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Non-Observed Economy: Features of Assessment and Management at the Regional Level

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Abstract. The article discusses the features of assessment and management of the non-observed economy at the regional level. The authors classify existing methods into micro (or direct) methods and macro (or indirect) methods. It also describes the main characteristics and limitations of these methods, which do not allow to apply some of them at the regional level.
The article discusses in more detail the method of electricity consumption, which is based on physical indicators and its application is possible both at the regional level and at the level of individual industries. There are three approaches to the definition of a non-observed economy: single elasticity, low elasticity, and general elasticity.
The results of experimental studies are presented as an example of calculating the indicators of electricity consumption, gross regional product growth and the dynamics of the non-observed economy for 2014-2018 for the Amur region.

1. Introduction

The integrated measurement of economic production is one of the necessary characteristics of the quality of official statistics. It is not possible without quantitative reflection in the macroeconomic indicators of any activity that falls under the definition of economic activity. But it is very difficult to achieve comprehensive coverage, as part of the production is deliberately hidden and becomes "unobservable" for official statistical services.

Incomplete coverage creates problems for the use of the information received: both the level and the dynamics are distorted. Gross regional product and other macroeconomic data are somewhat understated, creating an inaccurate picture of the economy of a particular region and impeding interregional comparability of these scales. And the measurement of the "unobservable" part of the region's economy is becoming an increasingly important task for various researchers.

Therefore, the main objective of the article is to identify the features of evaluation and management of the non-observed economy (NOE) at the regional level.

2. Background

The non-observed economy is a rather multifaceted phenomenon, which has long been discussed and studied, including from a quantitative point of view. Therefore, the diversity of its manifestations explains the existence of numerous methods of accounting and measuring its parameters, developed mainly by foreign economists D. Kaufman and A. Kaliberda [1], Johnson et.al. [2], Lacko [3], Schnei-

der [4], F., Buehn, A. [5], Elgin, C. and Oztunali, O. [6], Neuwirth, R. [7]. Jutting, J. and De Laiglesia, J. R. [8]. Significant contributions have been made by Russian scholars N. Bokun, I. Kulibaba [9], V. Burov [10], Yu. Latov [11], R. Suslina [12].

Table 1. Characteristics of the main methods of calculating the scale of the non-observed economy.

№	Method	Disadvantages	Possibility of application at the regional level
1	Method of operations (transaction)	Inflated results; assumption of constant ratio of operations to official GDP	Lack of information at the regional level
2	Cash-Deposit ratio	The assumption of the same productivity of $ 1 in official and NOE; the assumption that all transactions are not carried out in cash	Lack of information at the regional level
3	Demand for cash	Can give intuitively plausible results; the scatter of results	Lack of information at the regional level
4	Discrepancy between household income and expenditure	There is no rule of actually possible excess of expenses over income; assumption of obligatory use of income from NOE	Application is possible subject to the survey, significant for the whole population
5	The structure of household consumption	Understatement, as a result of distortion of the received data; dependence of expenses on a way of life	Application is possible subject to the survey, significant for the whole population
6	Italian method (in terms of employment)	Difficulty with organization and conducting of surveys; the distortion of the real data at the polls	Application is possible subject to the survey, significant for the whole population
7	Sociological method	Used more often for qualitative rather than quantitative analysis of NOE.	The application is possible with some restrictions; the results are partial and subjective
8	The recovery of GDP in taxes	Does not take into account the existence of possible statistical errors characteristic of the aggregated indicators, as well as the possible interdependence of the data	The application is possible, taking into account the peculiarities of tax gathering
9	Electricity consumption	Not all economic transactions require electricity; there are factors both underestimating and increasing the scale of NOE	Application is possible taking into account the specifics of different industries

Also, the study of the factors of formation and spatial distribution of the unobserved economy is also given special attention [13-18].

However, despite this, there is still no single classification of methods for measuring the scale of NOE, and the Guidelines presents only the most common of them [19]. The authors divide all existing methods into two groups: micro (or direct) methods and macro (or indirect) methods.

Micro-methods assess the extent do not rely on contact (interview or observation) with persons involved in non-observed economy. They are based on expert estimates and results of population surveys, surveys of specific population groups and institutional units, the analysis of the tax registers, etc. as a result of the analysis is determined by the structure of consumption, and the discrepancy between the expenditure and income of households that serve as indicators of the NOE. Today micro-method use Federal state statistics service and Internal revenue service of the United States [20-21].

As for the macro-methods (indirect), they are based primarily on information from the systems of summary indicators of macroeconomic statistics, data from tax and financial authorities, as well as on certain assumptions about the relationship of the parameters of the NOE with these indicators. It should be noted that while at the level of the country's economy as a whole there is a sufficient number of techniques devoted to the non-observed sector of the economy, there are relatively few approaches to measuring it at the regional level.

Table 1 presents the main characteristics and limitations of these methods, which do not allow some of them to be applied at the regional level.

3. Experimental research results

The method of electricity consumption proposed by D. Kaufman and A. Kaliberda uses electricity consumption as the only financial indicator of all economic activity [1].

It assumes the existence of an exact and constant relationship between electricity consumption and output. In addition to studies of Kaufmann and Kaliberda similar measurements are presented in several works by Johnson et.al. [2] and Lacko [3].

In the short term, the elasticity of the electricity/GDP ratio is constant and approximately 1. Consequently, with an economic downturn, electricity consumption decreases, and with economic growth – increases.

The authors of the method also consider three approaches to the definition of NOE:

1) with a single elasticity, i.e. the elasticity of GRP/power consumption is 1.

2) at low elasticity, when the increase in GRP corresponds to the elasticity of more than 1 (according to Kaufman and Kaliberda 1.15), and the decrease in GRP corresponds to the elasticity of less than 1 (1/1,15=0.87).

3) with general elasticity [1].

One of the advantages of this method is that it can be used in the regional context, including industry, as it is based on physical indicators. An example of calculation of indicators for 2014-2018 for the Amur region is shown in figure 1. (see Fig. 1).

As for the calculations themselves, first, the change in electricity consumption by year (increase in electricity consumption) is determined. Then, using the unit elasticity approach, it is assumed that the increase in total GRP is equal to the increase in power consumption, and the index of total GRP will vary by the same percentage in relative size. At the same time, if the difference between the increase in electricity consumption and the increase in GRP shows a positive value, we can say that the relative size of the non-observed economy increased, and if negative, on the contrary, decreased.

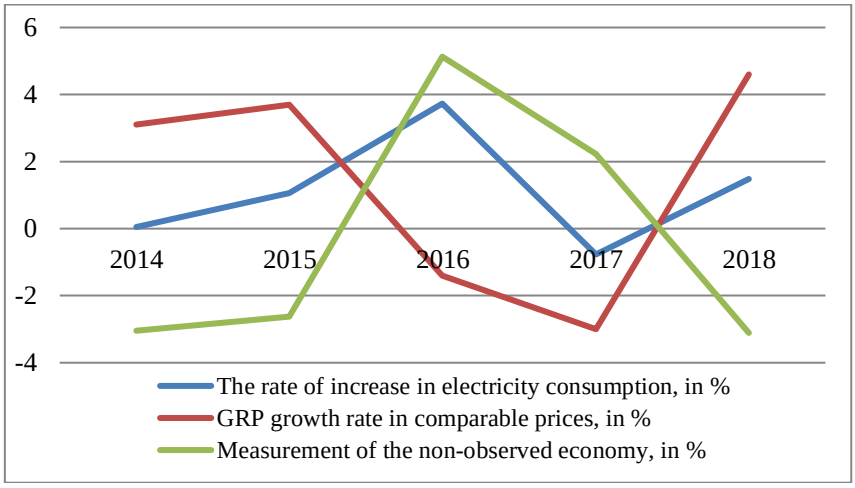

Figure 1. Measurement of the non-observed economy in the Amur region for 2014-2018.

4. Conclusions

There are economic activities that, for one reason or another, are not included in official statistics, evade taxation and are not included in GRP. We define this sphere as "non-observed economy". The analysis of methods of its estimation presented in the article allowed to make the author's classification of methods on the basis of macro approach when the economic object is considered as a complex unified system.

The authors also found that the use of some methods, due to the lack of necessary information, as well as a number of reasons, including the relative overstatement and understatement of the results, at the regional level is impossible. The most suitable method is a method of energy consumption, evaluates the top level of the non-observed sector.

The article presents an example of calculating the change in the non-observed economy in the Amur region for 2014-2018, based on the difference in the dynamics of electricity consumption and gross regional product.

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