. without regard to taxes on production, products, and transportation extras. They form the basis of a consequent computation of the GDP indicator at market prices. In published tables taxes on production and produce, as a rule, are labeled together as “Indirect taxes”.

The computation of provincial GDPs by sectors in factor prices is conducted on the annual basis and published annually in the progressive total form as a separate issue. The data are published by 45 activities as per the NAICS structure, while the initial computation covers 228 ones.

An ideal method of computation of GDP is production approach, which allows computation of the GVA value, or, as it is frequently called in the Canadian statistical publications, “net output”, by deducting of the value of intermediate costs from the value of gross output. Thus, computing provincial GDPs by sectors necessitates information of intermediate consumption of goods and services, and the value of gross output.

Unfortunately, at present the comprehensive information of all the noted elements is not available on the provincial level. For instance, the data on intermediate consumption of services, as well as those on indirect taxes in sectoral terms appear fairly scarce on the noted level, which necessitates employment of indirect methods for their assessment.

Most industries, except for the mining sector, presently practically have failed to provide direct information of intermediary consumption. That is why, while computing gross output and its components across

---

provinces for most industries, one has to employ an assumption of proportionality of costs for services to the gross output value. It very seldom happens that information of indirect taxes and subsidies is supplied from the same sources as the data on gross output. That is why, while computing the provincial GDPs, the Agency, as a rule, does not use direct computations of the value of indirect taxes. Rather, it distributes them across provinces as a part of costs of services. If the proportion of indirect taxes in the GDP value of most provinces appear relatively small, this cannot be argued about subsidies. Besides, the subsidies are allocated sporadically, which requires a compulsory assessment of their value in the course of computation of GDP by production approach. The information of the federal government’s subsidies and those allocated by the provincial governments and local administrations is published in the respective reports of the said bodies of executive power and other related sources.

The control computation of GDP in current prices can be based upon an assessment of revenues that form GDP and, theoretically, the assessments computed by this particular means should coincide with results of computations made by production approach. In practice, the information based upon enterprise surveys cannot always be classified in the manner as if it were received on the basis of institution surveys. That is why to verify the computations, needs to compare their results with the sum of revenues of a given structure, rather than with the sum of primary revenues.

Whereas the information of the value of all the intermediate costs is available on the regional level only with respect to just a number of industries, it appears impossible to apply production approach for computation of the provincial GDPs in full. Rather, a number of indirect methods are used, which allow assessments for other industries. More specifically, a great volume of information on provinces cannot be used to compute GDP by sectors, as at this point the reporting unit is, for instance, a company’s head office, rather than institution.

There exist several methods of indirect assessment, whose sense lies with gross output and GDP of a given industry being distributed
across regions in proportion to one or several specifically selected indicators.

**Gross output approach.** It suggests the distribution of GDP across regions is proportional to the distribution of the provinces’ gross output. It is also suggested that the distribution of gross output across regions forms an approximation of the distribution of intermediate consumption and GDP of a given industry. In other words, this particular approach admits the existence of identical production functions with an invariable technology and structure of costs in a given year in all the regions of a country.

**Selected factor incomes approach.** This particular approach to distribution of the national value of gross output and GDP of an industry is based upon the use of a sole primary income or an aggregate of several ones (such as compensation of employees, corporations’ net profits and capital consumption (the fixed assets depreciation value)) as an indicator. Whereas these components of information, as a rule, are available on the regional level in sectoral terms, they are often used in the course of distribution of GDP assessments across regions. As a number of industries lack sufficient information of the depreciation value or net profits of non-corporate enterprises, due to their small significance in GDP assessments, in such cases one uses only the compensation of employees data.

**Other indirect assessment methods.** As long as a range of industries is concerned, there is no possibility to assess their output or GDP by using any of the above methods. This is true, for instance, for taxi services, the assessment of regional GDPs of which is conducted in proportion to the value of spending on individual consumption.

Usually the assessment of the provincial GDP by industries on the basis of the above methods becomes available with a two-year delay. It is believed this period allows processing of the necessary original data. Plus, the noted GDP assessments are also conducted for next two years and considered as preliminary (indicative). Computation of the indicative assessments implies the use of indirect assessment methods only. The distribution of the provincial GDPs across sectors by the assessment methods used is given in *tables 6* (for the period of final assessment) and 7 (for the indicative period).³³

---

³³ Provincial Gross Domestic Product by Industry, pp. 192, 236.
Table 6

Methods of Assessment of Regional GDP in Canada by Industries
(Reporting Period)

<table>
<thead>
<tr>
<th>Type of Approach</th>
<th>Sectors</th>
<th>Canada GDP, 1992</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>As CND mln.</td>
</tr>
<tr>
<td>Production (net output)</td>
<td>172</td>
<td>226 261</td>
</tr>
<tr>
<td>Gross output</td>
<td>20</td>
<td>159 789</td>
</tr>
<tr>
<td>Selected factor incomes</td>
<td>32</td>
<td>186 952</td>
</tr>
<tr>
<td>Other methods of indirect assessment</td>
<td>4</td>
<td>31 277</td>
</tr>
<tr>
<td>Total</td>
<td>228</td>
<td>604 279</td>
</tr>
</tbody>
</table>

Table 7

Methods of Assessment of Regional GDP in Canada by Industries
(Indicative Period)

<table>
<thead>
<tr>
<th>Method</th>
<th>Sectors</th>
<th>Canada GDP, 1992</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>As CND mln.</td>
</tr>
<tr>
<td>Gross output</td>
<td>179</td>
<td>301 129</td>
</tr>
<tr>
<td>Selected factor incomes</td>
<td>39</td>
<td>225 463</td>
</tr>
<tr>
<td>Other methods of indirect assessment</td>
<td>10</td>
<td>77 687</td>
</tr>
<tr>
<td>Total</td>
<td>228</td>
<td>604 279</td>
</tr>
</tbody>
</table>

2.2.3. Economic accounts of provinces

Canadian provinces design their economic accounts basing on indicators of the Canadian regional accounts system computed and published by Statistics Canada. The composition of the published provincial accounts does not display fundamental differences from the regional accounts developed on the federal level, however, in a number of cases they specify single kinds of ongoing operations or economic processes in a given province.

In Ontario, Canada’s biggest province, collections of basic economic accounts are published quarterly and annually\(^\text{34}\). The compilations comprise the following groups of tables by quarters of the ongoing year:

- GDP (of Ontario province), income-based;
- GDP, expenditure-based;

− Integrated account of distribution of the household sector’s incomes (the table is entitled “Sources and Disposition of Ontario Personal Income”);
− Ontario province trade (including exportation of goods and services broken into the international one, i.e. export, and inter-provincial, and importation of goods and services and the province’s trade balance);
− Implicit price indexes (GDP).

Other provinces publish roughly the same composition of economic accounts, while some of them (for instance, the British Columbia) develop additional tourism accounts, for tourism plays an important role in the national economy.

The task of designing regional accounts in all the provinces and territories is commissioned to statistical divisions of the government, which in most regions form a part of the finance ministry. It should be noted that information that falls under the public sector and published by provinces and territories’ finance ministries is developed on the basis of Public Accounts that differ from the National Accounting System by methodology and structure.

The methodology of computations conducted on the federal level and by provinces and territories is uniform. That is why the published indicators are fully compatible to indicators of regional accounts by structure and absolute values.

Thus, in Canada, development of regional (provincial and territorial) accounts implies a close collaboration between the federal Agency and regional statistical bodies, with information collected in the frame of the national statistical observation and particularly in the course of selective surveys being generalized and processed on the federal level. It is this particular information that serves as a main informational source for regional assessments. Such an arrangement secures the uniformity of methodology and comprehensiveness of assessments of the respective indicators. In particular, the computation of account indicators for Outside Canada can be made on the federal level only.

2.3. Evaluation of overseas experiences

The current level of regional accounting in the developed countries can be generally assessed as sufficiently high to address challenges
facing their economies. Regardless of different groups of countries and individual economies’ specifics, designing regional accounts forms a relatively new avenue of development of the National Accounting System. The main common challenge for the economies concerned is the absence of a sufficiently detailed regional account building methodology in the 1993 UN NAS, while it is worth noting some general peculiarities shared by the existing regional accounts systems that should be considered in the course of designing Russia’s regional accounting system.

1. While developing its regional accounts, each country either identifies and sets in the respective methodological provisions *regional accounting standards*, or it adopts the respective above-national standards. More specifically, coping with the task of designing their regional accounting systems, the EU countries adhere to the standards set by the ESA 95 and the Eurostat recommendations which are based upon this particular methodology. The methodological envelope of regional accounts is constantly amended and improved. Thus, after the ESA Manual (название сверить!) was published in 1996, over the next 5 years Eurostat consequently published a whole series of fairly detailed methodological recommendations by single avenues of regional accounting.

2. Important is the fact that all the national and international regional accounting systems are based upon strictly defined notions associated with economic territory, residency and classification of units of the regional economy.

3. Despite certain distinctions in approaches to assessments of indicators, the composition of regional accounts does not display substantial differences in different countries. As on the national level, underlying all the indicators of regional accounts is likewise the assessment of output, intermediate consumption, and the one of gross value-added by regions.

   In addition to *production account*, most countries develop, on the regional level, *accounts* (or their elements) of *the sector for households and the one for public institutions*. They As a rule also assess gross fixed capital formation by regions. This composition of regional accounts is recommended by ESA 95 and currently the work on its improvement is underway.
4. **Selection of methods** of computation of regional account indicators appears dependent largely on the existing traditions of statistical observations in a country and the presence of additional informational sources. While some countries (for instance, UK) practice computation of value-added by regions on the basis of distributional method, other (such as Canada, for example) rely on production method in this regard.

The specificity of computation of regional indicators lies in the fact that, first, because of the absence of information in a necessary form, it appears very complex to employ several methods to re-verify the respective results and, second, due to the same reasons, direct assessment of an indicator which is fully based upon any of the methods is impossible. In particular, in Canada, the assessment of regional GDP (GVA) is conducted by direct (production) method at less than 40%, while the rest is computed by means of indirect methods.

The latter often involve fairly sophisticated procedures based on distribution of national indicators across regions in proportion to some indicators. A fairly popular approach involves an extrapolation of the structure of the national output in this or that kind of activity onto the respective regional output.

The employment of indirect methods can introduce substantial distortions in assessments of regional structural indicators. But in most countries this particular approach is broadly used not only to assess scalar indicators, but also to design matrix structural models of regions, for instance, the input-output one. The extent to which the resulting assessments approximate to reality depends on applied procedures and quality and degree of specification of the original information contained in the national accounts.

5. An important characteristic of the noted regional accounting system is the *comprehensiveness of accounting* in regional indicators of current economic processes in regions. The aggregate of regional values of any indicator constitutes the value of the respective national indicator less the value attributed to an extra-regional territory. All the developed countries apply this rigid formula, which determines a broad use of indirect methods of assessment in the situation in which direct ones appear impossible due to informational or methodological reasons.
This forms a fundamental distinction between the Russian approaches to assessing regional indicators and those practiced by the most developed countries.

To meet the requirement of comprehensiveness of regional indicators, computations are made by a national statistical agency in cooperation with territorial (regional) statistical bodies, rather than by the latter only. This ensures, in particular, coordination in regard to regional and national macroeconomic aggregates in the course of computation of their complex.

6. Thus, while *regional accounts* form an integral part of the NAS, presently they have failed to completely meet the assessment accuracy criteria adopted on the national level. In all likelihood, such a situation will exist in the future, too, while the accuracy of assessments should be growing in parallel with the improvement of statistical observation systems and the progress of their adjustment to the regional accounting needs. However, because of the noted methodological reasons, it will not ever match the accuracy of assessments of the national-level indicators, and regional assessments will remain to a certain extent conditional. This necessitates designing individual groups of regional account standards in the SNA framework.
3. Avenues of development of the regional economic accounting system and improving computations of regional macroeconomic indicators in Russia

3.1. The contemporary state of design of macroeconomic indicators on the subnational level in the Russian Federation

In today’s Russia, a number of regional macroeconomic indicators are computed. Regular publications\(^{35}\) highlight on values of GRP, as well as aggregate regional values of gross fixed capital formation and actual final consumption of households in the territory of a given region.

By its economic content, the GRP indicator constitutes the regional analogue to the GDP indicator computed on the federal level by production method. GRP is defined as the aggregate of gross value-added that resident units of a given regional economy produce over a reported period.

The methodology of value-added computation on the regional level mainly coincides with the one used on the federal level. VA is found as the difference between the output of goods and services at basic prices and intermediate consumption.

There exists a substantial difference between GDP indicators (on the federal level) and GRP indicators (on the regional level). Some elements of Russia’s GDP currently cannot be computed on the regional level or distributed across Russian regions. That is why they are included in a computation only for Russia as a whole.

The aggregate GRP computed by all the RF regions differs from Russia’s GDP by the value of value-added generated by the following activities:
- non-market collective services the public institutions render to the society on the whole (defense and public administration services);
- other non-market services funded out of the federal budget, the information on which is unavailable on the regional level;
- financial intermediaries’ (banks in particular) services whose operations are rarely limited by a single region;

services provided by the foreign trade sector, the information of which in many cases is available on the federal level only.

Plus, GDP differs from GRP at market prices by the value of taxes imposed on export and import, as the aggregate value of the taxes is impossible to fully distribute across regions, due to the specificity of their accounting.

GRP is computed annually, quarterly and monthly.

From the methodological perspective, the computation of output, intermediate consumption and gross value-added is conducted following the same fundamental procedure as on the federal level. However, there also exist a number of specifics associated with its computation. The annual, quarterly and monthly calculations of GRP involve the following types of information:

- **direct information** that represent complete or partial data on the volume or dynamics of a computed indicator. For instance, form № P-1 entitled "Data on production and shipment of goods and services" contains the data on the volume and dynamics of output in a given sector. The information collected from the report should be computed up to the full circle, with account of small enterprises’ operations, households’ output, and the informal economy;

- **indirect information** that represent data of the volume or dynamics of a given indicator that does not account for a whole or a part of a computed indicator, but whose changes allow judgment of changes in the indicator in question. For example, a change in the number of individuals to whom a particular service was rendered constitutes indirect information for finding out dynamics of the volume of services in question.

In the absence of direct or indirect information, it can be possible to employ expert assessments of a possible change in the indicator that can be made proceeding from a tendency that have emerged over previous periods. Such assessments are based on a sample survey of views on such a change.

Gross value-added of a sector is computed as the difference between the volume of goods and services produced over the reported

\[ \text{Gross value-added} = \text{Volume of goods and services produced} - \text{Intermediate consumption} \]

\[ \text{Output} = \text{Gross value-added} + \text{Intermediate consumption} \]

\[ \text{GRP} = \text{Output} + \text{Households' output} + \text{Informal economy} \]

\[ \text{GDP} = \text{GRP} + \text{Taxes on exports and imports} \]

---


37 For instance, it is recommended to conduct surveys on corporate accountants regarding changes in costs of capital repair.
period (output) and the volume of goods and services consumed over
the same period in the process of production (intermediate consump-
tion)\textsuperscript{38}.

Assessment of the market output of goods and services can imply
two kinds of prices:

1) producer price – that is, the price producer receives for unit of
goods or services, inclusive of taxes on products due (except for VAT,
excise tax and the tax on import), exclusive of subsidies on products
and imports due.

2) basic price – the one the producer receives for unit of goods or
services, exclusive of any taxes on products due and inclusive of subsi-
dies on products (except import subsidies).

As the current accounting system does not allow singling out from
the composition of production costs a part of taxes on products that are
included in producer price, a conditional decision has been made to
consider these particular taxes to be other taxes on production (such
as, for instance, the road users tax, the housing and social and cultural
objects maintenance tax).

While computing the final output and GRP indicators by a given re-
gion’s economy, one has to make a transition towards consumption
(market) prices. This is made by adding to the sum of volumes of value-
added produced by the goods-producing sectors and market and non-
market services at basic prices the value of taxes on products and sub-
tracting subsidies on products. On the federal level, the final value is
added by the value of the tax on import, with the conditionally computed
volume of payments for financial intermediaries’ services being sub-
tracted from it. Because of the noted reasons, these adjustments have
not yet been made for GRP calculations.

\textit{Calculations of output} (annual and quarterly one) in most sectors
that deal with production of goods and provision of commercial services
are made on the basis of the following information sources:

\begin{itemize}
\item sectoral goods accounting forms;
\end{itemize}

\footnotesize\textsuperscript{38} Under the monthly assessment of GRP, because of the absence of detailed information
by most industries that allows finding of the volume of value-added in current prices, by
contrast to analogous annual and quarterly computations, the one of GRP is made
assuming a great number of expert estimates and indirect computations.
− form № 5-z "Data on costs of production and sales of products (goods, services);
− form № MP "Data on main indicators of a small enterprise’s financial and economic performance"
− form № 1-des "Data on a joint venture and foreign company’s operations".

The volume of output by sectors computed on the basis of the noted forms is subject to adjustment to the value of the latent and informal operations as per "The main methodological provisions of assessing latent and informal operations".

Since 1998 Goskomstat of Russia (since 2004 Rosstat) has monitored production in industries by means of state federal statistical monitoring form № P-1 "Data on production and shipment of goods and services", while quarterly and annual data of the Form needs to be compiled from specified monthly indicators.

In some sectors, industry-specific forms are used, such as, for instance form № 22 ZHKHK (housing) "Data on the availability and operations of the housing fund", form № 10-lkh "Account on fulfillment of the production plan by forestry", etc.

The output in current prices in the industries that provide non-market services is computed on the basis of the Federal Treasury bodies’ data on execution of the federal budget in a given region and data supplied by the regional financial agencies the local budget expenditures, and annual correlations between the volume of output of non-market services (including expenditures of extra-budgetary funds) and the overall volume of the federal and local budget expenditure by the respective directions in each region.

Intermediate consumption of commercial enterprises is computed on the basis of output by a complete circle of enterprises and the proportional weight intermediary consumption account for in the output of the respective industry, which is computed using the data of form 5-z "Data on costs of production and sales of products (goods, services)".

The intermediary consumption of goods should be assessed by purchase prices existing as of the moment of their consumption in the production process, rather than as of the moment of their purchase. But, as a rule, the indicator of intermediate consumption computed on the basis of the accounting data does not match this particular principle of
assessment. Finding its value right from the accounting data may lead to a substantial decrease in intermediate consumption and, accordingly to boosting profit by the value of change in the price for goods supplied for intermediate consumption from reserves, as the prices have changed during the time the goods were in stock, which is particularly true, so long as periods of high inflation are concerned. That is why the respective adjustment of the value of intermediate consumption (computed basing ion the accounting data) is made. The adjustment implies re-valuation of the material component of intermediate consumption with account of an average price change over the period of storage of production reserves.

The computation pattern of intermediate consumption is to some degree sector-specific. If there are no data needed to identify the proportional weight of intermediate consumption in output, the former is computed proceeding from the respective correlations that existed in the most recent available period.

Gross value-added by each sector at basic prices is computed as the difference between output at basic prices and intermediate consumption in these particular sectors.

It was argued above that one of main areas where the GRP indicator is used is its employment as a basis for computation of tax capacity. But the computation of this particular indicator suffers numerous drawbacks and raises a growing criticism along with suggestions to replace it with some other one. Consequently the question arises as to what exactly a macroeconomic indicator used to assess tax capacity in an indirect way should reflect – region’s revenues to be taxed or its economic capacity? Evidently, any method of assessment of tax capacity should be based upon indicators whose economic substance matches the method. The case of indirect method of assessment implies an aggregate characteristic of the level of economic activity in the region, i.e. the ability of its economy to produce goods and services. Thus, it is suggested that some macroeconomic indicator finds itself to be closely statistically correlated with an assessment of a true value of a given region’s tax base.

Gross regional product is a sum of values-added at market prices created in a region over a period of time. Gross value-added at basic prices (less net taxes on products) is an aggregate of factor revenues,
which in the case of a regional economy is created by its residents. The gross value-added created in the region is distributed between resident and non-resident units.

So, GRP does not and may not precisely reflect the total value of incomes the residents of the given region have received. Theoretically, such an indicator can be represented by a regional analogue to gross national income, i.e. gross regional income (GRI). This particular indicator accounts incomes, which have not been produced, but received by the residents (including those received from beyond the region’s borders, i.e. from non-residents).

The employment of an indicator that characterizes the value of incomes received by residents of a given region constitutes an attempt to exercise a direct assessment of the object of taxation, which, strictly speaking, does not meet the essence of the method in question. At this point, it is worth noting that the RGI indicator (according to the SNA methodology) fails to cover all the taxation objects. Plus, it should be remembered that the assessment of the GRI indicator for regions is presently practically impossible, because of the absence of the much-needed statistical data on inter-regional financial flows.

The only macroeconomic indicator that mirrors the region’s actual contribution to a national economy and, consequently, its economic capacity is the one of gross regional product (gross value-added) that has been created in the region over the reported period. So, the employment of this particular indicator in computations of the tax capacity index (TCI) appears in principle matching the essence of the applied method and should secure informational needs in the course of computations.

Parallel statistical analyses carried out by the Center for Fiscal Policy and the Institute for the Economy in Transition evidence the significance of the TCI method, albeit the value of statistical error remains considerable. Despite the fact that any indirect assessment apriori is an approximation, there remains a considerable reserve of increasing the accuracy of computations by improving the methodology of assessment of the TCI indicator.

On the subregional level, analogous macroeconomic indicators are computed. More specifically, according to the ESA 95 methodology, as

---

well as in Canada, main macroeconomic indicators are computed for fairly small territorial units of the noted level. For example, in UK, territorial units NUTS 3, for which regional GDP (value-added) is computed, in some cases are represented by municipal entities.

At this point, however, there may arise problems associated with computation of analogous indicators on the municipal level, providing the municipal entity is a part of the settlement. In this case, in particular, the difference between households’ incomes computed on the basis of residency and those computed on the basis of job location appears great, while the accuracy of such computations drops. Obviously, for such kinds of territorial entities the assessment of tax capacity would be far more accurate, should it be based upon some indicators that reflect the base of a main tax (group of taxes), rather than on macroeconomic indicators. This is true, for instance, for estate value and/or the population’s incomes.

While regional macroeconomic indicators in presence in Russia are designed according to the national accounting methodology, their set does not form a regional accounting system. This happens, first, because the existing indicators do not mirror a complete picture of inputs and outputs on the regional level, and, second, because they do not cover all the reproduction stages, as national accounts do. It should be noted that this speaks not as much of defects of indicators designed on the regional level, as of insufficiency of the indicators and absence of their integral system.

Clearly, neither informational capacity, nor methodological problems presently allow designing on the regional level a complete set of economic accounts which would be identical to the National Accounting System, as evidenced, in particular, by the EU experiences and regional accounting standards designed on the basis of ESA 95.

3.2. The existing informational resources for developing regional accounts

We believe the possibility for the development of the regional accounts system is determined by two factors:

− level of development of the national accounting system in a country and particularly the comprehensiveness and trustworthiness of its indicators, and
level of its informational provision.

Today Russia is developing, on a regular basis, a comprehensive set of consolidated national accounts. They are being built on the basis of the UN NAS. However, the development of national accounts by institutional sectors is far from completion in the country, as it is in most countries worldwide. There already exists a complete set of accounts by the Households and Public Institutions sectors, which enables the government to continue designing the respective regional accounts, for indicators of the national accounts constitute control values relative to the respective indicators of regional accounts.

In addition to the accounts of the institutional sectors, "Input-Output" tables pose a core problem, as long as the design of the Regional Accounting System (RAS) is concerned. The analysis of overseas experiences proves that the input-output table forms an important instrument for developing numerous indicators of regional accounts. Furthermore, in some integrated national and regional accounting systems, such as, for instance the Canadian one, the regional "Input-output" tables constitute a nucleus of regional accounting. Russia has conducted the assessment of the intersectoral balance according to the SNAs since 1995, but the level of aggregation of kind of activities (OKONKH industries) represented therein, as well as the number of kinds of usage of produces would hardly allow application of the assessments available to the building of regional accounts.

The main challenges Russia faces in the area of informational provision of the RAS development can be reduced to the following ones:

- first, an insufficient volume of information that characterizes production on the level of institutions does not allow a sufficiently reliable assessment of a number of regional indicators in terms of kinds of activities;
- second, due to the absence of reliable data, the assessment of inter-regional goods and financial flows poses a serious problem;
- third, a part of information needed for the building of regional accounts that some countries collect by means of selective (sample) surveys is absent or not detailed enough (this concerns, in particular, spending on individual consumption); plus, in a number of cases sample surveys held by the Rosstat do not appear representative on the regional level;
fourth, conducting additional computations on the unobserved output appears far more complex on the regional level and requires additional informational sources;

As abroad, one of the informational problems facing Russia’s regional accounts is likewise the problem of identification of multi-regional companies’ residency. The currently used computation methodology of the major regional macroeconomic indicator – that is, GRP is based upon the data on output contained in quarterly form № 5-z. Whereas this form of the federal state statistical monitoring (FSSM) is not intended to provide data on territorially separated units, an actual account of output at enterprises that has such units in several regions is conducted by their head division’s residency.

Data on territorially separated units form the content of annual FSSM form № 1-enterprise. In addition, both the head division and its individual units submit to statistical bodies form № P1 "Data on production and shipment of goods and services". So, the existing regular statistical accounting generally allows a division of output by regions, however, the data on intermediate consumption can be assessed only at the level of an enterprise as a whole, for there are no such data on territorially separated units.

The currently used computation methodology of gross value-added generated by this or that kind of activity by regions is based upon production method and appears linked to the existing regular statistical monitoring system. By contrast, most developed countries conduct the respective computation by distributional method, i.e. as an aggregate of primary incomes, or by several methods for the sake of accuracy of computations.

The transition to the GRP assessment by other methods requires not a mere modification of the informational base of computations, but a consequent introduction of the regional accounting system that allows the respective computations as well.

Finding a solution to the problem of comprehensiveness of the account of regional output and its elements in the part of both regionalized and conditionally regionalized activities appears a fairly complex issue. The building of a regional accounting system is possible, providing one singles out, with a due account of the ESA experiences, an ex-
tra-regio territory, i.e. the part of a country's economic territory which geographically cannot be attributed to any of its regions.

However all economic activity that does not fall within the extra-regio territory should somehow be divided between regions, otherwise an error that may arise in the course of building regional accounts can distort an actual picture of economic interactions. Thus, according to FSSS\textsuperscript{40}, in 2000, the proportion of GDP elements computed on the regional level by the economy on the whole accounted for 14\% of GDP, while relative to gross value-added distributed by regions, their share exceeded 16\%.

Even assuming the GRP regional structure in RF mirrors the regional structure of GDP, in the course of building regional accounts that would specify the composition of this particular indicator by single elements, one would find out that distortions would exceed an acceptable level. It should be noted that, in contrast to overseas practices, none of GDP elements computed in Russia by the economy on the whole is distributed across regions in proportion to gross value-added or output generated by other activities. Clearly, such a base of computation of output and its elements by regions may not be considered satisfactory, as long as the task of building a regional accounting system is concerned.

Improvement of the informational base for the building of the national system of regional accounting in Russia should take several avenues.

First, it necessitates an introduction of all the existing informational sources into the process of assessment of regional indicators, as well as expansion of an operative volume of departmental information exchanges, including tax, banking and other departmental statistics.

Second, it has become evident that the current sample statistical observations on the basis of a regionally justified sample need to be extended.

Third, due to particularities of individual regional economies' structures, it will be possible to create special kinds of regional statistical observations that would allow information of non-characteristic of the country as a whole activities by the regions where they appear mature.

To ensure the emergence of the regional accounting system would as an integral part of NAS, its design and assessment of its indicators should be held on the federal level and in a close co-operation with regional and local statistical bodies. Whereas the regional accounting assesses a considerable part of indicators or their elements by "bottom-

\textsuperscript{40} Natsionalnye scheta Rossii v 1994-2001 godakh, 2002, p. 160.
up” or “top-down” methods, but in conjunction with the respective na-
tional indicator, it is the federal level that should deal with building ag-
ggregate tables that contain final results.

To ensure a maximum full satisfaction of regional and local admini-
strations’ needs in analytical data, the assessed standard set of indica-
tors will allow computation of the regional and local levels of additional
indicators or accounts. This can take place, for instance, in the event
there arises the need to specify single kinds or areas of economic activ-
ity that would require development of additional tables or satellite (auxil-
iary) accounts. To exemplify the above, some countries practice devel-
opment of regional satellite tourism accounts.

3.3. The proposed structure of subnational economic
accounts: the matrix approach

Russia’s future regional accounting system should be developed in
an organic conjunction with the existing national accounts. As the RF
national accounting system is under a constant progress, its regional
component can develop likewise. Today, the mission is to bridge the
gap between the level of development of the whole national accounting
system and the quality of regional macroeconomic indicators. The mis-
sion demands a maximal prompt introduction into the statistical turn-
over of some starting set of regional accounts that already at the first
stage would ensure a sufficiently comprehensive picture of Russia’s
regions in the SNA terms and, at the same time, the comparability of the
accumulated information in time.

Considering overseas experiences and the above ideas, at the first
stage it can be suggested to design regional accounts of two types:
first, consolidated accounts (primarily production account) and some
accounts of the institutional sector traditionally designed at the regional
level. These accounts are usually built in the traditional T-form, with an
individual table containing data on resources and their consumption
being built for each account. Secondly, at the first stage, there can be
designed consolidated regional accounts in the matrix form, i.e. a ma-
trix that contains a complete set of accounts with balancing elements.

Recommendations on the matrix representation of national accounts along
with the traditional T-form presentation are included in the 1993 SNA standard
and ESA 1995⁴¹. Such a combination of different kinds of accounts allows a two-stage process of development of a regional accounting system.

*On the upper (national) level*, values of the basic macroeconomic aggregates for each region and extra-regio territory should be computed and approved on the basis of a national indicator and by a uniform methodology. These aggregates are:

1) output, intermediate consumption, gross value-added (gross regional product at basic prices), and its components;
2) gross fixed capital formation;
3) indicators of the households sector income accounts;
4) indicators of the public institutions income accounts.

The accounts of the household and public institutions sectors can be developed primarily for regions, as the national level has long seen such computations held on these particular sectors. As foreign experiences show, computations of indicators of single regional accounts of the institutional sectors are conducted by means of distribution of national values across regions. That is why the final balancing of regional and national values should be made in the centralized manner, by using the national indicator as a control amount.

The final part of the GRP computation for regions and extra-regio territory (distribution of elements accounted on the national level) should also be held on the national level.

Once assessed on the national level, indicators of the noted regional accounts can form control values for computations of more detailed regional indicators that are computed on the lower (regional) level.

It is the matrix form that can be recommended as the most convenient and accessible form of presentation of regional accounts of any degree of specification. Presently, the UN SNA and ESA 95 standards constitute a fairly well designed matrix form of presentation of national accounts. The method of integration of national accounts into a single matrix that comprises a complete sequence of accounts for a national economy and the Rest of the World allows introduction of specification of individual accounts (sub-accounts), as well as various extensions. More specifically, one of the most popular forms of such a presentation of national accounts is the Social Accounting Matrix (SAM), which model designed following the ESA 95 standards is given in *table 8*.

Table 8

Schematic Representation of SAM in ESA 95

<table>
<thead>
<tr>
<th>ACCOUNT</th>
<th>THE NATIONAL ECONOMY ON THE WHOLE</th>
<th>THE REST OF THE WORLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Goods and services (products)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0. Goods and services (products)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Production (industries)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II.1. Generation of income (primary input categories)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II.2. Secondary distribution of income (institutional sectors)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II.4. Use of disposable income (institutional sectors)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| I. Production (industries) | | |
| II.1.1. Generation of income (primary input categories) | | |
| II.1.2. Allocation of primary income (institutional sectors) | | |
| II.2. Secondary distribution of income (institutional sectors) | | |
| II.4. Use of disposable income (institutional sectors) | | |

<table>
<thead>
<tr>
<th>NET VALUE ADDED (basic prices)</th>
<th>GENERATED INCOME, NET (basic prices)</th>
<th>NATIONAL INCOME, NET</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjust to the change in net equity of households on pension funds reserves</td>
<td>Property income</td>
<td>Current transfers</td>
<td>Adjustment to the change in net equity of households on pension funds reserves</td>
</tr>
<tr>
<td>Exports of goods and services</td>
<td>Property income and taxes less subsidies on production (from the rest of the world)</td>
<td>Current transactions from the rest of the world</td>
<td>Adjustment to the change in net equity of households on pension funds reserves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NET VALUE ADDED (basic prices)</th>
<th>GENERATED INCOME, NET (basic prices)</th>
<th>NATIONAL INCOME, NET</th>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjust to the change in net equity of households on pension funds reserves</td>
<td>Property income</td>
<td>Current transfers</td>
<td>Adjustment to the change in net equity of households on pension funds reserves</td>
</tr>
<tr>
<td>Exports of goods and services</td>
<td>Property income and taxes less subsidies on production (from the rest of the world)</td>
<td>Current transactions from the rest of the world</td>
<td>Adjustment to the change in net equity of households on pension funds reserves</td>
</tr>
</tbody>
</table>
The uniqueness of the matrix presentation of national accounts is explained by the integration of traditional accounts and "Input-Output" tables. The matrix presentation contributes greatly to an increase in the analytical value of accounts and the possibility for using an accounting matrix to build static impact models.

That is why various versions of accounting matrix are broadly used, primarily, for the purpose of developing national and regional models of general economic equilibrium.
In its most general form such an accounting matrix on the national level is called the National Accounting Matrix (NAM)\textsuperscript{42}, while SAM forms its specialized, extended presentation. The difference between these two buildings lies, essentially, in the degree of specification of social indicators.

With the account of a long record of usage of SAM, presently many authors use the terms “national accounting” and ‘social accounting” as synonyms\textsuperscript{43}.

Nowadays, the SAM methodology has become most popular in the developing countries that use it primarily to build simplified variants of national accounts. SAM requires a relatively minor volume of information for its building. Furthermore, thanks to the possibility for a simultaneous balancing in an accounting matrix resources and their consumption by all the accounts, one can use very disperse masses of information to develop matrix accounts.

This is the situation one has to cope with while developing regional accounts. At this juncture, we believe the SAM methodology at this stage can be considered optimal for building regional accounts in Russia. The regional accounting system in its matrix form can be called Regional Accounting Matrix (RAM).

The respective RAM pattern is given in \textit{table 9}. In this particular presentation, the standard regional matrix has been slightly modified: the sequence of accounts in the structure of the institutional sectors was replaced by their accounts and conditional accounts (that were introduced for a greater specification of economic operations reflected in the matrix) as basic elements of the matrix. Such a presentation of matrix accounts appears the most widespread SAM development practice. In \textit{table 9}, the group of conditional elements is formed by factor costs (compensation of employees and incomes, capital, non-investment goods and services, and kinds of activities, while other conditional accounts, in principle, can be introduced, if needed.

In the course of the assessment of RAM indicators, macroeconomic aggregates and their elements play the role of pre-set control values under balancing of other regional indicators. This is particularly impor-


\textsuperscript{43} N. Stuttard, M. Frogner, 2003, p. 92.
tant in the conditions of an incomplete information, particularly in the part of relationship between elements of a regional economy and the rest of the world.

This paper deals solely with a fundamental pattern of building regional matrix accounts that requires a further specification and development of a number of provisions. In particular, the UN SNA Guidelines recommend that, while considering a region’s economy as an autonomous economic system, its external ties should be divided into intranational and international ones. Besides, a separate design of the financial account that is just noted in this particular presentation is needed.

### Table 9
Schematic Representation of the Regional Accounts Matrix (RAM)

<table>
<thead>
<tr>
<th>ACCOUNT</th>
<th>No</th>
<th>Goods and services (non-investment)</th>
<th>Compensation of employees</th>
<th>Income</th>
<th>Households</th>
<th>Enterprises</th>
<th>Public institutions</th>
<th>Social insurance</th>
<th>Capital</th>
<th>Activities</th>
<th>The rest of the world</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods and services (non-investment)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensation of employees</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>3</td>
<td></td>
<td>Compensation of employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table continues...
<table>
<thead>
<tr>
<th>TOTAL</th>
<th>The rest of the world</th>
<th>Activities</th>
<th>Capital</th>
<th>Social insurance</th>
<th>Public institutions</th>
<th>Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td></td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Import of non-investment goods and services</td>
<td>Output of non-investment goods and services for domestic consumption</td>
<td></td>
<td></td>
<td>Employers’ contributions to social insurance</td>
<td>Corporate profit tax / Incomes from estate</td>
<td>Enterprises’ undistributed profit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-export</td>
<td>Export</td>
<td>Balance of capital</td>
<td>Balance of current transfers</td>
<td>Balance of current transfers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 10

Experimental Assessment of RAM of the City of Sochi in 2000., as Rb. Mln.

<table>
<thead>
<tr>
<th>ACCOUNT</th>
<th>Goods and services</th>
<th>Compensation of employees</th>
<th>Profit</th>
<th>Households</th>
<th>Enterprises</th>
<th>Municipal administration</th>
<th>Taxes</th>
<th>Social insurance</th>
<th>Capital</th>
<th>Public subsidies</th>
<th>Activities</th>
<th>The rest of the world</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>№ 1</td>
<td>№ 2</td>
<td>№ 3</td>
<td>№ 4</td>
<td>№ 5</td>
<td>№ 6</td>
<td>№ 7</td>
<td>№ 8</td>
<td>№ 9</td>
<td>№ 10</td>
<td>№ 11</td>
<td>№ 12</td>
<td></td>
</tr>
<tr>
<td>Goods and services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compensation of employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enterprises</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipal administration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social insurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public subsidies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The rest of the world</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TO-TOTAL</td>
<td>12</td>
<td>7 144.77</td>
<td>103.90</td>
<td>2.27</td>
<td>2 080.30</td>
<td>-2 238.71</td>
<td>1 091.19</td>
<td>903.32</td>
<td>5 947.56</td>
<td>418.38</td>
<td>8 917.44</td>
<td>15 721.79</td>
<td>7 731.90</td>
</tr>
</tbody>
</table>

75
To exemplify the above, let us consider the regional accounting matrix for the city of Sochi, which, according to indicators of its economy and other characteristics can be viewed as a sub-region (the region of the second order). The matrix is assessed in the experimental order and it is designated just for demonstration purposes.

The RAM capacity available for assessing indicators of regional consolidated accounts in their traditional form is presented in tables 11–17 (mln. Rb, year 2000).

The tables of accounts contain references to cells of the RAM (table 10) in the [number of line*number of column] format.

**Table 11**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Intermediate consumption (11.11 + 12.11)</td>
<td>12 604.73 26 033.48 1. Output at basic prices (total lines 11 less net taxes on products)</td>
</tr>
<tr>
<td>6. Final consumption expenditure (total lines 1)</td>
<td>7 731.90 7 740.58 2. Import of goods and services (12.1 + 12.9 + 12.11)</td>
</tr>
<tr>
<td>7. Gross fixed capital formation (total column 9)</td>
<td>5 947.56 1 766.58 3. Taxes on products</td>
</tr>
<tr>
<td>8. Exports of goods and services (11.12)</td>
<td>8 917.44 339.02 4. Subsidies on products</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>35 201.62</strong></td>
</tr>
</tbody>
</table>

**Table 12**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Intermediate consumption</td>
<td>12 604.73 26 033.48 1. Output at basic prices</td>
</tr>
<tr>
<td>5. Gross regional product (GRP) at market prices</td>
<td>14 856.31 1 766.58 2. Taxes on products</td>
</tr>
<tr>
<td></td>
<td>3 339.02 3. Subsidies on products (–)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>27 461.04</strong></td>
</tr>
</tbody>
</table>

TOTAL
### Table 13

**Generation of income account (2000, Rb. mln.)**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Compensation of employees (2.11)</td>
<td>6 186.14</td>
</tr>
<tr>
<td>3. Taxes on products and production (7.1 + 7.9 + 7.11)</td>
<td>2 498.68</td>
</tr>
<tr>
<td>4. Subsidies on products and production (11.10)</td>
<td>418.38</td>
</tr>
<tr>
<td>5. <strong>Operating surplus</strong> (3.11 + 9.11)</td>
<td>6 589.87</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>14 856.31</td>
</tr>
</tbody>
</table>

### Table 14

**Allocation of primary income account (2000, Rb. mln.)**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Subsidies on products and production</td>
<td>418.38</td>
</tr>
<tr>
<td>6. <strong>Gross regional income</strong></td>
<td>1 4856.31</td>
</tr>
<tr>
<td></td>
<td>2498.68</td>
</tr>
<tr>
<td></td>
<td>0.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>15 274.69</td>
</tr>
</tbody>
</table>

### Table 15

**Secondary distribution of income account (2000, Rb. mln.)**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. <strong>Gross disposable regional income</strong></td>
<td>14 006.46</td>
</tr>
<tr>
<td></td>
<td>−849.85</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>14 006.46</td>
</tr>
</tbody>
</table>
### Table 16

**Use of disposable income account (2000, Rb. mln.)**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Final consumption expenditure</td>
<td>7,731.90 14,006.46</td>
</tr>
<tr>
<td>3. <strong>Gross savings</strong></td>
<td><strong>6,274.56</strong></td>
</tr>
</tbody>
</table>

**TOTAL** 14,006.46 14,006.46 **TOTAL**

### Table 17

**Capital and Financial Account (2000, Rb. mln.)**

<table>
<thead>
<tr>
<th>Uses</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Gross fixed capital formation (total column 9)</td>
<td>5,947.56 6,274.56</td>
</tr>
<tr>
<td><strong>4. Net lending</strong>/net borrowing (-)</td>
<td><strong>327.00</strong> 0.00</td>
</tr>
</tbody>
</table>

**TOTAL** 6,274.56 6,274.56 **TOTAL**

The rows of the regional accounting matrix (*tables 9 and 10*) display revenues to each account, while elements of its columns highlight on its expenditures. Thus, all the records of resources and their consumption are reflected therein. Thanks to such a method of registration of economic operations, it becomes possible to ensure the compatibility between the RAM and the national accounting system. Plus, there arises a possibility for transforming regional accounts from one form into another.

Another advantage of the suggested approach to developing regional accounts lies in the possibility, at the initial stage, for receiving coordinated assessments of regions’ macroeconomic aggregates on the federal level and their further use for developing more detailed accounts by regions concerned, while the sectoral structure of output can be specified over time, in parallel with the expansion of the composition of the indicators assessed on the federal level.
In the aggregated RAM pattern (table 9) all the totals, except for the account of the Rest of the World, and all the elements of columns №№ 2 (Compensation of employees), 3 (Income), 4 (Households), 6 (Public Institutions), 8 (Capital) and 9 (Activities) should be assessed in the centralized way. Thus, the aggregated matrix can be built on the regional level with the help of the available regional information, expert assessments and, partly, (with regard to the Rest of the World) the balance method.

If needed, and providing there is information available, the Activities account can be extended following the "Input-Output" table pattern, while the regional account matrix can be transformed into SAM by specifying the structure of the household sector’s incomes and spending and by introducing a segmentation of this particular sector by this or that parameter.

### 3.4. Avenues of improving computation of subnational macroeconomic indicators

The published official methodology of GRP\textsuperscript{44} computation is considered in Section 2 of the present paper. Assessments of the regional output and gross regional product made according to the Rosstat methodology do not consider output and gross value-added of some activities (financial mediation, for instance), the value of non-market collective services, and a number of other elements whose computation can be conducted only in the centralized way. The existing computation methodology dictates the impossibility of a more comprehensive assessment of the GRP value. Hence, the main problems to be solved to improve the quality of the GRP assessments are:

- first, the comprehensiveness of distribution of output across regions, and
- second, realization of the principle of regional residency.

These problems appear interlaced, for gross value-added generated by economic activities that are hardly attributable to a certain region remains undistributed. The whole federal part of the output in the sector

\textsuperscript{44} Metodologicheskiye polozheniya po statistike. Vyp. 2/Goskomstat Rossii.-M., 1998, p. 131-38.
for public institutions, the one of the sector for financial corporations, and foreign trade likewise appear undistributed.

Another aspect of the same problem is uncertainty of the extra-regio part of the country's economic territory, which compels one to understand which activities should fall under the extra-regio territory, and why, and necessitates a separate conduct of GRP assessments for regions and assessments of the value of GDP that falls under the extra-regio territory.

Foreign experiences provide evidence that an extra-regio territory can comprise a complete or incomplete set of elements recommended by the SNA and/or ESA. In particular, in the UK and the Northern Ireland's national accounts attribute activity carried out in the sea shelf to the extra-regio territory, while in the US and Canada the situation is opposite in this respect.

With account of informational and organizational complexities that may impede Russia's transition to the formula "GDP = GRP + GDP of the extra-regio territory", the transitional stage allows an intermediate decision under which a conditional federal sector of the economy is kept for some time instead of an extra-regio territory. Obviously, it should comprise not only extra-regio units' operations, but only some non-market collective services as well, the distribution of which across regions presently appears impossible, due to objective reasons. It can be envisaged that in this case the non-distributed across regions part of GDP should not exceed 4–5%.

All the output that has a regional attribution, i.e. the one generated in the geographical territory of a country should ultimately be included in GRP.

Today, the territorial bodies of the state statistical agency conduct GRP computations by a wide array of activities at market prices by direct (production) method. Since the regular statistical monitoring has failed to cover all economic agents, the territorial bodies conduct complementary computations up to the full array of enterprises and organizations.

The main sources of information for regional output computations is the monthly Form P-1 "Data on production and shipment of goods and services" and specialized sectoral forms, while quarterly form 5-z "Data
on costs of production and sales of products" serves as an information source for computing intermediate consumption.

All the legal entities are bound to submit form 5-z, and it comprises the data on a legal entity on the whole, i.e. including its subsidiaries and structural subdivisions, regardless of their actual location.

Rosstat currently works on a transition to the accounting of output by institutions. Since 2003, as per the order of a territorial unit of Rosstat, forms P-1, P-2, P-3 and P-4 should be complemented by information of territorially separated units of a given legal entity that carry out operations in the territory of the same Subject of RF, regardless of their holding or not holding an independent balance sheet. This improvement should enable the Rosstat to accomplish the transition towards accounting by units, which will undoubtedly enhance the accuracy of the regional attribution of information. Thus, basing already on the 2003 results, it became possible to adjust the output by regions and municipal entities, following the requirement to identify residency of all the reporting enterprises.

The computation of intermediate consumption for some time can be made on the basis of form 5-z, though this particular monitoring instrument has failed to cover the small enterprises sector. To account the output and intermediate costs of the enterprises and organizations not included in this observation, one needs to hold sample surveys. More specifically, the accounting has failed to comprehensively cover output and intermediate consumption of a broad array of small enterprises dealing with trade, public catering, passenger transportation, accommodation and other activities, largely those that create services. But in most regions, and especially sub-regional entities, this output accounts for a considerable share of the local economy. In addition, the lower degree of the administrative-territorial unit is, the greater (because of the absence of accurate assessments of output in a given sphere) the biases of assessments of the respective indicators of spending on consumption and, ultimately, the whole system of regional indicators are.

The main methodological problems with regard to assessing regional output arise in the area of financial mediation and services rendered by federal public institutions.

It should be noted that in Russia, the assessment of output of FISIM by the SNA methodology finds itself on the nascent stage even on the
More specifically, the Russian practice of application of the criterion of residency to credit institutions does not fully match the SNA standards. There also are discrepancies in financial institutions’ (the main sources of FISIM) accounting methods, while the statistical accounting so far has failed to cover all the units and information on some operations is lacked.

But at this stage one can conduct assessments of regional output of financial mediation services by the "top-down" method, for instance, on the basis of the data of compensations paid to those employed in the financial sector.

Despite the existence of unresolved problems associated with output assessment and informational provision (caused in part by drawbacks of the existing classification of the state budget items)\(^{46}\), the accounts of the sector for public institutions are published regularly in Russia.

Consequently, there are no fundamental obstacles to a transition to the procedures of distribution, basing on indirect methods, of values of national variables across regions. This necessitates elimination of the inconsistency between the composition of the sector in question and the one recommended by the SNA standards. More specifically, in Russia, a part of extra-budgetary funds do not form a part of the public institutions sector, while they should to. According to the SNA requirements, *Vnesheconombank* (the state bank for official international settlements) should also fall under this sector, rather than that for financial institutions\(^{47}\).

But, as long as the part of Russia’s GDP not accounted in GRP is concerned, because of a variety of reasons, its distribution in the present form across regions appears impossible.

First, this is explained by certain differences between the computation methodology of GDP by production method and that of GRP. Thus,\(^{48}\)

---

\(^{45}\) *Metodologicheskiye polozheniya po ischisleniyu vypuska uslug finansovyh posrednikov i raspredeleniyu po polzovatelyam kosveennogo izmeryaemykh uslug finansovogo posrednichestva.*- Goskomstat, 2002.

\(^{46}\) See: *Metodologicheskiye rekomendatsii po strouyeniya schetov tekuschikh operatsiy i operatsiy s kapitalom diya sectora gosudarstvennykh uchrezhdений.*- Goskomstat, 2002.

on the national level, in addition to a broader sectoral coverage, there exists the adjustment of intermediate consumption by the value of payments for research, insurance, capital refurbishment and holding profit services. Such and adjustment is not made in the course of computation of GRP, as there is no respective informational base by the Federal Subjects of RF.

Second, while output and value – added by the sector "Health care, physical culture and social security" are computed, the national–level accounting covers the funds allocated to implement targeted programs and procurement of equipment, as well as resources the Fund of Compulsory Medical Insurance allocates to finance federal programs and services of non-profit institutions serving households (NPISHs). The regional-level accounting equally fails to accounts these elements of output.

So, the output and intermediary consumption assessments on the national level do not appear fully comparable to those on the regional level. To secure their structural comparability, one needs to conduct coordinated computations of output and intermediary consumption on the national level and the respective regional indicators, as it is made in the developed countries. For instance, the distribution of the value of collective services should be made on the stage of assessment of regional outputs, rather than on the stage of assessment of gross value-added.

Should one try a mechanical distribution of the difference between GDP and GRP (with the use of some indicators), this may result in yet more serious distortions in regional assessments.

Tables 18 and 19 provide, accordingly, the composition of the undistributed part of the national output and the one of the undistributed part of GDP in Russia over a number of years.

The data of the above tables designed by Rosstat provide an evidence that the proportion of value-added in the undistributed across regions part of the national output falls from 67% in 1999 to 52% in 2001. As concerns the item "Other undistributed elements", the respective share in GDP in 1999 was 47.3%, while in 2001– 1.7%. This speaks, particularly, of differences between the assessed structures of output and, accordingly, the structures of gross value-added on the national and regional levels.
### Table 18: Difference between the Output Across Russia and the Sum of Outputs of Subjects of the Russian Federation, as Rb. Mln. 48

<table>
<thead>
<tr>
<th>№</th>
<th>Kind of activity</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Elements of output computed on the federal level by the economy as a whole</td>
<td>1 012 317.1</td>
<td>1 923 176.1</td>
<td>2 324 302.1</td>
</tr>
<tr>
<td>2</td>
<td>Of which:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Trade and commercial operations on sales of goods and services</td>
<td>413 983.7</td>
<td>623 390.4</td>
<td>671 894.0</td>
</tr>
<tr>
<td>4</td>
<td>Health care, physical culture and social insurance</td>
<td>10 933.9</td>
<td>7 861.1</td>
<td>22 313.4</td>
</tr>
<tr>
<td>5</td>
<td>Administration</td>
<td>179 049.2</td>
<td>373 230.0</td>
<td>482 950.5</td>
</tr>
<tr>
<td>6</td>
<td>Taxes on products</td>
<td>120 434.2</td>
<td>302 587.3</td>
<td>420 692.9</td>
</tr>
<tr>
<td>7</td>
<td>Subsidies on products</td>
<td>4 073.8</td>
<td>7 259.5</td>
<td>10 769.3</td>
</tr>
<tr>
<td>8</td>
<td>Other undistributed elements</td>
<td>291 989.9</td>
<td>623 366.8</td>
<td>737 220.6</td>
</tr>
</tbody>
</table>

The share of net taxes on products ((6-7)/1):  11.5%   15.4%   17.6%

The difference is particularly great, as long as the item "Trade and commercial activity on sales of goods and services" is concerned. This can be explained by the conduct of additional computations with regard to revenues from foreign trade on the federal level. These computations were based upon the goods flows method, and they were made while developing the "Input-Output" tables.

Numerous overseas evidences prove that the computation of regional GDPs (GRPs), as a rule, is made at basic prices, i.e. less net taxes on products. The data of tables 18 and 19 show that net taxes on products (mostly export and import taxes), whose distribution across regions is extremely complicated, account for a considerable part of the undistributed GDP. So, it would be appropriate to make a transition to GRP computations at basic prices.

---

48 According to the FSSS of Russia.
### Table 19
**Difference between GDP Across Russia and the Sum of GRPs of Subjects of the Russian Federation, as Rb. Mn.**

<table>
<thead>
<tr>
<th>№</th>
<th>Kind of activity</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Elements of output computed on the federal level by the economy as a whole</td>
<td>673 943.9</td>
<td>1 086 392.5</td>
<td>1 202 201.1</td>
</tr>
<tr>
<td>2</td>
<td>Of which:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Trade and commercial operations on sales of goods and services</td>
<td>349 723.7</td>
<td>536 582.1</td>
<td>577 392.4</td>
</tr>
<tr>
<td>4</td>
<td>Health care, physical culture and social insurance</td>
<td>3 042.2</td>
<td>3 898.0</td>
<td>10 552.8</td>
</tr>
<tr>
<td>5</td>
<td>Administration</td>
<td>66 595.8</td>
<td>143 502.2</td>
<td>192 152.1</td>
</tr>
<tr>
<td>6</td>
<td><em>Taxes on products</em></td>
<td>120 434.2</td>
<td>302 587.3</td>
<td>420 692.9</td>
</tr>
<tr>
<td>7</td>
<td><em>Subsidies on products</em></td>
<td>4 073.8</td>
<td>7 259.5</td>
<td>10 769.3</td>
</tr>
<tr>
<td>8</td>
<td>Other undistributed elements</td>
<td>138 221.8</td>
<td>107 082.4</td>
<td>12 180.2</td>
</tr>
<tr>
<td>9</td>
<td><em>The share of net taxes on products</em>⇔(6-7)/1:*</td>
<td>17.3%</td>
<td>27.2%</td>
<td>34.1%</td>
</tr>
</tbody>
</table>

It is also necessary to consider the existing informational problems. The data on the output of the RF public institutions located overseas, which are needed for finding an extra-regio part of the nation’s GDP are unavailable. Plus, a part of information in territorial terms, which is needed for distributing non-market collective services across regions, appears classified in this country.

To improve the GRP computation, one needs to:

1) ensure a centralized assessment of regions’ output, intermediate consumption and gross value added with account of adjusting computations conducted on the federal level, thus linking regional-level indicators to the federal-level ones;

2) improve and extend statistical monitoring by those activities for which an assessing of output and its value structure on the regional level poses no methodological problem and allows their more accurate regional attribution;
3) introduce procedures of distribution of national values of output and gross value–added across regions for those activities for which regional assessments appear impossible or seriously complicated from the methodological perspective;
4) identify the composition of output of the RF extra-regio territory.

In conclusion, it is once again worth noting that there exists a certain difference in methods and accuracy of assessments between the national accounting indicators and regional ones. The difference is not determined solely by informational reasons that can be overcome, if needed, but methodological ones as well. The latter can be attributed to the fact that economic performance by a number of activities cannot be directly measured on the regional level. So, by contrast with national accounts, assessments of the regional accounting indicators will always result from a certain compromise between the need in a comprehensive picture of economic processes in the regions and requirements to have their accurate and trustworthy assessments. Evidently the present stage of development of statistics in Russia makes it possible to reach a sound compromise between these requirements.
Conclusion

The present paper constitutes an attempt to evaluate experiences in the area of designing subnational (regional and subregional) economic accounts to date and to consider ways of introduction them to Russia. The paper has evaluated the existing international standards of regional economic accounting and the UK and Canada’s experiences in this area. With account of the above, and basing on the analysis of Russia’s present capacity, the paper suggests an approach to development of regional economic accounting in the country.

The research allows a number of conclusions:

First, international experiences in the subnational accounting area provide an evidence of developed countries seeing an intensification of a trend to creation of full-fledged regional accounting systems that are based upon national and international standards. Thanks to the efforts the most progressive nations undertook chiefly over the past 25–30 years, it has become possible for a number of them to accomplish a transition to creation of statistical measurement systems on the regional level that appeared fully compatible to the national accounting systems.

Systematic development of regional accounts has paved the way to building a new generation of regional mathematical and statistical models analogous to those existing on the national level. This has drastically improved the quality of regional economic analysis and substantially enhanced the quality of decision making in the public administration and economic management areas, and justification of approved regional development programs.

But it should be remembered that due to a number of methodological reasons, while forming an integral part of the national accounting system, regional accounts do not fully meet the assessment accuracy criteria adopted on the national level.

Second, in the Russian Federation, both the federal and regional agencies constantly experience a growing demand for regional accounting indicators, but a great number of informational problems, a series of yet unsolved methodological complexities and the absence of uniform standards impede the country’s transition towards a regular development of regional accounting. Presently computed regional
macroeconomic indicators appear insufficiently comparable to their national analogues and do not create a uniform system as yet.

Third, to ensure the most adequate and accessible form of presentation of regional accounting of any level of specification, the present paper suggests the matrix form that has already been quite well designed in the UN SNA and ESA 95 standards. The integration of economic accounts into a single matrix that thus comprises a full sequence of accounts for a national economy and the Rest of the World allows introduction of a specification for, as well as various extensions to individual accounts (sub-accounts).

The application of this particular approach on the first stage of development of the regional accounting is determined by the fact that this methodology requires a relatively small volume of data. Thanks to the possibility for balancing in the accounting matrix resources and consumption simultaneously by all the accounts, it becomes possible for a matrix accounts compiler to attract very disperse masses of information. Besides, in a matrix presentation, the analytical value of accounts grows considerably, and there arises a possibility for using the accounting matrix to build static impact models. That is why a great variety of matrix accounts are applied for the sake of developing national and regional general economic equilibrium models.

On the basis of results of development of the experimental matrix accounting for Kaliningrad Oblast and the city of Sochi, the authors argue that there is a fundamental possibility for a transition to developing such accounts for Russian regions.

Fourth, the transition to the practice of building regional accounting and a regular computing of regional macroeconomic indicators in Russia necessitates development and adoption of the respective national standards, including definitions of such categories as regional economic territory, regional residency, etc. As well, it is necessary to extend the use of sample surveys, which would allow a greater coverage with statistical monitoring of such objects as small- and medium-sized enterprises, households, etc., and the creation of currently practically missing databases (for instance, the one of inter-regional goods flows).

Fifth, examples of development and use of subnational matrix models in the regional analysis given in the paper (see Supplement) allow a conclusion about a great analytical value of subnational accounts. Even
the experimental models to a significant extent built on indirect assessments for Kaliningrad Oblast (the regional level) and the city of Sochi (the sub-regional level) displayed a great sensitivity and ensured conceptual output. More specifically, particularly interesting are relative assessments of the role individual industries play in the regional economy, the effect of changes in gross output and final consumption on the regional economy, and macroeconomic assessments of the share of the shadow economy.

Together with a few others, the present research pioneers the area of a systemic evaluation of regional accounting in regard to Russia.
Supplement
Examples of using subnational economic accounts for the purpose of regional analysis in Russia

E1. Assessment of structural effects on the Kaliningrad Oblast economy

Measuring effects from economic influences on a regional economy plays a core role in the modern economic analysis. Today, this particular mission, as a rule, involves the application of Regional Computable General Equilibrium Models (Regional CGE Models) that constitute the combination of matrix and econometric models. Underlying such a model usually is the financial flows (social accounting) matrix (SAM). Regional CGEs allow, in certain conditions, conducting prognostic computations, which appears especially important for the operative and strategic planning purposes. Such models are used fairly widely, for instance, in the US, for the purpose of assessing effectiveness of various regional targeted programs.

To produce assessments of static influences, as a rule, only matrix models, such as an input-output table and SAM would suffice.

The informational provision of development of regional inter-sectoral models is directly dependent on the level of maturity of the regional statistics on the whole and the quality and comprehensiveness of existing regional economic accounts in particular. This concerns primarily production account both for the region on the whole and sectors of its economy. With the comprehensive information by institutional sectors on hand, it is basically possible to build an input-output table, while developing a SAM necessitates having information on other regional accounts as well and, particularly, on income generation, distribution and consumption accounts.

Another fundamentally important aspect of the informational provision concerns the assessment of inter-sectoral (inter-product) flows. The input-output table is based upon the matrix of direct costs, the information of which is obtained by means of costly sample surveys of

---

enterprises and organizations, with the respective indicators being subject to annual adjustment in the interim between the surveys.

It is understood that because of high costs of such surveys, it is impossible to conduct them in every region. That is why the building of regional matrix models is usually based upon coefficients of direct costs borrowed from the national input-output tables.

Once a model is built, there appears the possibility for conduct of the analysis by a series of scenarios that comprise an assessment of influence exerted by a given operating industry, an assessment of the influence of a single operating enterprise, as well as an assessment of effects from development of new activities or from the opening of a new enterprise.

For example, in the US, such a database is called the Regional Input-Output System (RIMS II), which is developed by the US Bureau of Economic Analysis, in the 1970s. This system allows computation of two types of multipliers of impact on gross output – that is, final demand and revenues, as well as two types of multipliers to assess changes in employment that are analogous to income multipliers: namely, the final demand multiplier and the direct impact multiplier.

While nowadays in Russia this approach to assessment of a regional economy’s structure finds itself at the experimental stage, it draws regional administrations’ growing attention. The example below illustrates possibilities for using the matrix accounting in the course of a static regional analysis.

E1.1. Experimental assessment of indicators of the input-output model; for Kaliningrad Oblast

An experimental table input-output for Kaliningrad Oblast was assessed basing on the respective table published by Russia’s Goskomstat and the 2000 materials on gross regional product provided by the Oblast Statistical Committee.

a) Aggregated indicators of production account

Because of some discrepancies between different groups of the respective data, the basis of the assessment was formed by a computation of the Oblast GRP by income generation method given in table E1.
### Table E1

**Gross Regional Product, income based, 2000, Rb. mln.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross regional product</td>
<td>24575.0</td>
</tr>
<tr>
<td><strong>Compensation of employees</strong></td>
<td>8602.1</td>
</tr>
<tr>
<td>including:</td>
<td></td>
</tr>
<tr>
<td>Salaries and wages (exclusive of actual deductions on social security)</td>
<td>6124.0</td>
</tr>
<tr>
<td>Actual deductions on social security</td>
<td>2478.1</td>
</tr>
<tr>
<td><strong>Net taxes on production</strong></td>
<td>2595.7</td>
</tr>
<tr>
<td>including:</td>
<td></td>
</tr>
<tr>
<td>Net taxes on products:</td>
<td>1057.2</td>
</tr>
<tr>
<td>Taxes on products</td>
<td>2188.2</td>
</tr>
<tr>
<td>Subsidies on products</td>
<td>1131.0</td>
</tr>
<tr>
<td>Other net taxes on production:</td>
<td>1538.5</td>
</tr>
<tr>
<td>Other taxes on production</td>
<td>1580.9</td>
</tr>
<tr>
<td>Other subsidies on production</td>
<td>42.4</td>
</tr>
<tr>
<td><strong>Gross profit of the economy and gross mixed income</strong></td>
<td>13377.2</td>
</tr>
</tbody>
</table>

**For reference:**
- Wages fund and social payments to employees: 6385.4
- Capital consumption: 3058.2

The data of the final computation of gross regional product in sectoral terms after aggregation of products according to the structure of the national input-output table are given in table E2.

b) **Coefficients of direct costs**

In our computations, we employed the structure of intermediary costs from the 2000 input-output table for Russia. The published 2000 symmetric table was reduced to 10 industries, with the respective indicators being recomputed from basic into purchase prices.

c) **Computation of sectoral structure of value-added elements**

---

50 The data of an experimental computation of indicators of the income generation account are provided by the Kaliningrad Oblast Regional Development Agency.
Disaggregating of sectoral values of gross value-added by elements is not mandatory in this paper. It was conducted to make the experimental table comprehensive.

Table E2

Gross Regional Product of Kaliningrad Oblast by activities, 2000, Rb. mln.

<table>
<thead>
<tr>
<th>Sector Output</th>
<th>Intermediate consumption</th>
<th>Gross value-added</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1 Industrial sector</td>
<td>19 440.8</td>
<td>9 833.3</td>
</tr>
<tr>
<td>2 Construction</td>
<td>2 813.0</td>
<td>1 129.5</td>
</tr>
<tr>
<td>3 Agriculture and forestry</td>
<td>3 776.9</td>
<td>1 787.6</td>
</tr>
<tr>
<td>4 Transport and communication</td>
<td>4 389.2</td>
<td>1 698.4</td>
</tr>
<tr>
<td>5 Trade, intermediary services, and public catering</td>
<td>5 994.8</td>
<td>2 331.6</td>
</tr>
<tr>
<td>Other kinds of activities on production goods and services</td>
<td>248.7</td>
<td>62.9</td>
</tr>
<tr>
<td>6 Housing and communal sector and non-productive kinds of household services to population</td>
<td>1 633.8</td>
<td>848.9</td>
</tr>
<tr>
<td>Finance, credit, insurance, public administration, public associations</td>
<td>1 338.4</td>
<td>573.7</td>
</tr>
<tr>
<td>Health care, physical culture and social security, education, culture and arts</td>
<td>3 059.4</td>
<td>1 277.7</td>
</tr>
<tr>
<td>Science and research servicing, geology and prospecting, geodesic and hydrometeorology services</td>
<td>709.7</td>
<td>343.3</td>
</tr>
<tr>
<td>i Total, at basic prices</td>
<td>43 404.7</td>
<td>19 886.9</td>
</tr>
<tr>
<td>iiia Taxes on products</td>
<td>2 188.2</td>
<td>0.0</td>
</tr>
<tr>
<td>iiib Subsidies on products</td>
<td>1 131.0</td>
<td>0.0</td>
</tr>
<tr>
<td>ii Net taxes on products</td>
<td>1 057.2</td>
<td>0.0</td>
</tr>
<tr>
<td>iii GROSS REGIONAL PRODUCT</td>
<td>44 461.9</td>
<td>19 886.9</td>
</tr>
</tbody>
</table>
Whereas the data on the element structure of gross value-added by sectors of the Kaliningrad Oblast economy were not available, we applied the data balancing procedure to values of elements of the value-added on the whole (table E1) and the value of the gross-value-added by the ten industries provided in table E2. While the values of the “Compensation of employees” and “Gross profit and gross mixed income” elements were computed in the structure of the national table, values of other net taxes on production were set as balancing ones.

It is worthwhile noting that the quality of this particular assessment has not exerted a substantial influence on the accuracy of our computations, for the vector of aggregated value-added was used in this respect.

d) Computation of elements of final demand and import

The computation of these particular elements of the input-output table on the regional level, as a rule, causes the greatest informational complexities.

The assessment of a general value of the domestic final demand (consumption and gross fixed capital formation) was made basing on data of the population’s income, final value of output in the construction sector, and volume of investment in fixed assets. We employed the sectoral structure of the final demand from the 1999 national table. The total value of the domestic (regional) final consumption was partially adjusted in the process of balancing of the matrix upon introduction into it of external relations (export and import).

To assess the value of export, we employed data on export of goods produced in the Oblast territory and on export of goods from the Oblast to other RF regions. Import and export of non-industrial goods (including services) on which the data were unavailable, were recognized as making up zero. Export and import of services were conditionally completely attributed to Kaliningrad Oblast, while import of industrial products in the Oblast was set as a balancing element of the table.

A more accurate assessment of final consumption and external flows of goods and services require additional information.

e) The area of possible application of the research findings

Results of the assessment of the experimental table are given in table E3.

This particular table was designed as a basis of a static impact model and cannot be fully regarded as an instrument of an analysis of inter-sectoral proportions of the region’s economy. An authentic model
of inter-structural economy of an oblast necessitates, first, adjusting the structure of intermediary costs (inter-goods flows) basing on an enterprise survey and, second, more accurate assessments of elements of final demand (including export) and import.

The table in question allowed building a static linear impact model which consequently was employed for making relative assessments, on the basis of earlier obtained sectoral assessments, of the role played by single industries in the Oblast economy, the impact the final demand had on the Oblast economy, as well as a macroeconomic assessment of the proportion of the shadow economy.

**Table E3**

Experimental Assessment of the 2000 input-output table for Kaliningrad oblast, as Rb.Mln

<table>
<thead>
<tr>
<th>№</th>
<th>Sector</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Industrial sector</td>
<td>6 987.07</td>
<td>800.75</td>
<td>626.52</td>
<td>822.81</td>
<td>670.94</td>
<td>41.63</td>
</tr>
<tr>
<td>2</td>
<td>Construction</td>
<td>208.06</td>
<td>23.07</td>
<td>15.91</td>
<td>81.82</td>
<td>64.70</td>
<td>1.56</td>
</tr>
<tr>
<td>3</td>
<td>Agriculture and forestry</td>
<td>742.86</td>
<td>0.01</td>
<td>922.31</td>
<td>0.00</td>
<td>52.66</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>Transport and communication</td>
<td>617.47</td>
<td>131.51</td>
<td>86.18</td>
<td>218.43</td>
<td>828.69</td>
<td>5.83</td>
</tr>
<tr>
<td>5</td>
<td>Trade, intermediary services, and public catering</td>
<td>945.96</td>
<td>150.80</td>
<td>128.34</td>
<td>488.38</td>
<td>541.21</td>
<td>6.48</td>
</tr>
<tr>
<td>6</td>
<td>Other kinds of activities on production goods and services</td>
<td>27.74</td>
<td>3.60</td>
<td>1.09</td>
<td>10.13</td>
<td>62.87</td>
<td>3.60</td>
</tr>
<tr>
<td>7</td>
<td>Housing and communal sector and non-productive kinds of household services to population</td>
<td>79.41</td>
<td>11.91</td>
<td>3.70</td>
<td>28.24</td>
<td>79.69</td>
<td>2.07</td>
</tr>
<tr>
<td>8</td>
<td>Finance, credit, insurance, public administration, public associations</td>
<td>4.03</td>
<td>0.45</td>
<td>0.38</td>
<td>2.63</td>
<td>2.16</td>
<td>0.18</td>
</tr>
<tr>
<td>9</td>
<td>Health care, physical culture and social security, education, culture and arts</td>
<td>133.77</td>
<td>1.12</td>
<td>0.21</td>
<td>6.03</td>
<td>0.90</td>
<td>0.68</td>
</tr>
<tr>
<td>10</td>
<td>Science and research servicing, geology and prospecting, geodesic and hydrometeorology services</td>
<td>86.91</td>
<td>6.28</td>
<td>2.93</td>
<td>39.88</td>
<td>27.79</td>
<td>0.92</td>
</tr>
<tr>
<td>I</td>
<td>Consumed in purchaser’s prices (intermediate costs, total)</td>
<td>9 833.28</td>
<td>1 129.52</td>
<td>1 787.55</td>
<td>1 698.36</td>
<td>2 331.61</td>
<td>62.94</td>
</tr>
<tr>
<td>i</td>
<td>Compensation of employees</td>
<td>3 216.20</td>
<td>723.34</td>
<td>324.57</td>
<td>1 159.34</td>
<td>314.43</td>
<td>116.64</td>
</tr>
<tr>
<td>ii</td>
<td>Operating surplus and gross mixed income</td>
<td>5 761.90</td>
<td>850.37</td>
<td>1 533.40</td>
<td>1 356.01</td>
<td>3 106.06</td>
<td>57.15</td>
</tr>
<tr>
<td>iii</td>
<td>Other net taxes on production</td>
<td>629.41</td>
<td>109.81</td>
<td>131.34</td>
<td>175.51</td>
<td>242.71</td>
<td>12.01</td>
</tr>
<tr>
<td>II</td>
<td>Gross value-added at basic prices(i + ii + iii)</td>
<td>9 607.51</td>
<td>1 683.53</td>
<td>1 989.32</td>
<td>2 690.87</td>
<td>3 663.20</td>
<td>185.80</td>
</tr>
<tr>
<td>iv</td>
<td>Net taxes on product</td>
<td>432.49</td>
<td>75.46</td>
<td>90.25</td>
<td>120.60</td>
<td>166.77</td>
<td>8.25</td>
</tr>
<tr>
<td>III</td>
<td>Gross regional product</td>
<td>10 040.00</td>
<td>1 758.99</td>
<td>2 079.57</td>
<td>2 811.47</td>
<td>3 829.97</td>
<td>194.05</td>
</tr>
<tr>
<td>IV</td>
<td>Gross output at basic prices(i + II)</td>
<td>19 440.79</td>
<td>2 813.05</td>
<td>3 776.87</td>
<td>4 389.23</td>
<td>5 994.81</td>
<td>248.74</td>
</tr>
<tr>
<td>V</td>
<td>Import</td>
<td>7 327.29</td>
<td>41.90</td>
<td>0.00</td>
<td>245.00</td>
<td>0.00</td>
<td>25.67</td>
</tr>
<tr>
<td>VI</td>
<td>Consumed at purchasers prices, total(i + III + IV)</td>
<td>27 200.57</td>
<td>2 930.40</td>
<td>3 867.12</td>
<td>4 754.83</td>
<td>6 161.58</td>
<td>282.66</td>
</tr>
</tbody>
</table>
### Table E3

<table>
<thead>
<tr>
<th>№</th>
<th>Sector</th>
<th>INTERMEDIATE DEMAND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>1</td>
<td>Industrial sector</td>
<td>490.70</td>
</tr>
<tr>
<td>2</td>
<td>Construction</td>
<td>117.32</td>
</tr>
<tr>
<td>3</td>
<td>Agriculture and forestry</td>
<td>1.61</td>
</tr>
<tr>
<td>4</td>
<td>Transport and communication</td>
<td>49.54</td>
</tr>
<tr>
<td>5</td>
<td>Trade, intermediary services, and public catering</td>
<td>109.76</td>
</tr>
<tr>
<td>6</td>
<td>Other kinds of activities on production goods and services</td>
<td>2.47</td>
</tr>
<tr>
<td>7</td>
<td>Housing and communal sector and non-productive kinds of household services to population</td>
<td>64.77</td>
</tr>
<tr>
<td>8</td>
<td>Finance, credit, insurance, public administration, public associations</td>
<td>0.70</td>
</tr>
<tr>
<td>9</td>
<td>Health care, physical culture and social security, education, culture and arts</td>
<td>0.60</td>
</tr>
<tr>
<td>10</td>
<td>Science and research services, geology and prospecting, geodesic and hydrometeorology services</td>
<td>11.41</td>
</tr>
</tbody>
</table>

**Final demand**

<table>
<thead>
<tr>
<th>№</th>
<th>Sector</th>
<th>Total</th>
<th>Final consumption and gross fixed capital formation</th>
<th>Export</th>
<th>Consumed at purchasers prices, total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td>n</td>
<td>o</td>
</tr>
<tr>
<td>1</td>
<td>Industrial sector</td>
<td>15 740.49</td>
<td>6 607.17</td>
<td>9 133.32</td>
<td>27 200.57</td>
</tr>
<tr>
<td>2</td>
<td>Construction</td>
<td>2 366.34</td>
<td>2 347.59</td>
<td>18.74</td>
<td>2 930.40</td>
</tr>
<tr>
<td>3</td>
<td>Agriculture and forestry</td>
<td>2 110.43</td>
<td>2 110.43</td>
<td>0.00</td>
<td>3 867.12</td>
</tr>
<tr>
<td>4</td>
<td>Transport and communication</td>
<td>2 654.40</td>
<td>1 312.25</td>
<td>1 342.15</td>
<td>4 754.83</td>
</tr>
<tr>
<td>a</td>
<td>b</td>
<td>n</td>
<td>o</td>
<td>p</td>
<td>q</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>5</td>
<td>Trade, intermediary services, and public catering</td>
<td>3 621.00</td>
<td>3 621.00</td>
<td>0.00</td>
<td>6 161.58</td>
</tr>
<tr>
<td></td>
<td>Other kinds of activities on production goods and services</td>
<td>149.80</td>
<td>46.85</td>
<td>102.95</td>
<td>282.66</td>
</tr>
<tr>
<td>7</td>
<td>Housing and communal sector and non-productive kinds of household services to population</td>
<td>1 269.07</td>
<td>1 269.07</td>
<td>0.00</td>
<td>1 668.77</td>
</tr>
<tr>
<td>8</td>
<td>Finance, credit, insurance, public administration, public associations</td>
<td>1 350.00</td>
<td>1 350.00</td>
<td>0.00</td>
<td>1 371.99</td>
</tr>
<tr>
<td>9</td>
<td>Health care, physical culture and social security, education, culture and arts</td>
<td>2 470.69</td>
<td>2 461.79</td>
<td>8.89</td>
<td>3 164.38</td>
</tr>
<tr>
<td>10</td>
<td>Science and research servicing, geology and prospecting, geodesic and hydrometeorology services</td>
<td>508.99</td>
<td>210.75</td>
<td>298.24</td>
<td>725.78</td>
</tr>
<tr>
<td>I</td>
<td>Consumed at purchasers prices, total</td>
<td>32 241.21</td>
<td>21 336.90</td>
<td>10 904.31</td>
<td>52 128.08</td>
</tr>
</tbody>
</table>

**E1.2. Assessment of economic effects**

**a) Model**

Underlying the assessment of economic effects on the basis of the “Input-Output” tables is the following Leontyev’s matrix equation:

\[
X = AX + Y, \quad (1)
\]

\[
P = BX, \quad (2)
\]

where \(X\) – vector of gross output;

\(A\) – matrix of coefficients of direct costs;

\(Y\) – vector of final product (demand);

\(P\) – vector of basic production factors;

\(B\) – matrix of factor coefficients.

Equations (1) and (2) allow assessment of possible changes in gross output and the level of the use of primary factors under some given change in final demand. If \(\Delta Y\) is vector of changes in final demand, then:

\[
\Delta X = A\Delta X + \Delta Y, \quad (3)
\]

\[
\Delta P = B\Delta X; \quad (4)
\]

and
\[ \Delta X = (I - A)^{-1} \Delta Y, \quad (5) \]
\[ B(I - A)^{-1} \Delta Y = \Delta P. \quad (6) \]

Direct and indirect effects from changes in final demand on gross output (at the expense of an additional import, export, etc.) can be found on the basis of equation (5), while equation (6) enables one to find assessments of the effect changes in final demand have on the need in production factors.

A long record of employment of the input-output method particularly overseas, has resulted in the design of certain standards of such an analysis.

Researchers, as a rule, compute three kinds of multipliers for each product (net profit) of a regional economy. The multipliers in question are based upon a direct, indirect and induced effect, respectively.

The direct effect multiplier was computed as a correlation between the value of increase of the respective indicator in the given sector \( (\Delta \phi_{i}) \) and the change of final demand in the given sector \( (\Delta Y_{i}) \):

\[ K_{i}^{j} = \frac{\Delta \phi_{i}^{j}}{\Delta Y_{i}}, \quad (7) \]

where \( i \) – number of the sector, \( j \) – number of the multiplier.

The indirect effect multiplier was computed as a change in the aggregate value of the given indicator in other sectors of the region \( (\Delta \Phi_{j} - \Delta \phi_{ij}) \) in relation to the change in final demand in the given sector:

\[ H_{i}^{j} = \frac{\Delta \Phi_{j}^{i} - \Delta \phi_{ij}^{i}}{\Delta Y_{i}}. \quad (8) \]

Assessment of the numerical value of the complete type I multiplier is the result of aggregation of the values of direct effect multiplier with indirect effect multiplier.

Induced effect is generated by households spending their incomes received both directly in this particular sector and due to creation of an indirect effect from their spending on buying products of a given sector. While direct and indirect effects can be assessed by solving equations (5)-(6), induced effect requires modification of the design model. Theoretically, it is assumed that the original matrix \( A \) (for instance, sized \( n \times n \)) is complemented by an additional line that contains coefficients of household incomes and a table that contains consumer spending coefficients. Once equation (5) is solved, such an extended model allows a...
numerical value of the complete type II multiplier that takes into account the induced effect.

\[b) \text{ Assessments of the impact of gross output}\]

This particular multiplier demonstrates an increment in this or that regional indicator under the isolated increment in gross output in a given sector. It is the indicators of gross output in a region and gross regional product (GRP) that are usually considered targeted ones.

Type I multipliers were computed on the basis of a standard (10 X 10) dimension.

To compute a secondary effect from an increase in household incomes (induced effect), the matrix of intermediate costs was complemented by conditionally assessed household income and spending vectors. It should be emphasized that assessments of this particular effect appear fairly conditional, because of two reasons.

First, the income statistic data currently available on the regional level in Russia form a substantial informational constraint in this respect. That is why to built an authentic balance of household incomes and spending in a given territory, one needs to have sufficiently detailed information.

Second, should the household sector be integrated into the matrix of intermediate costs of the input-output table, it suggests the equality of primary current incomes to spending, which, generally speaking, forms rather strong an assumption.

It should also be noted that, according to some experts, assessments of induced effect computed with the use of “Input-Output” models appears somewhat greater than in reality, for the model does not consider income redistribution. More accurate data are available on the basis of the SAM based models.

The data of computations of the multiplier of gross output are given in table E4.

A relatively loose effect of the outspread of the impact of the industrial sector appears quite notable.

First, regretfully, this picture is usually noted under computations built on the basis of a strongly aggregated model. With most intersectoral ties in the industrial sector fall on industries themselves, the assessing of a genuine value of industrial activities in a regional economy
makes it desirable to have a model with an extended structure of industrial production.

Second, the role of import is great in the structure of domestic consumption (intermediate and final) of produce of the Kaliningrad Oblast industrial sector. This also diminishes an indirect effect from the increment in gross output in the industrial sector, as it triggers an increment in output in supplying/consuming sectors, which, in turn, leads to a more or less proportional rise in importation of respective industrial products.

This particular indicator highlights on a relative macroeconomic efficacy of the contemporary structure of the oblast economy, rather than of the role the industrial sector plays in its economy.

Table E4

<table>
<thead>
<tr>
<th>Sector</th>
<th>Effect on increment in regional gross output</th>
<th>Effect on increment in GRP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct effect</td>
<td>Indirect effect</td>
</tr>
<tr>
<td>1  Industrial sector</td>
<td>1.00</td>
<td>0.138</td>
</tr>
<tr>
<td>2  Construction</td>
<td>1.00</td>
<td>0.589</td>
</tr>
<tr>
<td>3  Agriculture and forestry Transport and communication</td>
<td>1.00</td>
<td>0.342</td>
</tr>
<tr>
<td>4  Trade and public catering Other kinds of activities on production goods and services Housing and communal sector</td>
<td>1.00</td>
<td>0.457</td>
</tr>
<tr>
<td>5  Other kinds of activities on production goods and services Housing and communal sector</td>
<td>1.00</td>
<td>0.420</td>
</tr>
<tr>
<td>6  Finance, credit Health care, physical culture etc. Science and research servicing</td>
<td>1.00</td>
<td>0.333</td>
</tr>
<tr>
<td>7  Science and research servicing</td>
<td>1.00</td>
<td>0.739</td>
</tr>
<tr>
<td>8  Health care, physical culture etc. Science and research servicing</td>
<td>1.00</td>
<td>0.665</td>
</tr>
<tr>
<td>9  Finance, credit Health care, physical culture etc. Science and research servicing</td>
<td>1.00</td>
<td>0.380</td>
</tr>
<tr>
<td>10  Science and research servicing</td>
<td>1.00</td>
<td>0.723</td>
</tr>
</tbody>
</table>
An absolute significance of this or that industry to the Oblast economy is highlighted by the effect of the spread of a 1% increment in gross output in the given sector (table E5)

*Table E5*

Change in macroeconomic indicators of Kaliningrad Oblast under the 1% growth in its gross output

<table>
<thead>
<tr>
<th>Sector</th>
<th>Increment in the value of the regional indicator, as %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross output</td>
</tr>
<tr>
<td>1 Industrial sector</td>
<td>0.509</td>
</tr>
<tr>
<td>2 Construction</td>
<td>0.103</td>
</tr>
<tr>
<td>3 Agriculture and forestry</td>
<td>0.117</td>
</tr>
<tr>
<td>4 Transport and communication</td>
<td>0.148</td>
</tr>
<tr>
<td>5 Trade and public catering</td>
<td>0.197</td>
</tr>
<tr>
<td>6 Other kinds of activities on production goods and services</td>
<td>0.008</td>
</tr>
<tr>
<td>7 Housing and communal sector</td>
<td>0.065</td>
</tr>
<tr>
<td>8 Finance, credit</td>
<td>0.051</td>
</tr>
<tr>
<td>9 Health care, physical culture etc.</td>
<td>0.097</td>
</tr>
<tr>
<td>10 Science and research servicing</td>
<td>0.028</td>
</tr>
</tbody>
</table>

Results of the computations given in the table above demonstrate that in the modern structure of a regional economy, the greatest increment in output is secured in the industrial sector, followed by trade, transport and communications. The indicator of the impact the increment in gross output in industries has on the increment in GRP characterizes the reproduction potential of an industry in the region. Thus, it can be argued that from this perspective the industrial sector is capable of ensuring the most considerable contribution to the Oblast’s economic development.

c) Assessment of the impact of final demand

The impact of changes in final demand in a model with aggregated structure of the 2nd quadrant can mirror both a change in the domestic (consumption and fixed capital formation) and external (exportation) demand.

Multipliers of the final demand are given in table E6. The final effect from a 1 Rb. mln. – worth increment in export of industrial produces (multiplier 2 GRP) appears somewhat lower than in other
sectors. As concerns other profile sectors, it is transport and health care, physical culture, etc. represented in export by tourism services that display rather a great value of the indicator, while the sector for trade and public catering generates the greatest induced GRP effect.

Table E6

<table>
<thead>
<tr>
<th>Sector</th>
<th>Effect on increment in regional gross output</th>
<th>Effect on increment in GRP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct effect</td>
<td>Indirect effect</td>
</tr>
<tr>
<td>1  Industrial sector</td>
<td>1.387</td>
<td>0.191</td>
</tr>
<tr>
<td>2  Construction Agriculture and forestry</td>
<td>1.014</td>
<td>0.597</td>
</tr>
<tr>
<td>3  Transport and communication</td>
<td>1.325</td>
<td>0.453</td>
</tr>
<tr>
<td>4  Trade and public catering</td>
<td>1.077</td>
<td>0.492</td>
</tr>
<tr>
<td>5  Other kinds of activities on production goods and services Housing and communal sector</td>
<td>1.128</td>
<td>0.474</td>
</tr>
<tr>
<td>6  Finance, credit Health care, physical culture etc. Science and research servicing</td>
<td>1.014</td>
<td>0.338</td>
</tr>
<tr>
<td>7  Science and research servicing</td>
<td>1.045</td>
<td>0.772</td>
</tr>
<tr>
<td>8  Finance, credit Health care, physical culture etc. Science and research servicing</td>
<td>1.007</td>
<td>0.670</td>
</tr>
<tr>
<td>9  Science and research servicing</td>
<td>1.197</td>
<td>0.455</td>
</tr>
<tr>
<td>10 Science and research servicing</td>
<td>1.026</td>
<td>0.742</td>
</tr>
</tbody>
</table>

The role of the final demand of the Oblast’s economic sectors under the present structure of production of goods and services is given in Table E7.
### Change in macroeconomic indicators of Kaliningrad Oblast under the 1% growth in its final demand

<table>
<thead>
<tr>
<th>Sector</th>
<th>Increment in the value of the regional indicator, as %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross output</td>
</tr>
<tr>
<td>1 Industrial sector</td>
<td>0.559</td>
</tr>
<tr>
<td>2 Construction</td>
<td>0.086</td>
</tr>
<tr>
<td>3 Agriculture and forestry</td>
<td>0.084</td>
</tr>
<tr>
<td>4 Transport and communication</td>
<td>0.094</td>
</tr>
<tr>
<td>5 Trade and public catering</td>
<td>0.130</td>
</tr>
<tr>
<td>6 Other kinds of activities on production goods and services</td>
<td>0.005</td>
</tr>
<tr>
<td>7 Housing and communal sector</td>
<td>0.052</td>
</tr>
<tr>
<td>8 Finance, credit</td>
<td>0.051</td>
</tr>
<tr>
<td>9 Health care, physical culture etc.</td>
<td>0.092</td>
</tr>
<tr>
<td>10 Science and research servicing</td>
<td>0.020</td>
</tr>
<tr>
<td>Final demand on the whole</td>
<td>1.172</td>
</tr>
</tbody>
</table>

**Fig. E1.** Contribution of Industries of the Kaliningrad Oblast Economy to GDP Increment
The actual reproduction capacity of the Oblast economy sectors is highlighted by Fig. E1. The proportional rise of the final product by 1% generates a 1.312% growth in GRP, induced effect disregarded (see table E7). As the chart above shows, the increment in the industrial output ensures roughly as much as 49% of the increment in question. At this point, a considerable potential of trade and the sector for health care, physical culture, etc. is particularly worth noting.

The assessment of the impact of an increment in household incomes in the frame of the model can be conditionally made by means of changing the final demand value in the household consumption structure. The data of the respective computations (induced effect disregarded) are given in table E8.

### Table E8

**Change in Macroeconomic indicators of Kaliningrad Oblast under the rise in final demand by rb. 1 mln. in the structure of household consumption**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Gross regional output</th>
<th>Gross regional product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rb. mln.</td>
<td>%</td>
</tr>
<tr>
<td>1 Industrial sector</td>
<td>0.715</td>
<td>43.78</td>
</tr>
<tr>
<td>2 Construction</td>
<td>0.026</td>
<td>1.57</td>
</tr>
<tr>
<td>3 Agriculture and forestry</td>
<td>0.211</td>
<td>12.94</td>
</tr>
<tr>
<td>4 Transport and communication</td>
<td>0.149</td>
<td>9.13</td>
</tr>
<tr>
<td>5 Trade and public catering</td>
<td>0.353</td>
<td>21.62</td>
</tr>
<tr>
<td>6 Other kinds of activities on production goods and services</td>
<td>0.008</td>
<td>0.50</td>
</tr>
<tr>
<td>7 Housing and communal sector</td>
<td>0.088</td>
<td>5.38</td>
</tr>
<tr>
<td>8 Finance, credit</td>
<td>0.025</td>
<td>1.53</td>
</tr>
<tr>
<td>9 Health care, physical culture etc.</td>
<td>0.051</td>
<td>3.15</td>
</tr>
<tr>
<td>10 Science and research servicing</td>
<td>0.007</td>
<td>0.40</td>
</tr>
<tr>
<td><strong>Final demand on the whole</strong></td>
<td>1.634</td>
<td>100.00</td>
</tr>
</tbody>
</table>

A cumulative (direct plus indirect) effect from a 1 Rb.mln.– worth rise in household incomes, providing they are fully used for consumption purposes within the Oblast, accounts for Rb.1.634 mln. for the gross output of goods and services. However, as, first, the incomes are partly used for the purpose of savings and, second, they are partly used beyond the Oblast’s borders, the actual value should be less than the
above. The final data, nonetheless, mirrors the impact of the increment in consumer spending under the current structure in the Oblast.

A more accurate assessment of the impact changes in incomes of different institutional sectors of the regional economy have on its macroeconomic performance indicators can be found by means of a model based on the regional accounting matrix.

E1.3. Assessment of overall scope of non-observed (unregistered) sector of the economy

The impact model built allows assessment of the proportion of the unregistered (non-observed) sector of the economy in terms of basic macroeconomic indicators. Such an assessment can be produced, providing there are assessments of the size of the shadow sector in individual sectors of the local economy.

Whereas the data on volumes and structure of gross outputs in the balanced input-output table are official, we can recognize the volumes in questions as the value of output in the registered sector of the local economy, while single assessments of shadow output by sectors can be regarded as increments in model (5) – (6). Solving this system of equations under such conditions, we find a certain gross output and some other regional indicators bias from their original values.

The respective result has evidently taken into account both the direct and indirect multiplying effects from additional activity. The final aggregate biases of regional macroeconomic indicators from the official ones thus characterize the size of “shadow” components in the local economy.

The basis of the computations was formed by expert assessments of the shadow economic activity in the sectors of the Kaliningrad Oblast economy. The assessments were collected as a result of the 2002 surveys. They were conditionally attributed to 2000, for there were no 2002 assessments of indicators of the Oblast input-output table available, while no surveys were held in 2000. The respective data are presented in table E9.

51 The surveys were conducted under project Tacis SCRE/111060/C/SV/ RU “Promoting Trade and Investments In Kaliningrad Oblast – Russia”.
Table E9

Generalized expert opinion on the proportion of works (output) lacking authentic proof, as %

<table>
<thead>
<tr>
<th>Sector</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial sector</td>
<td>30.5</td>
</tr>
<tr>
<td>Construction</td>
<td>22.5</td>
</tr>
<tr>
<td>Trade (and public catering)</td>
<td>35.5</td>
</tr>
<tr>
<td>Transport</td>
<td>18.0</td>
</tr>
<tr>
<td>Other industries of material production</td>
<td>13.4</td>
</tr>
<tr>
<td>Education</td>
<td>10.5</td>
</tr>
<tr>
<td>Health care</td>
<td>35.7</td>
</tr>
<tr>
<td>Other industries of non-material production</td>
<td>23.0</td>
</tr>
</tbody>
</table>

The computations with the use of the data from table E9 allow the following assessments of the unregistered component of the Kalinin-grad Oblast economic indicators:

- The proportion of the unregistered sector in the regional gross output of goods and services 35.9%
- The proportion of the unregistered sector in the Oblast gross regional product (GRP) 28.7%
- The proportion of unregistered household incomes 35.5%

It should be taken into account that, as it follows from the expert assessments given in table E9, the respective final data reflects shares of the overall assessed indicator that considers both the official and unregistered production sectors. Thus, for instance, while the share of the “shadow” output, according to the assessments, accounts for some 56% of the official one, the proportion of GRP makes up roughly 40% of the official values, and the population’s shadow incomes – 55%.

These results can be viewed as a first attempt to assess the aggregate impact of “shadow” outputs in different sectors on the economy as a whole. It can be assumed that the existence of data on unregistered components of functional elements of the final demand and gross value-added would enable one to have control values of the shadow economy indicators.
E2. Modeling tourism impacts on regional economy

An assessment of the impacts of tourism on Sochi’s economy was carried out with both input-output (I-O) and Social Accounting Matrix (SAM) models. Both matrices were developed especially for the purposes of this research project and, therefore, have some special features.

E2.1. General description of the Sochi matrix models

a) Input-output model

The basic structure of the I-O table is based on the SNA 1993 methodology. All the values in the I-O table can be considered to be reasonable estimates – but estimates only - because the construction of a fully articulated detailed and precise regional I-O table for Sochi would entail meting very substantial data, methodological, and budgetary challenges that were beyond the scope of this project.

Two main problems had to be solved in the development of the Sochi input-output table. First, it was necessary to reflect the unusual industrial structure of the local economy within the framework of a standard industrial classification system. In other words, tourism is a major part of the economy, but tourism, of course, is not recognized within the standard industrial classification system as a discrete industry. Second, the gross output of local tourism activities as well as the structure and volume of final consumption of both residential units and tourists had to be evaluated.

The Russian Standard Classification of Industries and Products (OKDP) was used for the model. The list of groups defined by the first four digit in the OKDP is based on the third revised version of the International Standard Industrial Classification of all Economic Activities (ISIC) recommended by the UN Statistical Committee. However the OKDP differs somewhat from ISIC in order to reflect the unique structure of the Russian economy. These changes were basically the addition of code groups and sub-groups that are not presented or sufficiently detailed in ISIC.

In the current OKDP system, there are three general classification units that reflect tourism activities:

- 5510000 Hotels. Accommodation services;
- 6350000 Travel agents services, tour wholesale & other services incidental to transport;
− **8514000 Sanatoria services.**

OKDP also permits the widening of any code beyond the normal limit of seven digits. The following set of tourism activities was used in the final input-output table:

− **635 Travel agents services, tour wholesale & other services incidental to transport;**
− **5510000 Hotels. Accommodation services;**
− **5510092.1 Rest houses and health-improving centres. Accommodation services and meals;**
− **7000000.1 Other real estate services (tourist accommodation in private houses);**
− **8514000 Sanatoria services.**

The total number of activities (and commodities) included in the input-output table is 49. Each activity produces one commodity and each commodity is produced by the only one activity. For current modelling purposes, this list was reduced to 18 products (activities) by some aggregations (see table E10).

**Table E10**

<table>
<thead>
<tr>
<th>No</th>
<th>Commodity</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Agricultural, fishing and forestry products</td>
</tr>
<tr>
<td>002</td>
<td>Industrial products</td>
</tr>
<tr>
<td>003</td>
<td>Electric power, natural gas and heat; water and other utilities</td>
</tr>
<tr>
<td>004</td>
<td>Construction</td>
</tr>
<tr>
<td>005</td>
<td>Wholesaling and retailing margins</td>
</tr>
<tr>
<td>006</td>
<td>Food and beverage service industries</td>
</tr>
<tr>
<td>007</td>
<td>Transportation, transportation margins; communication services</td>
</tr>
<tr>
<td>008</td>
<td>Finance and insurance services; Real estate commissions and management fees</td>
</tr>
<tr>
<td>009</td>
<td>Government sector services; social insurance services</td>
</tr>
<tr>
<td>010</td>
<td>Education services</td>
</tr>
<tr>
<td>011</td>
<td>Health and social services</td>
</tr>
<tr>
<td>012</td>
<td>Municipal services, other social and personal services</td>
</tr>
<tr>
<td>013</td>
<td>Travel agents services, tour wholesale &amp; other services incidental to transport</td>
</tr>
<tr>
<td>014</td>
<td>Hotels. Accommodation services</td>
</tr>
<tr>
<td>015</td>
<td>Sanatoria services</td>
</tr>
<tr>
<td>016</td>
<td>Rest houses and health-improving centres. Accommodation services and meals</td>
</tr>
<tr>
<td>017</td>
<td>Other real estate services (tourists accommodation in private houses)</td>
</tr>
<tr>
<td>018</td>
<td>Other commodities</td>
</tr>
</tbody>
</table>
In the further analysis of tourism’s impact on the regional economy, all tourist expenditures were divided into two parts: (1) consumption of four different “package” activities (rows 014 through 017) and (2) final tourist consumption (“non-package”). The same structure was used in construction tables of the Tourism Satellite Account (TSA) for Sochi.

Gross output of the listed above tourist activities is defined as total receipts or sales of these activities. Value was based on and assessment of tourist expenditures and the TSA’s production account, which was based, in turn, on a tourist expenditure survey carried out in Sochi in 2000. These data also made it possible to evaluate the volume and structure of additional (“non-package”) tourist’s expenditures in Sochi.

The output of other activities was determined initially on the basis of the official Goskomstat data and corrected in the process of input-output table balancing.

b) Social accounting matrix (SAM) for Sochi

The Sochi social accounting matrix (table 10) was based on the experimental input-output table. In addition to the input-output table, official data on tax collection, the Sochi municipal budget, and data on social transfers (pensions, grants, social benefits for unemployed, temporary enabled, children, etc) were collected.

The basic structure of final matrix and its set of accounts are equivalent to the standard model. The “Government” account was split into two categories, "municipal authorities” and "taxes” to more precisely track changes in tax outflows and inflows from Federal budget subsidies to the Sochi municipal government. The ability to distinguish these flows was important to support a detailed analysis of the impacts of tourism on municipal government.

Unfortunately, the present state of regional financial statistics in Russia does not permit the collection of all necessary data on financial flows, especially with the “rest of the world” (RoW). In several cases, indirect estimates had to be used. In the case of the "rest of the world" column, values are estimated primarily from an account balancing perspective. This is not an uncommon practice. It is quite normal for regional matrix models to determine values of external flows as balancing items.

However, in some cases, quite strong assumptions were made. Because of a lack of data, it was assumed that all profits are distributed
equally among enterprises, and that the appropriate entry in the house-
hold row is zero. This assumption affects the value of transfers received
by households from the RoW and, as a result, the regional balance of
external payments as a whole.

It is important to note that, also due to the lack of information, calcu-
ling the regional external balance is a bottleneck in the construction of
the whole system of regional accounts and the regional matrix of finan-
cial flows (SAM), in particular. In this study’s matrix, for example, two
cells that normally contain net inflows of wages and profits are left
empty. In reality, they would have values of zero only by accident.

Despite these limitations, the matrix does reflect the general struc-
ture of the economy of Sochi, permits the calculation of main macro-
economic indicators, and enables the assessment of impacts of differ-
ent factors on the city’s economy.

Values of all the elements of primary and intermediate inputs, gross
output, and final use in the SAM, as a whole, are co-ordinated with the
I-O table, which was used as a basis for development of the SAM. Some
deviations in values were caused by price re-calculations but they do
not exceed 1%.

As the matrix was developed for the purpose of regional tourism im-
pact analysis, the vector of tourist non-package expenditures (addi-
tional expenditures) were included into the RoW column as a kind of
outflow (regional export). This explains the origin of the re-export (RoW
to RoW) value in the matrix, which here represents the value of com-
omodities imported from another regions and consumed by tourists (re-
calling that tourist consumption is a form of export). Due to this presen-
tation of the regional financial flows, the incomes and outlays of resi-
dents and non-residents are not mixed in the Households account.

Both models were used for quantitative assessments of tourism im-
pacts on the economy of Sochi. Due to their methodological differ-
ences, these two instruments were applied to different purposes. The
I-O table, as a model of regional production, was used for calculation of
sales and primary income tourism multipliers. SAM, as a general re-
gegional equilibrium model, made it possible to assess impacts of tourism
on aggregated regional indicators and compare possible tourism-
based city economy scenarios on a static basis.
E2.2. Tourism multipliers

I-O multipliers are considered to be the most universal instrument of static analysis of the impact of tourism on a regional economy. The significant analytical potential of this tool is described in this section, as well as its content and aspects of its application.

Input-output multipliers for Sochi were calculated as a sum of two elements that capture the indirect effect (Type I multipliers). Induced effects were not measured for three reasons.

First, the measurement of induced value (for example, gross output) requires a special modification of the structure of the input-output table. To modify the table, it would be necessary to include a vector-column of household final consumption and a vector-row of household income in the matrix of intermediate use/inputs. Thus one of the key elements of regional product final use becomes an element of intermediate use (and part of production in the model), while part of the primary inputs is considered to be an intermediate input. From this project’s perspective, this modification would change some basic properties of the model and thus make it necessary to apply a special methodology to the analysis of results.

Second, the potential to actually make this modification is substantially limited by the current information framework of Russian regional financial statistics. The household sector can be included into the intermediate use/inputs matrix only if its current primary income equals current expenditures for the same date, which itself is an unrealistic assumption. For this reason, sufficiently detailed information must be available to compose an authentic income-expenditures balance of households for the given territory – but such information is not available at this time.

Third, the interpretation of induced effects measured with an input-output model is not unequivocal. Some researchers consider induced effects to be “potential” or dynamic (not actual)\(^{52}\); it is difficult to combine the results of input-output estimated induced results with the static impacts represented by direct and indirect effects.

Further, some researchers'\textsuperscript{53} estimations of induced effects (Type II multiplier) based on input-output modelling are exaggerated, while more realistic measurements are obtained when using the more conservative SAM multipliers.

Three kinds of tourist multipliers with different numerators in Equations 3.1 and 3.2 - gross regional output, gross regional value-added and household income - were calculated for Sochi from the I-O table. Tourist expenditures were used as a multiplier factor (the denominator in 3.1 and 3.2). These expenditures were grouped into two types:

- package expenditures, which cover costs of packs of tourist services purchased from three types of enterprises specialised on collective accommodation and services of accommodation of non-organised tourists;
- "additional expenditures" of tourists of sanatoria, hotels and tourist complexes sectors and non-organised tourists.

\textit{a) Gross output multiplier}

The gross output multiplier shows the change in the regional gross output created by a unit increase in tourist expenditures.

Gross output multiplier analysis is traditionally used because it reflects (on a gross basis) general growth of money receipts in all the spheres of the regional economy caused by an increase of tourist expenditures. In this connection, it is especially important to estimate the value of tourist expenditures not only on the supply basis, but also on the demand basis, \textit{i.e.} including all the elements of tourist consumption.

The data presented in \textit{table E11} show that an increase in tourist expenditures by one rouble generates aggregated growth in gross regional output by a little bit more than one rouble. Within this general growth, one can observe an increase in backward-linked (non-tourist) industries (indirect effect) of 48.9 kopecks versus 51.5 kopecks in tourism industries.

The highest value of indirect effect is generated by “additional tourist expenditures” – an average of 80.6 kopecks. The growth of package tourist expenditures creates indirect effect in the range 15–19 kopecks in case of collective accommodation services and nearly 25 kopecks from the growth of non-organised tourist expenditures. This means that

The gross regional output multiplier captures the full (summary) effect of tourist expenditures. Data in *table E11* show that package expenditure-based multipliers are greater than 1 because any unit growth in consumption of tourism industry services is simultaneously a unit growth of gross output in these industries. Thus, the direct effect in this kind of multiplier is always equal to 1.

As “additional consumption of tourists” is not a specific activity (industry), it does not produce any direct effect in the tourist gross output multiplier or in other multipliers. Tourist “additional expenditures” are shared among goods and services produced in the region and imported commodities. In the first case, they increase gross regional output. In the second case they flow out of the region as payments for import.
Thus package and additional tourists expenditures contribute simultaneously to the gross regional output growth. Table E12 shows the shares of these two factors in generation this increase.

**Table E12**

<table>
<thead>
<tr>
<th>Factor/Type of tourist flow</th>
<th>Total tourist flow</th>
<th>Sanatoria sector</th>
<th>Hotels sector</th>
<th>Tourist complexes sector</th>
<th>Non-organised tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package expenditures</td>
<td>59,6</td>
<td>61,5</td>
<td>57,8</td>
<td>57,9</td>
<td>60,4</td>
</tr>
<tr>
<td>Additional expenditures</td>
<td>40,4</td>
<td>38,5</td>
<td>42,2</td>
<td>42,1</td>
<td>39,6</td>
</tr>
</tbody>
</table>

The overall ratio is about 6:4 in favour of package expenditures (package expenditures create greater gross regional output surplus). This ratio is nearly the same for all the sectors of tourism: package expenditures share fluctuates between 57.8% – 61.5%.

The structure of gross regional output growth by industry is partly determined by the structure of tourist consumption and partly by the structure of intermediate inputs of tourism industry enterprises.

![Fig. E2. Industrial structure of gross regional output increase](image-url)
The aggregate structure of the gross regional output growth is shown in Fig. E2. More than half the growth is associated with the aggregated output of the tourism industry, which includes all the tourist industries listed in table E10.

The structural share of growth in other (backward-linked) activities is nearly 48%, reflecting the nature and magnitude of the indirect effects. The most significant share is generated in the food and beverage service industry and is associated with “additional tourist expenditures”, because all other meals are included in tourist package products.

The growth in output of municipal and city infrastructure services (municipal services, gas, power and water supply, etc) is due primarily to package expenditures because extra output in these industries is consumed directly by tourism industries as intermediate inputs.

It should be noted that growth in the output of transport and communication is generated mostly by “additional tourist expenditures”. The insignificant contribution of industry to the total volume of indirect effect is due to its modest role in support of tourism activity in Sochi and its auxiliary functions in the city economy as a whole.

b) Gross value-added multiplier

Gross value-added includes the value of all paid regional primary income: wages, mixed income, and gross profits. Though it is necessary to keep in mind pure transfers and incomes from the rest of the world, the regional gross value-added gives an adequate measure of residents’ ability to provide payments for final consumption and gross capital formation in the region, and the ability of the regional economy to produce primary incomes.

Any one rouble increase of tourist expenditures (table E13) causes an average growth of gross value-added in the Sochi economy by 48 kopecks, which is less than 1.0 (compared with the output multiplier). The strongest impact is produced by the un-organised tourist accommodation expenditures. This is normal, as the share of intermediate inputs in the value of this product is very low. Its value-added consists of mixed income received by households.

The main part of the package expenditures effect is direct (that is, it influences mostly tourism industry itself) while their indirect effect is insignificant.

An increase in the non-tourist value-added in Sochi (indirect effect) is mostly caused by tourist additional expenditures.
### Table E13

<table>
<thead>
<tr>
<th>Factor</th>
<th>Direct effect ratio</th>
<th>Indirect effect ratio</th>
<th>Type I multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist expenditures</td>
<td>0,2497</td>
<td>0,2294</td>
<td>0,4792</td>
</tr>
<tr>
<td><strong>Including:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package expenditures</td>
<td>0,4841</td>
<td>0,0981</td>
<td>0,5822</td>
</tr>
<tr>
<td><strong>Including expenditures on:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanatoria services</td>
<td>0,4036</td>
<td>0,0973</td>
<td>0,5008</td>
</tr>
<tr>
<td>Hotels services</td>
<td>0,2760</td>
<td>0,0810</td>
<td>0,3570</td>
</tr>
<tr>
<td>Tourist complexes services</td>
<td>0,5658</td>
<td>0,0794</td>
<td>0,6452</td>
</tr>
<tr>
<td>Accommodation of non-organised</td>
<td>0,7193</td>
<td>0,1345</td>
<td>0,8538</td>
</tr>
<tr>
<td>tourists</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Additional expenditures:</strong></td>
<td>0,0000</td>
<td>0,3694</td>
<td>0,3694</td>
</tr>
<tr>
<td><strong>Including expenditures of:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanatoria sector tourists</td>
<td>0,0000</td>
<td>0,3565</td>
<td>0,3565</td>
</tr>
<tr>
<td>Hotels sector tourists</td>
<td>0,0000</td>
<td>0,3711</td>
<td>0,3711</td>
</tr>
<tr>
<td>Tourist complexes sector tourists</td>
<td>0,0000</td>
<td>0,3873</td>
<td>0,3873</td>
</tr>
<tr>
<td>Non-organised tourists</td>
<td>0,0000</td>
<td>0,3713</td>
<td>0,3713</td>
</tr>
</tbody>
</table>

In general, an increase in the regional value-added (as it happens in case of the gross output multiplier) is mostly created by tourists’ package expenditures (table E14). This can be explained by the same factors: direct supplementary consumption of services produced by the Sochi tourist industry automatically causes an increase in their value-added, which is totally produced in the region. At the same time, a certain part of money spent by tourists on other needs is paid for imports and leaks outside the region.

### Table E14

<table>
<thead>
<tr>
<th>Factor/Type of tourist flow</th>
<th>Total tourist flow</th>
<th>Sanatoria sector</th>
<th>Hotels sector</th>
<th>Tourist complexes sector</th>
<th>Non-organised tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package expenditures</td>
<td>61,2</td>
<td>58,4</td>
<td>61,8</td>
<td>62,5</td>
<td>69,7</td>
</tr>
<tr>
<td>Additional expenditures</td>
<td>38,8</td>
<td>41,6</td>
<td>38,2</td>
<td>37,5</td>
<td>30,3</td>
</tr>
</tbody>
</table>
Fig. E3. Industrial structure of gross regional value-added increase

The distribution of the increase in gross value-added is similar to the structure of the gross output multiplier. It should be noted, though, that the share of value-added directly attributable to the tourism industry is higher than that of other industries in terms of gross regional output. As a result, the contribution of non-tourism industries to income-generated by tourism activities is also smaller. First of all, this concerns operational surplus as a main source of production increase.

c) Household income multiplier

A household income multiplier was calculated to permit assessment of tourism expenditure impact on changes in household income. Household income was measured in the aggregate, and includes two primary sources of income: compensation of employees and mixed income. Property income was not taken into account because it is very difficult to incorporate into input-output-based models. Further, they are not always connected to primary income created within a regional economy. Secondary income (transfers) was not taken into account as there are no data for inclusion in an input-output table.

The estimate of the household income multiplier is in line with the values of other multipliers (gross output and value-added). An increase
of tourist expenditures by one rouble causes general increase in primary household income by 19.1 kopecks; 10.2 kopecks go to the tourism industry and 8.9 kopecks to other activities.

Table E15

<table>
<thead>
<tr>
<th>Factor</th>
<th>Direct effect ratio</th>
<th>Indirect effect ratio</th>
<th>Type I multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist expenditures</td>
<td>0.1020</td>
<td>0.0887</td>
<td>0.1907</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package expenditures</td>
<td>0.1977</td>
<td>0.0299</td>
<td>0.2276</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanatoria services</td>
<td>0.1373</td>
<td>0.0305</td>
<td>0.1679</td>
</tr>
<tr>
<td>Hotels services</td>
<td>0.1281</td>
<td>0.1638</td>
<td>0.2919</td>
</tr>
<tr>
<td>Tourist complexes services</td>
<td>0.0378</td>
<td>0.0280</td>
<td>0.0658</td>
</tr>
<tr>
<td>Accommodation of non-organised tourists</td>
<td>0.7193</td>
<td>0.0309</td>
<td>0.7502</td>
</tr>
<tr>
<td>Additional expenditures</td>
<td>0.0000</td>
<td>0.1515</td>
<td>0.1515</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanatoria sector tourists</td>
<td>0.0000</td>
<td>0.1377</td>
<td>0.1377</td>
</tr>
<tr>
<td>Hotels sector tourists</td>
<td>0.0000</td>
<td>0.1638</td>
<td>0.1638</td>
</tr>
<tr>
<td>Tourist complexes sector tourists</td>
<td>0.0000</td>
<td>0.1601</td>
<td>0.1601</td>
</tr>
<tr>
<td>Non-organised tourists</td>
<td>0.0000</td>
<td>0.1540</td>
<td>0.1540</td>
</tr>
</tbody>
</table>

The contributions of package and “additional expenditures” to household incomes are about the same as for other multipliers: 60% from package expenditures and 40% from “additional expenditures”. Two differences, however, should be noted:

1. Non-organised tourist package expenditures create a substantial impact in comparison to that of “additional expenditures”. This can be explained by the specifics of the product value structure. Package expenditures by non-organised tourists represent payments for private accommodation (usually in private houses or apartments), which contain a large share of value-added (72%) consisting of household income (usually not declared). The share of household income (compensation of employees) in additional tourist expenditures spent on other products is much lower.
2. In comparison with other sectors of the local economy, the impact of package expenditures in the tourist complex sector is underestimated. This is due to the relatively lower share of compensation of employees in this sector’s output, which is caused by the sharp seasonality of tourism in Sochi.

Table E16

<table>
<thead>
<tr>
<th>Factor/Type of tourist flow</th>
<th>Total tourist flow</th>
<th>Sanatoria sector</th>
<th>Hotels sector</th>
<th>Tourist complexes sector</th>
<th>Non-organised tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package expenditures</td>
<td>60,0</td>
<td>54,9</td>
<td>64,1</td>
<td>29,1</td>
<td>83,0</td>
</tr>
<tr>
<td>Additional expenditures</td>
<td>40,0</td>
<td>45,1</td>
<td>35,9</td>
<td>70,9</td>
<td>17,0</td>
</tr>
</tbody>
</table>

The distribution of the household income multiplier effect is more uneven than that of gross regional output and value-added. More than 59% of the impact of household income increases goes to those engaged in tourism industry directly. The food and beverage services, and transport sectors are the primary beneficiaries.

Fig. E4. Industrial structure of the impact of household income changes
A tourist multiplier analysis for Sochi leads to some general conclusions:

1. The absolute value of the aggregated gross output multiplier is insignificantly larger than 1.0. This reflects the high degree of specialization of the city’s economy and its high tendency to import goods.

At the same time, it is not incorrect to make some unequivocal conclusions based on the use of an aggregated multiplier calculated on the basis of overall tourist expenditures. An aggregated multiplier is appropriate to use for the assessment of the value of total increase in gross regional output. In contrast, the impact of individual tourism industries is best measured by gross output multipliers calculated on the basis of package expenditures.

Package expenditure multipliers of gross output are greater than 1.0 although the indirect effect created by these expenditures is small. The average value of this gross output multiplier (1.191) is typical for geographically small and highly specialised regions. As this value is so close to the lower usual boundary of 1.0, we can speak about tourism activity in Sochi being relatively inefficient as a form of wealth generation.

The proportional increase of additional tourist expenditures does not create any measurable increase in the gross output of any specific industry because these sales are already assigned to the output of different activities both within Sochi as well as outside the region. This means that the impact of this factor is similar to the impact of the final use of the regional product. Theoretically, it is possible to consider final tourist consumption as a separate activity and to insert it into the input-output intermediate use matrix. However, there is a threat of significantly over-estimating the gross regional output because certain parts of regional production will be double-counted. Consequently, the estimated results will differ from the data presented by regional accounts. It is more correct to consider additional tourist expenditure as a kind of regional export, as was done in this study. That is why the gross I-O multipliers calculated on the basis of additional expenditures can be less than 1.0.

2. Additional tourist expenditures create a significant increase in gross regional output, which confirms the distinct orientation of the city’s economy to tourism and its strong dependency on tourist receipts. It is worth noting that the city’s direct share of regional imports is about 28%.
This is most likely due to the tendency of tourists to consume local commodities over imported ones. In contrast, the share of regional imports in household consumption is 46.2%. This difference can be explained, in part, by the fact that tourists normally eat in restaurants, the output of which is 100% regional. In contrast, residents usually purchase food at stores whose contribution to gross regional output are retail trade margins because more than 80% of food sold in retail stores is imported.

Another possible factor influencing regional/imported ratio of tourist consumption is the generally low level of income of tourists, which induces them to reduce their extra expenditures.

3. An obvious difference can be noticed in the indirect effect share between the general gross output multiplier and the specialised value-added and household income multipliers. The indirect effect share is calculated as the ratio of the increase in non-tourism industries to the total increase and reflects the degree of dissemination of tourist expenditure impact to other activities in the regional economy. Thus the share of indirect effect due to increase in the gross regional output caused by total tourist expenditures is 48.0%; the portion of indirect effect due to an increase of regional gross value-added is 43.6%; and the portion due to increase of household income is 40.9%. In the same package-based multipliers, these shares equal 15.9%, 15.1%, and 10.1%, respectively.

**E2.3. SAM based assessments of tourism economic impact**

Assessments of tourism economic impact on the economy of Sochi were obtained with the help of SAM based model, which was modified in accordance with the methodology described above (see part 2.2.). Municipal authorities, capital, and the “Rest of the World” accounts were treated as exogenous components.

Calculations were done by looking at the variation of aggregated exogenous spending vector elements. Macro-economic aggregated indicators were calculated on the data obtained from the restored social accounting matrix. The reconstruction of SAM was done with the help of a constant normal propensities matrix. The “Rest of the World” account is used as a balancing item.

a) **Induced effect assessments**
Use of the SAM based model made it possible to obtain assessments of the Type II (full effect) gross regional output multiplier, which includes the induced tourist effect. Induced effect reflects an increase of gross output in the region generated by household spending of income earned directly or indirectly from tourist activity.

Type II gross regional output multiplier for Sochi assessments are presented in table E17.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Direct effect ratio</th>
<th>Indirect effect ratio</th>
<th>Induced effect ratio</th>
<th>Type II multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tourist expenditures</strong></td>
<td>0.5159</td>
<td>0.4887</td>
<td>0.1464</td>
<td>1.1510</td>
</tr>
<tr>
<td><strong>Including:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package expenditures</td>
<td>1.0000</td>
<td>0.1910</td>
<td>0.1528</td>
<td>1.3438</td>
</tr>
<tr>
<td><strong>Including expenditures on:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanatoria services</td>
<td>1.0000</td>
<td>0.1548</td>
<td>0.1202</td>
<td>1.2750</td>
</tr>
<tr>
<td>Hotels services</td>
<td>1.0000</td>
<td>0.1898</td>
<td>0.1316</td>
<td>1.3214</td>
</tr>
<tr>
<td>Tourist complexes services</td>
<td>1.0000</td>
<td>0.1617</td>
<td>0.0173</td>
<td>1.1790</td>
</tr>
<tr>
<td>Accommodation of non-organised tourists</td>
<td>1.0000</td>
<td>0.2511</td>
<td>0.4505</td>
<td>1.7016</td>
</tr>
<tr>
<td><strong>Additional expenditures</strong></td>
<td>0.0000</td>
<td>0.8058</td>
<td>0.1398</td>
<td>0.9457</td>
</tr>
</tbody>
</table>

The values of the Type II gross regional output multipliers are higher than 1.0 for total tourist and package expenditures, though they are still small. The full effect of additional expenditures is just under 1.0. A very modest value of induced effect ratio (0.1464) illustrates the influence of a high import share in the structure of final household consumption, which is typical for any municipal unit and certainly for Sochi with its distinct specialisation in tourism.

Analysis of the tourism economic impact on the basis of Type II multiplier depends on a high degree of accuracy; its value may be over-estimated. The reason for over-estimation can be due, for example, to the linearity of matrix models, which means that all income growth is always spent the same way (in the same structure). This causes especially significant distortions in the value of induced gross regional output because, in reality, the average household’s propensity to consume decreases with increases in income.

This linearity is avoided in more sensitive models by introducing redistribution procedures of household spending in favour of savings ver-
sus consumption. However, it should be noted that the actual level of household money income in Sochi is still not high enough to invalidate the assumption of linearity. On a more practical note, the dynamics of the Sochi economy do not permit making any assumptions regarding the changes to the structure for its subsequent use.\textsuperscript{54}

\textit{b) Assessment of tourism impact on key regional indicators}

The assessment of the impact of tourism activity on key regional economic indicators is one of the most important results of the analysis. These assessments provide a necessary basis for further conclusions about the type of activity that can serve as a reliable factor for regional economic development.

The impact of tourism on the major economic indicators was measured as a value of increase of this indicator generated directly and indirectly by a one-rouble growth of package tourist sales and additional tourist expenditures (see \textit{table E18})

\begin{table}[h]
\centering
\begin{tabular}{lcccc}
\hline
\textbf{Tourism expenditure} & \textbf{Household income (full)} & \textbf{Net corporate income} & \textbf{Taxes} & \textbf{Gross regional product} \\
\hline
\textit{Tourist expenditures} & 0,271 & 0,177 & 0,111 & 0,562 \\
\textit{Including: Package expenditures} & 0,310 & 0,205 & 0,133 & 0,663 \\
\textit{Including expenditures on:} & & & & \\
Sanatoria services & 0,258 & 0,129 & 0,131 & 0,562 \\
Hotels services & 0,237 & 0,294 & 0,258 & 0,748 \\
Tourist complexes services & 0,087 & 0,461 & 0,096 & 0,645 \\
Accommodation of non-organised tourists & 0,883 & 0,154 & 0,145 & 1,113 \\
\textit{Additional expenditures} & 0,229 & 0,148 & 0,087 & 0,454 \\
\hline
\end{tabular}
\caption{Impact of tourism expenditures on key economic indicators (Rub./Rub.)}
\end{table}

\textsuperscript{54} Nowadays the annual average growth of municipal service prices as well as transport tariffs and typical products of town infrastructure prices in Russia is faster than household disposable income growth. Therefore it is hard to expect any decrease in the share of these expenditures in total household income in the observed future. Concerning the Sochi household spending structure, it is necessary to note that the above listed services make its main part among locally produced commodities.
Table E18 contains estimates of the impact of tourism activity on the four key indicators: full household income (in contrast to the I-O data, this value includes all primary and secondary household incomes), net corporate income, collected taxes, and gross regional product. Because these impacts were assessed on the SAM basis, they reflect direct, indirect, and induced effect caused by change of tourism aggregate consumption.

As one can see, an increase in total tourism expenditures in Sochi by one rouble generates an increase of aggregate household income by 27.1 kopecks. The greatest growth is influenced by extra sales of individual accommodation services. The average value of increase in household incomes generated by package services (services of specialised tourist and resort enterprises and individual accommodation services) is higher than under the influence of additional expenditures. Similar to the multiplier effect, this can be explained by the leakage of a certain part of additional expenditures out of the region as a payment for imports, while package expenditures directly increase the volume of regional production.

Net corporate income reflects an investment potential created in the region. Its distribution by types of tourist expenditures reflects the present structure of the value-added.

The change of gross regional product (GRP) is a general indicator of tourism economic impact. GRP characterises the final result of production of goods and services in a region. Assessments of GRP change in table E18 shows the total multiplier effect of tourism expenditures. In other words, this GRP growth is created by an increase in production of commodities by all the regional activities, which in turn, is generated by a growth in tourism activity.

Any regional (city) economy can be divided into two main sets of industries. The first one consists of specialised activities providing the major cash flow into the region (city).

---

55 Other sources of cash inflow are resident’s income coming from their previous investments abroad, their wages earned abroad and incoming transfers from the rest of the world. External transfers except some federal transfers for items such as pensions could hardly be taken into account as a permanent source of cash flow. Two other sources can be considered a basis for regional economy only as exotic cases.
In the case of Sochi, as noted previously, this block consists of tourism and recreation activities. One of the implications of this is that nearly 100% of sales in these sectors are paid from extra-regional sources. These activities also generate extra demand for goods and services produced by other regional activities. This extra volume of sales is determined both by intermediate consumption of enterprises of the sphere of specialisation and additional final demand in the region, which is especially typical for tourist regions.

The second block consists of complementary industries that support the specialised block and thus the final demand generated in the region. The same functions can be partly (but never all) performed by imported goods and services (and, thus, by other regional or national economies). It is important to note that in the terms of the classification of tourist expenditures described above, additional tourist expenditures are caused by consumption of products produced by complementary block.

All products of the complementary block consumed by tourists directly or by specialised block are also paid for from external sources. Thus their producers theoretically could be included into the block of specialisation. Strictly speaking any non-resident consumption of goods and services produced in the region is an export, which should be reflected in the balance of external payments.

In the case of tourist regions, this situation is best illustrated by the food and beverage services sector. Restaurant sales to tourists in Sochi are many times higher than sales to residents of Sochi. Nonetheless, sales of food and beverage services would exist even if there were no tourism. Thus, although restaurants are a typical tourist activity (the tourism output ratio is 87.5%), restaurants are functionally part of the complementary block.

*Table E19* presents, for comparison purposes, the impact of complementary industries on the same set of economic indicators.
### Impact of complementary industries on key economic indicators (Rub./Rub.)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Household income (full)</th>
<th>Net corporate income</th>
<th>Taxes</th>
<th>Gross regional product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>0.287</td>
<td>0.239</td>
<td>0.170</td>
<td>0.653</td>
</tr>
<tr>
<td>Agriculture and fishery</td>
<td>0.434</td>
<td>0.161</td>
<td>0.152</td>
<td>0.779</td>
</tr>
<tr>
<td>Industry</td>
<td>0.172</td>
<td>0.069</td>
<td>0.165</td>
<td>0.365</td>
</tr>
<tr>
<td>Construction</td>
<td>0.213</td>
<td>0.330</td>
<td>0.207</td>
<td>0.705</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>0.392</td>
<td>0.199</td>
<td>0.129</td>
<td>0.693</td>
</tr>
<tr>
<td>Food and beverage services*</td>
<td>0.333</td>
<td>0.164</td>
<td>0.085</td>
<td>0.550</td>
</tr>
<tr>
<td>Financial institutions</td>
<td>0.525</td>
<td>0.031</td>
<td>0.385</td>
<td>0.825</td>
</tr>
<tr>
<td>Other</td>
<td>0.415</td>
<td>0.333</td>
<td>0.146</td>
<td>0.846</td>
</tr>
<tr>
<td>Receiving budget subsidies</td>
<td>0.295</td>
<td>0.260</td>
<td>0.181</td>
<td>0.764</td>
</tr>
<tr>
<td>Municipal, social and personal other services*</td>
<td>0.189</td>
<td>0.543</td>
<td>0.154</td>
<td>0.855</td>
</tr>
<tr>
<td>Power, gas and water supply</td>
<td>0.209</td>
<td>0.232</td>
<td>0.190</td>
<td>0.617</td>
</tr>
<tr>
<td>Transport and communication*</td>
<td>0.368</td>
<td>0.081</td>
<td>0.202</td>
<td>0.740</td>
</tr>
<tr>
<td>Mostly funded by budget</td>
<td>0.332</td>
<td>0.432</td>
<td>0.105</td>
<td>0.849</td>
</tr>
<tr>
<td>Government sector services</td>
<td>0.832</td>
<td>0.108</td>
<td>0.134</td>
<td>1.014</td>
</tr>
<tr>
<td>Education services</td>
<td>0.507</td>
<td>0.324</td>
<td>0.117</td>
<td>0.904</td>
</tr>
<tr>
<td>Health and social services</td>
<td>0.240</td>
<td>0.491</td>
<td>0.100</td>
<td>0.819</td>
</tr>
<tr>
<td><strong>Complementary industries total</strong></td>
<td><strong>0.288</strong></td>
<td><strong>0.244</strong></td>
<td><strong>0.171</strong></td>
<td><strong>0.672</strong></td>
</tr>
</tbody>
</table>

In **table E19**, industries with a share of tourist consumption greater than 50% are marked with an asterisk (*).

Calculated ratios show that the average impact of complementary industries is higher than that of tourism industries. It is important to note that an increase in output of these industries is largely determined by two factors. The first is the growth of tourist package expenditures (a direct effect) and package expenditures (and indirect effect) through intermediate consumption by specialised tourist enterprises. Second, output of complementary industries is influenced by the growth of final
demand of residential units, which itself depends on resident’s income and thus indirectly on tourist expenditures.

The following examples illustrate the potential use of the SAM in an analysis of tourism impact on regional economy.

c) Example 1. Role of tourism in budget incomes

The cumulative contribution of tourism to the Sochi tax base is estimated at 11.1 kopecks for each extra rouble of tourist expenditures (table E18). One can assess the necessary surplus of tourist expenditures to balance the city budget and to permit the ending of federal budget subsidies (see table 10). A simple calculation made on the basis of the Sochi SAM based model shows that, for the year 2000, the city budget could have been balanced using its internal tax base (assuming no change in existing tax rates and the structure of tourist expenditures) if tourist visitation were 24% higher.

Taking into account that the high season room capacity of all collective means of accommodation was virtually 100%, any increase in tourist flow could be achieved only by increasing the number of non-organised tourists. Thus, to provide the extra budget income equal to the 2000 federal subsidy, it would have been necessary to increase the number of non-organised tourists by 162%. This kind of physical growth of tourist is impossible.

Thus improvement of the budget situation through simply increasing tourism is possible through only two means: (1) increasing the annual occupancy rates of all modes of accommodation by 24% or (2) by raising prices on tourist services.

There is no need to say that both ways are unrealistic. Thus, there is no investment-free solution to the problem.

This example can be considered as a scheme to follow in analysis at a decision-making on a strategy of regional economic development. At the same time, creation and maintenance of regional (municipal) SAMs makes it possible to build more sophisticated dynamic systems of pal ling accounts, which may give results adequately reliable for strategic decision-making.

d) Example 2. Impact of tourism on household income

According to estimates calculated in this project, the average monthly personal money income in Sochi in 2000 was 1417.6 roubles. Russia’s national monthly average level for the same year was higher –
2136.1 roubles. If one sets 2200 roubles/month as a target for increasing personal incomes, it is possible to estimate from the SAM based model the necessary increase in tourism expenditures to generate the needed surplus of money income in the city’s economy to raise average monthly incomes in Sochi to the target.

Starting with the usual procedure, the SAM based model indicates tourist expenditures would have to grow by 89% (preserving the same structure). In 2000, the annual average hotel occupancy was 37.1%; the rate for sanatoria was 53.2% and for tourist complexes, 38.1%. Thus the advised variant of solution could not be realised in 2000.

At the second step, one can determine limits on possible annual average use of collective means of accommodation, using, for example, a very high annual average occupancy rate of 80%. Then one can find an optimal solution for the following set of equations:

\[
\sum_{i=1}^{n} \Delta X_i \rightarrow \text{min},
\]

at:

\[
\sum_{i=1}^{n} \Delta X_i k_i^h = \Delta Y^h,
\]

\[\forall i: X_i \leq Z_i, X_i \geq 0, i = 1 \div n,\]

where:

\[\Delta X_i\] – increase in type \(i\) tourist expenditures,

\[\Delta Y^h\] – target increase in personal income,

\[Z_i\] – maximal level of increase in use of type \(i\) collective mean,

\[k_i^h\] – increase of household income/increase of type \(i\) tourism expenditures ratio (see table E18).

The solution of this problem permits the identification of an optimal distribution of tourist flow and tourist expenditures by type of means of accommodation taking into account their ability to generate increase in household income.

The solution is presented in the following table:
<table>
<thead>
<tr>
<th>Accommodation type</th>
<th>Increase</th>
<th>Min. roubles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotels</td>
<td>115,6</td>
<td>511,1</td>
</tr>
<tr>
<td>Sanatoria</td>
<td>50,4</td>
<td>2 646,2</td>
</tr>
<tr>
<td>Tourist complexes</td>
<td>110,0</td>
<td>1 798,0</td>
</tr>
<tr>
<td>Individual</td>
<td>149,6</td>
<td>1 746,6</td>
</tr>
<tr>
<td>Additional expenditures</td>
<td>78,9</td>
<td>6 294,8</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>78,9</strong></td>
<td><strong>12 996,6</strong></td>
</tr>
</tbody>
</table>

If the annual average occupancy rates of all collective means of accommodation were to rise to 80%, the target result is achieved by increasing tourist flow by 78.9% in comparison with 89% in the basic solution.

Non-organised tourist flow must grow nearly 2.5 times with this solution. Actual tourist flow in 2000 exceeded 1 million people. As the major part of these people come to Sochi in the 3rd quarter, it is unrealistic to expect more than 50% annual increase. In this case the monthly average personal income can reach only 88.5% of the target level – Russia’s average.
Bibliography

27. Linacre A. Regional, sub-regional and local area household income. – Economic Trends, May 2002.
47. Vincent D. Sub-regional Gross Value Added: Methods and Background. – ONS, October 2003.
Подписано в печать 31.10.2005
Тираж 100 экз.