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MODELING OF CONSUMPTION TAXES FOR DIFFERENT MARKET FRAMEWORK: THE CASE OF UKRAINE

Abstract. *In the context of current discussion related to the improvement of efficiency of consumption taxes we developed a theoretical framework to model the turnover taxation. We empirically tested the capacity of VAT to stimulate the labor productivity in different markets. The results showed that this dependence is significant for the sectors similar to perfect competition markets, while in industries similar to monopoly and oligopoly this correlation is absent or insignificant. This means that in competitive markets the VAT should be kept, while in markets with imperfect competition the replacement of the VAT with other indirect tax, notably the turnover tax, could be considered. We conclude by determining, based on the developed theoretical model, weaknesses, which should be taken into account by policymakers and tax officials when designing tax reform policy in order to prevent market failures.*

Key words: VAT, turnover tax, consumption, competition, market failure.

JEL-Classification: C51, E62, H30

1. Introduction

According to the current tax theory, the government never has complete and necessary information; this in turn leads to the distortions in the form of market failures, information asymmetry, problems of adverse selection etc. This means that markets could be perfectly efficient only without taxation. But at the same

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time an appropriately developed tax system could correct in some way these distortions and market imperfections.

Now in Ukraine the institutional environment of taxation is characterized by complicated tax legislation; relatively high tax pressure on official profits of companies; the high level of tax evasion by economic agents; and substantial level of corruption in tax relations. Such institutional features lead to the negative consequences, notably to the insufficient financing of public goods, to the problems with redistribution of income through the public funds, to the permanent budget and Pension Fund deficit, to the inefficient allocation of resources as a consequence of their spending to the generation of rent instead of satisfying needs of productive activity, to the low profitability of significant number of economic agents caused by high formal and informal contributions in the interests of the regime, to the increase of risks of economic activity, coming from corruption and tax noncompliance, to the low level of regime's credibility etc. These factors, and not only high tax rates or absence in the tax legislation the investment and innovation reliefs, lead to the unattractive investment climate in the country and discourage the efficient industrial development. Such situation, typical for the most transitional countries, is currently complicated in Ukraine by geopolitical problems diverting significant resources from the sustainable economic development.

Currently in Ukraine there is a discussion among both policymakers and academics concerning the introduction of the turnover tax whether in pure form or along with value-added tax (VAT). This discussion is caused by significant problems related to the administration of the VAT (problem of incomplete and asymmetric information), which in turn leads to the significant VAT evasion and to the corruption in tax authorities of different levels. Some results of the tax theory predict that VAT is not the tax, able to resist the corruption, notably in transition countries (see for example Stiglitz (2010)).

At the same time, Ukraine cannot replace VAT with certain direct tax and completely abandon it for the following reasons: generally recognized advantages of the VAT compared with turnover tax (avoiding of the cascading effect, being closer to the production efficiency in terms of Diamond-Mirrlees etc.); efficiency of the VAT in presence of substantial share of the value added in economy, characterizing mostly by III-IV technological paradigms; and current Ukrainian issues to the European integration.

And the aim of this paper is to analyze opportunities and weaknesses of consumption tax alternative to the VAT in transition economies which is supposed to be tested empirically for Ukraine. To do this, we structured the paper as follows. Section 2 reviews research on consumption taxation in different markets. Section 3 presents both the theoretical model of the turnover taxation in economy with one good and the empirical testing of the capacity of VAT to stimulate the labor productivity in different markets. In Section 4 we provide the results and discussion. Finally, the Section 5 presents some concluding remarks.

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2. Literature review

The existing theoretical studies, comparing different types of consumption taxation in different markets, could be divided into two groups:

ad valorem vs. consumption taxes;

ad valorem vs. turnover taxes.

Keen (1988) defined two main ways in which commodities are generally taxed: by a specific (or 'unit') tax, charged as a fixed amount per unit of the product and so, in effect, a tax on the volume of sales; and/or by an ad valorem tax, specified as a proportion of the product price and so, in effect, a tax on the value of sales.

The bulk of neoclassical theoretical researches concluded that in an imperfect competition framework – monopoly and oligopoly, ad valorem tax is better that specific tax in terms of Pareto-improvement.

Anderson et al. (2001) consider that the relative efficiency of unit and ad valorem taxes is the same for the extreme cases of perfect competition and monopoly. Under perfect competition these types of taxes, constructed to raise the same amount of revenues, are equivalent and lead to identical economic outcomes, by shifting the demand curve down by the same amount at its intersection by supply. In a monopoly framework an ad valorem tax is better than a unit tax (both yield the same revenue) form the welfare perspective since it renders the demand curve more elastic and so encourages production.

Cournot (1838, 1960) argued that the two tax systems need different treatment in the monopoly framework. Wicksell (1856, 1959) showed that ad valorem taxes dominate unit taxation in the monopoly case. The standard and complete arguments for the superiority of ad valorem taxation in a monopoly market could be found in Suits & Musgrave (1953). They showed that in monopoly framework the tax revenue from specific tax is lower than the revenue from ad valorem tax provided that there is the same output. Accordingly they conclude that the choice between the two taxes is a matter of indifference under pure competition and the ad valorem tax is preferable under monopoly. Further, Delipalla & Keen (1992) analyzed specific and ad valorem taxes for the Cournot oligopoly and concluded that in order to be efficient the optimal tax policy requires maximum reliance on ad valorem taxation.

Skeath & Trandel (1994) analyzed the case for ad valorem taxes under monopoly framework and showed that for any given unit tax there is an ad valorem tax that producers larger consumer surplus, profits and tax revenue. For linear and homogenous demand they showed that such Pareto dominance also extends to Cournot-Nash oligopoly framework. Authors concluded that welfare-maximization behavior on the part of the government would always imply that the ad valorem tax would be imposed.

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But further a number of researches, considering other factors, appeared, and their conclusions were not unambiguous.

Thus, Anderson et al. (2001) showed that ad valorem taxes are better from the welfare perspective for both Cournot and differentiated-Bertand oligopolies when companies have symmetric costs. But in the Bertand oligopoly framework with differentiated goods, when companies have differentiated costs, the specific tax could be an effective welfare raising tool. Das-Gupta (2005) argued that under imperfect competition in a static economy a turnover tax may produce both more revenue and greater welfare than a VAT. Blackorby & Murty (2007) using a simple general equilibrium model showed that in a monopoly sector the set of unit-tax Pareto optima is identical to the set of ad valorem-tax Pareto optima. But their conclusions are reliable only when government is able to tax the companies' profits on 100% rate, which is unlikely in practice.

Schröder & Sørensen (2010) used a general equilibrium monopolistic model, similar to Dixit-Stiglitz (1977) one, with heterogeneous companies and intra-industry reallocations. They showed that under imperfect competition ad valorem taxes are better than unit taxes, since unit taxes distort relative prices, which in turn reduces average industry productivity, increasing the market share for firms with low productivity, allowing them to survive in the market. But according to authors, this result depends crucially on model assumptions. They assumed the constant elasticity of substitution (CES), which imply that the market equilibrium in the absence of a unit tax is first best. But for other preferences this first best property of the market equilibrium with no unit taxes does not hold and thus the unit tax may become the preferable instrument to tax consumption in the monopolistic competition framework.

Gaudin & White (2014) showed that total surplus is larger under the revenue-maximizing ad valorem tax than under the revenue-maximizing unit tax if and only if the elasticity of total demand increases in price. And by contrast, when this condition does not hold, the total surplus is higher in a unit tax regime. They concluded that this result is robust to a wide set of demand forms and to various frameworks of imperfect competition, including monopoly and Cournot oligopoly.

The institutional factors like tax avoidance and tax evasion in determining the type of consumption taxation for different market framework was introduced by Goerke (2010).He considered that if the costs of not paying the full amount of taxes are a function only of the amount of taxes avoided or evaded, a firm's output decision can be separated from its avoidance choice. In such conditions, a monopolist's response to the balanced-budget shift from specific to ad valorem taxation is unaffected by avoidance or evasion activities. But, if the amount of taxes not paid has an effect on output, tax avoidance or evasion opportunities may strengthen, mitigate or reverse the output and welfare consequences of the proposed tax reform. Notably, if the marginal costs of tax avoidance fall with the official tax base, for example, it becomes easier to find tax loopholes the larger the official tax base is because, the balanced-budget shift towards ad valorem taxation will reduce

the monopolist's output. Profits, however, are unaffected by the tax reform, given an adjustment in tax payments. In such a situation, a shift away from ad valorem taxation represents a Pareto improvement. Accordingly, the tax reform, aiming to reduce tax avoidance activities, requires the shift towards specific taxation.

Kotsogiannis & Serfes (2014) analyzed another institutional factor – uncertainty. They consider, that ad valorem taxes generate higher output variability and price variability than specific taxes and, therefore, it can lead to higher expected consumer surplus and profits. On the other hand, tax revenue under specific taxation is linear in price; while under ad valorem taxation it is non-linear, thereby making the tax authority risk-averse. Consequently, output and price variability do not affect expected tax revenue under unit taxation, but their impact on expected tax revenue is negative under ad valorem taxation. The implication of this allowed authors to conclude that specific taxation can generate higher expected tax revenue than ad valorem, which is contrary to the neoclassical deterministic model. Therefore, the social welfare equivalence between the two taxes, emphasized in the deterministic model, does not hold.

Schenk et al. (2015) consider that in a competitive market for certain good or service, which bears the economic burden of the VAT on the good or service, depends on the price elasticities of producers and consumers. The supply of a good in a competitive market permitting new entrance tends to be very elastic in the long term, which means that the tax burden is likely to be shifted forward to consumers. In contrast, in markets with imperfect competition similar to monopoly, oligopoly or cartelization, the real burden if the VAT may be shifted in different ways and may be partially borne by producers. So, depending on the government goals, VAT as ad valorem tax could be used in order to limit companies' profits on markets with imperfect competition. If the government intends to support such companies, the specific tax will be better to achieve this goal.

As intermediate conclusion we can note that neoclassical theoretical models in an imperfect competition framework argue the advantage of ad valorem tax over both specific taxes and turnover taxes (Fig. 1).

	Ad valorem taxes	Turnover taxes	Specific taxes	
Ad valorem taxes		+	+	Neoclassical approach
Turnover taxes	+		-	
Specific taxes	+	-		
Institutional approach				

Figure 1. Research on the choice of type of consumption taxation for imperfect competition framework

But taking into consideration the institutional factors, characterizing the practical aspects of functioning of the economic system, could significantly change the conclusions of theoretical models.

3. Methodology

Within the framework of the current discussion it is reasonable to examine the turnover tax as possible alternative to the VAT. To do this, we developed a model of turnover tax for an economy with one good.

Let's assume that there is a chain of sellers, the first of which buys the good as input resources at the given price V_0. Then sellers resell this good (improving it or not) to each other along the chain at the increased price. The final seller in the chain sells the good to the customer. In a competitive market framework the good is sold at the highest possible price ($\hat{V}$), determined by its demand.

So, the chain of resale of the good (including its possible improvement) of any length could increase its price from V_0 to $\hat{V}$ maximum. Let's formalize the income and costs of certain seller and denote:

$$\forall i : i = 1, 2, \ldots, N :$$

where N is the length of the chain of resale; V_i is the good's selling price determined by the i-th seller; V_{i-1} is the good's purchase price for the i-th seller; V_0 is the good's purchase price for the first seller, i.e. the good's price at the input resource stage; ΔV_i is the price increase by the i-th seller; b_i is the unproductive expenditure of the i-th seller; τ is the turnover tax rate; Inc_i is the i-th seller's income; c_i is the i-th seller's cost related directly to the price increase from V_{i-1} to V_i; C_i is the i-th seller's total expenditure during the price increase from V_{i-1} to V_i; T_i are the i-th seller's tax payments (and, accordingly, the budget income) from the i-th resale of the good; P_i is the after-tax profit of the i-th seller.

It's evident that

$$\forall i : i = 1, 2, \ldots, N :$$

the selling price determined by the i-th seller equals:

$$V_i = V_{i-1} + \Delta V_i = V_0 + \sum_{j=1}^{i} \Delta V_j ; \qquad (1)$$

the i-th seller's income is equal to the selling price:

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$$Inc_i \equiv V_i \; ; \tag{2}$$

the i-th seller's cost equals:

$$C_i = c_i + \tau V_i + b_i = c_i + \tau V_{i-1} + \tau \Delta V_i + b_i = c_i + \tau \left(V_0 + \sum_{j=1}^{i} \Delta V_j \right) + b_i \; ; \tag{3}$$

Notably, the i-th seller's tax payments are:

$$T_i = \tau V_i = \tau V_{i-1} + \tau \Delta V_i = \tau \left(V_0 + \sum_{j=1}^{i} \Delta V_j \right). \tag{4}$$

Consequently the i-th seller's profit equals:

$$P_i = Inc_i - C_i = V_{i-1} + \Delta V_i - c_i - \tau V_{i-1} - \tau \Delta V_i - b_i =$$

$$= V_0 + \sum_{j=1}^{i} \Delta V_j - c_i - \tau \left(V_0 + \sum_{j=1}^{i} \Delta V_j \right) - b_i ;$$

$$P_i = \left(1 - \tau \right) \left(V_0 + \sum_{j=1}^{i} \Delta V_j \right) - c_i - b_i . \tag{5}$$

Total tax revenue from the taxation of turnover along the chain with the length N equals:

$$T\left(N \right) = \sum_{i=1}^{N} T_i = \tau \sum_{i=1}^{N} V_i = \tau \sum_{i=1}^{N} \left(V_{i-1} + \Delta V_i \right) = \tau \sum_{i=1}^{N} \left(V_0 + \sum_{j=1}^{i} \Delta V_j \right);$$

$$T\left(N \right) = \tau \left(N V_0 + \sum_{i=1}^{N} i \Delta V_i \right). \tag{6}$$

According to the (6) it is evident that the government is motivated to increase the length of the resale chain. To do this it can apply both institutional, bureaucratic and also infrastructure instruments.

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Let's determine the necessary break-even condition for sellers. It follows from (5) that for this the satisfaction of (7) is required:

$$P_i > 0 \Leftrightarrow (1-\tau)V_i - c_i - b_i = (1-\tau)\left(V_0 + \sum_{j=1}^{i} \Delta V_j\right) - c_i - b_i > 0 \ ;$$

$$V_i > \frac{c_i + b_i}{1 - \tau} \tag{7}$$

or

$$V_0 + \sum_{j=1}^{i} \Delta V_j > \frac{c_i + b_i}{1 - \tau} \ . \tag{8}$$

The condition of profitability for all sellers is the satisfaction of (8) for $\forall i : i = 1, 2, \ldots, N$. Then the necessary (but not the sufficient) condition could be written as follows:

$$\sum_{i=1}^{N}\left(V_0 + \sum_{j=1}^{i} \Delta V_j\right) > \frac{1}{1-\tau} \sum_{i=1}^{N} \left(c_i + b_i\right) \ ;$$

$$NV_0 + \sum_{i=1}^{N} \left(N - i + 1\right)\Delta V_i > \frac{1}{1-\tau} \sum_{i=1}^{N} \left(c_i + b_i\right) . \tag{9}$$

From (7) we can conclude that producers which obtain the value added of a good by processing it in order to improve its quality (accordingly, having $c_i>0$) are in the worst conditions compared with speculators, who "increase" the good's price only due to its resale but not due to improvement of its qualities.

To make more valid conclusions it is necessary whether to analyze concrete applications with definite value added functions of and unproductive expenditure or to simplify the model by, for example, fixing these values. Generally the latter approach is correct, since even in the simplified model the main tendencies and trends of agents' economic behavior appear.

Thus, let's assume the following:

before-tax profit for each seller is proportional to the good's price at which he buys it, i.e.:

$$\forall i : i = 1, 2, \ldots, N : \Delta V_i = dV_{i-1}, \ d - const \ ; \tag{10}$$

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Unproductive expenditure on each link of chain is constant, i.e.:

$$\forall i : i = 1, 2, \ldots, N : b_i = b, \ d - const. \tag{11}$$

Then, for the i-th seller $\forall i : i = 1, 2, \ldots, N$:

his income is $V_i = V_{i-1} + d \cdot V_{i-1} = V_{i-1}(1+d) = V_0(1+d)^i$;

his expenditure is: $C_i = c_i + \tau V_i + b_i = c_i + \tau V_0(1+d)^i + b_i$;

his tax payments are $T_i = \tau V_i = \tau V_0(1+d)^i$;

and his profit is: $P_i = (1-\tau)V_0(1+d)^i - c_i - b$.

Based on the last expression, the necessary (but not the sufficient) condition of profitability for each seller is the satisfaction of condition is:

$$\forall i : i = 1, 2, \ldots, N : P_i = (1-\tau)V_0(1+d)^i > b$$

Thus

$$\min_{i=1,N} P_i > b;$$

$$(1-\tau)V_0 \min_{i=1,N}(1+d)^i > b;$$

$$(1-\tau)V_0(1+d) > b;$$

$$V_1 > \frac{b}{1-\tau}. \tag{12}$$

or

$$d > \frac{b}{(1-\tau)V_0} - 1. \tag{13}$$

However if the government constraints the income of the final seller, i.e.:

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$$\hat{V} \geq V_N = V_0 \left(1 + d\right)^N ,$$

whence it follows that

$$d \leq \left(\frac{\hat{V}}{V_0}\right)^{\frac{1}{N}} - 1 , \tag{14}$$

i.e., the longer is the resale chain, the less is potential "upcharge" of each seller. Combining (13) i (14) we obtain:

$$\frac{b}{\left(1 - \tau\right)V_0} - 1 < d \leq \left(\frac{\hat{V}}{V_0}\right)^{\frac{1}{N}} - 1 . \tag{15}$$

From (15) we can determine the limitation of the tax burden:

$$\frac{b}{\left(1 - \tau\right)V_0} - 1 < \left(\frac{\hat{V}}{V_0}\right)^{\frac{1}{N}} - 1 ;$$

$$\frac{1}{1 - \tau} < \frac{V_0}{b} \left(\frac{\hat{V}}{V_0}\right)^{\frac{1}{N}} ;$$

$$1 - \tau > \frac{b}{V_0} \left(\frac{V_0}{\hat{V}}\right)^{\frac{1}{N}} ;$$

$$\tau < 1 - \frac{b}{V_0} \left(\frac{V_0}{\hat{V}}\right)^{\frac{1}{N}} , \tag{16}$$

then again, based on (13), the condition (17)

$$\tau < 1 - \frac{b}{V_0 \left(1 + d\right)} . \tag{17}$$

should be held.

So, as it was already mentioned above, the government aims to increase the number of resales of the good (N) in order to tax more times its initial value. But

the marginal competitive price does not allow the uncontrolled increase of the turnover tax rate (τ); moreover, both τ and N are oppositely directed, so the increase of the length of the resale chain increases the tax base, but at the same time it forces the reduction of the tax burden. The latter is not often taken into consideration by tax officials and policy makers and could lead to the losses for the less effective producers, their withdrawal from the business activity, and, consequently to the splitting of a chain and short deliveries. This results to the market failure, notably to the incomplete market, and if this situation persists – to the shifting from competitive economy to the shortage one.

In the shortage economy in order to prevent the speculations the introduction of the turnover tax could be regarded as efficient tool of disabling such speculations. By its mechanism the shortage economy is similar to the imperfect competition, notably monopoly and oligopoly.

The value added in absolute terms depends on production output and normalized value added, defined based on the labor productivity. The turnover tax, as opposed to the VAT, does not depend directly on the labor productivity. So, in industries, where are long value added chains, which should be reduced, the reforming of the VAT system could be reasonable. For monopoly and oligopoly by definition there are no special incentives for increasing of the labor productivity, i.e. the VAT could not bring special benefits. At the same time if the government takes care of the welfare of people, it makes sense to reduce in these industries the value added chains, which "upcharge" without competition the price of products.

So, let's suggest the hypothesis that the VAT revenue, collected in sectors with imperfect competition (similar to monopoly and oligopoly), does not depend from the labor productivity.

In order to test empirically this assumption, according to the Ukrainian Standard Industrial Classification of Economic Activities 2005 and 2010, we determined the main economic activities, which were further aggregated into 10 main industries/sectors (Table 1). As we mentioned above the value added in absolute terms depends both on production output and on normalized value added defined based on the labor productivity. We defined the labor productivity in industries as ratio of output in market prices and number of employees in the sector.

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Table 1.Economic activities chosen for analysis

No	Economic activity	Sections according to the Ukrainian SIC 2010
1	Agriculture, forestry and fishing	A
2	Mining and quarrying	B
3	Manufacture of chemicals and chemical products	C20
4	Manufacture of basic metals	C24
5	Machinery, including: Manufacture of computer, electronic and optical products; Manufacture of electrical equipment; Manufacture of machinery and equipment n.e.c.; Manufacture of motor vehicles, trailers and semi-trailers; Manufacture of other transport equipment.	C26-C30
6	Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities	D+E
7	Construction	F
8	Wholesale and retail trade; repair of motor vehicles and motorcycles; Repair of computers and personal and household goods	G+S95
9	Transportation and storage, Postal and courier activities	H
10	Accommodation and food service activities	I
11	Financial and insurance activities	K
12	Real estate activities	L

Using the nonlinear multifactor regression analysis with Tweedie distribution[1] and power link function[2]in STATISTICA 10.0 Enterprise we defined the influence of labor productivity on the VAT revenue in main industries.

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[1] Since neither the normal distribution nor the binomial and Poisson distribution do not correspond to the type of input data
[2] Since data sets are continuous

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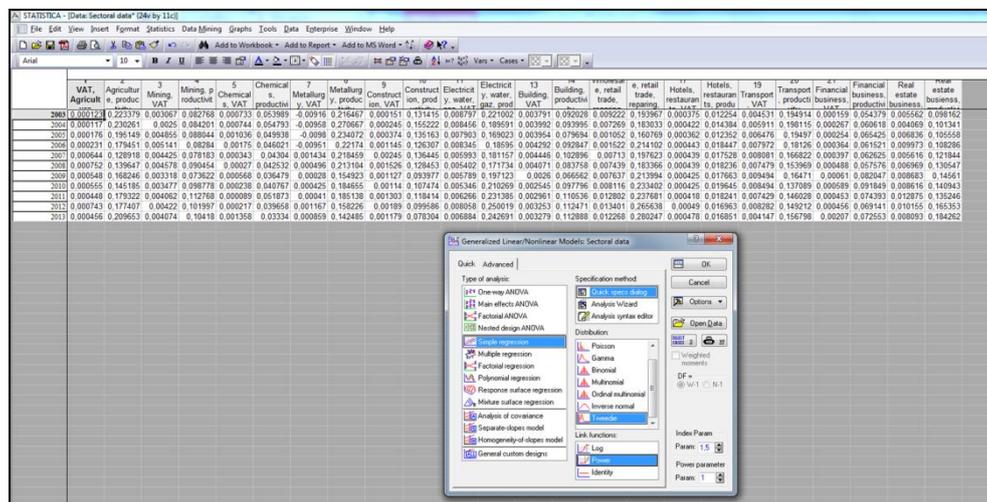
**Figure 2. Input data for calculation in the Statistica 10.0 Enterprise –
screenshot**

4. Results and Discussion

The obtained results are presented on Fig. 3-4[3].
The parameters of labor productivity, which have the significant correlation with
independent variables (the VAT revenue), are highlighted in red.

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[3]Wald Test is a parametric statistical test, which can be used to test the true value of the
parameter based on the sample estimate. Typically it is used to estimate the coefficient of
independent variable in nonlinear regression model. If such coefficient equals to zero, the
model becomes constant, and if no, then the Wald test allows to define if this difference is
significant. Critical value for the Wald test equals to the "chi-squared" criterion (χ^2-
distribution) with one degree of freedom.

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Figure 3. Correlation results
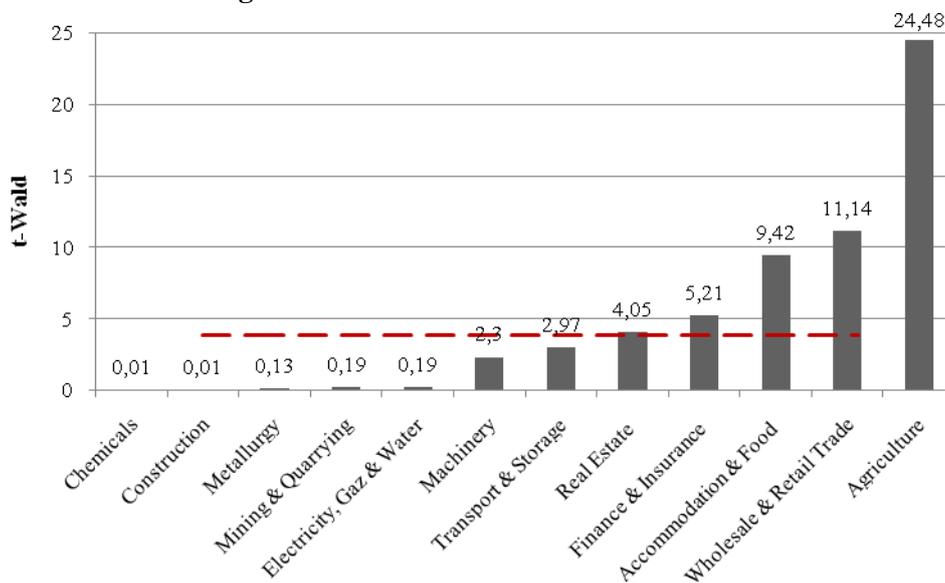
Figure 4. Results of the Wald test for economic activities

So, our estimation showed that the significant correlation between labor productivity and VAT revenue is absent in mining and quarrying; manufacture of

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chemicals and chemical products; manufacture of basic metals; machinery; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities; construction; transportation and storage, including postal and courier activities.

While in agriculture, forestry and fishing; wholesale and retail trade; repair of motor vehicles and motorcycles; repair of computers and personal and household goods; accommodation and food service activities; financial and insurance activities; real estate activities, our regression analysis showed the significant correlation between variables.

According to the Report of the Antitrust Committee of Ukraine (June 2015) in Ukraine the most monopolized are fuel and energy industry, which includes D and E sections, according to the Table 1., and also transportation, storage and communication (section H). The machinery sector in Ukraine, including C26-C30 sections, is the oligopoly market while the mining and metals sector (B and C24 sections) is the dominance market. Both agricultural and retail and wholesale trade sectors (A, G and S95 sections) are competitive markets (Fig. 5).
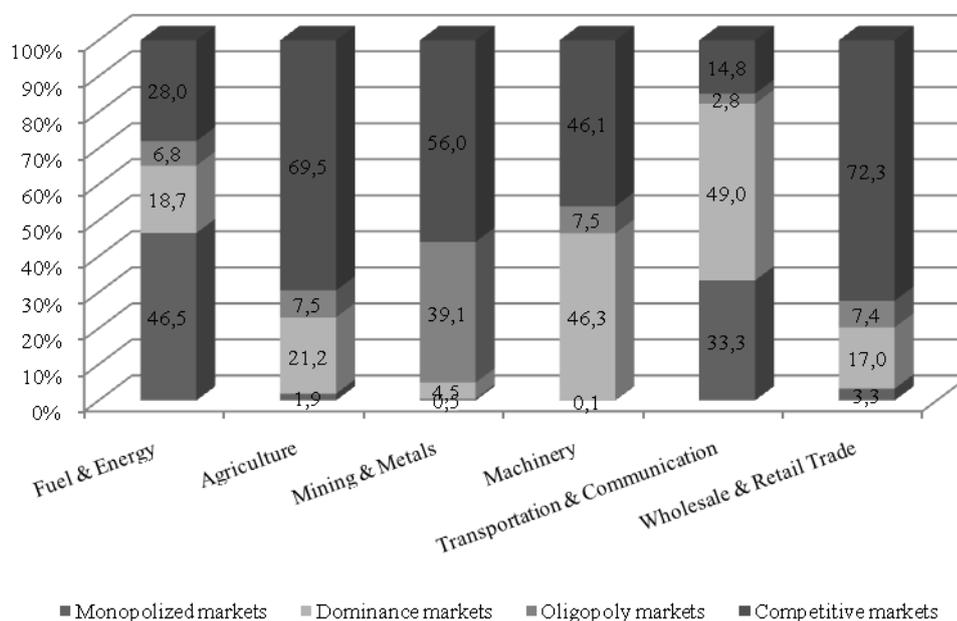
Figure 5. Market framework for economic activities in Ukraine as of June 2015

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Sections I, K and L (accommodation and food service activities, financial and insurance activities, and real estate activities, respectively), by definition could be regarded as close to competitive market due to a large number of economic agents, operating in these industries.

So, our hypothesis concerning absence of significant correlation between VAT revenue and labor productivity in industries with imperfect competition (similar to monopoly and oligopoly), is confirmed.

This means that in competitive markets the VAT should be kept, while in markets with imperfect competition the replacement of the VAT with turnover tax could be considered. But in that case policymakers and tax officials should take into account the negative consequences of the introduction of the turnover tax, following from an analysis of our theoretical model.

First, in the shortage economy resellers in order to avoid losses can considerably increase the price, but at the final stage goods could not be entirely sold, since consumers, despite of merchantability, may not have means to buy them. As a result, the situation of the incomplete market appears again.

Second negative consequence is evident in the fact that the government intentionally allows agents who are not broadly involved in the production and processing process or other agents who get means which are the unproductive expenditure of participants of the chain at each stage of production (variable b_i in the model) to receive income. This capital could otherwise be invested in the technical upgrading or be kept as insurance reserves in order to prevent local losses. Moreover, if the issue is about government authorities and officials dealing with licensing functions, this contributes to the increase of corruption.

Thirdly the turnover tax could contribute to the rise of adverse selection problem. As follows from the analysis of the model, the less profitable are producers, who process goods and improve their quality. Consequently they risk to suffer losses and to withdraw from the value chain; that is typical for adverse selection framework.

When the revenue-maximizing (as opposed to welfare-maximizing) government introduces turnover tax, it intends to increase the length of the chain, *ceteris paribus*, the tax revenue. This conclusion of the model contradicts in some way to the widespread opinion that the turnover tax could combat with the shortage in uncompetitive markets. At the same time, under this tax, as opposed to VAT, the tax burden falls not only on consumers, but also on producers and sellers of goods and services. Consequently, the possibility of its introduction should be considered primarily for economies with high level of income inequality and low purchasing power.

5. Conclusions

This paper develops a theoretical framework to model the turnover taxation. We empirically tested the capacity of VAT to stimulate the labor productivity in different markets. The results showed that this dependence is significant for the sectors similar to perfect competition markets, while in industries similar to monopoly and oligopoly this correlation is absent or insignificant. This means that in competitive markets the VAT should be kept, while in markets with imperfect competition the replacement of the VAT with other indirect tax could be considered. We analyzed the turnover tax. The developed theoretical model allowed us to determine weaknesses, which should be taken into account by policymakers and tax officials when designing tax reform proposals in order to prevent market failures, notably the incomplete market problem.

Since it makes sense to change taxes in markets with imperfect competition, further investigations supposed to be concentrated on developing models of turnover taxation (or other taxes on consumption) in a shortage economy, and also on more detailed study of natural monopolies.

Furthermore the similar estimates for other transition countries with the same problems in tax policy could be regarded as one of the directions of future research in order to confirm or reject the hypothesis that in markets with imperfect competition there is a weak correlation between labor productivity and VAT revenue.

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