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Did the flat tax reduce informal employment in Albania?

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Abstract⁴

Albania is one of the Eastern European countries that have adopted a 10% flat rate of taxation on personal income with the intention of providing incentives to increase the formal sector and regular employment. The purpose of this study is to analyse the individual labour supply in Albania by applying a micro-simulation model, which allows counting for both, formal and informal employment. To achieve this purpose we use the Albanian Living Standard Measurement Survey (2005 and 2008 waves), which allow observing whether individuals are entitled to social security benefits by unveiling information on the employment variables and personal characteristics. We find that the flat tax implemented since July 2007 has not contributed to the reduction of labour informality. Rather, the increase of regular wages has played an important role in inducing individuals to move to formal labour market. The responses in the informal labour market are mainly driven by the behaviour of middle and high income earners rather than the low income earners. Considering gender differences, we find that women, similarly to men, show a positive response toward participation in the formal labour market, but differently from men, the magnitude of this response is definitely higher. Finally it is shown that the social norms and the amplification of job opportunities in the formal labour market are important factors for combating informal employment.

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1. Introduction

The research in high-income countries has shown that labour income taxes might stimulate activities in informal labour market and consequently generate undeclared income and evaded taxes (Smith, 2001). The theory of tax evasion sustains that individuals supply labour to informal labour market either because regulations constrain their labour supply or because they are unemployed (Sandmo, 2002).⁵ On the other hand, the research in transition countries has shown that tax evasion is quite a widespread phenomenon and its implications to the growth and efficiency of the fiscal system are serious (Schneider, 2010). In these countries the informal employment could be a forced preference driven by the labour market segmentation, limited access to formal employment and the risk of social exclusion. The study of Cichocki and Tyrowicz (2010), which investigates whether the informal employment in transition economies is a matter of choice, shows that the employment in the informal labour market was more of a forced choice among low-income earners compared to their counterparts.

The intervention of the governments to reduce the informal employment, especially through fiscal policies, has demonstrated that changes in tax and social welfare system affects in particular the low-income earners (Fortin et al., 1994). However, in transition economies, the intervention of the governments to reduce tax evasion and increase the efficiency of the tax regime is jeopardised by the high level of corruption and its positive relationship with tax evasion, Schneider (2007).

In a country as Albania, the phenomenon of informal economy is perceivably sizeable but somewhat hardly measurable. On one side this parallel informal economy contributes by providing many individuals with employment alternatives and poverty alleviation possibilities. On the other side, a large informal economy implies unfair competition for registered businesses and consequently lower tax revenues (IMF, 2003). The literature argues that the shadow economy absorbs a good share of GDP (OECD, 2004). For example, the study of Schneider (2010) shows that between 1999 and 2006 the average size of the shadow economy of Albania increased by more than 3%, from 34.7% official GDP in 1999 up to 38% in 2006.⁶ In particular, the informal production in small enterprises is 40% larger than the formal one while enterprises underreport more

⁵ See Andreoni et al. (1998), Allingham and Sandmo (1972), Fugazza M and Jacques for references and discussion.

⁶ See in the Appendix 1, Figure.1 and Figure.2 on the GDP growth and share of shadow economy on GDP between 1999 and 2006.

than 30% of their employees.⁷ In addition, Schneider (2007) shows that in transition countries shadow economy activities and corruption reinforce each other meaning that there exists a positive relationship between these two. The realization of additional income through underground activities is reached via corruption of public officials which get easily seduced by the bribes received from permitting the exercise of such activities.

At micro level, the underpay of wages along with non-contribution to social security system is a widespread and socially acceptable phenomenon both by employees and employers. The conclusion of the OECD(2004) study, as regards the Albanian case, was that under these conditions the passivity of the government in undertaking fiscal reforms and actions of fighting tax evasion, would result to a continuous decline of tax revenues, less investments, less formal employment, less social security contributions and lower social benefits. Consequently, in July 2007, the Albanian Government introduced a flat tax rate of 10% with the intention of making Albania more attractive to foreign investors by radically reducing the fiscal burden on business income tax and also increasing incentives to regular employment, income declaration and social security contributions.⁸

The example of Albania, having a sizable informal economy, at macro level estimated to 38% of the GDP, along with the application of one of the lowest personal income taxes, only at 10 %, provides an interesting exercise of analyzing the implications of the tax system on informal employment. Therefore, the purpose of this research is to study the individual labour supply in Albania by applying a micro-simulation model, which allows counting for both, formal and informal employment. One hypothesis concerning the tax regimes is that the progressive taxation is designed to collect a greater proportion of income from the rich relative to the poor, reducing in this way the inequality of disposable income relative to taxable income. On the other hand, introducing a flat tax regime and reducing the progressivity of tax rates may induce especially low income earners to reduce taxable income by either working less in the formal labor market or declaring less earning income.

For our purpose of research, we focus on the implications of a flat tax regime to individuals' decision to undertake irregular activities in the labour market. Motivated by the arguments above, the question raised in this research

⁷ OECD (2004) "The Informal Economy in Albania Analysis and policy recommendations".

⁸ Agenda Institute in Albania provides a comprehensive policy brief concerning the flat tax in Albania. "The Craggy Flat-Tax Reform- Agenda Institute Policy Brief-nr 4."

is: Does the application of a low flat tax in a transition economy, with a high level of informal market, provide incentives to increase the formal sector and regular employment? Answering to this question has important policy implications, since understanding better the individual behavior towards labor market will help to lessen informal employment incentives.

The paper is organized as following: section two presents the main hypothesis of introducing a flat tax in Albania, section three describes the methodology and data used in the analysis; section four presents the specifications and simulations of alternative scenarios aiming to reduce tax evasion, e.g. swapping of tax regimes in 2005 versus 2008; section five presents the main estimation results and the main findings from the simulations. The last section concludes.

2. The “flat tax” race in transition economies and the case of Albania

As shown in the literature, the linkage of labor supply decisions with taxation systems and the way of how to bring down the informal economy is still questionable. Choosing between progressive and flat tax systems is a crucial issue and the consequences of the respective tax regimes have to be examined in details counting for participation and hours of work both in the formal and informal labor market.⁹ The focus at these segments of the labor market, is motivated by the fact that efficiency of reforms in the tax system depend on the response of honest labor suppliers as well as evaders, their behavior in relation to tax evasion especially of the last ones.

The implementation of relatively low tax rates is also related to the issue of whether it taxes more at the top or at the bottom of income distribution. To avoid large negative effects on the intensive margin (hours of work), the increase of tax rates at the top of the distribution is often not recommended. On the other side, to avoid large negative effects on the extensive margin (participation decision) it is suggested not to increase taxes at the bottom of the distribution. The overall effect of switching from progressive to flat taxes could result to lower marginal tax rates for the high-income deciles and increased average tax rates for the low-income deciles.

In most of the transition economies, the flat tax remains the main fiscal instrument introduced with the purpose of simplifying the tax system, increasing the compliance and reducing tax evasion. The implementation of a flat tax system in transition economies of Central - Eastern European countries has produced diverse results. For example in Russia, the replacement of a

⁹ The extensive margin implies the change of participation in the labour market, regular and irregular one, while intensive margin implies changes in hours of work.

progressive tax system (composed of 20 and 30% rates) by a flat one of 13% in 2001 on personal income was followed by a significant real growth in tax revenue. But as the study of Gorodnichenko et al. (2009) show in spite of a positive relationship between lower tax rates and lower tax evasion the adoption of a flat tax was not the main cause of increase in the tax revenues.¹⁰ Brook and Leibfritz (2005), considering the effect of a flat tax of 19% on capital and labour income adopted in Slovakia in 2003, find a significant and positive effect on economic performance of the country. The uniform and simplified taxation negatively affected tax evasion and the reduction in personal income tax resulted to an increase of compliance and stimulated a shift from the informal to the formal labour market. However, in spite of the fact that this reform in the fiscal system was complemented with reforms in the welfare system, the overall outcome was an increase of income inequality relative to the previous system. While compared to the previous system the low and very high-income earners were better off, under the new system, the middle-income earners were negatively affected and inequality rose up. With reference to the Albanian case the purpose of the reform introduced in July 2007 was to implement a similar tax regime, as the one in Macedonia and Bulgaria, at a rate of 10%. The flat tax rate replaces various brackets into a single one. In case of individuals is applied on personal income while in case of businesses is exercised on the business income. In this way, with the intention of affecting all income deciles, the profit business tax reduced from 20 to 10 % while the personal income tax reduced from a five brackets (between 1 and 20%) tax to 10%.

Having said that it is obvious that Albania, in this flat tax race, is not pioneering but it might do so if we consider that this country has applied one of the lowest tax rates, that of 10%. The supporters of this new tax regime argue that flat and low taxes bring many benefits by encouraging foreign direct investment, increasing the economic activity and stimulating reporting of income which consequently leads to the reduction of tax evasion and informal economy. Other arguments pro the implementation of the flat tax regime are that it guarantees equality through the implementation of uniform rate of taxation, reduces the chances for tax fraud which consequently increases the tax revenues. Thus to a certain extent the lessening of disincentives to formal employment is very likely.

However, opponents of such reform argue that this system reward businesses, high income earners and punish the poor. The arguments against the flat tax regime are that by removing progressive taxation inequality raises as the redistribution of income from the rich to the poor cease to function With the

¹⁰ Furthermore, Schneider (2010) provide figures of an increase of informal economy in Russia between 2001 and 2006 from 46.0 to 46.4%.

abolition of a progressive tax system, low and middle income earners may be charged a higher average income tax and consequently being left with a lower level of disposal income. In contrast high income earners benefit from the elimination of marginal tax ending up to pay a lower average income tax and accordingly attain a higher level of disposal income.

3. Data Description

In this study we use two waves of the Albanian Living Standard Measurement Survey (ALSMS), organized in 2005 and 2008 by the World Bank, which contain information about individuals and their households in different areas of Albania; information on variables such as hours of work, earnings and consumption level, social security contributions entitlements, information about social and demographic characteristics, such as gender, age, education, marital status, number of children, family composition, etc.

Concerning the definition of informal economy several versions have been introduced under the pretension of largely reflecting the activity exercised in the informal sector. However, in our context an informal activity is considered the individual participation in informal labour market and tax evasion behavior. The undeclared work to the tax authorities is captured through the ineligibility to the social security benefits scheme whenever nonzero working hours are declared. Thus, personal income tax evasion is captured through the lack of access to the social security system while the individual supplies certain hours of work in the labour market which under these conditions classifies him as irregular worker.

In other words, we define as irregular workers all those individuals who in spite of reporting nonzero working hours and labour income they declare of not being entitled to social security benefits.¹¹ This assumption might be a rough approximation of informal employment definition but in the Albanian context this choice is truly realistic. The explanation and justification is that the social security system in Albania provides with mandatory protection all persons employed and also those who experience an income reduction due to temporary disability caused by disease, accident, illness and unemployment. However, is the Council of Ministers who decides on other areas of protection as well as for exceptions such as seasonal and temporary workers, self-employed in

¹¹ The criteria on employment status including undeclared work and its consequences such as lack of social security benefits, sub-minimum wages and poor working conditions has been used to characterize informal sector by Harding and Jenkins (1989), Renooy (1990) and the International Labor Organization.

agriculture, unpaid family workers, trainees and students of practice teaching etc.¹²

Table 1 shows the demographic and economic characteristics of the sample both for regular and irregular workers in 2005 and 2008. The statistics indicate that while 48% of the sample was not entitled to social security benefits in 2005, in 2008 this share reduced to 43%. Individuals holding a university degree evade less and this is in line with most of the empirical papers studying tax evasion issue. Also women tend to work less than men in the irregular market. If we consider the occupational sectors, there is an inverse shift of irregular workers from construction sector to manufacturing sector and this may be explained by the expansion of the latter during the period 2005-2008 (or contraction of the former). The last part of the descriptive Table 1 (related to monetary variables) shows the loss incurred by the government in terms of taxes and social security contributions by the informal employment phenomenon (or irregularity) which exceeds also the revenues collected from the regular workers in 2005. Despite their higher devotion in working hours, irregular workers earn less in average than the regular counterparts. It is relevant to emphasize that there is an increase in the wage rate for regular workers and a decrease for irregular workers from 2005 to 2008.

Add Table 1 here

4. The model specification

The basic model is the one developed by Eide, Von Simpson and Strom (2011) and Shima (2006), a labor supply model that focuses on the labour responses, both at participation and hours of work decision, in the formal and informal market, counting for the option of tax evasion. Different studies have emphasized diversities between labor supply responses on the extensive margin (participation) and intensive margin (hours worked) (Heckman, 1993). The literature consistently suggests that, for the low-income earners, the response at extensive margin is probably more important than the response at the intensive margin. However, a crucial drawback of these studies is that they ignore the attractiveness that the irregular labor market may inspire to individuals especially when the implicit tax rate, at the low end of the earnings distribution, is very large. Consequently, in contrast to these studies this research brings an innovative approach where the inclusion of informal employment, both at intensive and extensive margin, makes the difference and we can build a more realistic scenario of informality in the labour market.

¹² To avoid any bias that may come out from the inclusion of the above categories, we exclude from our final sample individuals working in the agriculture sector and the self-employed

Our methodology consists in solving the problem of utility maximization including the option of tax evasion.¹³ Individuals consider after tax income as a good and hours offered in the labor market as a bad. Differently from other studies that maximize the utility function considering only the disposal income and leisure, we distinguish between income received through the formal and informal employment.

We assume that an individual chooses simultaneously to work in the formal or informal labour market as well as the number of hours supplied under the principle of utility maximization. His decision is taken based on a range of variables such as wages, tax rates, norms and the opportunity to engage in informal employment. The opportunity to work in the informal labour market may depend on the working sector, e.g. it is considered easier to work irregularly in the construction sector rather than in the public sector. We model the individuals' decision in two stages:

- 1) At stage 1, he chooses to be honest or evader. Here, the choice is determined in a way that if the expected consumer surplus of being an evader exceeds the consumer surplus of being honest by a certain threshold, then he chooses to evade. This threshold depends on the individual tax morale and the opportunities to evade. The higher is the individual tax morale and the fewer are the opportunities he faces for tax evasion, higher is this threshold.
- 2) At stage 2, he chooses the optimal labour supply and how many hours of work to supply in each market. The variables that help to explain his labour supply choice are merely his net income, working sector and family characteristics.

It seems reasonable to presume that norms and opportunities to evade do not affect the individuals' choice on how many hours to work in formal or informal market. Hence, we will assume that tax morale, norms and opportunities to evade affect the decision in the first stage but not in the second one. Instead it is his tax morale and the loss in future social security benefits that may affect his choice of working in the formal or informal labour market. Therefore from here on, we will not define an individual as honest or evader but rather as regular (R) and irregular (IR) worker.

The individuals' preferences to be a regular or irregular worker and supply a certain hours of work are not fully observed by us. There is a random

¹³ Option of tax evasion will be considered as the option of regular hours of work not declared to the tax authorities including also the option of non-participation in the tax and social security system.

component in individual behavior and we will derive the probability of each decision under a certain assumption made on the distribution of the random component. If we assume that the random errors are extreme value distributed, following Ben-Akiva and Lerman (1979, 1985), we can derive a closed form solution for the expected value of the maximum utility, for both choices, that of being a formal or informal worker.

Eide et. al (2011) and Shima (2006) follow Alingham and Sandmo (1972) approach to allow the individuals to choose under uncertainty. But their method is based on the fact that tax evasion is a risky activity and there is a probability of detection for those who evade which consequently are penalized for the act of tax evasion. Different studies have shown that in Albania the probability to get detected and penalized in case of tax evasion is extremely low.¹⁴ In a scenario of unreported labour income and detection by the tax authorities is only the employer who is warned and punished. Therefore, in this specification we deviate from the above-mentioned approach and use a simplified model.

We start from stage two to explain the econometric model and more specifically the choice of optimal labour supply made by the individual in formal and informal market.

Stage 2.a. : Labour supply of a regular worker

An individual after having chosen to work in the formal market has to choose the number of working hours that maximize his expected utility. Let D_i^R be his net income after paying taxes on personal income and let h_i^R be the annual working hours for the alternative i . We denote w_i^R the hourly wage rate for registered work and G_i^R is gross wage income given as $G_i^R = w_R h_i^R$. The individuals' net income is given as following:

$$(1) \quad D_i^R = G_i^R + I - C(R_i^R I); i = 1, 2, \dots, 5$$

Where the variable I refers to other income and is considered as exogenous and $C(.)$ is a tax function of wage income and non-wage income.

Let U_i^R be the utility of the individual working h_i^R in the formal market and let Z be a vector of socio-demographic characteristics. The random error ε_i^R is assumed to be extreme value i.i.d with zero mean and constant variance. Then we have that:

¹⁴ OECD (2005) "The informal economy in Albania: analysis and policy recommendations".

$$(2) \quad U_i^R = u(D_i^R, h_i^R, Z) + \varepsilon_i^R; i = 1, 2, \dots, 5$$

where $u(\cdot)$ is the deterministic part of the utility function and ε_i^R is the random part.

The probability of choosing h_{iR} under the choice of being a regular worker is given as:

$$(3) \quad P(h_i^R | R) = P(U_i^R = \max_{k=1,2,\dots,n} U_k^R)$$

Under the assumption of the random error as extreme value i.i.d, the optimal choice probability is a multinomial logit and given as:

$$(4) \quad P(h_i^R | R) = \frac{\exp(u_i^R / \mu_2)}{\sum_{k=1}^n \exp(u_k^R / \mu_2)}; i = 1, 2, \dots, 5$$

Stage 2.b. : Labour supply of an irregular worker

In contrast to an individual working as a regular worker, an individual working in the informal labour market doesn't pay taxes on the labour income. An irregular worker chooses to simultaneously to work in the informal labour market and not report its participation or the actual hours of work offered in the labour market. Thus under the assumption of expected utility maximization the net income of an irregular worker are defined as following:

$$(5) \quad D_i^{IR} = R_i^{IR} + I; i = 1, 2, \dots, 5$$

The conditional probability of working h_i^{IR} unregistered hours conditional on being an irregular worker, is given by:

$$(6) \quad P(h_i^{IR} | IR) = \frac{\exp(u_i^{IR} / \mu_2)}{\sum_{k=1}^n \exp(u_k^{IR} / \mu_2)}; i = 1, 2, \dots, 5$$

Stage 1: choosing between being regular and irregular worker

The decision made by an individual to be irregular or regular worker depends on the expected values of maximized utilities of the respective choices. Let denote $P(R)$ the probability of choosing the formal labour market. The probability of choosing to work in the informal labour market is then $1 - P(R)$. Let also denote S_R and S_{IR} respectively the expected value of the maximum utility function when choosing to work in the formal market and informal market. As demonstrated by Ben-Akiva and Lehrman (1985) the expected value of utility can be given as following:

$$(7) \quad \begin{aligned} S_R &= E(\max_{i=1,2,\dots,5} U_{iR}) = \mu_2 \ln \sum_{k=1}^5 \exp\left(\frac{U_{kR}}{\mu_2}\right) \text{ for the regular market} \\ S_{IR} &= E(\max_{i=1,2,\dots,5} U_{iIR}) = \mu_2 \ln \sum_{k=1}^5 \exp\left(\frac{U_{kIR}}{\mu_2}\right) \text{ for the irregular market} \end{aligned}$$

where μ_2 is a constant reflecting the unobserved heterogeneity in labour supply preferences meaning that larger are the values more uncertain are the preferences.

Following Ben-Akiva (1979, 1985), the probability of choosing the optimal alternative can be given in terms of expected consumer surpluses as:

$$(8) \quad P(R) = \frac{\exp(S^R / \mu_1)}{\exp(S^R / \mu_1) + \exp(S^{IR} / \mu_1)}$$

where μ_1 is a positive constant which reflects the unobserved heterogeneity of preferences in stage one.

Tax morale and tax evasion opportunities

While in high income and developed countries unreported labour income is considered as an illegal and punishable action, in countries as Albania, even though this action is considered as illegal, still the legislation and tax authorities almost have weak punishing instruments against it.¹⁵ Therefore, it is more realistic to consider tax evasion from the "tax morale" viewpoint in this paper. Eide et. al (2011) and Shima (2006) give importance to social norms believing that

¹⁵ The legislation foresees the employer punishment in those occasions of unregistered employees to the social security system. ("Drejtoria e Përgjithshme e Tatimeve - Legjislacioni tatimor 2008 -Udhëzim Nr. 24 datë 02.09.2008"Për procedurat tatimore në Republikën e Shqipërisë")

the propensity of being evader increases with the amplification of this phenomenon in the population. They assume that the probability of choosing to work in the informal labour market depends on the individual's perception concerning the social acceptability of tax evasion. Instead we believe that as long as tax evasion is mostly acceptable in the Albanian society, it's the tax morale instead that may affect individuals' decision to be irregular workers. In this contest, we define tax morale as individual's awareness and willingness to be regular worker or to pay labour income taxes under the belief of being in conformity with law and state (Cummings et al. 2009).

Torgler (2003) defines tax morale as the intrinsic motivation to pay taxes or the willingness to pay taxes. He says that "contrary to tax evasion, tax morale does not measure individuals behaviour, but individuals attitude. It can be seen as the moral obligation to pay taxes and the belief in contributing to the society by paying taxes." However, the "harmful" attitude of individuals towards tax payment in transition countries has historic grounds. During the communism, the most important taxes were the taxes on profit and individuals were not aware of taxes or had no perception regarding the tax burden, Torgler (2003). In this spirit, we proxy the tax morale by the trust the individuals have in local and central government.

In addition, depending of the working sector, there might be differences in opportunities of working in the informal labour market as there are jobs that the individuals can fully work irregularly and others that such option is almost null. For example working in the construction sector compared to the public sector is considered as accommodating to the option of working irregularly while in the public sector there is no room for such option. The same holds for retail sector. It is easier for women to find a job in the retail sector, a sector where the irregularity prevails (see summary statistics).

Consequently, in order to take into consideration the opportunity set of working regularly/irregularly we include four dummy variables. The dummy refer to the following working sector: construction; manufacturing; trade restaurants and hostelling sector and transport/service sector. We try to control for those working sectors where tax evasion is easily practicable versus others e.g. public sector where this choice is impossible. The dummies have been constructed by dichotomizing the working sector variable for each of the categories included in the list.

Another argument is that household composition can push individuals to accept irregular jobs. For example, higher number of children means more responsibilities within the household and tighter liquidity constrains and this makes the individuals more resilient to irregular market. Also, migration may affect the decision to accept or not an irregular work. If the household receive

remittances from other household members (migrants), they may be more resilient to work irregularly.

We weight the expected utility values of choosing the irregular work by a density function of the variables standing for evasion opportunities and tax morale $g(Z)$ and get :

$$(9) \quad P(R) = \frac{\exp(S^R / \mu_1)}{\exp(S^R / \mu_1) + g(Z)\exp(S^{IR} / \mu_1)}$$

which can be written as:

$$(10) \quad P(R) = \frac{\left[\sum_{k=1}^n \exp(u_k^R / \mu_2) \right]^{\frac{\mu_2}{\mu_1}}}{\left[\sum_{k=1}^n \exp(u_k^R / \mu_2) \right]^{\frac{\mu_2}{\mu_1}} + g(Z) \left[\sum_{k=1}^n \exp(u_k^{IR} / \mu_2) \right]^{\frac{\mu_2}{\mu_1}}}$$

When $\frac{\mu_2}{\mu_1} = 1$ the nested multinomial logit model equals the multinomial logit or:

$$(11) \quad P(h_i^R, R) = \frac{\exp(u_k^R / \mu_2)}{\exp(u_k^R / \mu_2) + g(Z)\exp(u_k^{IR} / \mu_2)}$$

and

$$(12) \quad P(h_i^{IR}, IR) = \frac{g(Z)\exp(u_k^{IR} / \mu_2)}{\exp(u_k^R / \mu_2) + g(Z)\exp(u_k^{IR} / \mu_2)}$$

The opportunity and tax morale density is assumed to follow an exponential form as follows:

$$(13)$$

$$g(Z) = \exp(g_0 + g_1 Z_1 + g_2 Z_2 + g_3 Z_3 + g_4 Z_4 + g_5 Z_5 + g_6 Z_6 + g_7 Z_7 + g_8 Z_8 + g_9 Z_9 + g_{10} Z_{10})$$

Where

- Z_1 equals 1 if the individual works in the construction sector or zero otherwise,
- Z_2 equals 1 if the individual works in the manufacturing sector or zero otherwise,
- Z_3 equals 1 if the individual works in the trade, restaurants and hostelling sector or zero otherwise,
- Z_4 equals 1 if the individual works in the transport and service sector or zero otherwise,
- Z_5 refer to the log of remittances received
- Z_6 refer to number of children
- Z_7 is a categorical variable capturing individual's trust in local government. It takes values from 1 (complete trust) to 5 (not trust at all).¹⁶
- Z_8 is a categorical variable capturing individual's trust in central government. It takes values from 1 (complete trust) to 5 (not trust at all).
- Z_9 dummy living in Tirana
- Z_{10} dummy if the observation is taken from the wave 2008.

The likelihood function

Let n^{IR} and n^R be the group of individuals who have answered no and yes to the question of whether they are entitled for social security benefits in the current work. The likelihood function (the joint a priori probability) then is given as:

$$(14) \quad L = \prod_{j \in n^R} P_j(h_i^R, R) \prod_{j \in n^{IR}} P_j(h_k^{IR}, IR)$$

The unconditional probabilities $P(h_i^R, R)$ and $P(h_i^{IR}, IR)$ are given by:

¹⁶ The use of variable "trust in government" in the analysis is justified by the findings of Wintrobe(2001) which argues that the distrust of the individuals toward the government makes individuals more inclined to not pay taxes. Moreover if the individuals perceive that the tax evasion is a phenomenon accepted in the society they will also tend to apply the same behavior as those who evade.

$$P_j(h_i^R, R) = P_j(h_i^R | R)P_j(R)$$

(15) *and*

$$P_j(h_i^{IR}, IR) = P_j(h_i^{IR} | IR)P_j(IR)$$

The maximization of the likelihood function yields the estimates of the utility function parameters

The utility function specification

The deterministic part of the utility functions is assumed to be a Box Cox transformation of net income and leisure as follows: ¹⁷

(16)

$$u(D, h, Z; b) = \alpha_0 \frac{(D/10000)^\lambda - 1}{\lambda} + (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4) \frac{(T - h)^\gamma - 1}{\gamma}$$

Where

- D is net income
- $(T - h)$ refers to the leisure time
- X_1 refers to age
- X_2 refers to number of children
- X_3 refers to gender
- X_4 refers to wave year

and

- α_0 is the linear coefficient for income
- β_0 is the linear coefficient for leisure
- λ is the exponent coefficient for income
- γ is the exponent coefficient for leisure.

¹⁷ In cases when the transformation parameter, λ or γ , equal to 0 we attain the logarithmic transformation of the data.

In most of the cases the assumption of normal distribution are the basic assumptions in a maximization problem. The Box-Cox transformation of the variables is a functional specification, which allows converting the variables to follow approximately a normal distribution. If λ and γ are less than one, then the quasi-concavity condition of the utility function is satisfied. The utility function takes a linear form if these parameters approach one and a log-linear form if they approach zero. The Box-Cox modelling of the utility function as well as the inclusion of the weighting of the utility function with an exponential function (g(.)) does not allow to use friendly software commands. Therefore, Maximum Likelihood Programming is used to estimate the model.

The choice set is composed of five alternatives respectively for being a irregular and regular worker by specifying the interval of hours of work and sample randomly within this interval which has a length of 16 hours and a maximum of 80 weekly hours. The first alternative refers to 1-16 and so on until the last alternative 64-80. The actual observed hours will be rounded to the closest discrete value. The basic idea can be appropriately modified when one observes directly annual hours or weeks worked.

5. Estimation results and model prediction

We use three main specifications: a pooled one with the intention to figure out the general characteristics of individuals who work in the irregular market and two separated ones for men and women. Starting from the general specification presented in Table 2, the first equation on utility parameters, shows that individuals have a strong preference for leisure and income. The estimated coefficients of the exponential terms are smaller than 1 satisfying in this way the quasi-concavity condition. The model yields good predictions in terms of labour supply and disposal income. In addition, the variable related to the number of children does not affect the preference for leisure. Individuals have a lower marginal utility from leisure with age. The positive and significant coefficient related to gender implies that women prefer to work less than men. Lastly, there is a higher preference for leisure in 2008 compared to 2005.

The second equation (Table 2) refers to estimated parameters of opportunity density. In particular, the significantly negative gender coefficient reflects the gender differences on the participation decision in the formal versus informal labour market. The negative sign implies that the participation in the informal labor market is more widespread among men compared to women.

These findings are in line with Gerxhani (2007) which shows that women tend to evade less frequently than men and in case of occurrence the amount is

relatively lower. Furthermore she explains that apart personal characteristics, differences by sector of employment matter. In the Albanian case the gender segregation in the working sectors is such that most of men bread winners are allocated to the private sector and in their own businesses, while in contrary women are mostly positioned in the public sector. Working in the public sector and under a labor contract compared to those working in the private sector and frequently without a labor contract, is less likely to evade personal income and insurance taxes. In addition, Table 2 shows that occupational sectors such as construction, manufacturing, trade, hotelling, transport and services shadow more irregularity than the others. This finding confirms that it is empirically important to distinguish between working sectors of the economy and their propensity to host the option of tax evasion.

Other relevant findings are that the amount of remittances received from relatives or family members doesn't seem important to induce people to get involved in irregular market. Education seems to be important for the evasion decision as it seems that educated people evade less compared to medium and low educated. This result could be due to the fact that highly educated have higher chances of attaining a job or being employed in the public sector. The perceived trust in the local and central government has a positive effect on the value of tax morale and a negative one on the evasion probability. Nevertheless, the trust in local government is not as significant as the trust in central government. Finally, people have a stronger preference to work in the regular market in 2008 compared to 2005.

After having figured out the characteristics of the irregular worker for the pooled sample, we look at two other specifications separately for men and women. Tables 2.1 and 2.2 illustrate the estimates of the utility function for men and women. We find again a strong preference for leisure in 2008 compared to 2005 while the number of children and age seem to not be important for the decision to work in case of men. As regards the evasion decision, we find again that the more men trust in central government the less they work in the irregular market. However despite the right sign, this is not statistically proved for women as Table 2.2 shows. The difference between men and women stands on the fact that while the number of children doesn't affect male decision to work in irregular or regular market, in case of women the more children they have the more they contribute in irregular work. But having children younger than 5 years makes women less likely to evade. This might be due to their lesser participation in the labour market as well.

As Tables 2, 2.1 and 2.2 show, after having controlled for the occupational sector, education, family composition, the impact of migration, trust in government and what may be more important after having accounted for the

simultaneous decision of labour supply and irregular work, there is a clear tendency to contribute less in the irregular market in 2008 compared to 2005.

In the following section we try to explain the decrease incurred by irregular market in 2008 versus 2005 through changes in wage rates and tax progressivity. In this way we can understand whether it is the implementation of the flat tax that brings to informality reduction or other factors have helped it as well.

6. Policy simulations

The summary statistics (Table 1) and the estimated results of conditional logit indicate a 10% reduction in labour informality (from 48% to 43%) during the period 2005-2008. These years have been characterized by a decline in tax progressivity. Also while the regular wages have risen, a drop in the irregular wages is noticeable. Such changes may have rendered less attractive the option of working in the informal market. On the other hand, social norms and opportunities to work in the irregular sector, as the conditional logit estimation shows, affect the individual perception of labour informality. This is not strange as long as the involvement of people in the informal market is not a pure choice as it may be in the developed economies. Instead it is conditioned by the lack of opportunities in the formal economy, personal characteristics and the lack of confidence in a good governance. As North (1990) argues, the change of laws is not immediately followed by the change of the habits, including the behavior of individuals towards those activities considered as informal.

To single out the impact of the tax change from that of wage change we proceed as follows: 1) simulate a tax regime swap for capturing the impact of tax change per se and 2) calculate the participation elasticities with respect to a 10% increase in the wages with the intention to discern the impact of wages. The estimated parameters of the conditional logit are used to simulate the changes in tax regimes and wages as shown in the Appendix 2.

6.1 Simulation of Tax Regime Swap in 2005 and 2008

Here we answer the hypothesis raised in the introduction: Did the flat tax reduce labour informality? We tackle this issue by swapping the tax regimes applied in the 2005 and 2008:

- 1) By replacing the former progressive regime (PT) with the latter flat tax one (FT) using the 2005 ALSMS
- 2) By replacing the latter flat tax (FT) with the former progressive tax (PT) using the 2008 ALSMS.

Tables 3-3.2 show the results of changes in regular and irregular participation, working hours, taxes, net income and social insurance contributions for men, for the whole sample and by income deciles, under a certain tax rule (progressive as of 2005 and flat as of 2008).

A replacement of the Flat tax regime in 2008 by the Progressive tax regime of 2005 results in:

- 1) A lower participation in informal labour market among both regular and irregular workers, respectively reduced by 7 and 3% for the whole sample of men.
- 2) Looking into the individual behaviour towards labour participation and informality across income deciles we notice that the reduction in informality is driven by middle-high income individuals (8%) while a moderate reaction is observed among low-income men (2%). Nevertheless, low income individuals have higher rates of participation in the informal labour market compared to their counterparts under both regimes. This finding is in line with those of Chichocky (2009).
- 3) Concerning labour supply, the replacement of FT in 2008 by the PT doesn't affect the expected supply of working hours both for regular and irregular workers pertaining to all categories of income deciles. We have to consider here that they previously used to work more than 40 hours per week.
- 4) The disposal income and social security contributions slightly increase while the level of taxes is almost halved.

If we confront the changes incurred due to the replacement of PT regime with FT regime in 2005 data, similar results are found but with an opposite sign. Thus, middle-high income earners, under the flat tax regime, would participate more in informal labour market, and regularly offer less working hours, pay higher taxes on income, lower social security contributions and earn less, while the low-income earners will be slightly affected. The only distinction stands on prediction of tax changes which range from -35% in former simulations to 83% in the latter.

Tables 4 - 4.2 show the results of changes in regular and irregular labour participation, working hours, taxes, net income and social insurance contributions for women, the whole sample and by income deciles under a certain tax rule (progressive as of 2005 and flat as of 2008). We find again that a tax switch from a flat tax regime (in 2008) to a progressive tax regime (as in 2005) might result in a lower participation in informal labour market (reduced by 14 % for the regular workers and 4% for the irregular ones). Results by income deciles indicate that upper and middle income women might reduce their participation

in the informal labour market by almost 25 and 16%, while low income women by only 5%.

Thus, women similarly to men show a positive response toward participation in the formal labour market, but differently from men, the magnitude of this response is definitely higher. Besides, low and middle income earners would be the main beneficiaries of keeping a progressive tax system. Under the former progressive tax regime they would have been supposed to pay almost half of the tax amount compared to the amount to be paid under the flat tax regime.

These results seem surprising if we keep in mind that the application of a flat tax should entail lower marginal tax rates at the top of the distribution and hence be an incentive to declare more hours of work for the high income earners. Considering that the application of a flat tax should entail lower marginal tax rates at the top of the distribution we should expect a higher participation in the regular labour market for the high income earners. But in our case, a flat tax of 10% generates higher taxes in average than previously for middle-high income earners.

6.2 Predicted elasticities

Estimates of labor supply elasticity, regular and irregular one, both at intensive and extensive margin are reported in Tables 5-5.2 for men and in Tables 6-6.2 for women.

The wage elasticity of labor supply of the representative sample is defined as the percentage change of the expected weekly hours of work and participation as a result of an increase of gross hourly wage by 10 percent. It is important to underline that the gross hourly wage is increased by 10 percent and the respective tax rules (progressive one in 2005 and flat in 2008) are used to simulate the new disposable income.

An overall increase of wages, both in the formal and informal labour market, implies:

- 1) A reduction of labour informality both at the intensive and extensive margin.
- 2) The magnitude of this reduction in informality varies by waves and income deciles. More specifically, middle-high income individuals show higher participation elasticities under the FT of 2008 than under the PT 2005. In contrary the response is generated by the low-income earners. Thus, middle-high income earners have more incentives to move from

the informal market to the formal one under a flat tax regime while low income earners are more encouraged in switching to the formal market under a progressive taxation.

- 3) In addition, we find higher elasticities to the bottom than at the top of income distribution, a finding which is consistent with the labour supply theory literature.

As regards women compared to men, Tables 6-6.2 show higher elasticities at both margins of the responses.. However, differently from men the reduction of hours of work due to the wage increase is higher under the progressive tax regime of 2005.

The increase (decrease) of expected regular (irregular) labor supply is quite plausible since a higher reward for a regular work implies higher opportunity costs to stay irregular. It is interesting to notice that the evaders are more sensitive to wage changes compared to the honest individuals. This is an important fact, which indicates that the wage changes might have a greater impact on the labor supply decision of evaders. In addition, a 10% increase of wage rates in the formal labour market results to an increase of regular labour supply and consequently to a lower informal employment. On the other hand, an increase of wage rates in the informal labour market has the opposite effect on regular labour supply. However, the positive effect in the former increase overcomes the negative effect caused by the later increase.

Lastly, as the summary statistics demonstrated, in between 2005 and 2008, there has been an increase in the regular wage rates as well as a moderate decrease in the irregular wage rates. These changes in wages may partly explain the decline of informal employment in 2008 (43% in 2008 versus 48% in 2005).

7- Conclusions

This paper provides empirical evidence on the individual behaviour in a transition economy towards labor supply and participation in the formal/informal labour market under different tax regimes. A discrete choice model is used to estimate the labour supply decision which incorporates the informal employment option. We find that the flat tax implemented since July 2007 has not contributed to the reduction of labour informality. In spite, has been the wage increase in the formal labour market that has played an important role in inducing individuals to move from the informal to the formal labour market. The rationale behind these results is that higher average tax rates are imposed by the new flat tax regime for the whole sample. The flat tax regime of 10% is certainly the lowest applied in the world but as our results demonstrate, leads to higher average taxes compared to the former progressive one, save the labour

income remain unchanged. Furthermore, the responses in informal labour market are mainly driven by the behaviour of middle-high income earners. The gender dimension, shows that that women compared to men tend to have a similar response toward participation in the formal labour market, but in a smaller magnitude.

These results guide to the conclusion that a kind of progressivity should be back in the taxation system without affecting the attractiveness of the simplicity that a flat tax entails. Furthermore, the main findings suggest that social norms and increase of opportunities in the formal labour market are important factors for combating the informal employment and consequently tax evasion.

Lastly, to conclude, the answer to the research question we raised in the beginning of this study is that the application of a low flat tax in a transition economy, with a high level of informal market, didn't provide a stimulus to increase the formal sector and regular employment. Instead, financial incentives such as fiscal reforms and raises of wages are important tools for combating informal employment especially in a transition economy as in Albania, where the culture of paying taxes is still hybrid. However, such reforms, whenever implemented without supportive instruments, e.g. instruments that enforce compliance and incentivize the shift from informal to formal labour market, are destined to be insufficient.

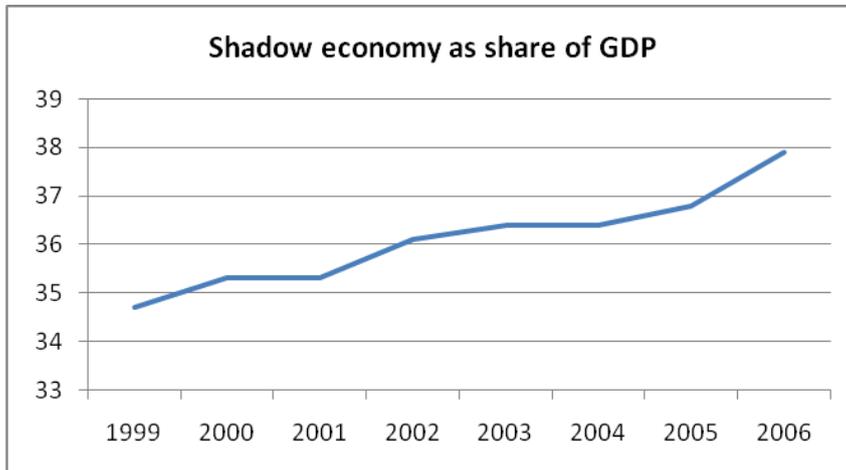
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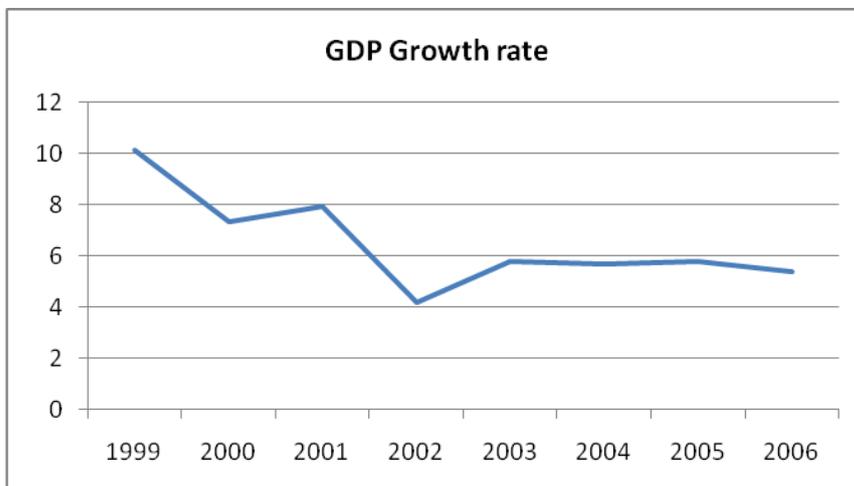
APPENDIX 1

Figure 1: Share of shadow economy on the GDP in Albania



Source: Schneider (2010)

Figure 2: The GDP growth in percentage change in Albania, 1999-2006



Source: IMF Statistics(2010)

APPENDIX 2

PREDICTED LABOR SUPPLY UNDER THE CURRENT TAX SYSTEM

This microsimulation model is flexible and allows experimenting and analyzing different tax regimes in the following way: the estimated parameters of the utility function are kept fixed and counting for the tax evasion option only the disposable income is changed under a new tax regime. Keeping the utility parameters fixed and changing the disposable income alter the choice probabilities which are further used to predict the expected labour supply conditional on the regular/irregular labour status. Thus, the expected labour supply conditional on the fact that an individual is irregular workers can be given as follows:

$$(17) \quad E(YL^R / R) = \left[\sum_{i=1}^5 P(h_i^R / R) * h_i^R \right]$$

where $E(YL^R / R)$ denotes the expected hours of work, given that the individual has chosen to work in the regular market and $P(h_i^R / R)$ is the probability of working h_i^R in the regular market.

The same procedure can be followed to recover the expected regular labor supply conditional that the individual decides to work in the irregular labour market.

$$(18) \quad E(YL_i^R / IR) = \left[\sum_{i=1}^5 P(h_i^R / IR) * h_i^{IR} \right]$$

The conditional probabilities can also be used to calculate the expected irregular labor supply conditional that the individual is an irregular worker is as follows¹⁸:

$$(19) \quad E(YL^{IR} / IR) = \left[\sum_{i=1}^5 P(h_i^{IR} / IR) * h_i^{IR} \right]$$

¹⁸ $E(YL^R) = E(YL^R / R) * P(R) + E(YL^R / IR) * P(IR)$

$E(YL^{IR}) = E(YL^{IR} / IR) * P(IR)$

- $E(YL_R)$ is the honest expected labor supply and $E(YL_{IR})$ is the evader expected labor supply.

The policy simulations test the individual behavior, their labor supply response at intensive and extensive margin, including participation and hours of work response in the informal labour market.

Once we attain the estimation results these can be used to calculate and predict the expected labor supply through the conditional probabilities of being regular or irregular worker combined with individual characteristics and actual rules of the tax system. $E(YL^R / IR)$ is the expected hours of work in the formal labour market, given that the individual has chosen a tax evading strategy, $E(YL^{IR} / IR)$ is the expected hours of work in the informal labour market, given that the individual has chosen a tax evading strategy, EL^R is the unconditional expectation of hours of work in the labour market, while EL^{IR} is the unconditional expectation of hours of work in the informal labour market. The predicted level of taxes is the expected taxes paid by the honest individuals (first column) and $T_{R|IR}$ (second column) denotes the expected taxes supposed to be paid by the tax evaders.

Table 1: Summary Statistics

| | 2005 | | 2008 | |
|-----------------------------|----------------|------------------|----------------|------------------|
| | Regular worker | Irregular worker | Regular worker | Irregular worker |
| Observations | 1548 | 1460 | 1500 | 1171 |
| Evasion Probability | 48,54% | | 43,84% | |
| Male | 57,04% | 77,67% | 57,00% | 75,92% |
| Age | 41,56 | 39,71 | 42,27 | 40,69 |
| Education | | | | |
| Primary | 16,60% | 42,05% | 21,46% | 47,56% |
| Secondary | 53,48% | 50,00% | 47,73% | 45,60% |
| University | 29,78% | 7,74% | 30,66% | 6,49% |
| Occupation | | | | |
| Construction | 14,21% | 32,81% | 10,47% | 18,19% |
| Manufacture | 11,82% | 11,30% | 15,60% | 22,03% |
| Trade+hotelling | 3,42% | 27,74% | 5,40% | 31,60% |
| Transport+Services | 9,37% | 13,29% | 14,87% | 17,51% |
| HS + Public + Health | 61,18% | 14,86% | 53,66% | 10,67% |
| Monetary Variables | | | | |
| Wage rate | 149 | 142 | 200 | 138 |
| Gross Income | 28043 | 25771 | 34847 | 25600 |
| Taxes | 1020 | 1261 | 3101 | 2713 |
| SIC¹⁹ | 3140 | 3409 | 3902 | 3593 |
| Working hours | 43,77 | 48,94 | 43,19 | 48,66 |

¹⁹ Note: Monetary variables are expressed in Albanian currency, Lek, and given on a monthly basis. SIC stands for social insurance contributions and in case of irregular worker, together with taxes, it denotes the sum that the tax evader is supposed to pay if he would have been a regular worker. Both taxes and social insurance contributions are calculated according to the formulas in exercised respectively in 2005 and 2008.

Table 2: Estimation results for all sample

| <i>Variables</i> | | <i>Coef.</i> | <i>t-value</i> | |
|------------------------------------|-------------------|--------------|----------------|-----|
| Utility function | | | | |
| Income constant | alfa | 3,31 | 22,13 | *** |
| Income exponent | gamma | -0,19 | -16,12 | *** |
| Leisure constant | beta ₀ | 7,25 | 9,98 | *** |
| Leisure*Age | beta ₁ | -0,03 | -2,80 | * |
| Leisure*nch | beta ₂ | -0,04 | -0,52 | |
| Leisure*year | beta ₃ | 0,75 | 3,55 | *** |
| Leisure*gender | beta ₄ | 2,45 | 6,95 | *** |
| Leisure exponent | delta | -0,34 | -5,09 | *** |
| Opportunity density | | | | |
| Constant | g ₀ | -0,39 | -2,13 | *** |
| Construction | g ₁ | 1,44 | 15,36 | *** |
| Manufacture | g ₂ | 1,08 | 11,34 | *** |
| trade+hoteling | g ₃ | 2,95 | 25,94 | *** |
| transport+services | g ₄ | 1,11 | 11,26 | *** |
| log(remittance) | g ₅ | 0,01 | 1,33 | |
| Nch²⁰ | g ₆ | 0,03 | 1,21 | |
| trust in local government | g ₇ | 0,06 | 1,86 | |
| trust in central government | g ₈ | 0,11 | 3,32 | *** |
| Tirana | g ₉ | 0,11 | 1,49 | |
| Education | g ₁₀ | -0,29 | -12,98 | *** |
| Gender | g ₁₁ | -0,64 | -8,66 | *** |
| Year | g ₁₂ | -0,53 | -7,96 | *** |
| <i>Log</i> | | | -9,659 | |
| <i>Goodness of Fit</i> | | | 0,83 | |
| <i>Observations</i> | | | 56790 | |

²⁰ Note: The variable “Nch” refers to number of children, the variable “year” is a dummy variable taking value 1 if the observation is from the 2008 wave and 0 otherwise, the variable “gender” is a dummy variable taking value 1 if the individual is a woman and 0 otherwise.

Table 2.1: Estimation results for men

| <i>Variables</i> | | <i>Coef.</i> | <i>t-value</i> | |
|------------------------------------|-------|--------------|----------------|-----|
| Utility function | | | | |
| Income constant | alfa | 2,89 | 17,11 | *** |
| Income exponent | gamma | -0,20 | -12,62 | *** |
| Leisure constant | beta0 | 9,35 | 8,48 | *** |
| Leisure*age | beta1 | -0,02 | -2,13 | * |
| Leisure*nch | beta2 | -0,05 | -0,54 | |
| Leisure*year | beta3 | 0,88 | 3,23 | ** |
| Leisure exponent | delta | -0,39 | -4,5 | ** |
| Opportunity density | | | | |
| Constant | g0 | -0,93 | -5,03 | *** |
| Construction | g1 | 1,56 | 14,85 | *** |
| Manufacture | g2 | 1,27 | 10,58 | *** |
| trade+hoteling | g3 | 2,92 | 19,39 | *** |
| transport+services | g4 | 1,12 | 9,58 | *** |
| log(remitance) | g5 | 0,00 | 0,02 | |
| Nch²¹ | g6 | 0,01 | 0,35 | |
| trust in local government | g7 | 0,06 | 1,43 | |
| trust in central government | g8 | 0,12 | 2,97 | ** |
| Tirana | g9 | 0,12 | 1,35 | |
| Education | g10 | -0,31 | -11,56 | *** |
| year | g11 | -0,53 | -6,64 | ** |
| <i>Log</i> | | | -6676,44 | |
| <i>Goodness of Fit</i> | | | 0,82 | |
| <i>Observations</i> | | | 37610 | |

²¹ The variable “nch” refers to number of children, the variable year is a dummy variables and takes value 1 if the observation is taken from the 2008 wave and 0 if otherwise.

Table 2.2: Estimation results for women

| <i>Variables</i> | | <i>Coef.</i> | <i>t-value</i> | |
|------------------------------------|-------------------|--------------|----------------|-----|
| Utility function | | | | |
| Income constant | alfa | 4,49 | 13,99 | *** |
| Income exponent | gamma | -0,15 | -9,05 | *** |
| Leisure constant | beta ₀ | 12,58 | 6,56 | *** |
| Leisure*coage | beta ₁ | -0,03 | -1,67 | |
| Leisure*nch | beta ₂ | -0,06 | -0,35 | |
| Leisure*nch05 | beta ₂ | 0,32 | 0,80 | |
| Leisure*2008 | beta ₃ | 0,46 | 1,37 | |
| Leisure exponent | delta | -0,21 | -2,09 | * |
| Opportunity density | | | | |
| constant | g ₀ | -1,99 | -7,01 | *** |
| manufacture | g ₁ | 0,76 | 4,60 | *** |
| trade+hoteling | g ₂ | 3,02 | 17,36 | *** |
| transport+services | g ₃ | 1,28 | 6,74 | *** |
| log(remitance) | g ₄ | 0,05 | 2,64 | ** |
| nch | g ₅ | 0,15 | 2,59 | ** |
| nch05²² | g ₆ | -0,29 | -2,01 | * |
| trust in local government | g ₇ | 0,09 | 1,40 | |
| trust in central government | g ₈ | 0,08 | 1,31 | |
| Tirana | g ₉ | 0,12 | 0,92 | |
| education | g ₁₀ | -0,24 | -5,88 | *** |
| year | g ₁₁ | -0,58 | -4,79 | *** |
| <i>Log</i> | | | -2944,57 | |
| <i>Goodness of Fit</i> | | | 0,84 | |
| <i>Observations</i> | | | 19180 | |

²² Note: The variable nch refers to number of children, the variable year is a dummy variables and takes value 1 if the observation is taken from the 2008 wave and 0 if otherwise, the variable nch05 refers to the number of children under 5 years.

Table 3: Tax regime Swap from 2005 to 2008 and vice-versa - men

| Changes across income deciles | | | | | |
|---|-----------------|--------------|----------------|--------------|----------------|
| | | Regular Work | Irregular Work | Regular Work | Irregular Work |
| Decile I-II | P(IR) | -2% | 1% | 3% | 0% |
| | P(R) | 2% | -1% | -3% | -1% |
| | Hours | 1% | 0% | -1% | 0% |
| | Disp | 2% | 0% | -2% | -1% |
| | Tax | -52% | -20% | 105% | 57% |
| | Sic | 5% | 1% | -5% | -3% |
| | Revenues | -2% | 0% | 2% | 0% |
| Decile III-VIII | P(IR) | -9% | -4% | 10% | 4% |
| | P(R) | 6% | 7% | -6% | -9% |
| | Hours | 0% | 1% | -1% | -1% |
| | Disp | 3% | 2% | -3% | -1% |
| | Tax | -53% | -54% | 121% | 112% |
| | Sic | 6% | 9% | -8% | -11% |
| | revenues | -6% | -2% | 5% | 2% |
| Decile IX-X | P(IR) | -8% | -5% | 9% | 6% |
| | P(R) | 3% | 8% | -6% | -11% |
| | Hours | -1% | 0% | 1% | 0% |
| | Disp | 0% | 0% | 0% | 0% |
| | Tax | -16% | -12% | 51% | 28% |
| | Sic | 1% | 3% | -4% | -5% |
| | Revenues | -3% | -2% | 3% | 2% |
| All | P(IR) | -7% | -3% | 8% | 4% |
| | P(R) | 5% | 6% | -6% | -8% |
| | Hours | 0% | 0% | -1% | 0% |
| | Disp | 2% | 1% | -2% | -1% |
| | Tax | -35% | -27% | 83% | 55% |
| | Sic | 4% | 5% | -6% | -8% |
| | Revenues | -5% | -2% | 4% | 1% |
| <p>Note: The third and fourth column denote replacement of FT with PT in 2008 data, the fifth and sixth denote the replacement of PT with FT in 2005 data.</p> | | | | | |

Table 3.1: Simulation of 2005 PT regime on 2008 data - men

| | | 2008 Current | | 2005 PT | |
|------------------------|----------|--------------|----------------|--------------|----------------|
| | | Regular Work | Irregular Work | Regular Work | Irregular Work |
| Decile I-II | P(IR) | 0,48 | 0,67 | 0,47 | 0,67 |
| | P(R) | 0,52 | 0,33 | 0,53 | 0,33 |
| | Hours | 46,37 | 48,70 | 46,61 | 48,83 |
| | Disp | 13306 | 8014 | 13532 | 8052 |
| | Tax | 320 | 41 | 154 | 32 |
| | Sic | 802 | 316 | 843 | 319 |
| | Revenues | 3783 | 1959 | 3703 | 1962 |
| Decile III-VIII | P(IR) | 0,39 | 0,63 | 0,35 | 0,60 |
| | P(R) | 0,61 | 0,37 | 0,65 | 0,40 |
| | Hours | 43,51 | 44,65 | 43,69 | 44,91 |
| | Disp | 31439 | 20906 | 32441 | 21242 |
| | Tax | 2001 | 531 | 947 | 242 |
| | Sic | 2494 | 925 | 2649 | 1010 |
| | Revenues | 10782 | 5637 | 10085 | 5501 |
| Decile IX-X | P(IR) | 0,30 | 0,58 | 0,28 | 0,55 |
| | P(R) | 0,70 | 0,42 | 0,72 | 0,45 |
| | Hours | 41,92 | 42,97 | 41,51 | 42,88 |
| | Disp | 69491 | 59309 | 69553 | 59275 |
| | Tax | 5626 | 2922 | 4743 | 2559 |
| | Sic | 6346 | 3338 | 6378 | 3424 |
| | Revenues | 25870 | 18121 | 25032 | 17838 |
| All | P(IR) | 0,39 | 0,63 | 0,36 | 0,61 |
| | P(R) | 0,61 | 0,37 | 0,64 | 0,39 |
| | Hours | 43,76 | 45,13 | 43,84 | 45,29 |
| | Disp | 35423 | 25971 | 36081 | 26174 |
| | Tax | 2390 | 909 | 1548 | 661 |
| | Sic | 2926 | 1283 | 3034 | 1352 |
| | revenues | 12400 | 7386 | 11798 | 7248 |

Note: The third and the fourth column refer to the current system while the fifth and the last column to the simulated tax rule.

Table 3.2: Simulation of 2008 FT regime on 2005 data - men

| | | 2005 current | | 2008 FT | |
|---|----------|--------------|----------------|--------------|----------------|
| | | Regular Work | Irregular Work | Regular Work | Irregular Work |
| Decile I-II | P(IR) | 0,49 | 0,67 | 0,51 | 0,67 |
| | P(R) | 0,51 | 0,33 | 0,49 | 0,33 |
| | Hours | 47,46 | 48,99 | 47,09 | 48,77 |
| | Disp | 14989,03 | 10668,22 | 14749,49 | 10598,81 |
| | Tax | 151,00 | 46,00 | 310,11 | 72,25 |
| | Sic | 919,00 | 411,00 | 872,00 | 398,93 |
| | Revenues | 4068 | 2591 | 4132 | 2591 |
| Decile III-VIII | P(IR) | 0,40 | 0,68 | 0,44 | 0,71 |
| | P(R) | 0,60 | 0,32 | 0,56 | 0,29 |
| | Hours | 45,85 | 46,01 | 45,41 | 45,77 |
| | Disp | 26941,84 | 23175,38 | 26131,63 | 22904,05 |
| | Tax | 585,00 | 218,00 | 1295,49 | 461,75 |
| | Sic | 1978,00 | 864,00 | 1819,00 | 765,45 |
| | Revenues | 7951 | 5717 | 8341 | 5808 |
| Decile IX-X | P(IR) | 0,41 | 0,66 | 0,44 | 0,70 |
| | P(R) | 0,59 | 0,34 | 0,56 | 0,30 |
| | Hours | 42,85 | 43,65 | 43,12 | 43,73 |
| | Disp | 92784,61 | 63583,41 | 92339,76 | 63488,63 |
| | Tax | 2147,00 | 1378,00 | 3242,42 | 1761,34 |
| | Sic | 3870,00 | 2139,00 | 3706,33 | 2027,05 |
| | Revenues | 24574 | 16234 | 25417 | 16486 |
| All | P(IR) | 0,42 | 0,67 | 0,45 | 0,70 |
| | P(R) | 0,58 | 0,33 | 0,55 | 0,30 |
| | Hours | 45,57 | 46,14 | 45,29 | 45,96 |
| | Disp | 37669,68 | 28724,84 | 37046,68 | 28529,12 |
| | Tax | 810,00 | 415,00 | 1486,03 | 642,78 |
| | Sic | 2143 | 1028 | 2005 | 943 |
| | Revenues | 10487 | 7188 | 10900 | 7292 |
| <p>Note: The third and the fourth column refer to the current system while the fifth and the last column to the simulated tax rule.</p> | | | | | |

Table 4: Tax regime Swap from 2005 to 2008 and vice-versa, women

| Changes across income deciles | | | | | |
|-------------------------------|----------|-------------------|---------------------|-------------------|---------------------|
| | | Regular CHANGE | Irregular change | Regular CHANGE | Irregular change |
| Decile I-II | P(IR) | -5% | 2% | 4% | -2% |
| | P(R) | 2% | -3% | -2% | 2% |
| | Hours | 1% | 0% | -1% | 0% |
| | Disp | 3% | 0% | -2% | 0% |
| | Tax | -51% | 124% | 93% | -47% |
| | Sic | 5% | -2% | -4% | 1% |
| | Revenues | -2% | 1% | 1% | -1% |
| Decile III- VIII | P(IR) | -16% | -4% | 9% | 2% |
| | P(R) | 4% | 5% | -3% | -3% |
| | Hours | 1% | 1% | -1% | -1% |
| | Disp | 5% | 2% | -3% | -1% |
| | Tax | -56% | -51% | 108% | 97% |
| | Sic | 6% | 8% | -4% | -5% |
| | Revenues | -7% | -1% | 4% | 1% |
| Decile IX-X | P(IR) | -21% | -9% | 11% | 5% |
| | P(R) | 3% | 10% | -3% | -4% |
| | Hours | -1% | 0% | 0% | 0% |
| | Disp | 2% | 1% | -2% | -1% |
| | Tax | -38% | -27% | 59% | 45% |
| | Sic | 1% | 4% | -2% | -3% |
| | Revenues | -8% | -3% | 5% | 3% |
| All | P(IR) | -14% | -4% | 8% | 2% |
| | P(R) | 3% | 4% | -3% | -2% |
| | Hours | 1% | 1% | -1% | -1% |
| | Disp | 4% | 1% | -2% | -1% |
| | Tax | -47% | -35% | 80% | 54% |
| | Sic | 4% | 6% | -3% | -3% |
| | Revenues | -7% | -2% | 4% | 2% |

Note: The third and fourth column denote replacement of FT with PT in 2008 data, the fifth and sixth denote the replacement of PT with FT in 2005 data.

Table 4.1: Simulation of 2005 regime on 2008 data - women

| | | 2008 Current | | 2005 PT | |
|------------------------|-----------------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | P(IR) | 0,29 | 0,55 | 0,27 | 0,56 |
| | P(R) | 0,71 | 0,45 | 0,73 | 0,44 |
| | Hours | 42,98 | 45,24 | 43,42 | 45,37 |
| | Disp | 11871,93 | 6548,89 | 12174,54 | 6566,19 |
| | Tax | 350,63 | 13,64 | 172,62 | 30,52 |
| | Sic | 1037,11 | 340,29 | 1087,86 | 334,84 |
| | Revenues | 3762 | 1664 | 3695 | 1679 |
| Decile III-VIII | P(IR) | 0,20 | 0,52 | 0,17 | 0,50 |
| | P(R) | 0,80 | 0,48 | 0,83 | 0,50 |
| | Hours | 40,86 | 42,02 | 41,46 | 42,46 |
| | Disp | 24546,83 | 15055,47 | 25832,08 | 15341,60 |
| | Tax | 1858,80 | 341,95 | 819,84 | 168,51 |
| | Sic | 2611,66 | 884,86 | 2761,88 | 953,39 |
| | Revenues | 9380 | 4238 | 8748 | 4190 |
| Decile IX-X | P(IR) | 0,13 | 0,54 | 0,10 | 0,50 |
| | P(R) | 0,87 | 0,46 | 0,90 | 0,50 |
| | Hours | 39,84 | 40,80 | 39,38 | 40,96 |
| | Disp | 51579,05 | 39912,00 | 52663,23 | 40288,89 |
| | Tax | 5173,09 | 1908,79 | 3231,46 | 1389,55 |
| | Sic | 5862,69 | 2351,52 | 5938,28 | 2454,08 |
| | Revenues | 21352 | 12243 | 19702 | 11901 |
| All | P(IR) | 0,21 | 0,53 | 0,18 | 0,51 |
| | P(R) | 0,79 | 0,47 | 0,82 | 0,49 |
| | Hours | 41,08 | 42,43 | 41,44 | 42,75 |
| | Disp | 27418,30 | 18272,10 | 28466,80 | 18521,92 |
| | Tax | 2220,02 | 586,74 | 1172,72 | 383,10 |
| | Sic | 2946,96 | 1066,04 | 3062,36 | 1126,37 |
| | Revenues | 10651 | 5307 | 9928 | 5214 |

Note: The third and the fourth column refer to the current system while the fifth and the last column to the simulated tax rule.

Table 4.2: Simulation of 2008 regime on 2005 data - women

| | | 2005 current | | 2008 FT | |
|------------------------|-----------------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | P(IR) | 0,28 | 0,54 | 0,29 | 0,53 |
| | P(R) | 0,72 | 0,46 | 0,71 | 0,47 |
| | Hours | 43,27 | 46,34 | 42,70 | 46,16 |
| | Disp | 12680,86 | 7566,85 | 12405,29 | 7544,59 |
| | Tax | 143,00 | 37,00 | 276,61 | 19,61 |
| | Sic | 1119,00 | 418,00 | 1079,04 | 421,22 |
| | Revenues | 3798 | 1968 | 3837 | 1950 |
| Decile III-VIII | P(IR) | 0,23 | 0,54 | 0,26 | 0,55 |
| | P(R) | 0,77 | 0,46 | 0,74 | 0,45 |
| | Hours | 42,61 | 43,85 | 42,22 | 43,54 |
| | Disp | 18604,99 | 14243,67 | 18088,47 | 14054,55 |
| | Tax | 374,00 | 122,00 | 777,81 | 239,85 |
| | Sic | 1768,00 | 790,00 | 1697,33 | 753,21 |
| | Revenues | 5863 | 3761 | 6093 | 3804 |
| Decile IX-X | P(IR) | 0,20 | 0,44 | 0,22 | 0,46 |
| | P(R) | 0,80 | 0,56 | 0,78 | 0,54 |
| | Hours | 39,16 | 39,33 | 39,21 | 39,34 |
| | Disp | 36341,23 | 37557,07 | 35680,29 | 37179,83 |
| | Tax | 1510,00 | 1228,00 | 2394,96 | 1777,06 |
| | Sic | 3623,00 | 2660,00 | 3547,18 | 2582,70 |
| | Revenues | 12401 | 11399 | 13078 | 11796 |
| All | P(IR) | 0,24 | 0,52 | 0,26 | 0,53 |
| | P(R) | 0,76 | 0,48 | 0,74 | 0,47 |
| | Hours | 42,05 | 43,46 | 41,71 | 43,23 |
| | Disp | 20967,41 | 17540,30 | 20470,20 | 17347,45 |
| | Tax | 555,00 | 326,00 | 1001,00 | 501,76 |
| | Sic | 2009,00 | 1087,00 | 1943,64 | 1050,77 |
| | Revenues | 6757 | 4921 | 7039 | 5022 |

Note: The third and the fourth column refer to the current system while the fifth and the last column to the simulated tax rule.

Table 5.1: Mean value of elasticity of labour supply with respect to a wage increase in both regular and irregular market - men

| | | 2005 | | 2008 | |
|--|-------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | Hours | -0,05 | -0,06 | -0,04 | -0,07 |
| | P(IR) | -0,26 | -0,20 | -0,26 | -0,17 |
| | P(R) | 0,26 | 0,41 | 0,24 | 0,37 |
| Decile III-VIII | Hours | -0,05 | -0,05 | -0,02 | -0,03 |
| | P(IR) | -0,27 | -0,15 | -0,63 | -0,23 |
| | P(R) | 0,18 | 0,32 | 0,39 | 0,36 |
| Decile IX-X | Hours | -0,05 | -0,05 | -0,08 | -0,05 |
| | P(IR) | -0,21 | -0,13 | -0,67 | -0,44 |
| | P(R) | 0,14 | 0,25 | 0,31 | 0,65 |
| All | Hours | -0,05 | -0,05 | -0,03 | -0,04 |
| | P(IR) | -0,25 | -0,15 | -0,57 | -0,26 |
| | P(R) | 0,19 | 0,32 | 0,34 | 0,42 |
| <p>Note: the third and the fourth columns show the wage elasticity for regular and irregular workers in 2005 while the fifth and the last columns show the wage elasticity for regular and irregular workers in 2008.</p> | | | | | |

Table 5.2: Mean value of elasticity of labour supply with respect to a wage increase in the regular market - men

| | | 2005 | | 2008 | |
|---|-------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | Hours | -0,03 | -0,02 | -0,02 | -0,03 |
| | P(IR) | -2,25 | -1,71 | -2,15 | -1,65 |
| | P(R) | 2,44 | 3,90 | 2,23 | 4,07 |
| Decile III-VIII | Hours | -0,04 | -0,02 | 0,00 | 0,00 |
| | P(IR) | -2,35 | -1,43 | -2,34 | -1,49 |
| | P(R) | 1,72 | 3,30 | 1,58 | 2,74 |
| Decile IX-X | Hours | -0,04 | -0,03 | -0,06 | -0,02 |
| | P(IR) | -2,00 | -1,29 | -2,30 | -1,58 |
| | P(R) | 1,50 | 2,72 | 1,12 | 2,48 |
| All | Hours | -0,04 | -0,02 | -0,02 | -0,01 |
| | P(IR) | -2,26 | -1,45 | -2,30 | -1,54 |
| | P(R) | 1,82 | 3,30 | 1,62 | 2,95 |
| <p>Note: the third and the fourth columns show the wage elasticity for regular and irregular workers in 2005 while the fifth and the last columns show the wage elasticity for regular and irregular workers in 2008.</p> | | | | | |

Table 5.3: Mean value of elasticity of labour supply with respect to a wage increase in the irregular market - men

| | | 2005 | | 2008 | |
|---|-------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | Hours | -0,03 | -0,04 | -0,01 | -0,04 |
| | P(IR) | 2,20 | 1,48 | 2,07 | 1,42 |
| | P(R) | -1,99 | -2,72 | -1,81 | -2,70 |
| Decile III-VIII | Hours | -0,02 | -0,03 | 0,02 | -0,01 |
| | P(IR) | 2,46 | 1,21 | 1,57 | 1,15 |
| | P(R) | -1,49 | -2,42 | -0,98 | -1,92 |
| Decile IX-X | Hours | -0,02 | -0,03 | -0,05 | -0,03 |
| | P(IR) | 2,06 | 1,12 | 1,55 | 0,91 |
| | P(R) | -1,31 | -2,08 | -0,63 | -1,22 |
| All | Hours | -0,02 | -0,03 | 0,00 | -0,02 |
| | P(IR) | 2,33 | 1,25 | 1,67 | 1,16 |
| | P(R) | -1,56 | -2,41 | -1,07 | -1,94 |
| <p>Note: the third and the fourth columns show the wage elasticity for regular and irregular workers in 2005 while the fifth and the last columns show the wage elasticity for regular and irregular workers in 2008.</p> | | | | | |

Table 6.1: Mean value of elasticity of labour supply with respect to a wage increase in both regular and irregular market - women

| | | 2005 | | 2008 | |
|---|--------------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | Hours | -0,11 | -0,09 | -0,04 | -0,05 |
| | P(IR) | -0,49 | -0,39 | -0,47 | -0,36 |
| | P(R) | 0,19 | 0,49 | 0,18 | 0,46 |
| Decile III-VIII | Hours | -0,09 | -0,08 | 0,06 | -0,02 |
| | P(IR) | -0,45 | -0,30 | -1,09 | -0,29 |
| | P(R) | 0,14 | 0,37 | 0,22 | 0,29 |
| Decile IX-X | Hours | -0,09 | -0,08 | -0,06 | 0,01 |
| | P(IR) | -0,38 | -0,26 | -1,54 | -0,74 |
| | P(R) | 0,10 | 0,23 | 0,25 | 0,80 |
| All | Hours | -0,09 | -0,08 | 0,02 | -0,02 |
| | P(IR) | -0,45 | -0,31 | -1,05 | -0,40 |
| | P(R) | 0,14 | 0,36 | 0,22 | 0,42 |
| <p>Note: the third and the fourth column show the wage elasticity for regular and irregular workers in 2005 while the fifth and the last columns show the wage elasticity for regular and irregular workers in 2008.</p> | | | | | |

Table 6.2: Mean value of elasticity of labour supply with respect to a wage increase in the regular market - women

| | | 2005 | | 2008 | |
|------------------------|--------------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | Hours | -0,09 | -0,04 | -0,04 | -0,04 |
| | P(IR) | -3,57 | -2,77 | -4,20 | -3,26 |
| | P(R) | 1,46 | 4,22 | 1,99 | 4,81 |
| Decile III-VIII | Hours | -0,08 | -0,05 | 0,06 | -0,03 |
| | P(IR) | -3,36 | -2,34 | -4,45 | -2,99 |
| | P(R) | 1,12 | 3,39 | 1,31 | 3,82 |
| Decile IX-X | Hours | -0,08 | -0,05 | -0,05 | 0,01 |
| | P(IR) | -2,95 | -2,11 | -4,70 | -2,92 |
| | P(R) | 0,79 | 2,12 | 0,79 | 4,31 |
| All | Hours | -0,08 | -0,05 | 0,02 | -0,02 |
| | P(IR) | -3,32 | -2,38 | -4,45 | -3,03 |
| | P(R) | 1,12 | 3,30 | 1,34 | 4,12 |

Note: the third and the fourth columns show the wage elasticity for regular and irregular workers in 2005 while the fifth and the last columns show the wage elasticity for regular and irregular workers in 2008.

Table 6.3: Mean value of elasticity of labour supply with respect to a wage increase in the irregular market - women

| | | 2005 | | 2008 | |
|--|--------------|----------------|------------------|----------------|------------------|
| | | Regular Market | Irregular Market | Regular Market | Irregular Market |
| Decile I-II | Hours | -0,04 | -0,06 | 0,01 | -0,03 |
| | P(IR) | 4,07 | 2,79 | 5,79 | 3,34 |
| | P(R) | -1,53 | -2,87 | -1,95 | -3,40 |
| Decile III-VIII | Hours | -0,03 | -0,05 | 0,09 | 0,02 |
| | P(IR) | 3,96 | 2,37 | 4,63 | 3,10 |
| | P(R) | -1,14 | -2,41 | -1,12 | -2,89 |
| Decile IX-X | Hours | -0,02 | -0,04 | -0,03 | 0,03 |
| | P(IR) | 3,45 | 2,26 | 4,12 | 2,20 |
| | P(R) | -0,80 | -1,60 | -0,57 | -2,29 |
| All | Hours | -0,03 | -0,05 | 0,05 | 0,01 |
| | P(IR) | 3,88 | 2,43 | 4,76 | 2,97 |
| | P(R) | -1,15 | -2,34 | -1,18 | -2,88 |
| <p>Note: the third and the fourth columns show the wage elasticity for regular and irregular workers in 2005 while the fifth and the last columns show the wage elasticity for regular and irregular workers in 2008.</p> | | | | | |