

METHODOLOGICAL PROBLEMS OF STATISTICAL CALCULATIONS OF MACROECONOMIC INDICATORS

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Abstract

The paper highlights the basic issues in the area of statistical methodology of calculations of macroeconomic indicators. In particular, it is proved that a single, internally consistent methodology and methods of the GDP calculation do not exist. Moreover, current methodology and methods of the GDP calculation have significant drawbacks. From the point of view of the theory of cycles of resources self-renewal which is still developing, both theoretically and practically, modern methods of the GDP calculation do not reflect the final results of such a complex system as the economy is. From our viewpoint, in order to reflect adequately the final results of the economic system as a whole it is necessary to use such indicators as:

- Gross increase in all types of resources in all sectors of the economy for Δt ;
- Net increase in stocks of all kinds of resources for Δt .

Keywords: Final results of a whole economic system functioning, gross domestic product, the cycles of resources self-renewal, gross increase in stocks of all kinds of resources (including human resources), net increase in stocks of all types of resources.

Introduction

It is known that the GDP or the gross domestic product is one of the most important and widely used in international practice macroeconomic indicators. It is difficult to identify the problems that lie in the field of statistical calculation of this index and have not been solved today. Especially, if these problems refer to the methodology of the GDP calculation. However, we are going to draw your attention to the fact that there are unresolved issues.

It is generally accepted that the basis of calculation of GDP with any of its methods (officially, there are three such methods) is the concept of the so-called “end product”, “end results” of functioning of the national economy or “final consumption resources”. Economic literature suggests various approaches to the definition of “outcomes” or “final consumption resources” [1,2,3].

According to one of these approaches, and in strict accordance with the System of National Accounts (SNA) interpretation of the boundaries of production activities, the end result of such activities should be all the volumes of material benefits (goods and services) which are produced in their industries and spheres of production for a period of time Δt , and which eventually leave the sphere of production and move into their final consumption by households regardless of the source of funding of the final consumption of households [4,5].

From this perspective, the final product is formed only by the resources (goods and services) that will forever leave their sphere of production. Those resources that are completely consumed in production for the unknown segments Δt , in strict terms are intermediate resources (intermediate goods and services). Characteristics of resources as “intermediate” or “ultimate” resources are defined by objective technological value of these

resources in the manufacturing sector. All resources defined as “intermediate” are factors in the production of “ultimate” resources, which are the result of the required factors of production activities and leave the sphere of production.

Resources that remain in production as definite unconsumed stocks are also “intermediate” from the point of view of the above understanding of the “end product” or “final consumption resources”. Although these resources are not consumed within a specified period of time Δt , in all cases, whether their volume is consumed or not consumed in the form of stocks, they are factors of production of the final product that will never leave the sphere of production and, therefore, they are “intermediate” resources.

Another possible criterion for resources division into the intermediate and ultimate ones may be a condition of their full or partial consumption for the unknown Δt . That is, if some resources for some given Δt are consumed in full volume, they are considered to be intermediate in the volume of such total consumption of resources. Then, increase in stocks of resources unconsumed within Δt will be considered as ultimate resources. From this perspective, all kinds of material goods (resources) are both intermediate and ultimate resources at the same time. So, resources are final in terms of increase in their unconsumed stocks, but they are intermediate resources in terms of their total consumption [1].

Nowadays the existing methodology and practice of the GDP calculation use both of these criteria simultaneously. Thus, in accordance with the method of the GDP calculation as total resources of final use, it includes four groups of resources, such as:

1. Goods and services that make up the final consumption of households. This group includes most of the so-called consumer goods and services produced within some Δt ;
2. Gross fixed capital accumulation. This value is the gross fixed capital accumulation over a period Δt , made at the cost of all sources of funding by all the economic units producing material goods.
3. Stockbuilding of real working assets inventories. This value represents a net accumulation of inventories of raw materials, materials of incomplete production and finished products for unknown Δt .
4. Balance between export and import of goods and services for Δt .

As it can be seen from the above definitions, records of volumes that make up all these groups of final consumption resources don't differ in using common methodology.

Thus, the first group of final consumption resources represents the total amount of material goods produced by all economic units for a certain Δt and consumed by all the households.

It doesn't matter that considerable mass of goods and services produced for Δt is not physically exist at the end of a given period Δt , as it is consumed by households. That is, a significant amount of resources (commodities) produced for example, throughout the year, has been already consumed at the end of that year.

However, in the volume consumed, these goods and services are part of the GDP. Therefore, the criterion for their inclusion in the GDP is the fact that they are the “end result” in relation to the factors of production, and they finally leave the sphere of production. So, commodities are included in the GDP not only to the extent of increase in their unused stocks, but also in the volume of their consumption. That is, in essence, we deal with the overall volume of gross output of all kinds of material resources consumed by all households for some Δt .

A very different approach is characteristic for calculation of the third group of final consumption resources which is part of the GDP. In contrast to the case for the calculation of the first group of resources, it doesn't take into account the volumes of all circulating material resources produced for Δt . That is, not the entire gross volume of current material resources output which in fact has taken place over a period Δt is accounted for in the GDP, but only

the volume which is not consumed for Δt and forms a net increase in unconsumed stocks of these resources. The criterion for inclusion of these resources in the GDP is the rate of unconsumed stocks change of these resources.

Calculation of the second group of resources which is called “gross fixed capital accumulation” is based on the third approach. Gross fixed capital accumulation consists of two groups: the net increase in unconsumed stocks of fixed capital for the period Δt plus the volume of fixed capital consumption for the same Δt . Neither the first criterion for assignment of resources to the GDP (resources leaving the sphere of production) nor the second one (increase in stocks of unconsumed resources) are not applied here in their pure form.

When calculating this group of resources, a combination of the first and the second criteria is used. Fixed capital resources don't leave the sphere of production, so it would seem that it should be taken into account in the GDP in the volume of net increase of its unconsumed stocks, that is, according to the second criterion. However, it is taken into account in the volume of its gross accumulation, i.e. with its consumed part, as it was in the case under the first criterion. So, in its natural-and-material composition or in terms of the final consumption resources the GDP, if one doesn't take into account the balance between export and import, consists of three groups of resources: all goods and services which are produced for some Δt and mostly consumed by all households over the same Δt ; increase in gross fixed capital stocks; net increase in inventories of circulating material resources for the same Δt .

Thus, one can see that the criteria by which certain kinds of resources or their groups are classified as “final consumption resources” and included in the GDP, are diverse and quite blurred. There is no reason to believe that there won't be some new, additional or hybrid criteria. All this leads us to conclude that a single, internally consistent methodology and, therefore, methods for calculating such macroeconomic indicator as GDP don't exist today.

It may seem that the GDP calculated by production method or by using such indicator as gross added value (GAV) is devoid of the shortcomings that are inherent in the method of “final consumption resources”.

It is known that according to natural-and-material composition of the GDP, not all of the economic units are able to produce its elements directly. Therefore, according to the objective technological chains, all economic units are divided into those that directly produce relevant elements of the “final product” and those that directly produce only elements of the “intermediate product” which is fully consumed in the production of “final product”.

However, if some economic unit itself doesn't produce final goods and services, but produces only intermediate ones, it is considered to produce the final product indirectly and, therefore, has the right to claim its share in the production and distribution of the final product. The so-called production method of the GDP calculation is connected with the determination of these shares in the GDP for any economic unit. The share of the GDP (the final product) attributed to the economic activity of any unit is called the gross added value (GAV) [2]. Without going into detail of a special analysis of the GAV method, let's pay attention to the fact that this method of the GDP calculation is fully based on the above concept of “final and intermediate consumption resources”. It is known that the GAV is the difference between the value of goods and services produced (output) and the value of goods and services consumed in the production process or cost of resources that form the intermediate consumption. $GAV = O - IC - T + S$, where T means tax, S means subsidy. The cost of GAV includes employees' salary with all the finance charges on it, plus amortization charges, plus gross profit. $GVA = S + A + GP$. Such a structure of the GAV is consistent with accepted methods of the GDP calculation based on the “final consumption resources”.

As you know, amortization and share of profits are invested in gross increase of fixed capital stocks (the second group of resources included in the final product or the GDP). Salary is invested in purchasing of consumer goods by households (the first group of final consumption resources). Share of profits is invested in a net increase in inventories of circulating material resources (the third group of final consumption resources). An amount of profits is invested in private consumption of entrepreneurs who own economic unit of production (the first group of final consumption resources).

Finally, the rest of profits is invested in a net increase in consumption of human resources. This share of profit doesn't fit into the concept of calculation of the GDP based on purely material "final consumption resources". This share of profits, under any circumstances, can not be a part of the material GDP as it is embodied in the natural form of human resource. Therefore, in strict terms, it should be excluded from the GAV used for the calculation of the GDP.

All the above allows us to conclude that a single and internally consistent methodology as well as methods of the GDP calculation don't exist. In order to identify some of the ways that could lead to the creation of a monistic and consistent methodology, i.e. the method of calculation of the GDP, let's pay attention to the following.

The concept of calculation of the GDP based on the material "end- product" doesn't reflect, and may not reflect all the results of such a complex system as an economy. From the viewpoint of the theory of cycles of resources self-renewal which is still developing, there isn't any kind of resource or group of resources, including human resource, which would have been the most important. From natural-material and purely technological positions it is impossible to say which resources are "final" and which ones are "intermediate" [6,7].

All the individual types of resources and their groups including all consumer goods and man-power (human resource), in the technological sense are "intermediate" that is, moving into each other and consumed by each other.

At the same time, a resource such as i -th resource, is technologically moving to another resource, and that one is moving to the third resource, the third is moving to the fourth, etc. Finally, for example on the tenth step of such technological transitions, the tenth resource is moving to the initial i -th resource. Thus, the processing chain of resources transition into each other is closed. Such a closed technological transition is typical for all types of reproducible resources.

So, the consumption of i -th resource in full or in part volume of its stocks is a necessary technological condition for the same process of production. That is, i -th resource is self-producing or self-renewing. From the viewpoint of the process of resources self-renewal, any resource at the same time and in full volume of its stocks is both the intermediate product (resource) and the final product (resource). And this is typical for all kinds of reproducible resources available in the economic system, $i = 1 \dots z$.

All resources taken together form a single, closed, emergent, self-updating system in which they act simultaneously, in their full stocks as both intermediate products (resources) and end products (resources) [6,7].

From these perspectives, all kinds of reproducible resources in statistical calculations of macroeconomic indicators should be taken into account in full gross volume of their production and in full gross volume of their consumption. Therefore, all kinds of resources as the "end results" should be taken into account in full gross amounts of their output or volumes of renewal for Δt , no matter how much of them has been consumed. As the "intermediate products" (resources), all kinds of resources should be taken into account in full gross volume of their consumption, no matter how much of them has been issued.

Proceeding from the above, the question arises naturally enough. How do the statistical surveys evaluate the final results of these constantly recurring, cyclical processes of consumption and renewal or self-renewal of resources?

We believe that the following factors are able to be considered as end results of processes of resources self-renewal that occur in all economic units (including households) and in any other institutional structures of society:

- gross increase in stocks of all kinds of resources for self-renewal (for their consumption and recovery) within Δt ;
- net increase in stocks of all kinds of resources for self-renewal within Δt .

Gross increase in stocks of all kinds of resources for self-renewal within Δt is the gross volume of resources consumption for Δt plus the net increase in stocks of resources for self-renewal within Δt . Gross and net increases in stocks of resources for self-renewal contain all kinds of resources (including human resource) functioning in any sectors or parts of economy as a whole, including such sectors as households.

From the point of view of the theory of self-renewal cycles of resources, the indicator of economic system development as a whole is the level of stocks of all types of resources in all sectors of the system, and the end results of its operations for some given Δt are both gross and net increases of the resource stocks for the unknown Δt . From this perspective the level of GDP reflects only a part (and not necessarily that the largest one) of the gross increase in stocks of all types of resources in all sectors of the economy for some given intervals Δt .

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