Statistical approach to calculation of VAT and problems related to tax credit and export tax refund

Abstract. The Theory of National Accounts opens up new possibilities for improving VAT taxation. New terms have been introduced: statistical tax rates are equal to the current VAT rate multiplied by the share of value added for VAT or by the share of input for the export tax refund (ETR) in products output, which are calculated for selected sectors of the economy on the basis of National Accounts. Statistical tax rates allow for determining VAT or ETR from sales turnover, which reduces the probability of tax fraud. Time limitations associated with a three-year delay in the calculation of National Accounts are treated as insignificant in many cases. The authors of the article have suggested an algorithm of taking into account VAT exemptions and made calculations using statistical data for the United Kingdom of Great Britain. Information about VAT exempted turnover should be obtained from the State Fiscal Service of Ukraine and compiled into the National Accounts Database. The Input-output approach to the calculation of VAT can be applied both for the analysis of tax legislation and for direct VAT assessment.

Keywords: National Accounts Database; Input-output Tables; Value Added Tax; Tax Rate; Export Tax Refund

JEL Classification: E62; O17; E01; C10

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1. Introduction and Brief Literature Review.

The Theory of National Accounts opens up new possibilities for improving VAT taxation. New terms have been introduced: statistical tax rates are equal to the current VAT rate multiplied by the share of value added for VAT or by the share of input for the export tax refund (ETR) in products output, which are calculated for selected sectors of the economy on the basis of National Accounts. Statistical tax rates allow for determining VAT or ETR from sales turnover, which reduces the probability of tax fraud. Time limitations associated with a three-year delay in the calculation of National Accounts are treated as insignificant in many cases. The authors of the article have suggested an algorithm of taking into account VAT exemptions and made calculations using statistical data for the United Kingdom of Great Britain. Information about VAT exempted turnover should be obtained from the State Fiscal Service of Ukraine and compiled into the National Accounts Database. The Input-output approach to the calculation of VAT can be applied both for the analysis of tax legislation and for direct VAT assessment.
company’s profits, including depreciation of capital, or as a difference between the total output and intermediate input. There are four methods by which we can calculate VAT:

1. (Wages + profits) * \( R \) - direct addition method (accounting method);
2. \( R \times Wages + R \times profits \) - indirect addition method;
3. (Output - input) * \( R \) - direct subtraction method (accounting method);
4. (Output - input) * \( R \) - indirect subtraction method (invoice or credit method) [2].

Here \( R \) means the tax rate. Indirect methods are called so because value added itself is not calculated, however tax liability (credit) relevant to the components of value added is. The term «input» denotes raw materials or purchases for production other than labour. The term «output» means final goods and services sold or consumed for non-commercial purposes. Comparison of the methods leads to the following conclusions.

Method 4 attaches tax liability to a particular transaction (the main advantage) and leaves good tracks for the audit, although today this barrier against manipulations is not sufficient.

Method 3 does not give certainty that inputs are deducted only when tax is paid. It is harder for tax payers to get a tax credit in full. Also, it is inconvenient to identify value added of different products each month as sales may greatly change.

For methods 1 and 2, it is necessary to determine the profit. Usually it is not broken down into individual products of the company, which may be taxed differently and inputs are never divided depending on VAT rates. Besides, calculation of profit requires considerable time.

Ultimately, method 4 is the best according to the fiscal economists, which is why we will use it hereinafter.

The main advantage of the value added tax, if compared with the sales tax, is that there is no double taxation since the subject is not final consumption but only value added [3]. Due to the fact that each processing stage is levied, the tax is evenly distributed between companies. VAT is charged in most cases in accordance with the technique common in the world and meets the recommendations of the International Monetary Fund. The unification of the method has contributed to the spread of VAT and improvement of tax legislation by studying the experience of different countries. Following the same logic, the European Union has obliged its member states to harmonise their policies in the field of VAT. However, along with the positive trends, there appear negative ones over time.

The disadvantages of VAT include inflation of tax credit by fictitious transactions, understatement of import profit and overstatement of export tax refund by unscrupulous taxpayers [3].

For many years, the accumulated problems have often been solved at the crossroads of several scientific disciplines. In the second half of the 20th century, the approximate counts developed along with taxation. Currently, most of the UN member states compile «input-output» tables on the basis of financial and statistical reporting. Such calculations are of great importance, therefore they are done by skilled professionals in the field of modern math, as it is the basis for the calculation of GDP and the structure of the economy which are indicators that determine the financial strategy of the state [5].

The Statistical Office of the European Union compiles the summary tables of National Accounts in Euros and in national currencies using special codes according to data of the national statistical offices. Thus, data used above are encoded as follows: CP\_MNAC, B1GQ, UK is GDP including taxes less subsidies on products at current prices in million national currency; CP\_MNAC, B1G, UK is GVA no taxes less subsidies on products at current prices in million national currency; CP\_MNAC, D21X3, UK are taxes less subsidies on products at current prices in million national currency, etc. This grouping is carried out at several levels: for example, for 10 aggregated economic activities and to all available separately: A * 10 and A * 64 by NACE [6]. There are other input-output databases, for example, Eora, GTAP and WIOD, Differences between them were analyzed by Owen, Wood, Barrett and Evans (2016) [7].

At present, the National Accounts statistics are increasingly applied by scientists for solving different economic problems [8; 9].

2. Purpose. The purpose of this article is to connect the achievements in the field of taxation and National Accounts in order to create an alternative method for calculating VAT.

3. Results. The authors’ approach is based on invariability of the tax and export tax refund amounts as we transit from one mode of calculation to another:

\[
\text{Recurrent} * \text{GVA} = \text{Rstatist VAT} * \text{Op} \quad \text{and Recurrent} * \text{Ip} = \text{Rstatist ETR} * \text{Op}.
\]

Then \( \text{Rstatist VAT} = \text{Recurrent} / \text{VA} / \text{Op} \) and \( \text{Rstatist ETR} = \text{Recurrent} / \text{Ip} / \text{Op} \).

\[
\text{VAT new} = \text{Rstatist VAT} * \text{SR and ETR new} = \text{Rstatist ETR} * \text{SR},
\]

where \( \text{GVA} \) - gross value added; \( \text{Ip} \) - input (intermediate consumption); \( \text{Op} \) - products (services) output in basic prices; \( \text{ETR} \) - valid VAT rate (for example, it is 20% in Ukraine); \( \text{Rstatist} \) - statistical VAT or export tax refund rates; \( \text{ETR} \) - export tax refund; \( \text{SR} \) - sales revenue.

Then \( \text{GVA/Op} \) is the key to solving the problem of overestimation of tax credit and \( \text{Ip/Op} \) is the key to solving the problem of overestimation of export tax refund.

There are new terms introduced: the statistical VAT rate and the ETR rate. The statistical VAT rate is a rate of taxation of the sales revenue in order to obtain value added tax. It is equal to the current VAT rate adjusted for the share of value added in products output which is calculated for selected economy sectors on the basis of statistical data from National Accounts. Similarly, the statistical ETR is a rate is rate of the taxation of sales revenue to obtain the export tax refund. It is equal to the current VAT rate adjusted for the share of intermediate consumption in products output, which is calculated for the selected economy sectors on the basis of statistical data from the National Accounts.

The proposed method saves import VAT at the current rate. The method originates from Ukraine and calculations of the statistical VAT rates are performed by Afanasieva (2016) [10]. In order to illustrate her approach to foreign colleagues, the authors refer to statistical data related to the United Kingdom of Great Britain. Table 1 shows the statistical VAT and the ETR rates for selected economy sectors. The statistical ETR rates are more for industries with a high share of exported products (NACE 24, 29 - Nomenclature of Activities for Community of Europeans), which may be a feature of this activity or evidence of the discussed problems. It can be developed in further researches. Annual changes of statistical rates for whole economy are shown in Table 2. The absolute numbers are the same for the export tax refund, but with the opposite sign. Changes are less significant in the macroeconomic stability periods and vice versa. The results of official National Accounts do not take into account tax exemptions and some features of pricing, as detailed below.

Advantages of the method. The application of the statistical rates deprives market subjects of personal interest in fraud. Blurring of the tax base by the tax credit stops. The tax is calculated with regard to the sales revenue. It is not necessary to pre-calculate the tax base. It is only required to document income via cash registers or the banking system. This results in value
added tax. It provides all the advantages if compared with the sales tax. Similarly, it becomes possible to calculate the export tax refund. It should be added that the transfer to offshore zones begins with unaccounted cash, which can be formed as a result of bogus transactions to overstate loans.

Assessing the advantages of the proposed method, it is useful to take into account the results of the corruption study in Ukraine conducted by Ukrainian authorities along with international organisations, such as Transparency International (2015) [12], Gesellschaft fur Konsumforschung and Pricewaterhouse-Cooper Ukraine. The survey was conducted among 2,741 corporate directors. The companies were chosen according to the regional criteria, turnover and type of activity for the sample to be representative. Opinions about the corruption centers of all the respondents who experienced that in August-October, 2015, are given in descending order: 26.7% - tax authorities, especially VAT authorities; 6.3% - Customs; 6.0% - the State Agency of Land Resources; 3.5% - the Prosecutor General’s Office of Ukraine, etc.

Testing and development. It is required to obtain information about tax exemptions and turnovers when VAT is not charged on small taxpayers and those who pay taxes with regard to special tax incentives grouped by industry. We also need the actual VAT data by those sectors of economy which are not published.

National Accounts by branches of industry contain information which includes VAT and excise duties and taxes on imports, yet this enables making only rough qualitative estimates. The new algorithm can be considered justified when calculating VAT for all industries and the whole economy will have a permissible deviation from the actual values.

Directions and scope of use. The proposed algorithm can be applied differently. It is logical to apply statistical as the check figures in the analysis of compliance with the current tax legislation. Small deviations from the actual amounts of the tax burden (VAT/SR) and share of the export tax refund (ETR/SR) from the statistical rates (average values) for a specific industry indicate that the company works on an equal basis. Consequently, significant deviations are likely to indicate tax fraud (Formula 3). It should be noted that the percentage the tax burden (VAT/SR) for honest taxpayers is higher than the average value equal the statistical rate in this activity type and for unscrupulous taxpayers it is lower than the statistical rate.

Besides, you must add VAT to exempt consumption or subtract it from export tax refund. All this leads to some underestimation of VAT and overestimation of export tax refund. To eliminate this difference, the intermediate VAT consumption should be subtracted before calculating statistical rates. Finding the solution to this task is a subject for further research. By using information about tax exemptions by industries (15), we need to distinguish the taxable turnover from intermediate consump-
tion (69-15=54), then we are to exclude VAT from the taxable turnover (54+42=96) and determine the adjusted input and output (45+56=101; 60+40=100) and then calculate the statistical rates (60/100 & 40/100). To do this, it is necessary to obtain information about VAT exemptions by industries from the Safeguarding information about VAT exemptions by industries from the NACE 84-88 and 64-66 are completely exempt from tax.

Note: Only the standard operating rate of 20% is taken into account. It is expected that the activities of

References


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