ESTIMATING LABOR SUPPLY IN ALBANIA

By
Gisela Shameti

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Supervisor: Professor Peter Grajzl

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Abstract

Estimating labor supply in Albania is interesting not only from an econometrical point of view but it is mainly important for policy making in the field of labor market. Using the data from the Living Standard Measurement Surveys in Albania covering the period from 2002 to 2005, this paper studies the labor force participation changes in the Albanian labor market and, focusing on the 2003-2004 period, estimates labor supply, correcting for selectivity bias via the Heckman procedure. Drawing on these samples, it is evident that labor participation rates in Albania declined from 2002 to 2005 both in terms of age cohorts and in terms of gender. Female participation shows a continuous decline, as does the participation of older generations. The OLS results over 2003 and 2004 samples indicate small positive wage elasticity of 0.08 and 0.06, respectively. The results are nevertheless subject to many procedural and methodological limitations. When correcting for exogeneity and selectivity bias through Heckman procedure on these datasets wage elasticities became 0.23 and 0.12 confirming labor supply theory and getting closer to worldwide trends. However, the other variables in the equation proved insignificant suggesting various problems with data, like measurement error, exogeneity or multicollinearity. The paper suggests ways for further work on the topic.

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1. INTRODUCTION

The fall of communism in Albania in 1991 was followed by many economic, social and demographic changes. All the sectors experienced huge structural modifications through their transformation from a state of command economy to a market economy. The labor market constitutes a very important element of this transformation, representing that vital part determining an economy's development and growth. While it is a well known fact that the Albanian labor market, due to the political and economic changes, as any other transitional economy, went through essential shocks like huge initial unemployment, drastic declines in labor force participations (LFP), new job reorganization, emigration, etc., systematic empirical analyses of Albanian labor market are scant.

The many reasons for this lack of systematical empirical analysis include the non-availability of data (especially before 2000), huge informal sector, emigration and missing international surveys undertaken in the country. Only a few attempts on quantifying each of these are existent like, for example, Muço et al. (2004) who works on the movements of the Albanian labor market, trying to assess the size of the informal market, or Kule et al. (2002), who working on micro-data tries to identify the causes and consequences of emigration, a widespread phenomenon in Albania after the 1990s. Many other labor market reports from the World Bank, Albanian Ministry of Labor and Equal Opportunities, Albanian Institute of Statistics, United Nations Development Programme (UNDP) and International Labor Organization (ILO) only give a general picture of the Albanian labor market. However, to the best of my knowledge, there exists no systematic econometric study done on the trends of Albanian workers' labor supply and the

determination of the uncompensated, compensated wage elasticity and income elasticity. Studies on this topic would be particularly interesting for the case of transitional Albania, a country whose GDP has been one of the lowest in Europe for a considerable time frame now and for which the development of the labor market constitutes one of the primary objectives of each and every political party in power after the 1990s.

This paper, therefore, tries to identify the movements and trends in the Albanian labor market from 2002 to 2005 and estimate labor supply elasticity for different subsets. Unfortunately, due to the non-availability of the necessary data, compensated wage elasticity and income elasticity cannot be estimated, only the uncompensated one[1]. However, knowing the average labor response of the Albanian employees, captured by uncompensated wage elasticity, is not only informational from an applied econometrics point of view and a checking exercise for how the Albanian labor market fits into the whole world labor supply theory but it can be mostly applicable by labor market policy makers in constructing the most adapt policies fitting into the Albanian environment. This is beneficial especially in the case of Albania, one of the poorest countries in Europe and a country where the Vocational Education and Training (VET) system, a crucial program for improving human capital, has been experiencing a dramatic deterioration (ILO, 2003-2004). Therefore, this study, although encountering different technical caveats working on the Albanian Panel Surveys of 2003 and 2004, estimates uncompensated wage elasticity, first, by simple Ordinary Least Squares (OLS), and second, by the two-step Heckman procedure, which corrects for selectivity bias and exogeneity.

[1] The uncompensated wage elasticity is defined as the percentage change in hours worked as a result of a one percentage change in the net hourly wage. This elasticity is broken into substitution effect: compensated (for income changes) elasticity and income effect: income elasticity.

The thesis is organized as follows: Section 2 describes the situation of the Albanian labor market from 2002 till 2005, Section 2 gives a theoretical background, Section 4 is dedicated to data description, followed by regression results and interpretation in Section 5. Section 6 concludes.

2. THE STRUCTURE OF THE ALBANIAN LABOR MARKET AFTER THE 1990S

After the 1990s, Albania went through many radical economic, social and demographic changes. During the whole period of transition, which is not over yet, it has experienced many ups and downs in terms of economic growth, structural changes and macroeconomic stability, and the labor market was not an exception to this. Albania currently has a young age structure, with almost half of the population being under 25 years, but with the tendency to decline in the future (ILO, 2006). One possible reason for this can be the fact that since the collapse of communism, the Albanian population has been decreasing rapidly due to large-scale emigration and falling birth rates. 600,000-800,000 people (mostly men) are working abroad, mainly in Greece and Italy (EIU, 2004).

After restructuring in the early 1990s, labor force participation rates fell by 18% points for the period 1991-2002, and since 2000 less than two thirds of the working age population is actively participating in the labor market (INSTAT, 2002). The decline has been higher for women, for whom only 50% of the working age population is active in the labor market. This decline may be explained by various factors, including engagement in the informal sector, which is not recorded, discouragement and dropping out of the labor force or problems coming from the economic transformation and industrial restructuring in terms of available jobs suitable for certain population with certain sets of qualifications (ILO, 2006). Due to the mass privatization of state-owned enterprises, Albania experienced a huge drop of employment in the public sector, and the industrial sector, with only the service sector keeping good rates of employment. Two

thirds of all employees till 2002 were employed in private agriculture, which makes agriculture the largest sector in the country.

For women the decline was more pronounced because besides the overall changes hitting the Albanian labor market, they were more exposed to the lack of childcare (in 2003 the number of kindergartens fell by 60% in urban areas) (INSTAT, 2004), consequently prohibiting them from participating as equally as men in the labor market. Another very important factor which is usually claimed to explain the higher decline is related to the male mass emigration, which leaves the wives at home taking care of their children, engaging in housework or informal market and thereby decreasing their working hours out of the house. One would expect male emigration to open more vacancies for women; however, the higher decline in female labor supply and also the much lower share of women holding full-time jobs suggests that either these positions did not exist in the first place (as a consequence of which males emigrated) or females moved to the informal market, a measurement of which is still not available for a country as Albania.

Many of the firms, enterprises and employees in Albania operate in the shadow or informal market. Studies on the size of the Albanian informal market conclude that it is mainly supported by remittance flows from emigrants living in the neighboring countries, which most of the time are also channeled through the informal currency market, therefore not possible to be measured in size and/or frequency. IMF reports of 2003 claim that the informal sector should be between 30 and 60 percent, with a higher chance of it being close to 60 (Muço et al., 2004). However, the unemployment rate measured by the General Census, 2001 was 22.7%, while the registered unemployment rate according to

Bank of Albania was 16.4% (Muço et al., 2004). Therefore, it is very important to mention that the quality of data and the accuracy with which they were gathered is limited. In a survey conducted by the Albanian Ministry of Labor in 1996, about 65%-70% of individuals working in the private sector were not officially recorded, and Albania first conducted a Labor Force Survey only in 2007. A lot of information is missing and the only available source of it is the Albanian Institute of Statistics. The size of the gap between the actual economic parameters and the published numbers cannot be accurately quantified, but according to Muço et al. (2004), it is around 10% of the total employment.

3. EMPIRICAL FRAMEWORK

Labor market participation influences and determines the development and the performance of a country's labor market, which by itself constitutes a key sector of the market economy. Labor market participation can be measured in two ways: by the presence of the workers in the labor market and actually working in it (usually estimated by a conditional logit econometric method) or alternatively by the number of hours, depending on many factors, one decides to supply to the labor market. The factors that establish labor market participation have always been numerous and varying from person to person, across genders, from a different age group to another age group and from country to country. The most common ones among those factors are own-income, individual characteristics like education, age, gender, family content, geographical characteristics and many others.

Historically, the difference in labor supply is particularly exhibited between males and females, with the latest world trends showing that male labor participation has declined, while female labor supply has increased significantly. (Bosworth et. al., 1996) However, according to Killingsworth (1983), despite the labor supply upward trend, female participation has increased more in part-time jobs than in full time, showing once more that factors such as the existence of small children, childcare, presence and help of the spouse, etc. are more influential when it comes to female labor participation. In terms of uncompensated wage elasticity, international research suggests values which vary from -0.23 to -0.05 for males and 0.6 to 1.1 for females (Killingsworth, 1983).

In particular, the neo-classical approach of consumer theory states that the number of hours a person supplies in the labor market is derived by solving the first-order conditions of the household utility maximization problem, where the utility function is assumed to be the standard and well-behaved one. That is, following Lokshin (2004), a consumer maximizes utility:

(1) $U_{ijt} = \beta_j X_{it} + \gamma_j Y_{ijt} + \varepsilon_{ijt}$

where U_{ijt} is utility of household i choosing state j at time t (j presents different states in the labor market, like employed, unemployed, out of the labor force etc.), X_{it} is the vector of household characteristics that impact household's choice at time t, Y_{ijt} contains the outcome variables from choosing state j, like wage, social assistance, etc., β and γ are vectors of unknown parameters and ε_{ijt} is a random disturbance, including unobservable factors. The probability that household i chooses j at time t is given by:

(2) $Pr_{it}(j) = Pr\,[U_{ijt} > U_{iqt}]$

$= Pr[\varepsilon_{ijt} - \varepsilon_{iqt} > X_{it}(\beta_{qit} - \beta_{jit}) + Y_{jit}(\gamma_{qit} - \gamma_{jit})]$ for any $j \neq q$

In order to estimate the intertemporal elasticity of labor supply, one has to look at the labor supply function, which is given by a homogenous-of-degree-zero function of wage or labor income(i), the price of a basket of consumption goods (p) and non-labor income (V):

(3) $H = H(i, p, V)$

with explicit functional form adopted looking like:

(4) $\log(H_i) = \alpha_0 + \alpha_1 \log(w/p)_i + \alpha_2 \log(V/p)_i + \alpha_3 X_i + \varepsilon_i$

where again X_i is the vector of individual characteristics and ε_i random error. In cross-section samples, p is assumed to be the same to all individuals and is dropped out of the model.

Wage elasticities are then given by a transformation of the Slutsky decomposition of the wage effect into substitution and income effect:

(5) $(\partial H/\partial w)(w/H) = (\partial H/\partial w)_{u=const}(w/H) + (w/H)\, H(\partial H/\partial V)$

where the left hand side refers to the uncompensated wage elasticity, which is further broken into: the substitution effect (the first term on the right), also known as compensated wage elasticity, and income effect (the second term on the right), also known as marginal propensity to earn. Referring to the semi-log specification in equation (4), the uncompensated wage elasticity is given by α_1, the income elasticity is given by α_2 and compensated wage elasticity by $\alpha_1 - (wH/V)\alpha_2$. According to the classical theory, α_1 is expected to be positive (higher wage results in higher number of hours) and α_2 negative, resulting in a C-shaped (backward-bending) labor supply curve (Robins, 1930).

The usual problem that is encountered when estimating labor supply is the way hourly wages are imputed into the equation, since there is no unique rate for measuring that in practice. Usually for salaried workers, the hourly wage is computed as the salary divided by the standard amount of hours per time period, which obviously induces measurement error and a negative correlation between hours and wages, which consequently creates a downward bias for the wage coefficient. One way to deal with this error is through instrumenting wage by age, education and other similar parameters that might influence it. However, in order for the estimate to be consistent, the instrumental variables for wage should be exogenous, i.e they should not reflect the person's taste for

work, a condition which cannot be easily achieved. Moreover, such exercises also suffer from sample selection or selectivity bias: the wages of non labor participants cannot be observed and therefore, the labor supply is fit only to the participants.

A standard way to deal with these two problems simultaneously is via the Heckman procedure (Heckman, 1980) according to which, the following equations are estimated:

(6) $LFP_i = \alpha_0 + \alpha_1 \ln(w)_i + \alpha_2 X_{i1} + \varepsilon_i$

(7) $\log(w)_i = \gamma_1 X_{i1} + \gamma_2 X_{i2} + \delta\lambda_i + u_i$ where $\lambda_i = \varphi(\alpha X`_i) / F(\alpha X`_i)$;

(8) $\log(H_i) = \alpha_0 + \alpha_1 \log(\hat{w})_i + \alpha_2 X_{i2} + \theta\, \hat{\lambda} + \nu_i$

where the first one, a probit equation also known as the selection equation which measures the probability of participation, includes all observations and singles out participants from nonparticipants. The estimates of this equation are then used to create λ- the inverse Mills ratio, which captures this selection and introduces it to the wage equation applicable only to the participants. The last stage of the procedure estimates labor supply using the predicted wages from equation (7). X_{i2} includes personal characteristics that influence wages but not labor force participation, so that the predicted values of wage are not perfectly collinear with the regressors of hours equation (El-Hamidi, 2003). In this manner, both sample selection and exogeneity are taken care of. The structure of the dataset which is used from this paper, however, does not allow us to apply this method to each and every year.[2] Therefore, after analyzing analytically the moves in the Albanian labor market participation from 2002 till 2005, the abovementioned procedure will be applied only to the 2003 and 2004 data.

[2] In datasets of 2002 and 2005, no unique identification number is present therefore the merging of different tables was impossible. The 2003 and 2004 datasets do not have this problem.

4. DATA SUMMARY

This study takes into consideration the results of four Living Standards Measurement Surveys (LSMS) that were undertaken in Albania between 2002-2005. These multi-purpose surveys are generally used as a useful source of information for determining the living conditions of the country's households, the poverty level and for assisting policy-makers in their surveillance of various social programs. The household questionnaires include information about the household members like, age, gender, marital status, education, labor market status and various other modules including migration, fertility, subjective poverty, agriculture and nonfarm enterprises. The LSMS of 2002 included 458 Primary Sampling Units, with a total of 3600 households covering some of the largest cities in Albania. Based on this data set, two panel data surveys: Albanian Panel Surveys (APS), were conducted in 2003 and 2004. The APS of 2003 was constructed in a panel form, taking almost half of the households of 2002 (2155 out of which 1780 were interviewed in 2002), and the panel size of the 2004 APS was the same as the one in 2003. The LSMS of 2005 followed rigorously the structure and the notations used by LSMS of 2002, including 1800 panel household units and 3600 new households (WORLD BANK, 2008). According to the World Bank publications on the main labor market indicators based on these surveys, during 2002-2005, the labor force participation rate fell from 65.2% in 2002 to 63.7 % in 2004, due to which unemployment rate fell from 10.2% to 5.6%.(Carletto et al., 2005). One possible explanation for the double fall in unemployment and labor force participation rates is the low amount of job creation in the

Albanian labor market during this period, or the discouragement of employees, who stopped searching for jobs and left the labor market.

Figure 1 and 2 below, drawing on these datasets, give a representation of the changes in labor force participation by age and gender, respectively.[3] The calculations for the LFP are made based on the individuals' responses about their presence in the labor market, i.e labor force participation (LFP) was measured as the percentage of population who declared to have been working during the last 7 days (as defined by ILO). Looking at LFP by age (Figure 1), we can infer that the majority of the working population is concentrated between 35-44 and 45-54 age cohorts, for which in each case LFP in 2005 increased. For the other age groups, however, participation decreased from 2002 to 2005. An interesting feature of the chart is also the great amount of 15-24-year-old workers in 2002 and its sharp decline afterwards.

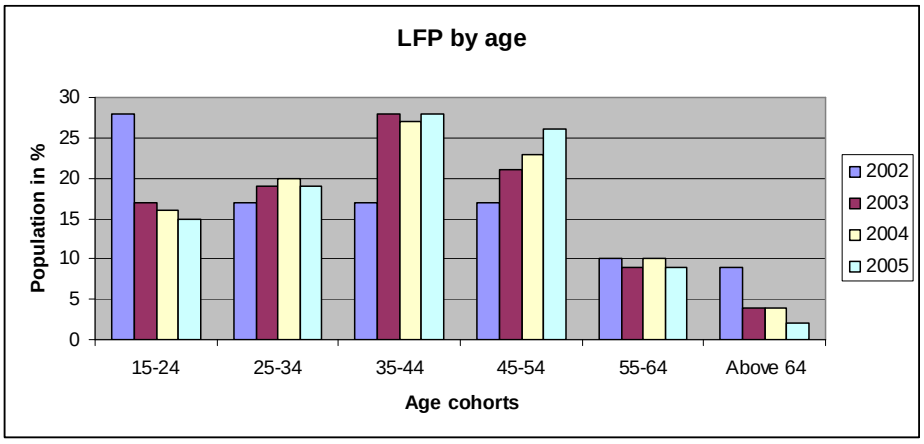

Figure 1. LFP by age

Turning to Figure 2, the percentage of women participating in the labor market decreased from 31% in 2002 to 26% in 2005 while an opposite trend is observed for males, confirming our prior beliefs.

[3] Table A3.1 in the Appendix gives a summary of the data sets downloaded from the World Bank classified by gender for each respective year

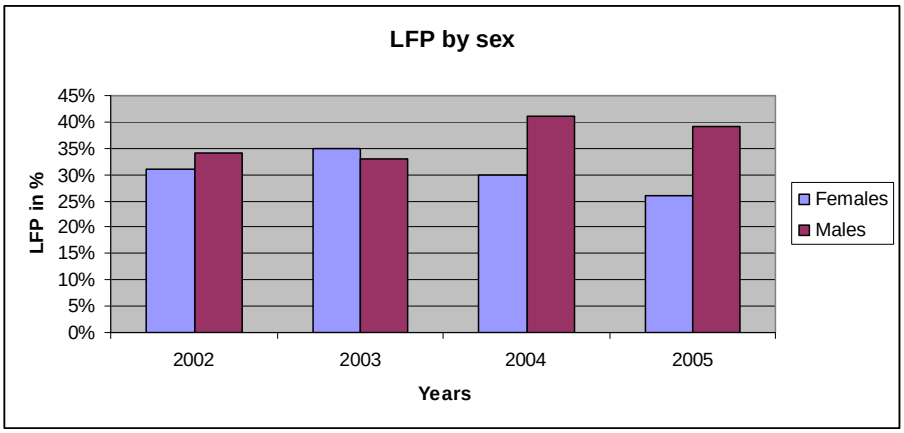

Figure 2. LFP by gender

Although the samples do not represent the same households during these years, there are about 1700 observations (mainly from the working age population) which are interviewed consequently. Assuming that these samples of households are randomly chosen year after year besides the ones kept the same, the numbers presented in the table and by the figures remain indicative of the fall in female labor market participation. However, a problem we have to be cautious about is that, as also suggested by the data, there is a considerable number of individuals who claim not to work but who on the other side work on their own account or on their own farm and for whom wages or amount of labor supply is missing or cannot be precisely calculated. Therefore, the results obtained here are not an indication of the whole population features but only of the ones who declared to be working.

The careful cleaning of each of the four data sets based on LSMS-s of 2002, 2003, 2004 and 2005 resulted into fours subsets for which there are no missing data and for every single observation age, gender, marital status, occupation, the approximate number of hours the individual worked during the last month and the net payment per month are available. The APS of 2003 and 2004 also gives us the possibility to extract person's

highest level of education attained, number of children under 6, experience measured by the number of years the person had been working in his/her primary occupation and health status, i.e. a self–assessment of the person's health if his/her health is below or above average. Tables A3.2 and Table A3.3 in the Appendix give a summary of those.

As Table A3.2 reveals, females are represented in a lower share during the four years, indicating that either their labor participation is lower and consequently the data for them is missing or that the data is missing because they are more involved in the informal sector not captured by the survey. In terms of the average age, both females and males show a stable pattern through the years, although females' average working age is lower than for males. The average monthly wages (around 20000 Lek or around 180 EUR) display an irregular pattern among females and males, while the average monthly hours for females are always lower than those of males, although they seem to follow the same trend as for males: declining initially and then going upward in 2005, surpassing the 2002 level. Figures 3 and 4 illustrate this point.

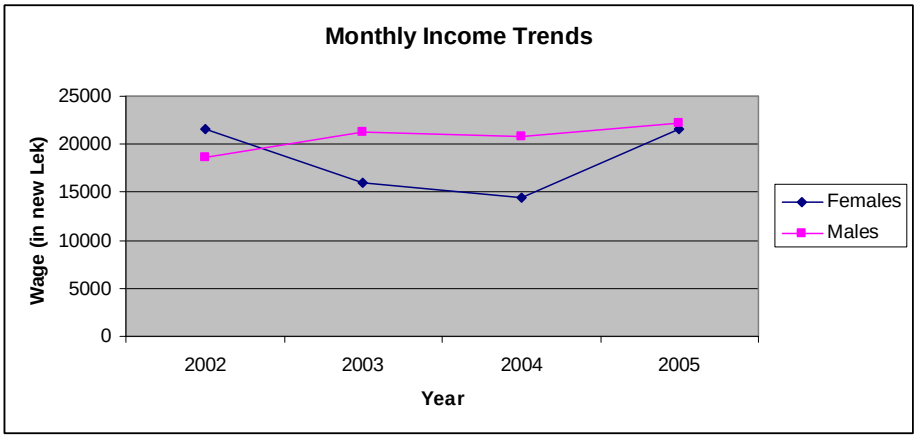

Figure 3.Monthly income

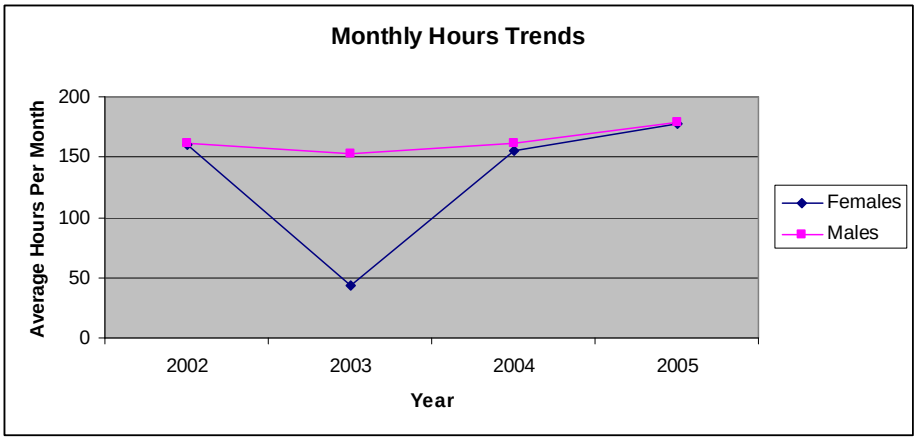

Figure 4. Monthly hours trends

Regarding occupation, the majority of the observations belong to group 7, group 6 and group 2 in decreasing proportions, each representing Craft and Related Trade Workers, Skilled Agricultural and Fishery Workers and Professionals, as defined by the International Standard Classification of Occupation (ISCO) 1988.[4] 86% of the sample is married, 6% are single and a very small part of the wage earners are widowers or divorced.

For the variables not available for all the years, we turn to Table A3.3. In terms of health, the majority of the households are above the average level. Education level has different representations in 2003 and 2004: in 2003 for the majority the highest level of education is the vocational 4 to 5 years, while for 2004 nine years of schooling or secondary general is the highest. Also in 2003, the representation of higher education levels like university in Albania, abroad or post-graduate studies, although small in absolute terms, compared to 2004 is much bigger. The average experience in 2003 is around 9 years, while in 2004 it is close to 7 and there were more individuals with children younger than six in 2004 than in 2003. Keeping in mind the characteristics of our datasets, we proceed now to the estimation results.

[4] A list of the ten major groups and their respective definition is given in the Appendix

5. ESTIMATION RESULTS

To estimate the wage elasticities and identify the different trends across years, we first run five different regressions: one cross-section for each particular year and then a pooled Ordinary Least Square (OLS) for all the observations (see Table A3.4 in Appendix). The pooled OLS is used for two reasons: first, because a panel data regression cannot be conducted since the sample of the households for each year is different (although 1700 observations were kept the same); and, through the data cleaning and data mining even more observations were left out of the regressions due to missing information; and second, because pooling the years together increases the sample size and gives a more accurate estimate for the elasticities. Each of the first four regressions follow equation (4), where vector X_i includes age, gender, three dummies for the marital studies: married, single, widower with divorced as the numeraire. Education, number of small children, health conditions should have also been included in the regressions but since they are not available for all the years, for comparison reasons, they are left out at this point. The pooled OLS includes three year dummies also, taking year 2002 as the base year.

The OLS regressions presented in Table A3.4, corrected for heteroskedasticity and run on Albanian datasets of 2002, 2003, 2004 and 2005, show that age, marital status and wage are (statistically) significant in determining employees' labor market participation and the amount of hours they devote to working, with few exceptions from one year to another. Age and gender have the expected sign and they usually behave the same during different years. Marital status, on the other hand, comes only significant in 2002 and the signs of the estimates are negative. According to them, a married person,

single or widower, is expected to work less than a divorced one, implying that the absence of a spouse gives an incentive for more labor market participation. However, in the other years these dummies have different signs and are insignificant. Obviously, the results are highly biased not only due to selectivity and exogeneity but also omitted variables bias, as they are a poor capture of equation (4), made evident by the very small respective R-squares: 1%, 2%, 5% and 3%. The aim here was to look at the values of the uncompensated wage elasticities and focus more on their trends than their actual values. In these terms, the uncompensated wage elasticities turn out to be significant, and they have the expected size and sign for this type of exercise. For 2002, for example, a 1% increase in the monthly wage increases monthly working hours on average by 0.11% (subject to the abovementioned econometric caveats). Interestingly, wage elasticity declines during the years from 0.11 in 2002 to 0.06 in 2005, implying a labor supply function getting more and more inelastic.

The last column of Table A3.4 gives the results of pooling the four years together. In this regression, in addition to X_i, year dummies are included in order to capture for the year differences. The increase in sample size did not improve our results much and, as a matter of fact, all the variables but log wage and the year dummies are insignificant, and therefore, the results are not that informative. For this reason, more variables were included and two more OLS regressions on 2003 and 2004 datasets were run.

The OLS regressions on 2003 and 2004 are presented in Table A3.5, and they include a quadratic form of age, education dummies, a health dummy (1 if the person said their health is above average, 0 otherwise) and number of children younger than 6 in the household. Evidently, the results ameliorated relative to the previous ones but not very

significantly so. For example, for 2003, although many new factors, which are expected to be important in determining one's decision to the amount of participation in the labor market, were added and would correct for the omitted variable bias, the estimates are still not significant. Only wage elasticity is significant at the 5% significance level, and it shows that, *ceteris paribus*, the uncompensated wage elasticity for 2003 is 0.08. The independent variables could explain only 4% of the variation in the dependent variable, which shows once again the big exogeneity present in the model and multicollinearity among the dummy variables.

For 2004 the picture looks better. Age affects the labor supply positively, but after some point it has decreasing marginal effects (the coefficient on age squared). All three marital status dummies are also significant, and all are negative, suggesting that divorced people (the numeraire) tend in general to work more than others, *ceteris paribus*, which is consistent with the previous OLS results presented in Table A3.4. From the education dummies only the first two, for which the highest level of education attained is 9 years and secondary general, come out significant. The negative coefficients on them mean that people from these education categories work more than those with no education. Number of children under six and health status do not affect labor supply for this sample. Female labor supply is 10% lower than for males, *ceteris paribus* and the uncompensated wage elasticity is 0.06, different from the 0.08 estimated earlier and much more significant. Although part of the omitted variable bias seems to have been taken good care of, the problems of exogeneity and sample selection bias are still not solved. Therefore, we next apply the two-stage Heckman procedure, which in theory is supposed to correct for those.

Table 1 gives the results from equations (6) and (7). In the probit equation, vector X_{i1} includes age (in quadratic form), gender, a health dummy based on individuals' health self-assessment, education represented by three dummies measuring the highest level of education attained by the interviewees and a variable about the number of children under six years old present in the household. In the OLS regressions earlier education was imputed by 9 dummies, but given that most of them come out insignificant and a lot of multicollinearity is induced because of them, the education dummies were grouped in groups of two, and post graduate studies dummies were left out, since these last ones always turned out insignificant and their variance is very small. Marital status dummies were also left out of the equation for the same reasons. In the wage equation health and number of children are not included, making these variables in this way our exclusion restriction, since there is no logical reasoning behind why these variables would directly determine a person's wage. The rest of the variables from equation (6) are kept the same, and in addition, experience (in quadratic form), 9 dummies representing different occupations and the inverse Mills ratio, which counts for sample selection, were added.

Looking at the probit estimates and comparing the results for 2003 and 2004, the variables have almost the same expected signs and quite the same magnitude. In both years, age and its quadratic form are significant and have a positive effect on the probability of labor participation. Gender and health dummies are both significant as well for 2003 and 2004, and as expected, females, the same with people whose health is below average, have a lower probability of being present in the labor market than the rest of the population, keeping everything else constant. Interestingly, the number of the children under six does not show to have any impact on labor participation, probably due to the

small representation of those captured by the current sample. Education also appears not to affect this decision either and the signs of the estimates are different in 2003 and 2004. For example, in 2003, having a secondary school as the highest level of education increases the probability of labor force participation by 0.03, while in 2004 this probability increases by 0.21, although insignificant. In 2003, having vocational school or university as the highest level of education decreases this probability while in 2004 the opposite is observed. The probit regressions pass the stability test quite significantly, but given that many dummies are used at this stage and keeping in mind that one of the serious problems associated with probit estimator is exogeneity, we should still be very cautious in interpreting these results from a quantitative point of view.

Next let us look at the wage equation in Table 1, the coefficients of which across years are very close in magnitude. The significance is not the same as for the case of 2003 when many of the variables like age, education, experience and some of the occupations turn out insignificant. Only gender and groups 5, 6 and 9 are statistically significant. On the contrary, in 2004 all the variables but gender are significant and, moreover, age and experience affect wages in the same manner: they have a negative effect as age and experience increase but after a turning point, the marginal effect is positive. Regarding education estimates, they are all negative, implying that the people with these highest levels of education tend to work less than those with other types of education. The same sign is observed for most of the occupations too, indicating that members of these groups work less than the armed forces (the numeraire). The overall quality of the regressions is good, especially for 2004, for which the test results are more satisfactory than for 2003. The inverse Mills ratio for 2003 turns out insignificant,

implying that sample selection is not a problem for this sample, but for 2004 the ratio is significant, indicating the presence of sample selection bias and supporting the validity of the applied procedure.

Table 1. Results of Probit and Log(Wage) Equations

	Dependent Variable: LFP_i		Dependent Variable: $log(W)_i$	
Independent Variable	**2003 Coefficient**	**2004 Coefficient**	**2003 Coefficient**	**2004 Coefficient**
C	-3.61655* (0.105429)	-3.49864* (0.322978)	9.547006* (3.152431)	13.45239* (0.795391)
AGE	0.174285* (0.004437)	0.178064* (0.006229)	0.033983 (0.094176)	-0.04757** (0.023173)
AGE^2	-0.00198* (5.51E-05)	-0.00212* (7.26E-05)	-0.00043 (0.001067)	0.000266** (0.000274)
EXPERIENCE			-0.01257 (0.011793)	-0.0177** (0.007484)
EXPERIENCE^2			8.87E-05 (0.000379)	0.000396** (0.000219)
GENDER	-0.27887* (0.033972)	-0.70492* (0.038265)	-0.34114** (0.148627)	0.023167 (0.093259)
HEALTH	0.464904* (0.065386)	0.679178* (0.075087)		
SECONDARY	0.036975* (0.062709)	0.217755 (0.295919)	0.003392 (0.105595)	-1.06714* (0.232294)
VOC	-0.05597 (0.038259)	0.250696 (0.298316)	-0.00598 (0.063175)	-1.12436* (0.237033)
UNI	-0.09728 (0.072883)	0.562631*** (0.320288)	0.047143 (0.134516)	-1.12436* (0.262707)
CHILDREN	0.01083 (0.017292)	-0.00959 (0.019264)		
GROUP1			0.408934 (0.250801)	0.471823* (0.136617)
GROUP2			0.010846 (0.177218)	0.226257** (0.121417)
GROUP3			-0.28243 (0.173109)	0.032642 (0.124558)
GROUP4			-0.230159 (0.204785)	-0.586403* (0.141341)
GROUP5			-0.435979** (0.171099)	-0.28823** (0.123456)
GROUP6			-0.512772** (0.197898)	-1.244542* (0.118103)
GROUP7			-0.239472 (0.16391)	-0.515901* (0.118323)
GROUP8			-0.183272 (0.175235)	-0.16527 (0.119134)
GROUP9			-0.549668* (0.179264)	-0.631389* (0.158871)

IMILLS			0.033653 (2.833789)	-3.83283* (0.780031)
Mean dependent var	0.344663	0.526278		
S.E. of regression	0.396283	0.427688		
R-squared			0.229754	0.367026

*** statistically significant at 1% ** statistically significant at 5%*** statistically significant at 10%**
Standard errors are presented in the brackets

Proceeding to the third equation, our equation of interest, where the predicted wages from equation (7) and the inverse Mills ratio are also included, we find out that almost all of the variables are insignificant. In particular for the regression on the 2003 dataset, all the variables but the uncompensated wage elasticity are not significant. The uncompensated wage elasticity jumps to a bigger value, 0.23, and it is significant at the 5% significance level. The selection term continues to play no role in the regression, which is consistent with the results in the previous equation for year 2003. In 2004, both the elasticity and the inverse Mills ratio turn out significant establishing an uncompensated wage elasticity of 0.12 (almost double the size of the OLS results) and the fact that the selection term plays a crucial part in the model for this year. The results obtained did not change much when the procedure was conducted for each of the genders separately, which is why those results are not presented and taken into consideration here. Since the children variable, which is expected to influence differently the labor supply across genders, comes out insignificant, the results were not expected to change if the model was applied to women and men separately given the small variance of this variable.

Overall, the Heckman procedure worked out quite well in both cases, establishing uncompensated wage elasticities much closer to the world trends. The results changed

considerably compared to the OLS regressions, which gives rise to many discussions and mainly puts into light a lot of problems the actual datasets are characterized of. First of all, besides econometric issues like sample selection, endogeneity, omitted variable bias, many caveats are present in these datasets. As officially admitted by their source (INSTAT, 2006), the process of data gathering is not accurate and a lot of measurement error is induced along the process, a huge obstacle for the conduction of such kind of studies in Albania. One should also keep in mind that there is also measurement error created by the ones interviewed, especially when it comes to their declared hours of work during the month or their wages. The samples suffer from missing data and a lot of other information about family income or other benefits are missing, which might affect the hours supplied are missing.

Second, given that variables used are mostly presented by dummies, a lot of multicollinearity is present in the regressions. We tried to correct for that, and we got significant results for the wage elasticities but still the rest of the variables were left insignificant. Last but not least, heterogeneity might be a further handicap for our methodology in the sense that the sample might not be a representative one, and the agents are heterogeneous. Creating and working on homogenous subsamples might yield better results, but this is left as a task for further research.

The results obtained are meaningful in terms of the wage elasticities obtained, which are closer to what other economists have concluded and in terms of the validity of the Heckman procedure applied on this sample. The fall from 0.23 to 0.12 of the uncompensated wage elasticity also confirms the common belief that labor supply in Albania has become more inelastic regarding changes in wage. Nevertheless, a strong and

sure statement about the true values of the uncompensated wage elasticity is very hard to be made, especially since the direction of the bias of estimates is not straightforward to identify. Therefore, further research accounting for and curing the problems encountered is needed.

Table 2. Hours Estimates (Heckman Selection Model)

	Independent Variable: $\log(H)_i$	
Independent Variable	**2003 Coefficient**	**2004 Coefficient**
C	-5.07693 (5.834043)	5.087187* (0.557519)
AGE	0.22668 (0.156464)	-0.01734 (0.013918)
AGE^2	-0.00265 (0.001767)	0.000184 (0.000165)
GENDER	-0.34464 (0.258583)	0.026016 (0.052785)
HEALTH	0.600732 (0.415025)	-0.00935 (0.077379)
SECONDARY	0.081243 (0.123804)	-0.1416 (0.091061)
VOC	-0.00822 (0.073948)	-0.13568 (0.093373)
UNI	-0.03387 (0.125697)	-0.1877*** (0.10939)
CHILDREN	-0.01457 (0.025837)	-0.00771 (0.006525)
IMILLS	6.147217 (4.881668)	-1.50843* (0.483682)
LOG(FITTEDWAGE)	0.237427** (0.112211)	0.123049* (0.01336)
R-squared	0.095682	0.173653
Adjusted R-squared	0.076842	0.170862
S.E. of regression	0.59665	0.385517
Sum squared resid	170.8757	440.0749
Log likelihood	-437.572	-1378.76

*** statistically significant at 1% ** statistically significant at 5% statistically significant at 10% standard errors are given in the brackets**

6. CONCLUSION

This thesis analyzed the labor market and tried to estimate the labor supply elasticity in Albania from 2002 till 2005. Looking at the labor market movements in Albania using Living Standard Measurement Surveys, we conclude that labor force participation rates declined substantially and sequentially. The decline was bigger for females than for males and bigger for older generations than middle-aged ones. These statements were additionally proven through econometric methods, where different regressions run on the 2002-2005 datasets, separately and pooled, showed that age and gender are among the most important factors determining labor supply in Albania. Females, together with older individuals, tend to work less than males and younger people. The OLS results suggest that the uncompensated wage elasticity lies in the range between 0.06 and 0.11.

These values, however, should not be taken for granted since, besides the problems associated with the current data samples, the econometric method by itself has many limitations, like exogeneity problems, measurement error and selectivity bias. In order to correct for the omitted variable bias, we focused on the datasets for which the most available data could be included: 2003 and 2004, for which more variables were found significant, such as marital status, the highest level of education attained and even health status. The wage elasticities were 0.08 and 0.06 in this case, for 2003 and 2004, respectively, but although they are not very different from the first OLS results, the quality of the regressions was much better.

However, in order to get a better measure of the estimates quantitatively and qualitatively, and taking into consideration the many caveats our datasets contained and the respective problems associated with the econometric methods applied, we tried to correct for those through the Heckman procedure- a two-step econometric method which solves simultaneously for exogeneity and sample selection. Multicollinearity was also taken care of by grouping the education dummies and excluding marital status from this procedure. The application of this method changed the picture considerably because due to it almost all the estimates for 2003 became insignificant, while for 2004 only the inverse Mills ratio (the selection term) and the wage elasticity remained significant. The uncompensated wage elasticities became 0.23 and 0.12, respectively, for 2003 and 2004, supporting the view that labor supply in Albania has become more inelastic.

The methodology applied here pointed out more the features of our regression results: like huge measurement error, exogeneity especially since the method includes many dummies and selectivity bias. The bad quality of the data set is a big handicap for these kind of surveys conducted in Albania and the related research that could be done on it. Although the quality of the existent data cannot unfortunately be changed, further research could improve the results through trying to include more variables for more years in the labor supply equation, through creating homogeneous subsamples (by age, gender or location) and observing their behavior in particular and/or even better work with the panel data to track the change in behavior during a time span. Working on these possible extensions, as previous studies on this topic on the country do not exist, this paper could be used as a good starting point in estimating labor supply in Albania.

APPENDIX

A1.List of Major Occupations (ISCO-1988)

Group 1 Legislator, Senior, Official, Managers

Group 2 Professionals

Group 3 Technicians & Associate Professors

Group 4 Clerks

Group 5 Service Workers & Shop & Market Sales Workers

Group 6 Skilled Agricultural and Fishery Workers

Group 7 Craft and Related Trade Workers

Group 8 Plant and Machine Operators and Assemblers

Group 9 Elementary Occupations

Group 10 Armed Forces

A2.List of Variable Definition

Age – age

Gender - 1 if female, 0 otherwise

Experience - number of years spent in the primary occupation

Health – 1 if health is above average, 0 otherwise

Children - number of children below 6 years old

_9years - 1 if highest level of education is primary 9 years, 0 otherwise

Secondary_general - 1 if highest level of education is secondary general, 0 otherwise

Secondary – 1 if the highest level of education is secondary, 0 otherwise

Voc23 - 1 if highest level of education is vocational school of 2 or 3 years, 0 otherwise

Voc45 - 1 if highest level of education is vocational school 4 or 5 years, 0 otherwise

Voc - 1 if highest level of education is vocational school, 0 otherwise

Unial – 1 if highest level of education is university in Albania, 0 otherwise

Uniab - 1 if highest level of education is university abroad, 0 otherwise

Uni – 1 if highest level of education is university, 0 otherwise

Postal – 1 if highest level of education is post graduate studies in Albania, 0 otherwise

Married - 1 if married, 0 otherwise

Single- 1 if single, 0 otherwise

Widower - 1 if widower, 0 otherwise

Group1 - legislator, senior, official, managers

Group2 - professionals

Group3 - technicians & associate professors

Group4 - clerks

Group5 - service workers & shop & market sales workers

Group6 - skilled agricultural and fishery workers

Group7 - craft and related trade workers

Group8 - plant and machine operators and assemblers

Group9 - elementary occupations

Group10 - armed forces

Imills - inverse Mills ratio as defined in the paper

A3. TABLES

Table A3.1. Summary Statistics of LSMS 2002-2005

Year	Total Observations		Working	
2002	*Females*	8126	2636	**31%**
	Males	8395	2807	34%
	Total	*16521*	*5443*	*33%*
2003	*Females*	3929	1420	**35%**
	Males	4044	1326	33%
	Total	*7973*	*2746*	*34%*
2004	*Females*	4064	1215	**30%**
	Males	3961	1676	41%
	Total	*8025*	*2891*	*36%*
2005	*Females*	8586	2348	**26%**
	Males	8712	3359	39%
	Total	*17298*	*5707*	*33%*

Table A3.2. Summary Statistics for 2002-2005 data used in OLS Regressions

		2002	**2003**	**2004**	**2005**
Observations	*Females*	684	345	160	1468
	Males	1369	673	1100	2482
	Total	*2053*	*1018*	*1260*	*3950*
Average Age	*Females*	46.7	37.6	40.1	43.9
	Males	46.2	40.6	44.8	47.4
Average Monthly Wage (in new Lek)	*Females*	21586	15958	14392	21570
	Males	18586	21267	20874	22212
Average Monthly Hours	*Females*	160	43	155	178
	Males	162	153	161	179
Marital Status	*Married*	1780	888	1092	3399
	Divorced	70	44	40	27
	Widower	90	41	54	174
	Single	90	42	64	338
	other	23	3	5	12
Major Occupation		Group7: 408	Group7:239	Group7:333	Group6:968
		Group2: 389	Group2:205	Group6:315	Group7:720
		Group3: 198	Group8:127	Group5:139	Group2:520

Table A3.3. Summary Statistics for 2003-2004

	2003		2004	
	Mean	Standard Deviation	Mean	Standard Deviation
AGE	31.10548	2301.751	32.43252	21.47689
WAGE	19415.72	12911.01	18324.62	22465.63
GENDER	0.492788	0.49999	0.506417	0.49999
MARRIED	0.478615	0.499979	0.465919	0.498868
SINGLE	0.254986	0.499574	0.229283	0.420398
WIDOWER	0.047912	0.43588	0.049221	0.216343
DIVORCED	0.005393	0.213593	0.003988	0.063025
HEALTH	0.915841	0.073245	0.905256	0.292888
_9YEARS	0.033112	0.277644	0.278006	0.448044
SECONDARY_GENERAL	0.051047	0.17894	0.279502	0.448782
VOC23	0.037627	0.220108	0.07053	0.256053
VOC45	0.267152	0.190304	0.039626	0.195091
UNIAL	0.037627	0.4425	0.010592	0.102377
UNIAB	0.025586	0.190304	0.003988	0.063025
POSTAL	0.031983	0.157908	0.002243	0.04731
NONE	0.272294	0.175966	0.000498	0.022322
WORKED	0.344663	0.445168	0.360623	0.480211
HOURS	29.46244	2.033511	60.92162	85.57973
GROUP1	0.006397	69.09495	0.009221	0.095589
GROUP2	0.027342	0.079727	0.028162	0.165446
GROUP3	0.015302	0.163089	0.017695	0.131848
GROUP4	0.004264	0.122757	0.009969	0.099351
GROUP5	0.029976	0.065167	0.034393	0.182247
GROUP6	0.176094	0.170532	0.182679	0.386427
GROUP7	0.036122	0.380924	0.052835	0.223718
GROUP8	0.021071	0.186605	0.022181	0.14728
GROUP9	0.026213	0.14363	0.00972	0.098114
EXPERIENCE	8.875318	0.15978	7.211978	6.172775
CHILDREN	0.703123	0.970739	0.638131	0.980819

Table A3.4. OLS Regression Results

	Dependent Variable: LOG(HOURS)				
	2002	2003	2004	2005	POOLED
Independent Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
C	3.985128*	4.565998*	3.819058*	4.440375*	4.268822*
AGE	-0.0006	-0.00419**	0.007448*	-0.00067	0.000317
GENDER	-0.01412	-0.10387***	-0.01334	-0.00495	-0.01034
MARRIED	-0.10738*	-0.06228	0.027383	0.088419	-0.02153
SINGLE	-0.04868	-0.18063	-0.04082	0.071454	-0.02388
WIDOWER	-0.13942*	-0.02734	0.017422	0.179423**	0.005692
LOG(PAYMENT)	0.116597*	0.076007**	0.087851*	0.066092*	0.074405*
YEAR2003					0.068141*
YEAR2004					0.035128***
YEAR2005					0.157424*
R-squared	0.016647	0.023051	0.054487	0.031278	0.041136
Adjusted R-squared	0.013763	0.014494	0.049959	0.029791	0.040045
S.E. of regression	0.533057	0.465251	0.476828	0.40925	0.46132
Sum squared resid	581.3713	148.2743	284.8877	654.702	1683.588
Log likelihood	-1617.98	-448.885	-851.196	-2054.4	-5106.22

*** significant at 1% ** significant at 5% *** significant at 10%**

Table A3.5. OLS Results for 2003-2004

	Dependent variable: log(H)	
	2003	2004
Independent Variable	Coefficient	Coefficient
C	3.835905* (0.539478)	4.201786* (0.137524)
AGE	0.022684 (0.018268)	0.027893* (0.004874)
AGE^2	-0.000302 (0.000221)	-0.000337* (5.57E-05)
MARRIED	-0.148638 (0.155656)	-0.1159* (0.042975)
SINGLE	-0.034271 (0.159005)	-0.09717** (0.048525)
WIDOWER	-0.286706 (0.245173)	-0.157974** (0.077281)
_9YEARS	-0.071029 (0.147403)	-0.125485** (0.065151)
SECONDARY_GENERAL	-0.056027 (0.115403)	-0.119687** (0.065442)
VOC23	-0.041146 (0.116453)	-0.085138 (0.06907)
VOC45	0.006536 (0.114492)	-0.056135 (0.074102)
UNIAL	-0.062312 (0.038289)	-0.009758 (0.083184)
UNIAB	0.096475 (0.117559)	-0.026749 (0.123896)
POSTAL	0.11349 (0.082037)	
GENDER	-0.097265 (0.056589)	-0.107448* (0.01884)
CHILDREN	-0.009113 (0.018098)	-0.007328 (0.006571)
HEALTH	0.207557 (0.138181)	0.079406 (0.051178)
LOG(WAGE)	0.080339** (0.245173)	0.067213* (0.008508)
R-squared	0.042847	0.135551
Adjusted R-squared	0.019921	0.128473
S.E. of regression	0.465860	0.335468
Sum squared resid	144.9733	233.6303
Log likelihood	-440.1153	-675.0907

*** statistically significant at 1% ** statistically significant at 5% statistically significant at 10%**
standard errors are given in the brackets

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