THE DETERMINANTS OF TAX EVASION AMONG UKRAINIAN HOUSEHOLDS

by
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Abstract

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From year to year Ukrainian government tries to unlock about 40 to 60 percent of the economy, which still remains under the shadow. Flourishing of tax evasion practice led to disappointing results: almost half of the salaries are paid in envelopes bypassing tax liabilities. Boundaries between lawful and illicit activity are blurred, in this study the definition 'tax evasion' will be considered as an attempt of an individual to hide his income without consideration of legality. Since tax evasion is difficult to observe directly, the paper attempts to construct accurate measures of tax evasion by evaluating the deviation between households' consumption and income, following the theoretical framework suggested by Gorodnichenko (2008). Also paper examines three-dimensional set of characteristics of Ukrainian household members - individual and household characteristics, geographical position and job occupation of the agent, - which have a significant impact on evasion behaviour. The analysis is provided on the ULMS dataset of 2007 wave. Besides, it is defined a person's profile of individual, which more likely be engaged in tax evasion. The results obtained might have a policy implication: tax authorities could increase accuracy of tax evasion detection techniques by paying close attention to a target group of concern.

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GLOSSARY

Tax evasion The illegal attempt of individual, company or organization to minimize tax liabilities through fraudulent schemes.

Tax avoidance The attempt of individual, company or organization to minimize tax liabilities legally.

Tax compliance The willingness of individual company or organization to pay tax liabilities on time in the appropriate formats.

Chapter 1

INTRODUCTION

In most cases tax evasion is associated with behaviour of companies, organizations or business structures, who intentionally tries to minimize their tax obligations by transfer pricing schemes: the owners of businesses evade from responsibility through offshore tax havens and fraudulent accounting schemes. The wealthiest people of Ukraine, oligarchs, still benefit from the post-soviet period of cheap and rigged privatization after the establishment of Ukrainian independence.

As for the average citizens, it is widely considered that high tax rates on personal income have a partial causal effect of tax evasion increase; especially it concerns transition economies, like Ukraine, Russia and Belarus. As a result, tax evasion is presented everywhere; it consequently leads to flourishing corruption in all levels of economic activity. This phenomenon prevails in the countries where the hidden income is extensively distributed, like Ukraine, Russia and Belarus. Ukraine as such is contaminated by corruption. The fact that people hide their income is also negatively correlated with trust in government institutions; citizens do not believe that their money will be treated fairly and appropriately.

As a result, the exposure of shadow economy in Ukraine reaches a horrendous level, as recent study suggested[2] about 40 percent of the economy is under shadow and the number is still growing.

[2] The article of Kyiv Post by Brian Bonner from the 25th of December, 2015.

The flourishing of the shadow economy leads to a large budget deficit, underinvestment in public goods, the overall decrease in living standards; all these lead to economic crises, poverty and flourishing of criminals.

Over the last two years, the government of Ukraine tries to fulfil a large state budget deficit and stabilize Ukrainian economy. In 2014 the government of Ukraine announced a program of tax reforms with such targets: decrease of tax rates, simplification of a procedure, reduction the tax burdens, and tax decentralization. But now, after the Revolution of Dignity, it is the trust of Ukrainians to their government that shrank dramatically. The increased utility bills, uncertainty about future of Ukraine and constant changes in legislation, policy shattered trust further. The cost of living in Ukraine became significantly higher.

Today Ukrainian government tries to find ways to revive the dialog between state and people, workers and entrepreneurs, and with mutual support strengthen the economy of Ukraine. A new tax police was launched in February 2015, the compromised result of the government and Ministry of Finance proposals. This tax reform is supposed to motivate the local business and foreign investors to become fairer, more transparent and compliant. Consequently, the revenue, collected from taxpayers, from local businesses and individuals, will increase and may well lead to a lower budget deficit.

The citizens hide their actual income: almost half of salaries in Ukraine are paid in envelopes bypassing tax liabilities. The initial reason for this situation is that oligarchs try to increase the profit of their business by reducing labour costs on goods and services production.

Worth clarifying, in prevailing cases tax evasion and tax avoidance are the same phenomena but with different legal inner history: tax evasion is an illegal activity of reducing tax burden, whereas tax avoidance is hidden income but within legal requirements. Since boundaries between lawful and illicit activity are blurred, it is difficult to distinguish accurately the legality of bypassing tax liabilities, in this study the definition 'tax evasion' will be considered as an attempt of an individual to hide his income without consideration of legality.

Since it is hard to measure the illegal behaviour directly, the paper attempts to construct a tax evasion function that accurately indicates the hidden income among Ukrainian households. The analysis is based on the data from Ukrainian Longitudinal Monitoring Survey (ULMS) of 2007 wave. The study uses the information about expenditures, savings and income structure of Ukrainian families together with the individual level characteristics to define the extent of tax evasion – the discrepancy between reported consumption and income – and find the factors of a personal characteristics of Ukrainian household members, which contribute to the evasion behaviour, following the existing literature and taking into account distinctive features of Ukrainian economy.

The understanding of tax evasion driving force will help to reduce the drawbacks in tax policy by distinguishing people's preferences and initial incentives. Using the theoretical framework based on the permanent income hypothesis and appropriate assumptions, which are described in the next chapters, the empirical analysis will provide a profile of a Ukrainian citizen who most likely engaged in evasion behavior.

For this reason, the results might as well have a strong policy implication: tax authorities could use these individual characteristics to define a target group of concerns and apply for them additional control. Consequently, authorities could

indirectly find the employees who pay their employers in pockets bypassing tax liabilities, since the analysis will include not only personal characteristics of individuals but their settlement, job occupation and size of the firm from primary jobs and structure of household.

In parallel to newly introduced tax policy, the detection of tax evaders will significantly increase the efficiency of reforms, collecting more revenues in the state and local budgets.

To sum up, the main goals of this paper are the following:

- to provide the accurate measure of tax evasion phenomenon among Ukrainian households by constructing a theoretical framework that detect the income being hidden;
- to define the factors which contribute to tax evasion extension;
- to construct a profile of potential tax evader and give policy recommendation to tax authorities.

Since there are a limited number of articles on tax evasion for Ukraine case, the value of this thesis has a significant impact on tax policy of Ukraine as an whole. The author initiated a new direction of research in this field.

Tax morale is perplexing. With the extension of issues of tax evasion Ukraine will hardly recover from economic recession and living standards will still be on the nascent level, as well.

The thesis structure is as follows. Chapter 2 represents a literature review concerning the determinants of evasion behaviour, ways of constructing tax

evasion measure, theoretical and empirical approaches in tax evasion estimation. Chapter 3 discusses the underlying theoretical model with reasonable assumptions, which will be further used in the empirical estimation. Chapter 4 focuses on the data description, including the information concerning the construction of tax evasion function, descriptive statistics, advantages and disadvantages of estimated variables and discussion about possible omitted variables. Chapter 5 represents the empirical results of research and discussion concerning advantages of chosen methodological estimation method. Finally, Chapter 6 follows with the conclusion and general policy recommendations together with considering further direction of the research.

Chapter 2

LITERATURE REVIEW

The main goal of this thesis is to research and model the structure of tax evasion among Ukrainian households. The first part of this chapter represents both theoretical and other possible determinants of tax evasive behaviour mentioned in the literature of investigation of the tax morale question. Then the section looks at the methodology previously used in tax evasion research. Finally, the papers, which describe theoretical frameworks and empirical technics of investigation of tax evasion, will be reviewed in more details.

The literature analyzing tax evasion is parsimonious.

The most frequent factors mentioned in the literature are the following:

i. Age. The most prevalent finding notes that more compliant taxpayers are older people; Tittle(1980) marshals this fact as young taxpayers are more risk-adverse, less sensitive to penalties and reflect socio-psychological differences (a generational difference). Although a positive correlation was repeatedly claimed, several authors find this link insignificant.

ii. Sex. The majority of researches also include gender as a key variable of tax evasion. Analysing the tax compliance level of males vs. females mostly proves that women are more tax compliant. A possible explanation of this argument can be more conservative behaviour, moral restrains and predisposing rule- taker's life patterns of females (not rule-breakers, as a prevalent part of males can be considered); all of which result in promoting compliance among females. There is also consideration about the correlation between gender and the proxy

"probability of detection by tax authorities". Richards and Tittle (1981) conclude that female's realization of arrest is significantly higher than that of male's.

iii. Education. In the literature education is distinguished between two aspects: the general level of knowledge about tax and the knowledge with the opportunity to use evasive schemes. The former Lewis (1982) suggests that less educated people see tax payments as a burden, nominal value and eliminate the benefits presented by public goods like park zones and recreation areas, which can be viewed as tax evasion. However, the latter Witte and Woodbury (1985) considers more educated people, especially who know evasion ways, as that have less incentives to pay taxes.

iv. Income level. Mason and Lowry (1981) concluded that taxpayers with both high and low income are less tax compliant than those who earn middle level income.

v. Income source. This factor is defined by income type and source: income is from freelances, independent trade and farming or from income earned from primary jobs. Due to the article from Wall Street Journal (1984, p.34), in case of Japan, the estimate claims that salaried employees pay tax on 90% of their income, on average, while freelancers reported about 60% and farmers – 40%. Thus, the countries engaged in agriculture or small trading are likely to maintain the reduction on a tax basis.

vi. Job occupation. Occupation is determined by individual's employment or earning activity. Yankelovich, Skelly, and White (1984) the variable called "opportunity' is represented as a composition of occupation (freelancer, production, retail), income level and access to cash income resourses, whether they can get a loan or not. Another possible composition variable can be a complex of income, education and occupation.

vii. Peer influence. The research suggests that the more tax evaders are among the agent, the more likely tax evasion occurs. This variable can hardly be estimated, as it requires the results from surveys (questionnaires ,etc.). Also it is often closely connected with deinition of tax morale. Grossmann (1982) in his study considers the importance of social interactions in the informal sector of planned economies.

viii. Ethics, fairness, complexity of law. These variables are usually used in behaviour economics; whether this data set exists it's hard to answer immediately. The institutional approach, low tax morality, low trust in government institutions, and non-provision of public goods influence the (non)compliant behaviour of taxpayers. Schneider and Enstee (2000) in their study discuss the impact of the shadow economy, namely tax evasion, on the official economy.

ix. Probability of detection, punishment, tax rates, audit, benefits, fines. The body of literature suggests that these determinants have statistically significant impact on tax morale. In their cross-country analyses, Johnson et al., (1998a, 1998b) and Friedman et al., (1999) conclude that the government policy in tax field, such as the efficient work of tax authorities and simplified bureaucratic procedures and low level of corruption, have a greater impact on the taxpayers' attitudes towards taxes than the tax rates per se.

x. Other variables. Also the determinants of tax evasion can be the mobility of taxpayers, geographic location, the penalty of noncompliance, etc.

The methodology of tax evasion and compliance, mentioned in the literature, is usually represented by the survey research, experiment study, analytical and regression modeling.

The survey research is often represented by logit or probit model .The experiment research is less frequent type of the empirical technics due to its expensiveness and potential bias of results. In regression modeling there are two interesting approaches to define tax compliance.

Clotfelter (1983) tests the elasticity of expected hidden income with respect to income after tax and tax rates. Clotfelter's work concludes that the marginal tax rates have statistically significant impact on taxpayer's evasion decision.

Madeo, Schepanski, Uecker (1985) considers the judgement model of evasion behavior. This model includes economic oriented variables- level and source of income, penalties and structure of tax rate - and, finally, indicates that professionals, more skilled workers have a valuable incentives to be compliant.

Another approach of tax evasion estimation is to compare the groups of individuals, assuming to be more compliant, and the questioned group like self-employed individuals. The research conducts the level of tax evasion as the deviation between compliers and avoiders. Lyssiotou, Pashardes, and Stengos (2004) consider the discrepancy in the consumption. Ivanova, Keen and Klemm (2005) define tax compliance as an income- expenditure ratio. Whereas, Feldman and Slemrod (2007) defines the participation in charity as an indirect way of income hidden from tax obligations.

Now let's concentrate on two fundamental articles, which will be used in the analysis of tax evasion.

First, Cevik (2014) looks at the effect of individual values, such as cooperation with political representatives and the society for becoming a highly tax compliance payer. In order to define the influence of socio-economic and political factors on tax evasion behaviour, the author uses the logistic regression

model. Results confirm that individuals with high tax morale show the sensitivity to expectations of peers and parents, trust in government and social institutions. The difference between this study and mentioned above article is that Cevik (2004) uses social and political factors, while this study pays more attention on economic and individual characteristics, job occupation and geographical position of the agent.

Finally, Gorodnichenko, Martine-Vazquez and Peter (2008) investigate the effect of tax policy, new flat tax reform, on tax compliance behaviour. The main theoretical concept used in the article is the permanent income hypothesis, which states that income should be equal to permanent consumption. Assuming that the expenditures of consumption are fully reported the deviation between consumption and reported income indicates the hidden income. In order to separate the tax evasion effect from other factors' influence, the difference-in-difference approach and discontinuity regression analysis in numbers of specifications are used in this work.

These articles gave an idea how indirectly define evasion behaviour. The ULMS household questionnaire provides detailed information about the structure of consumption and expenditure, sources and amount of income of Ukrainian households, including income from purchases of home-grown items, based on which the measure of tax evasion was constructed. Together with individual questionnaire, which cover individual characteristics of respondents, the variable of interest tax evasion, will be composed in the next Chapters.

Chapter 3

METHODOLOGY

3.1. Theoretical analysis.

Since tax evasion is hard and very complicated to estimate directly, we make use of a theoretical framework, the permanent income hypothesis (PIH) to define the level of tax evasion indirectly. The tax evasion effect is estimated on the household level data: the monthly consumption of an individual in Ukrainian family estimated in cash equivalent is compared with income for the same person – if the deviation exists, it means that some part of income is hidden. This idea is proved by the theoretical model described by Gorodnichenko, Martine-Vazquez and Peter (2008). This framework was used for tax evasion estimation in Russia. Since Russia is also a transition economy as Ukraine, the theoretical approach, used in the paper, is relevant for the Ukrainian case.

The theoretical concept of tax evasion: derivation.

The core theoretical argument is that consumption should be equal to permanent income. Consumption is an important observable source of possible households' income identification, meaning that consumption indicates the actual amount of money which can be spent by household.

Following the conceptual framework described by Gorodnichenko, Martine-Vazquez and Peter (2008), the tax evasion function is defined by the corresponding procedure.

It is assumed that I_{ht}^{*} be the actual income received by the household members *h* at time period *t*. Households can make a decision to hide some part of income; let

reported part of income is defined as $I_{ht}^{R} = \Gamma_{ht} * I_{ht}^{*}$, where Γ_{ht} is a share of real income, a function of observable factors which influence on compliance behaviour, such as job and personal characteristics: $\Gamma_{ht} = \Gamma(S_{ht}) = \exp(-\gamma S_{ht} + error)$.

Let the actual household income I_{ht}^{*} has the following relationship to the permanent income I_{ht}^{P} : $I_{ht}^{*} = H_{ht} * I_{ht}^{P}$, where $H_{ht} = H(X_{1,ht}) = \exp(-\mu X_{1,ht} + error)$ indicates the discrepancy between the permanent income and the actual (current) income according to life cycle determinants $X_{1,ht}$ such as education, employment occupation, the structure of family and transitory shocks, which are included in the error term.

Besides, let some fraction of non-durable consumption C_{ht} be reserved in permanent income I_{ht}^{P} : $C_{ht} = K_{ht} * I_{ht}^{P}$, where $K_{ht} = K(X_{1,ht}) = \exp(-\tau X_{2,ht} + error)$, K_{ht} indicates the factors which accounts the economy of scale of the household's structure, such as the number of members or children within household, which are widely used in the definition of consumption functions.

To sum up, three main relationships were introduced:

$$I_{ht}^{R} = \Gamma_{ht} * I_{ht}^{*} = \exp(-\gamma S_{ht} + error) * I_{ht}^{*} \quad (1.1)$$

$$I_{ht}^{*} = H_{ht} * I_{ht}^{P} = \exp(-\mu X_{1,ht} + error) * I_{ht}^{P} \quad (2.1)$$

$$C_{ht} = K_{ht} * I_{ht}^{P} = \exp(-\tau X_{2,ht} + error) * I_{ht}^{P} \quad (3.1)$$

Divided the right-hand side each equation by the corresponding type of income we obtain the following relationships:

$$\frac{I_{ht}^{R}}{I_{ht}^{*}} = \exp(-\gamma S_{ht} + error) \quad (1.2)$$

$$\frac{I_{ht}^{*}}{I_{ht}^{P}} = \exp\left(-\mu X_{1,ht} + error\right) \quad (2.2)$$

$$\frac{C_{ht}}{I_{ht}^{P}} = \exp\left(-\tau X_{2,ht} + error\right) \quad (3.2)$$

Taken the natural logarithm from the left and right hand sides, the relationships are the following:

$$\ln I_{ht}^{R} - \ln I_{ht}^{*} = -\gamma S_{ht} + error \quad (1.3)$$

$$\ln I_{ht}^{*} - \ln I_{ht}^{P} = -\mu X_{1,ht} + error \quad (2.3)$$

$$\ln C_{ht} - \ln I_{ht}^{P} = -\tau X_{2,ht} + error \quad (3.3)$$

Summarized the first two equations (1.3) and (2.3) and subtracted from the obtained sum the last equation (3.3), the final specification of the model eliminates the unobserved components I_{ht}^{*} and I_{ht}^{P} :

$$\ln C_{ht} - \ln I_{ht}^{P} = \gamma S_{ht} + \theta X_{ht} + u_h + \varepsilon_{ht}, \quad (4)$$

where γ, θ indicates the impacts of tax evasion determinants; u_h is a time invariant component of the error term, which accounts constant factors of personal or location characteristics that have a significant impact on income and the consumption level; ε_{ht} is a random error term.

Assuming that the non-durable consumption (the baseline consumption measure) is fully reported and the reported income can be used for tax purposes. Holding this assumption, if non-durable expenses are underreported, the tax evasion is underestimated as well. Johnson and Moore (2005) suggest that the level of the

reported income in surveys is on average higher than the income for tax authorities. This fact also causes the underestimation of tax evasion.

The main model specification model does not account the impact of households' savings on the tax evasion behaviour. However, to check the potential impact of savings, a special measure of consumption (C4), which includes households' net savings, is constructed, assuming that the available (actual) household's income is expended on consumption and saving liabilities, and the level of savings is stable and not significant. Making the assumption that expenditures on consumption are fully reported, the deviation of the log of consumption from the log of income indicates the level of tax evasion in the research if evasion occurs.

3.2. Empirical analysis.

The empirical analysis is based on the pooled data from Ukrainian Longitudinal Monitoring Survey (ULMS) of 2007 wave and follows the theoretical frameworks described in the previous subsection of this chapter.

The main model specification model does not account the impact of households' savings on the tax evasion behaviour. However, to check the potential impact of savings, a special measure of consumption (C4), which includes households' net savings, is constructed, assuming that the available (actual) household's income is distributed between consumption and savings and the level of savings is stable and not significant.

All the specifications of tax evasion are described in the next subsection.

3.2.1. Model specifications.

Based on the different definitions of consumption and income and theoretical framework of deriving the tax evasion function, four models of tax evasion function (TE), the dependent variable of the analysis, were constructed:

- TE1: a baseline tax evasion function defines the log deviation between reported cash equivalent of baseline consumption (C1) of nondurable goods and expenditures on services versus reported regular income (I1).

- TE2: a tax evasion function controls not only the log deviation between consumption and income but individual's purchases of durable goods. The rationale of this model is that the monthly individual's consumption may not only be constrained baseline consumption as, for instance, food consumption, using services or medical treatment, but also include the expenditures on durable goods. The model considers the deviation between expenditures on baseline consumption and nondurable purchases (C3) versus regular income (I1).

- TE3: a tax evasion function revises the difference between consumption individual's net savings (C4) versus regular income (I1) of a respondent. Model validation bases on the assumption that individual could smooth his consumption by borrowing or lending money to others, meaning that deviation between consumption and income might occur not later the personal income was hidden but exactly by the reason for financial liabilities of a respondent.

- TE4: a tax evasion function covers the deviation between baseline consumption of nondurable goods and expenditures on services versus a regular income together with the revenue received from home production, in most cases from agriculture activity – harvests from personal land plots. This model is relevant to distinct features of Ukraine: Ukraine is an agricultural country and a lot of people have own land plots where they can grow goods both for their own consumption and for purchasing. For this reason, including this source of income in the model we can make the definition of tax evasion function more precise.

3.2.2. Tests

Cross-Section regression analysis is used to define the factors which contribute to tax evasion phenomenon. To prove the unbiasedness of results, the analysis should include tests that check whether the data meet the assumptions of underlying OLS regression.

Assumptions being verified and correspondent tests are the following:

- Homogeneity: constant variance of error terms. To check the heteroscedasticity of residuals, Cook and Weisberg and White general test for Heteroscedasticity revises.

- Collinearity: predictors in the model should not be perfectly cross-correlated. To check the multicollinearity, VIF test considers.

- Linearity. The study uses scatter plots to detect nonlinearity.

- Model specification: the model should include only relevant variables; the violation will cause the omitted variable bias. To check this, Ramsey RESET test will be used.

The results described above will be presented in Chapter 5 of this paper.

Chapter 4

DISCRIPTIVE STATISTICS

4.1. Data source.

To determine the determinants of tax evasion in Ukraine the data of the panel research of the Ukrainian Longitudinal Monitoring Survey 2007(ULMS 20007) were used. The survey was carried out by the Kiev International Institute of Sociology and administrated by IZA, Economics education and Research Consortium (EERC-Ukraine) and DIW, Berlin. The dataset covers detailed information on employment, unemployment conditions, job searching, education, settlement, occupation, individual information; on the household level the survey incorporates questions concerning welfare of Ukrainian families, particularly the sources and amount of income, detailed structure of consumption and expenditures. There were 3101 questionnaires of households and 6774 of individual responses (the response rate is 75% and 68% accordingly) in 2007 wave. Both individual and household questionnaires represent a working age population (age from 15 till 82), settling all the regions of Ukraine and the Crimean Autonomous Republic.

The ULMS household questionnaire provides some detailed information about the structure of consumption and expenditures, sources and amount of income of Ukrainian households, including income from purchases of home-grown items which further included as independent variables in the analysis.

4.2. The construction of tax evasion function.

The dependent variable in the analysis is the accurate measure of tax evasion. In order to define the evasion, we use a hypothesis that individual's income is distributed on consumption and savings. Since Ukrainian families are not involved in trading and the level of savings on average are stable, in the baseline model the savings are not included due to its insignificant impact. Thus, the key variables in the analysis of tax evasion are consumption and reported income of Ukrainian households. Consumption and income variables are calculated on the monthly basis. Statistics were constructed with individual and household weights provided by the Ukrainian Longitudinal Monitoring Survey.

The underline idea is simple: if consumption permanently deviates from reported income, holding other factors fixed, the conclusion is that some part of the income might be hidden. In fact, this instrument of detection of the deviation between income and consumption is used by tax inspectors to find tax violations. For this reason, the difference between consumption and income will be the dependent variable, which define the level of tax evasion occurred in Ukraine.

Hereafter we construct different specification types of consumption and income for each representative of the household.

4.2.1. The composition of household consumption.

The variable consumption has four specification types: a baseline measure of consumption (C1); transfer consumption (C2), which besides a baseline measure of consumption, includes transfer payments in-kind and cash help from relatives; durable consumption (C2) additionally to baseline consumption has the durable purchases; net savings consumption (C4) controls net savings of individuals on the baseline measure of consumption.

The baseline measure of consumption (C1) is an aggregated consumption of non-durable goods for the period of last 30 days, which includes 83 categories of food, alcoholic, non-alcoholic and tobacco products purchased in the last 14 days (converted into a monthly base); non-food expenditures on cosmetics, pet food, telephone services in the last 30 days; expenditures on clothes, toys and footwear in the last 3 months(also converted in a monthly base); service expenditures on transport, medicine purchases, entertainment, insurance; fuel, renting and utilities expenses and other expenditures, including insurance payments, alimonies and lending money in the last 30 days.

Additionally, three measures of consumption were constructed. The second measure of consumption (C2) consists of a baseline amount of consumption (C1) plus transfer payments in the last 30 days. According to the classical definition of consumption transfer payments are not typically included, however, providing help to relatives and engaging in charity may induce individuals to more compliant behaviour. Transfer payments consist of 6 categories, including food transfers in the last 14 and 30 days, non-food transfers in the last 3 months, remissions for transportation services in the last 30 days, fuel (gas, kerosene, coal) in the last 12 months to individuals outside the households. All items in each category transformed into monthly base.

The third measure of consumption (C3) consists of baseline consumption (C1) and expenditures on durable goods in the last 3 months, converted into monthly base in hryvna's equivalence.

To check the impact of savings on tax evasion the fourth measure of consumption (C4) was constructed, consisting of a baseline consumption (C1) and net savings. Net savings are defined as the difference between the net changes in financial assets, the sum of households' savings and income from

interest, dividends and profits from all investments and the net change in liabilities, the difference between households' borrowings and landings in the last 30 days.

However, following the distribution of consumption variable with different specifications, it was decided to top-code the variables by replacing the cash equivalent of consumption below 1 percentile and after 99 percentile to the unreasonably low and high consumption. The comparison descriptive statistics for consumption variables before and after procedure of top-coding is presented in the Table 1. As can be seen, the top coding procedure slightly reduced the standard errors and left the mean almost the same. The kernel density of each consumption specification can be seen in Appendix A, Figure 3 and Appendix B, Figure 4. By this procedure the impact of outliers in the data sample was eliminated.

Table 1 The comparison descriptive statistics for different specifications of consumption variable before and after top coding procedure. Top coding is implemented at 1-st and 99-th percentiles. All values are in hrivnas, UAH

Variable name	*N*	*mean*	*Sd*	*min*	*max*
C1	3055	3006.987	2647.77	30.68	78007.53
C1_t[3]	3055	2940.988	1884.877	455.61	12243.9
C2	3055	3042.974	2660.819	54.08	78037.53
C2_t	3055	2976.474	1900.567	455.61	12243.9
C3	3055	3602.139	6660.469	30.68	263009
C3_t	3055	3366.95	2421.132	477.7467	16899.34
C4	3055	2181.296	7624.214	-250838.1	37210.96
C4_t	3055	2494.9	2252.118	-8964.691	10554.28

[3] The underscored sign in the name of the variable means that the procedure of top coding was implemented.

The summarized information for different consumption specifications with the description of problems, which occurred during the data processing, is presented in the Appendix E, Table 9.

4.2.2. The composition of household income.

The variable income has three specification types: a baseline measure of income, regular income (I1); irregular income (I2), which besides a baseline measure of income, includes irregular payments; own production income (I3) additionally to baseline income involves income from home production, in most cases from agriculture activity.

The baseline measure of income (I1) consists of labour income, any payments after tax and other deductions, and non-labour income, including pensions, stipends, unemployment benefits, and income from renting, benefits for children, and Chernobyl assistance, from all members of households in the last 30 days. Since the response rate for labour income was not very high, about 54%, monthly labour earnings were adjusted to non-response. The labour income was calculated using the regression approach as predicted earnings times the predicted probability of working using the set of interactions between age, sex and the type of settlement. According to labour income adjusted for non-response, the highest income was made, on average, at 37 years. The distribution of labour income can be seen in the Graph 1.

The second measure of income (I2) consists of the baseline measure of income (I1) and irregular payments, including contributions from friends, relatives, international organizations- help, gifts and transfers; income from renting and utilities, renting assets and income from lotteries and inheritance in the last 30 days. Since household can obtain additional income from selling home-grown production, the third measure (I3) also consists of a baseline measure (I1), adding

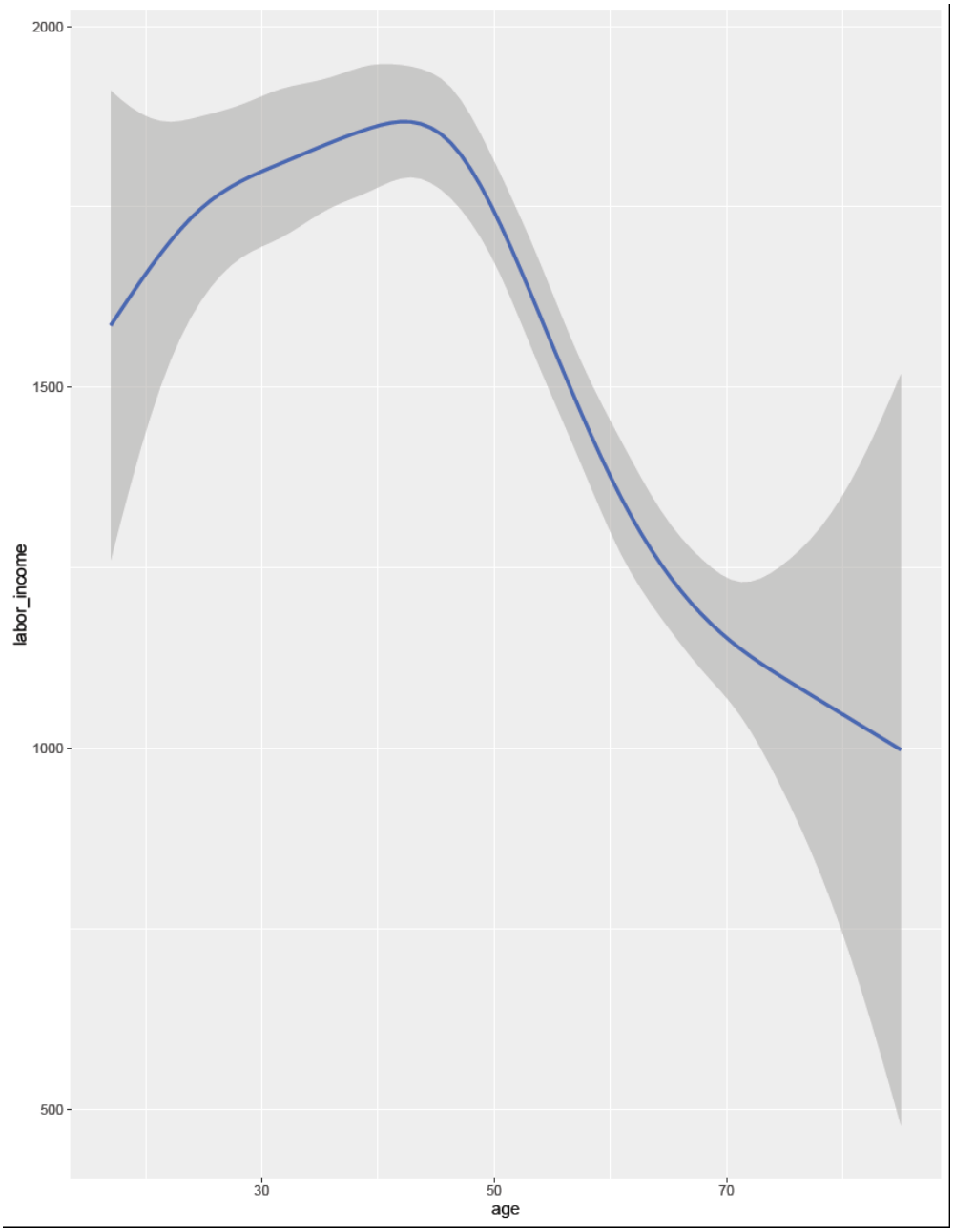

Figure 1 The distribution of individual labour income adjusted to non-response by age. All values are in hrivnas, UAH, except age.

the income from home production, mostly agricultural goods, from livestock, bees and animal husbandry in the last 30 days.

However, the same problem as with consumption variable occurred with income specifications. It also was decided to top-code the variables by replacing the cash equivalent of income below 1 percentile and after 99 percentile for unreasonably low and high income. The comparison descriptive statistics for income variables before and after procedure of top-coding is presented in the Table 2. As can be seen, the top coding procedure slightly reduced the standard errors and left the mean almost the same. The kernel density of each income specification can be seen in Appendix C, Figure 5 and Appendix D, Figure 6. By this procedure the impact of outliers in the data sample was eliminated.

Table 2 The comparison descriptive statistics for different specifications of income variable before and after top coding procedure. Top coding is implemented at 1-st and 99-th percentiles. All values are in hrivnas, UAH.

Variable name	*N*	*mean*	*Sd*	*mi*	*max*
I1	3055	2132.887	1231.796	0	15000
I1_t[4]	3055	2100.883	1073.928	25	8475
I2	3055	2225.009	1381.484	0	17866.67
I2_t	3055	2200.597	1216.296	40	8000
I3	3055	2170.887	1237.505	0	15000
I3_t	3055	2150.005	1108.885	40	6845

[4] The underscored sign in the name of the variable means that the procedure of top coding was implemented.

The summarized information for different income specifications with the description of problems, which occurred during the data processing, is presented in the Appendix F, Table 10.

4.2.3. Specifications of tax evasion function: dependent variable.

Based on the described above different structures of consumption and income and theoretical framework of deriving the tax evasion behaviour, four specifications of tax evasion function (TE) were constructed:

- TE1: a baseline tax evasion function defines the log deviation between reported cash equivalent of baseline consumption (C1) of nondurable goods and expenditures on services versus reported regular income (I1).

- TE2: a tax evasion function considers the deviation between expenditures on baseline consumption and nondurable purchases (C3) versus regular income (I1)

- TE3: a tax evasion function revises the difference between consumption individual's net savings (C4) versus regular income (I1) of a respondent.

- TE4: a tax evasion function covers the deviation between baseline consumption of nondurable goods and expenditures on services versus (C1) a regular income together with the revenue received from home production (I3), in most cases from agriculture activity – harvests from personal land plots.

The data proves that the deviation between consumption and income exists for different age categories. In the Figure 2.a), following the baseline definition of tax evasion, it can be seen that on average, individuals among household consume more than they earn; however, the difference decreases with the age of respondents, meaning that older people less exposure to hide their income. The same tendency holds for other three tax evasion specifications, which can be seen in Appendix G in Figure 7.b), c) and Figure 7.d). For this reason, the theoretical measure of evasion is accurately defined and corresponds to the data, proving the hypothetical income hidden by individuals.

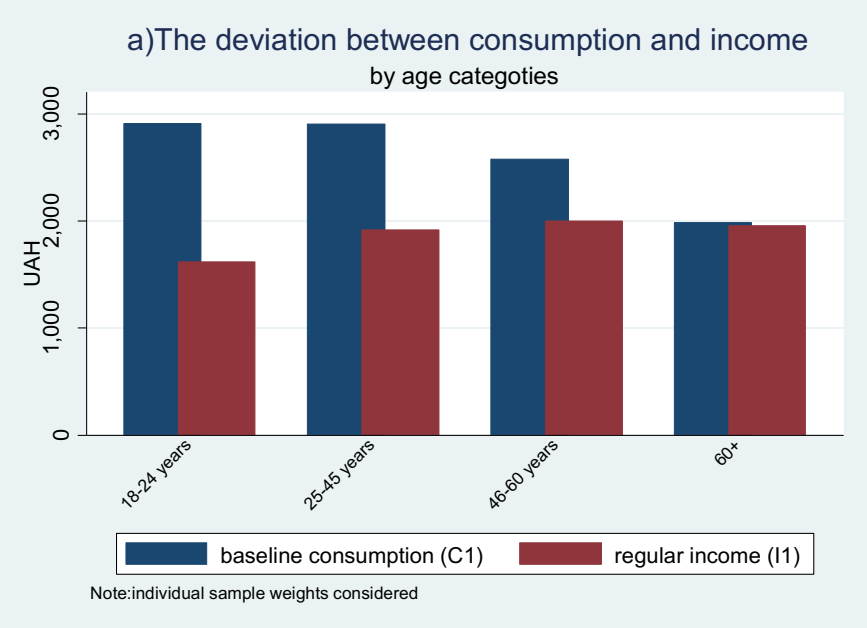

Figure 2.a) The deviation between consumption and income (in baseline specifications of consumption (C1) and income (I1)) in cash equivalent, UAH, for individuals among households differentiated by age category.

The comparison descriptive statistics for all specifications of tax evasion function is presented in the Table 3. All four models correctly define the amount of income hidden.

Table 3 The comparison descriptive statistics for different functions of tax evasion function. Top coding is implemented at 1-st and 99-th percentiles. All values are in hrivnas, UAH.

Variable name	*N*	*mean*	*sd*	*min*	*p50*	*max*
TE1[5]	3049	.307	.601	-2.760	.275	3.373
TE2	3049	.418	.631	-2.713	.388	3.695
TE3	3049	.245	.655	-3.470	.243	3.224
TE4	3049	.281	.589	-2.71	.257	3.373

4.3. Socioeconomic and personal factors of the model.

Three groups of factors have been chosen to estimate the impact on tax evasion behavior. They are the following:

- Individual and household characteristics: age and sex of a respondent and structure of the household – the number of children within family. The variable age is categorized into five groups: individuals from 18 till 24 years – 110 individuals and 3.6 % of the whole sample[6], from 25 till 45 years – 869 people and 28.5% respectfully, from 46 till 60 years – 1150 respondents and 37.72% and up 60 years – 920 people and 30.17%. The female share of the sample is 80% and 2 469 individuals, respectfully. There are 308 households, 10.10% without children; 29.2% with one

[5] All models of tax evasion function are constructed on the data which held top-coding procedure.

[6] The sample consists of 3 049 observations. This number corresponds to the final sample after the merging the household and individual level data of ULMS dataset

children, 48.87% with two children, 8.95% with three and about 2 % with 4 and more children, respectfully.

- Geographical location: region and settlement of respondent's accommodation. Based on ULMS dataset the variable region presents economic districts of Ukraine. The whole list of regions and corresponding oblasts can be found in Appendix H in the Table 11. For instance, Eastern region consists of Poltavska, Sumska and Kharkivska oblasts and covers 13.81% of the whole sample; Donetsk region – 17. 19% of respondents accommodate this region, Prydniprovsky - 13.97%, Prychornomorsky - 13.48%, Podilsky - 9.08%, Central - 11.25%, Carpathian and Polisky - 11.05% and 10.17%, respectfully.

- Job characteristics: the level of income, job occupation and firm size of a respondent's primary job and dummy variable which indicates whether an individual engaged in farm business. The variable income is separated into three groups: low level of income – 28.14%, middle level – 47.23%, high income – 24.63%. 886 households out of 3049, 29.06%, are engaged in farm business. Job occupation is categorical variable of 11 categories, for instance, there are 3.25% of individuals self-employed; the actual structure of this variable can be seen in the Table 4.

Descriptive statistics for all variables can be seen in the Table 5. All the variables are categorized: the variable age has 4 categories, the highest share of observations is in the third category – the age of respondents is from 46 till 60 years; the variable region has 8 categories, the detailed information of a region structure can be found in Appendix H, Table 11. The highest frequency of this variable is in the fourth category – Donetsk region. The variable settlement has 6 categories; the highest frequency is in the fourth

category – village, about 33 percent of the sample. About 29 percent of respondents are engaged in farm business. Both variable firm size and job occupation have 11 categories; in the sample individuals are prevailingly self-employed and assigned as unemployed.

Table 4 Descriptive statistics for explanatory "job occupation" in the model.

Job occupation	*Frequency*	*Percent*	*Cumulative*
self-employed	99	3.25	3.25
professionals	253	8.30	11.54
technicians	221	7.25	18.79
clerks	117	3.84	22.63
Service/shop workers	138	4.53	27.16
skilled agricultural	7	0.23	27.39
skilled manual worker	233	7.64	35.03
machine operators	87	2.85	37.88
unskilled occupations	299	9.81	47.69
armed forces	17	0.56	48.25
unemployed	1,578	51.75	100.00
Total	3,049	100.00	

Table 5 Descriptive statistics for explanatories in the model.

Variable name	*N*	*mean*	*Sd*	*min*	*median*	*max*
Age categorized	3049	2.945	.8534	1	3	4
Gender (1=female)	3049	.190	.393	0	0	1
Number of children in HH	3049	1.663	.917	0	2	5
Region	3049	4.156	2.282	1	4	8
Settlement	3049	3.303	1.999	1	4	6
Income	3049	1.965	.7256	1	2	3
Farm business	3049	.291	.4541	0	0	1
Firm size	3049	8.497	3.156	1	11	11
Job occupation	3049	8.204	3.498	1	11	11
Schooling	3049	9.666	1.230	1	10	12

Chapter 5

EMPIRICAL RESULTS

5.1. Estimation results.

The merged dataset, a household level data with the individual level questionnaire from the Ukrainian Longitudinal Monitoring Survey, represents a sample of 3049 observations. The dependent variable is tax evasion, whereas potential determinant of tax evasion are separated into three main groups, individual and household characteristics, geographical variables – region and settlement of household accommodation and job characteristics – job occupation, firm size and whether the household engaged in agricultural business.

The analysis was run for each tax evasion function; the description and procedure of composition are described in Chapter 3. The estimated results emphasize that older people are less evasive on average by 20% than the youths with age from 18 till 24 years. However, with increasing the number of children within household tax evasion also increases; the largest extent of evasion has families with four children – by 20%, on average, but additional increase of children decrease tax evasion almost twice. However, the gender of a respondent has a negative effect on tax evasion (column 2 in the Table 7): females are by 4 percent less evasive than male's respondent. The estimated result from the first group of determinants, which includes individual and personal characteristics, can be seen in the Table 6.

Table 6 Results of pooled regression estimation (partial)[7] for each model specification of respondent's individual and household characteristics using ULMS (2007) data. Logarithm of tax evasion function is dependent variable.[8]

Variable name	*TE1*[9]	*TE2*	*TE3*	*TE4*
Age: base is 18-24 years				
25-45 years	-0.0338	-0.0496	-0.0165	-0.0647
	(0.0521)	(0.0560)	(0.0618)	(0.0520)
46-60 years	-0.168**	-0.208***	-0.147*	-0.179***
	(0.0518)	(0.0554)	(0.0612)	(0.0516)
60+ years	-0.450***	-0.502***	-0.399***	-0.435***
	(0.0534)	(0.0571)	(0.0633)	(0.0531)
Sex (female)	-0.0420	-0.0661*	0.0000104	-0.0396
	(0.0245)	(0.0261)	(0.0274)	(0.0244)
Number of children in HH: 0				
1	0.0807*	0.0805*	0.0988*	0.0749*
	(0.0348)	(0.0377)	(0.0404)	(0.0345)
2	0.0866*	0.0830*	0.108**	0.0820*
	(0.0338)	(0.0366)	(0.0387)	(0.0335)
3	0.105*	0.0957*	0.145**	0.101*
	(0.0455)	(0.0473)	(0.0518)	(0.0452)
4	0.230**	0.271***	0.0858	0.223**
	(0.0704)	(0.0805)	(0.0915)	(0.0677)
5+	0.0848	0.109	-0.00189	0.0845
	(0.0878)	(0.0884)	(0.109)	(0.0915)
Observations	3049	3049	2925	3049
Adjusted R-squared	0.293	0.286	0.248	0.275

Notes: Standard errors in parentheses: * p<0.001, ** p<0.01, *** p<0.001

According to the second group of factors, the geographical position has a significant impact on tax evasion: Donetsky, Prydniprovsky, Podilsky, Central and Polisky are on average by 10 percent less evasive than correspondent Eastern economic district, whereas Prychornomorsky and Carpathian are more evasive on average by 13 percent than Eastern one. It can be explained by the fact that

[7] Next part of estimated results can be found on the next page in Table 7, 8.

[8] Tax evasion function is defined in Chapter 3.

[9] The description of each model specification is described in Chapter 3, subsection 3.2.1.

Prychornomorsky disctrict has port access, where the majority of corruption schemes occurs in Ukraine. The Carpathian region borders with European countries and, the same as Prychornomorsky region are engaged in corruption manipulation, in this case, through customs, where illegal income may be obtained. The estimated result from the second group of determinants, which includes geographical accommodation of households, can be seen in the Table 7.

The last group of determinants presents the job occupation and income of household representative. The estimated results show that people with the middle and high income are less evasive than low income individuals by, on average, 40 and 70 percent respectfully. The reason for this phenomenon can be substantiated that low income individuals do not believe the taxes, which government collects, will be treated fairly and appropriately. However, the households which have farm business, whether they grow harvest or meat, are on average more evasive than the household without land plot. It can be explained by the fact that the households sell their goods without legal certification and, as a result, part of the income is hidden; this hypothesis proved by the fourth model of tax evasion, where the income from home production is accounted, due to the fact that the model TE4 (column 4 in the Table 8) shows less magnitude effect on evasion than other correspondent ones almost twice. Individuals who occupy unskilled and skilled jobs are on average by 15 and 12 percent less evasive than the same self-employed people, who have common sense: self-employed people have more incentives to hide income and bypass their tax liabilities. The estimated result from the third group of determinants, which includes job characteristics, can be seen in the Table 8.

These results might have a policy implication: tax authorities could increase the accuracy of tax evasion detection techniques, by monitoring more precisely a target group with the described above characteristics. The profile of a person who

might be engaged in tax evasion behaviour are the following: age – from 18 till 24 years, gender – male, number of children if any – two or more; geographical location - Prychornomorsky and Carpathian region, live in the city of more than 100 thousands or in rural area; job occupation – self-employed or engaged in small farm business, meaning an individual has a land plot where the vegetables and poultry being grown.

5.2. Discussion of the results.

Following the tests described in Chapter 3 in subsection 3.2.2, all models were checked.

To check the heteroscedasticity of residuals, Breusch-Pagan / Cook-Weisberg test was revised: Ho hypothesis, that variance of error term is constant, with probability 74.8 percent was not rejected for the model TE1, and with 79.4 percent for the model TE2; for the model TE2 and TE3 the Ho hypothesis was rejected. For the models TE3 and TE4 White correction was implemented. The test results can be reviewed in Appendix I, Table 12.

To check the multicollinearity, VIF test was considered. The variables in the model are not perfectly cross-correlated. The test results can be reviewed in the log file of this paper.

To check the correctness of the model specification, a link test for model specification was revised. This test is used for single-equation model; it creates both the variable of prediction and the squared variable of prediction. In the result, if the model specification is correct, the coefficient of prediction should be statistically significant, whereas the squared prediction coefficient is insignificant. For all models TE1, TE2, TE3, TE4 test shows that the model is defined correctly. The test results can be reviewed in Appendix J, Table 13.

To check whether the models have omitted variable bias, the Ramsey test for independent variables was run. For each of the model TE1, TE2, TE3, TE4, the H0 hypothesis that the model has no omitted variable was not rejected. The actual test results can be seen in Appendix K, Table 14.

Following the educts, the results of OLS estimation are BLUE. However, the test on normality was rejected, this means, that the results have the property of best linear unbiased estimator, but not best unbiased one.

However, the model does not include other possible variables that can potentially have significant impact on tax evasion behavior: ethical and social characteristics of people such as religion, satisfaction from work, willingness to risk or ability to work in different job occupations, sickness, which limits the job activity, trust in people, government, and financial institution that also may have a significant impact on evasive behaviour. Constrains of this dataset do not give the instruments to resolve it by this time. Since the analysis is provided on one year time period dataset, it cannot be checked the time dependent characteristics, which may have the effect on tax evasion and also may cause the omitted variable bias.

Table 7 Results of pooled regression estimation (partial)[10] for each model specification of respondent's geographical location – settlement and region of accommodation, - using ULMS (2007) data. Logarithm of tax evasion function is dependent variable.[11]

Variable name	*TE1*	*TE2*	*TE3*	*TE4*
Region : base - Eastern				
Donetsk	-0.0979**	-0.0756*	-0.0918*	-0.102**
	(0.0315)[12]	(0.0336)	(0.0382)	(0.0314)
Prydniprovsky	-0.0328	-0.00297	-0.00923	-0.0689*
	(0.0315)	(0.0345)	(0.0370)	(0.0314)
Prychornomorsky	0.102**	0.0938*	0.129***	0.0769*
	(0.0344)	(0.0366)	(0.0387)	(0.0336)
Podilsky	-0.0503	-0.0327	-0.142**	-0.0749*
	(0.0384)	(0.0401)	(0.0512)	(0.0378)
Central	-0.101**	-0.107**	-0.0825	-0.105**
	(0.0372)	(0.0403)	(0.0427)	(0.0372)
Carpathian	0.131***	0.0882*	0.194***	0.144***
	(0.0385)	(0.0406)	(0.0420)	(0.0386)
Polisky	-0.149***	-0.146***	-0.0970*	-0.147***
	(0.0390)	(0.0419)	(0.0434)	(0.0389)
Settlement : base - Village				
Urban settlement	-0.0609*	-0.0734*	-0.120***	-0.0235
	(0.0297)	(0.0314)	(0.0356)	(0.0295)
Town: Small (< 2 ths)	-0.303**	-0.325**	-0.319**	-0.264**
	(0.0991)	(0.105)	(0.103)	(0.100)
Medium (20 – 99 ths)	0.0350	-0.0414	0.0324	0.0693*
	(0.0333)	(0.0349)	(0.0382)	(0.0336)
City (100 – 499 ths)	0.0299	-0.0431	0.0599	0.0610*
	(0.0291)	(0.0307)	(0.0336)	(0.0289)
Large cities (>500tths)	0.0585	-0.0253	0.0889*	0.0846**
	(0.0310)	(0.0337)	(0.0364)	(0.0309)
Observations	3049	3049	2925	3049
Adjusted R-squared	0.293	0.286	0.248	0.275

[10] Previous and next part of estimated results can be found in Table 6, 8.

[11] Tax evasion function is defined in Chapter 3.

[12] Standard errors in parentheses: * p<0.001, ** p<0.01, *** p<0.001

Table 8 Results of pooled regression estimation (partial)[13] for each model specification of respondent's job characteristics – level of income, job occupation, engagement in farm business using ULMS (2007) data. Logarithm of tax evasion function is dependent variable.[14]

Variable name	*TE1*	*TE2*	*TE3*	*TE4*
Level of income: base - low income				
middle income	-0.419***	-0.398***	-0.424***	-0.396***
	(0.0227)	(0.0238)	(0.0257)	(0.0223)
high income	-0.711***	-0.681***	-0.760***	-0.681***
	(0.0295)	(0.0310)	(0.0363)	(0.0291)
Farm business	0.0976***	0.104***	0.113***	0.0443
	(0.0263)	(0.0284)	(0.0308)	(0.0256)
Job occupation				
professionals	-0.0475	-0.0555	0.00858	-0.0270
	(0.0640)	(0.0717)	(0.0675)	(0.0636)
technicians	-0.122	-0.129	-0.0723	-0.101
	(0.0684)	(0.0753)	(0.0726)	(0.0680)
clerks	-0.0811	-0.0788	-0.129	-0.0644
	(0.0725)	(0.0812)	(0.0870)	(0.0720)
service workers	-0.0434	-0.0785	-0.0687	-0.0173
	(0.0658)	(0.0724)	(0.0705)	(0.0650)
skilled agricultural	0.204	0.0997	0.264	0.207
	(0.248)	(0.262)	(0.243)	(0.246)
skilled worker	-0.133*	-0.140	-0.0886	-0.111
	(0.0650)	(0.0720)	(0.0706)	(0.0642)
machine operators	-0.0746	-0.115	-0.115	-0.0592
	(0.0798)	(0.0866)	(0.0908)	(0.0798)
unskilled occupation	-0.140*	-0.153*	-0.161*	-0.120
	(0.0627)	(0.0704)	(0.0693)	(0.0621)
armed forces	-0.135	0.0372	0.0426	-0.0758
	(0.106)	(0.112)	(0.111)	(0.109)
unemployed	-0.261***	-0.301***	-0.144	-0.293***
	(0.0744)	(0.0815)	(0.0827)	(0.0740)
Constant	0.813***	1.025***	0.790***	0.804***
	(0.115)	(0.123)	(0.128)	(0.114)
Observations	3049	3049	2925	3049
Adjusted R-squared	0.293	0.286	0.248	0.275

[13] Previous and next part of estimated results can be found in Table 6, 7.

[14] Tax evasion function is defined in Chapter 3.

Chapter 6

CONCLUSION

The research was conducted on the dataset from the Ukrainian Longitudinal Monitoring Survey (ULMS), the third way which covers 2007 year. The dataset consisted of both individual level and household level data questionnaires. During the research tax evasion function and four corresponding model were constructed.

This study determines the evasion effect among Ukrainian households as the deviation between reported consumption and income of a respondent. The key theoretical argument is that consumption should be equal to permanent income. Consumption is an important observable source of possible households' income identification, meaning that consumption indicates the amount of money which can be spent by household. By this reason the reported income was compared with expenditures on consumption and services. The other models controlled the individual's possibility to have savings and income from home growns.

For the factors that might affect the evasion behaviour, there were constructed three dimensional set of variables: structural and individual characteristics of household such as age, gender and the number of children within household; geographical location of respondent like region and settlement of household's accommodation; finally, job characteristics of an representative agent such as job occupation, firm size and the level of income.[15] These results have a policy implication: tax authorities may construct a target group with the described above characteristics which being monitored more precise. The profile of a person who

[15] The detailed information about impact of these factors can be seen in Chapter 5, Table 6, 7, 8.

might be engaged in tax evasion behaviour are the following: age – from 18 till 24 years, gender – male, number of children if any – two or more; geographical location - Prychornomorsky and Carpathian region, live in the city of more than 100 thousands or in rural area; job occupation – self-employed or engaged in small farm business, meaning an individual has a land plot where the vegetables and poultry being grown.

Since the analysis is provided on one year time period dataset, the constraints of this dataset do not give the instruments to resolve it by this time; it cannot be checked the time dependent characteristics, which also might contribute to this problem.

Since there is limited number of articles on tax evasion for Ukraine case, the value of this thesis have a significant impact on tax policy research for Ukrainian case. The author initiated a new direction of research in this field.

Due to dataset limit, the research ran on the only one wave of the Ukrainian Monitoring Survey, 2007 year base. Future access to the next waves of the survey will give the author an opportunity to investigate the dynamics of the evasion behaviour in time-series scope, not only cross-sectional dimension. It will be interested to separate the tax evasion effect from other factors by constructing panel dataset and using the difference-in-difference approach and the regression discontinuity design in different specification, mentioned in Gorodnichenko, Martine-Vazquez and Peter (2008) article.

Tax moral is crucial. Any tax policy cannot be efficient without compliance of the citizens. The goal of Ukrainian government is to prove that the money of taxpayers will be treated fairly and appropriately and restore faith of Ukrainians. With further extension of tax evasion issues of Ukraine will hardly recover from economic recession and living standards will still be on the nascent level.

WORKS CITED

Çevik, Savaş 2014.*Tax Morale in Socio-Political Interactions: Insiders and Outsiders,* Journal of Applied Business and Economics.

Clarke, Alan; Margaret Lewis, 1982. *Fear of crime among the elderly: An Exploratory Study,* Crimiol , 22 (1): 49-62.

Clotfelter, C 1983.*Tax evasion and tax rates: an analysis of individual returns,* The Review of Economics and Statistics, 47, 363-373.

Feldman, Naomi; J. Slemrod, 2007. *Estimating Tax Noncompliance With Evidence from Unaudited Tax Returns.* Economic Journal, Vol. 117, No. 518, pp. 327-352.

Friedman, E.; S.Johnson, D. Kaufmann, and P. Zoido-Labrataton, 1999, *Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries*, The World Bank, Discussion paper

Gorodnichenko, Yuriy; Peter Martinez-Vazquez, 2008. *Myth and Reality of Flat Tax Reform: Micro Estimates of Tax Evasion Response and Welfare Effect in Russia,* National Bureau of Economic Research.

Gorodnichenko, Yuriy; Klara Sabirianova Peter, and Dmitry Stolyarov, 2008 *A Bumpy Ride along the Kuznets Curve: Consumption and Income Inequality Dynamics in Russia,* unpublished paper.

Johnson, Barry; Kevin Moore, 2005. *Consider the Source: Differences in Estimates of Income and Wealth from Survey and Tax Data*, Internal Revenue Service.

Johnson,Simon; Daniel Kaufmann, and Pablo Zoido-Lobtaton, 1998a , *Regulatory Discretion and the Unofficial Economy*. The American Economic Review, Vol.88, №.2, pp. 387-392.

Johnson, Simon; Daniel Kaufmann, and Pablo Zoido-Lobtaton, 1998b, *Corruption, Public Finances and the Unofficial Economy*. Washington,D.C., The World Bank, Discussion Paper

Ivanova, Anna; Michael Keen, and Alexander Klemm, 2005. *The Russian Flat Tax Reform*, Economic Policy 20(43): 397-444.

Lewis, A., 1982. *An empirical assessment of tax mentality*, Public Finance 34, pp.245-57.

Madeo, R.; A. Schepanski, and W. Uecker. 1985. *Modeling judgments of taxpayer compliance*, Working paper, University of Iowa.

Mason, R.; H. Lowry, 1981. *An estimate of income tax evasion in Oregon*, Survey Research Center, Oregon State University, Corvallis , Oregon.

Martinez-Vazquez; Jorge, and Mark Rider, 2005. "*Multiple Modes of Tax Evasion: Theory and Evidence*," National Tax Journal 58 (1): 51-76.

Pashardesand, Panos; Lyssiotou Panayiota,T. Stengos, 2004. *Estimates of the black economy based on consumer demand approaches*, The Economic Journal, Volume 114, Issue 497, pages 622–640.

Richards, P.; C.R. Tittle, 1981. *Gender and Perceived Chances of Arrest,* Social Forces, 59:1182-1 199.

Schneider; Friedrich,D. Enstee, 2000. *Shadow Economies: Size, Causes, and Consequences*, Journal of Economic Literature Vol. XXXVIII , pp. 77–114

Tittle C., 1981. *Careers and family; sex roles and adolescent life plans,* Sage Publications, library of social research, v. 121, pp. 319

Witte, A. D.; D. F. Woodbury, 1982. *Factors Affecting Voluntary Compliance with Federal Individual Income Tax Laws,* working paper, Department of Economics, University of North Carolina, Chapel Hill.

Yankelovich; Skelly , White, 1985. *Taxpayer attitudes study : final report.* Washington, D.C.: Dept. of the Treasury, Internal Revenue Service, Public AffairsDivision.

APPENDIX A

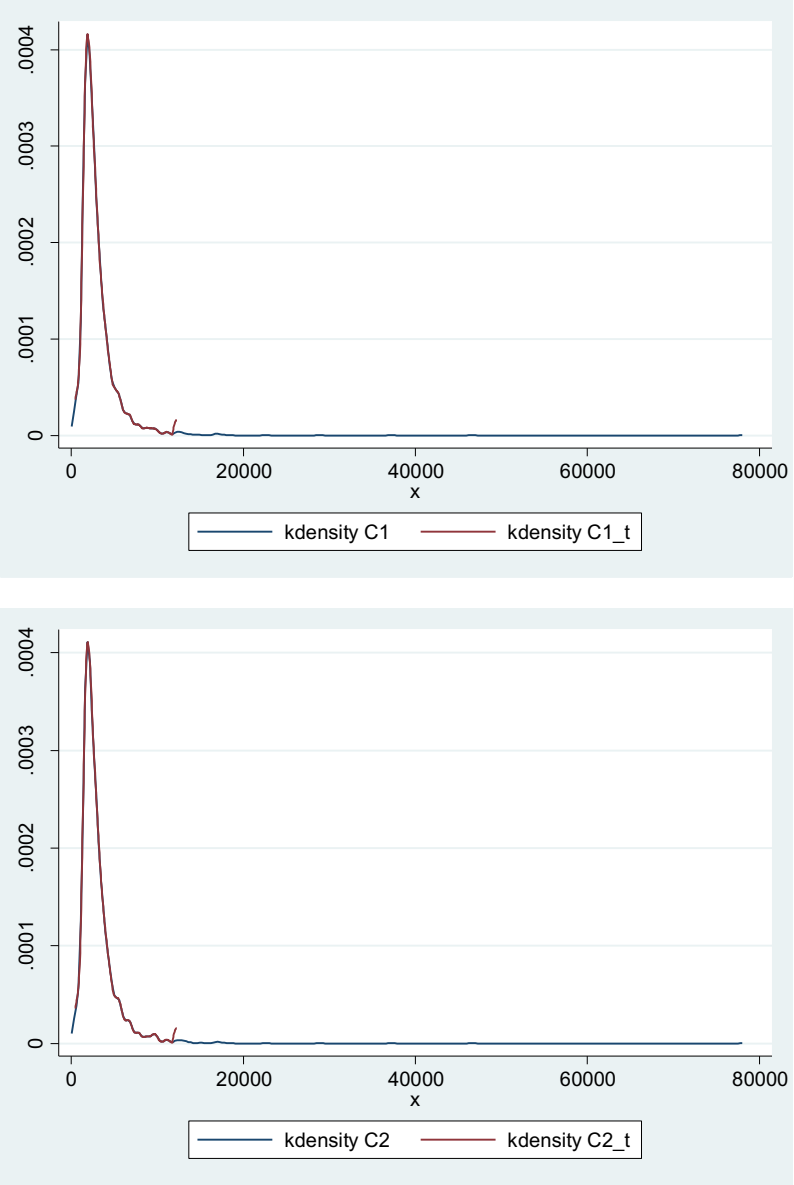

Figure 3. The kernel density of baseline measure of consumption (C1) and transfer consumption (C2) before and after top-coding

APPENDIX B

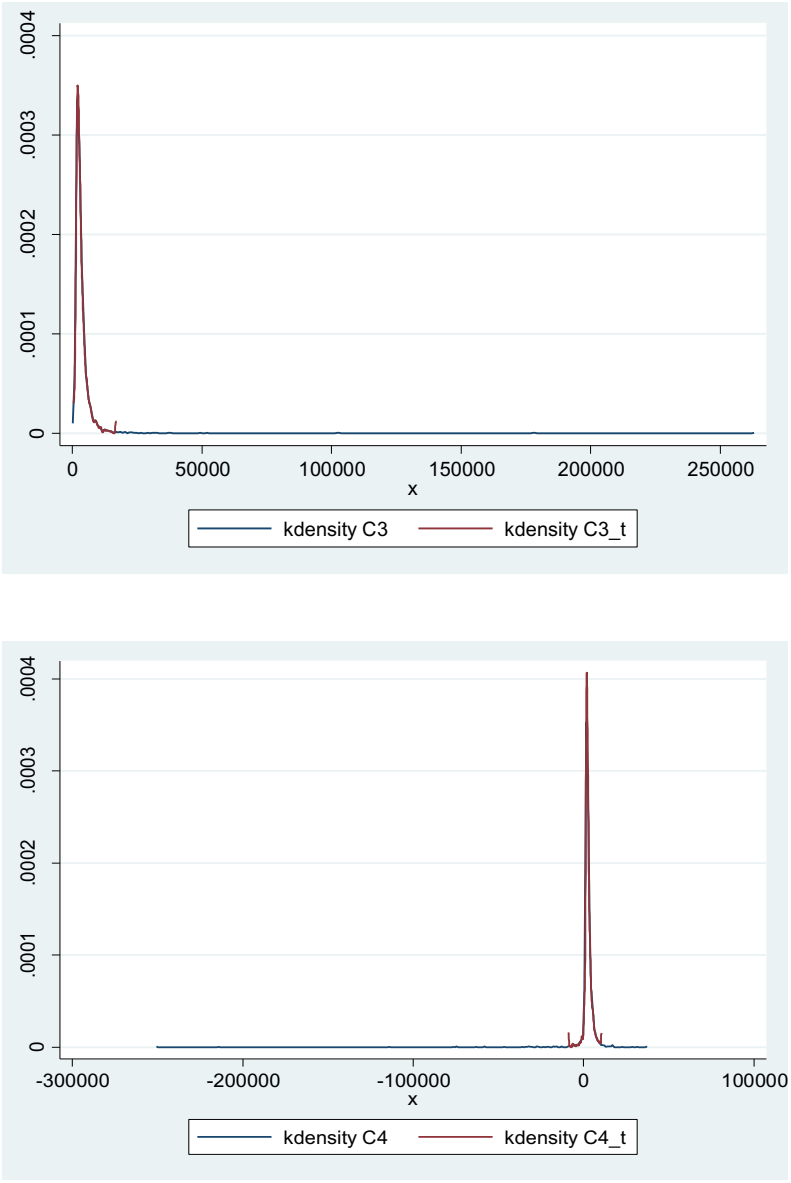

Figure 4 The kernel density of durable consumption (C3) and net saving consumption (C4) before and after top-coding.

APPENDIX C

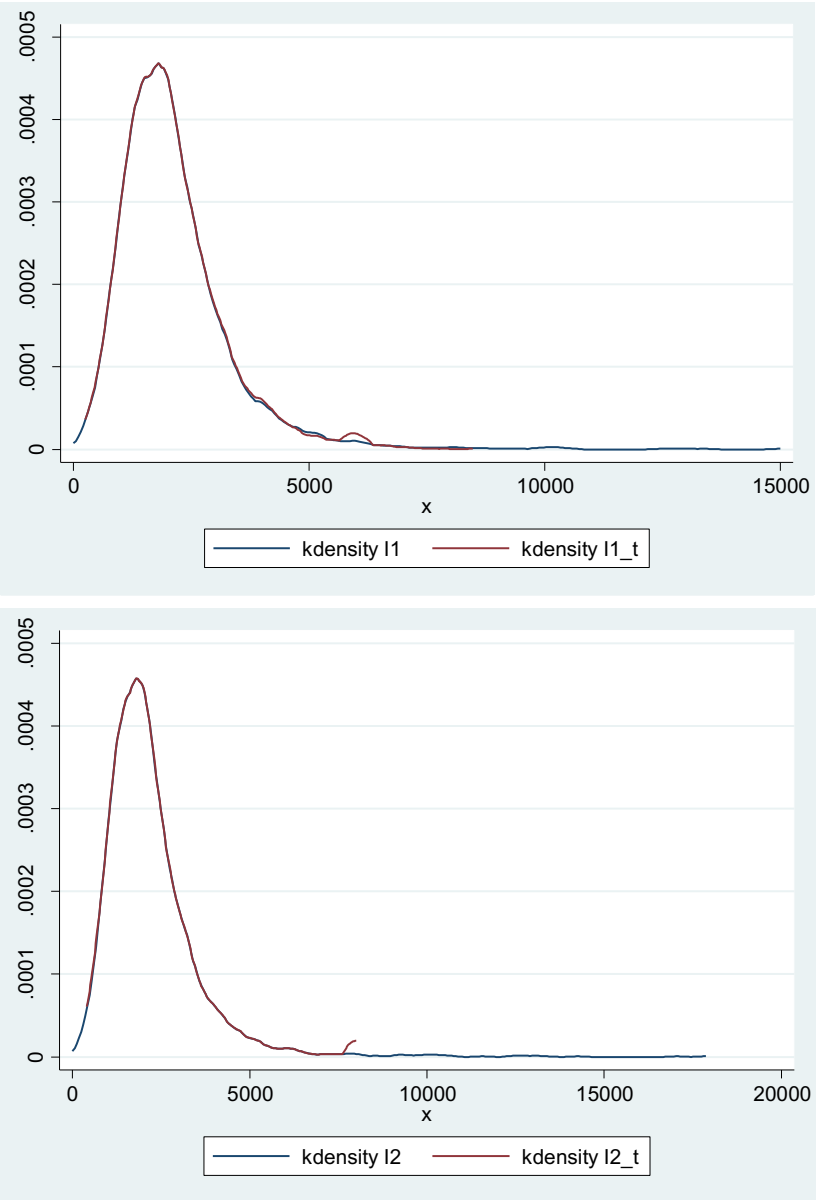

Figure 5 The kernel density of regular income (I1) and irregular income (I2) before and after top-coding.

APPENDIX D

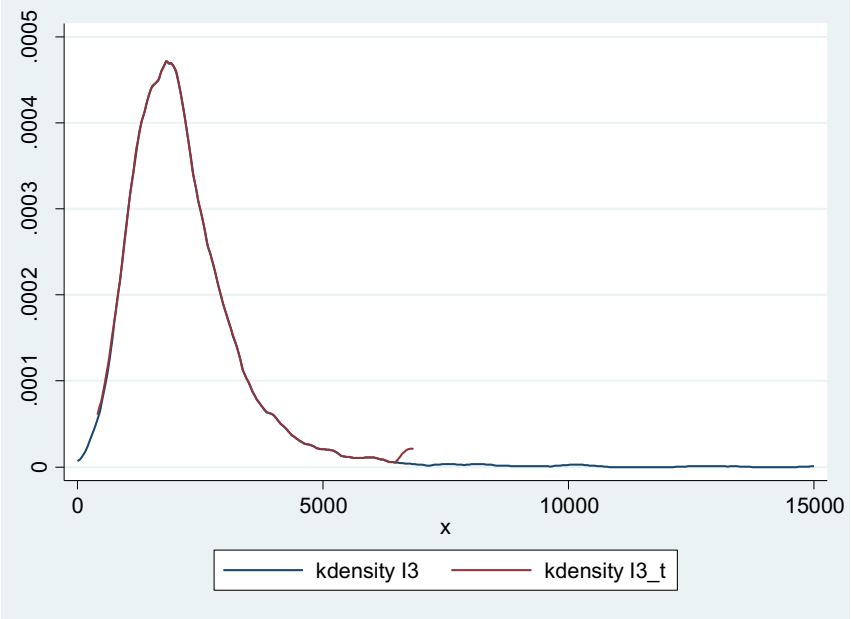

Figure 6 The kernel density of regular income and own production income (I3) before and after top-coding.

APPENDIX E

Table 9 The composition of household consumption.

Variable name	Definition	Notes
C1	The baseline measure of consumption is an aggregated consumption of : *non-durable goods*, including 83 categories of food, alcoholic, non-alcoholic and tobacco products in the last 14 days; *non-food expenditures* on cosmetics, pet food, telephone services in the last 30 days; *expenditures on clothes, toys and footwear* in the last 3 months; *service expenditures* on transport, medicine purchases, entertainment, insurance; *fuel, renting and utilities expenses* and *other expenditures,* including insurance payments, alimonies and lending money in the last 30 days.	A variable is constructed on a monthly basis: non-durable goods are computed as the sum of purchases in the last 14 days multiplied by 30/14=2.14; expenditures on clothes, toys and footwear are computed as the sum of purchases in the last 3 months divided by 3.
C2	=(C1) + *transfer payments* (6 subcategories include alimonies and various contributions in money to individuals outside the household unit)	
C3	= (C1) + *1/3(durables purchases)* in the last 3 months (10 subcategories include major appliances, vehicles, furniture, entertainment equipment, etc.)	A variable is constructed on a monthly basis: durables purchases are computed as the sum of purchases in the last 3 months divided by 3.
C4	= (C1) + *net savings* (the difference between the net change in financial assets and the net change in liabilities).	

APPENDIX F

Table 10 The composition of household income.

Variable name	Definition	Notes
I1	The baseline measure of income consists of *labour income*, any payments after tax and other deductions, and *non-labour income*, including pensions, stipends, unemployment benefits, and income from renting, benefits for children, and Chernobyl assistance, from all members of households in the last 30 days.	Since the response rate for labour income was not very high, about 54%, monthly labor earnings were adjusted to non-response. The labour income was calculated using the regression approach as predicted earnings times the predicted probability of working using the set of interactions between age, sex and the type of settlement.
I2	=(I1) + *irregular payments* (payments from insurance, amounts received from the sales of material assets, and 11 subcategories of contributions from persons outside the household unit, including contributions from relatives, friends, charity, international organizations, etc)	
I3	= (I1) + *income from home production*, mostly agricultural goods, from livestock, bees and animal husbandry in the last 30 days.	

APPENDIX G

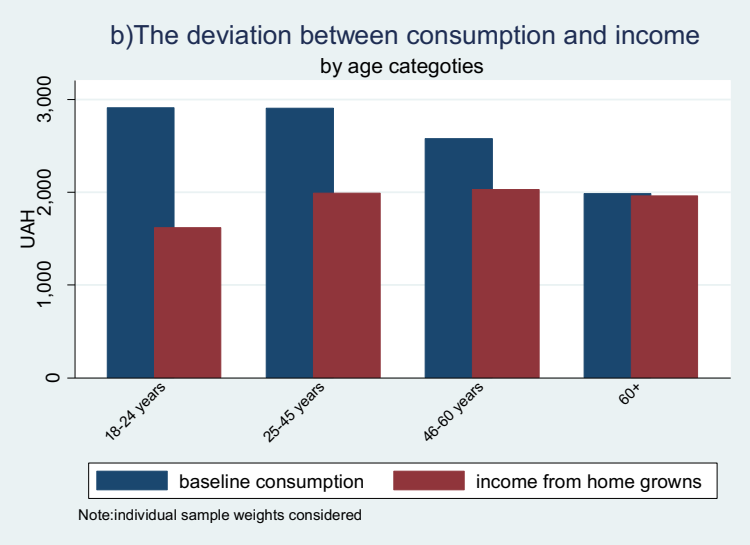

Figure 7.b), c) The deviation between consumption and income: b) baseline consumption (C1) versus income from home growns (I4)); c) consumption and durable purchases (C3) versus regular income (I1) in cash equivalent, UAH, for individuals among households differentiated by age category.

APPENDIX G

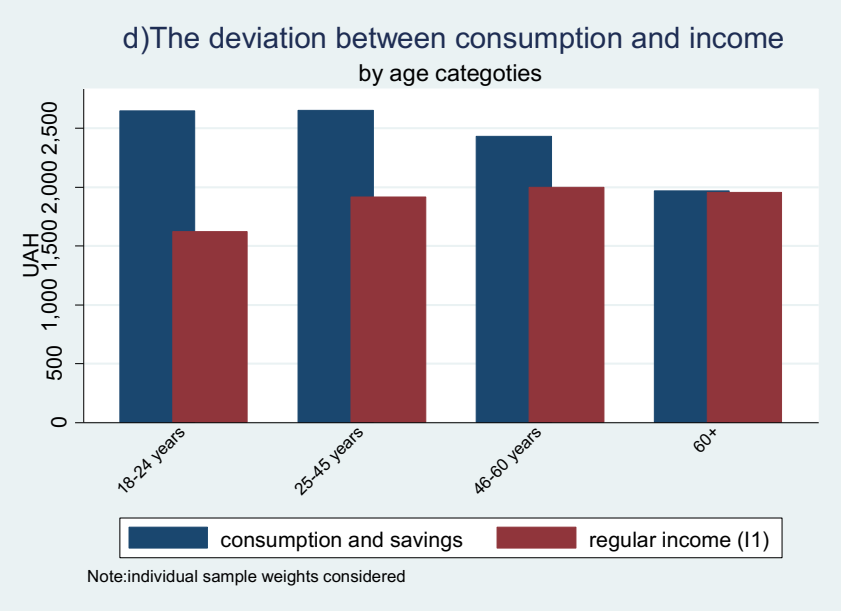

Figure 7.d) The deviation between consumption and income: baseline specifications of consumption (C1) versus regular income (I1) in cash equivalent, UAH, for individuals among households differentiated by age category.

APPENDIX H

Table 11 The construction of regions.

Name of economic region	**Oblasts**
Eastern	Poltavska Sumska Kharkivska
Donetsk	Donetska Luganska
Prydniprovsky	Dnipropetrovska Zaporizka Kirovogradska
Prychornomorsky	Autonomous Republic of Crimea Mykolayivska Odeska Khersonska
PODILSKY	Vinnytska Ternopilska Khmelnytska
Central	Kyivska Cherkaska Kyiv city
Carpathian	Zakarpatska Ivano-Frankivska Lvivska Chernivetska
Polisky	Volynska Zhytomyrska Rivnenska Chernigivska

APPENDIX I

Table 12 The results of Breusch-Pagan/ Cook-Weisberg test for heteroscedasticity.

TE1 model

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of TE1
chi2(1) = 0.10
Prob > chi2 = 0.7480

TE2 model

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of TE2
chi2(1) = 0.07
Prob > chi2 = 0.7940

TE3 model

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of TE3
chi2(1) = 5.83
Prob > chi2 = 0.0158

TE4 model

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of TE4
chi2(1) = 2.45
Prob > chi2 = 0.1176

APPENDIX J

Table 13 The results of link test for model specification.

TE1	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	.9889508	.0522734	18.92	0.000	.886456	1.091446
_hatsq	.0158117	.0635421	0.25	0.804	-.108778	.1404013
_cons	.0001793	.0124591	0.01	0.989	-.0242497	.0246084

TE2	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	1.046164	.0625235	16.73	0.000	.9235719	1.168757
_hatsq	-.051396	.0622305	-0.83	0.409	-.1734141	.070622
_cons	-.0042674	.016006	-0.27	0.790	-.0356511	.0271162

TE3	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	1.020426	.0539596	18.91	0.000	.9146233	1.126229
_hatsq	-.0338779	.0727398	-0.47	0.641	-.1765044	.1087486
_cons	.0007708	.0130698	0.06	0.953	-.0248563	.0263978

TE4	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
_hat	1.017522	.0536387	18.97	0.000	.9123505	1.122694
_hatsq	-.0271617	.0701371	-0.39	0.699	-.1646825	.1103591
_cons	-.0001071	.0121425	-0.01	0.993	-.0239154	.0237012

APPENDIX K

Table 14 The results of Ramsey RESET test for omitted variables.

TE1 model

Ramsey RESET test using powers of the independent variables
Ho: model has no omitted variables
F(6, 3006) = 0.76
Prob > F = 0.5994

TE2 model

Ramsey RESET test using powers of the independent variables
Ho: model has no omitted variables
F(6, 3006) = 0.67
Prob > F = 0.6746

TE3 model

Ramsey RESET test using powers of the independent variables
Ho: model has no omitted variables
F(6, 2882) = 0.46
Prob > F = 0.8395

TE4 model

Ramsey RESET test using powers of the independent variables
Ho: model has no omitted variables
F(6, 3006) = 0.72
Prob > F = 0.6324