RECENT TRENDS AND DEVELOPMENT OF THE LABOUR FORCE IN SERBIA[32]

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Abstract: Serbia has experienced a permanent fall in the labour force as a result of several factors, out of which negative demographic tendencies and migrations of the population are the most important ones. The long-term structural changes, driven by transitional processes and shifts in the global economy,caused structuralbreaks in theemployment trend. Successive rates of positive economic growth that occurred in the mid-2000s pointed out to some favourable developments in the labour market. These favourable economic conditions wereadditionally contributed to bythe intensified privatisation and the stimulating business climate, but these improvements were only temporary.The economic crisis occurred, turning positive developmentsinto the negative ones. This paper will examine recent trends and development of the labour force andits components in the labour market of Serbia. The Labour force survey data and the data from other statistical sources will be used for the purpose of the analysis presented in this paper.[35]

Key words: Labour Force, Serbia, Structural Changes

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INTRODUCTION

One of the major problems in the Republic of Serbia is related to the negative demographic tendencies: a declining number of inhabitants and aging of population. These long-term tendencies are also translated into the labour market. Due to that, the number of labour force in Serbia has decreased over years, while its age structure has deteriorated.

This work aims to analyse recent trends and development of the labour force and its components in the labour market of Serbia. In the first part of this work we will examine the extant of the fall in the number of inhabitants and how the age structure has changed over the previous two decades. We will also point to the fact that migrations also shape changes in population and labour force, but will not be able to discuss it in more detail, due to the lack of data. The second part of this work deals with main characteristics of the labour force and main tendencies in the labour market, related to economically active population, employed and unemployed persons of the working age. We will also examine some characteristics of two vulnerable groups in the labour market: young persons and women. Afterwards, an analysis of the factors that most likely increase or constrain the probability of the participation in the labour force in Serbia has been presented, based on data from the Living Standard Measurement Survey. Finally, in the last part of this work we draw the main conclusions.

DEMOGRAPHIC TRENDS AND MOVEMENTS OF POPULATION

The labour force supply in the Serbian market is shaped by two main factors: demographic trends and migrations. In this chapter we will analyse the latest data from the 2011 Census (Statistical Office of Serbia 2012b, 2013b, 2013c), which refer to the Republic of Serbia without Kosovo and Metohija.

The main demographic tendency in Serbia is a decrease in the total number of inhabitants. According to data of the 2011 Census, the total number of inhabitants in Serbia stood at 7.2 million, which is a decrease of more than 300 thousand in relation to the previous Census, which took place in 2002.

The main factor that contributes to this trend is the fact that over the last couple of decades a number of deaths has been higher than a number of births. Which is even worse, this trend keeps deteriorating, since the negative rate of natural increase of population has been growing. Namely, the negative rate of the natural increase of population, measured per 1000 inhabitants, increased over the last decade from -3.3 in 2002 to -5.2 in 2011 (Statistical Office of Serbia, 2012a, pp. 28).

Migrations are another major driver of changes in the number of inhabitants over time. The 2011 Census data published so far do not provide us with a

comprehensive insight into this factor, because data on emigrant population are lacking. What is available, however, shows that the influx of migrants from abroad has been relatively modest, and could not make up for the decreasing number of births in Serbia. Namely, the total number of immigrants since 2001 onwards stood at only around 85 thousand.

The negative tendencies related to the total number of inhabitants are translated into the negative structure of population according to age. As shown in Fig. 1, over the last 20 years the share of the working age population (15-64) has remained the same. At the same time, the share of persons older than 65 has increased, on behalf of the decreasing share of children below 15 years of age.

Figure 1: Structure of population of Serbia according to age groups, in %
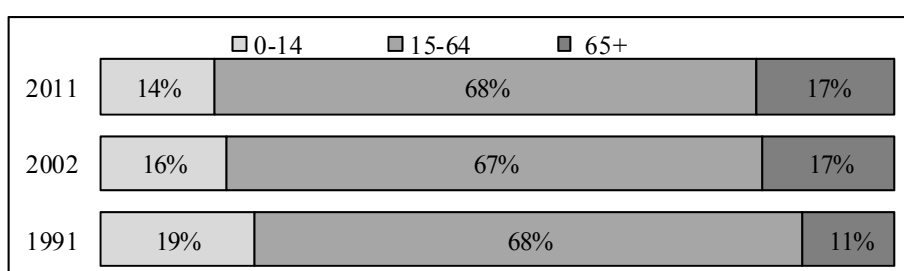
Figure 1: Structure of population of Serbia according to age groups, in %

Source of data: Statistical Office of the Republic of Serbia. 2012. Book 2: Population - Age and Sex. 2011 Census of Population, Households and Dwellings in the Republic of Serbia. Belgrade. Retrieved from www.popis2011.stat.rs.

Note: the shares for 1991 and 2002 do not add up to 100% because persons whose age was unknown have been excluded.

Inevitable consequence of such demographic tendencies will certainly be that until the next census the share of the working age population will decrease, while the share of persons older than 65 years will continue to increase.

As far as migrations are concerned, data on emigrant population are lacking, but data on internal migrants and immigrants are available. These data point to the conclusion that over the last decade, i.e. from 2001 onwards, nearly 550 thousand persons within Serbia moved to a new place of residence. Out of that number vast majority, nearly 85%, refers to internal migrations, that is persons who moved from one municipality to another, or even from one settlement to another within the same municipality. The inflow of immigrant population over the same period included nearly 85 thousand persons. Out of that number two thirds refer to persons from the republics of former Yugoslavia, mostly from Bosnia and Herzegovina (33%) and Montenegro (17%).

LABOUR FORCE CHARACTERISTICS

In this part, main characteristics of the labour force in Serbia are examined. For that purpose, we use data from the Labour Force Survey (Statistical Office of Serbia 2013a), which is executed and published by the Statistical Office of Serbia.

In 2012 economically active population in Serbia accounted to 2.8 million, constituting 60% of the total number of persons who were 15-64 years of age. Out of that number 2.1 million were employed, which means that the employment rate (measured as ratio of employed persons in relation to the total number of persons who are 15-64 years of age) stood at 45%. On the other hand, the number of the unemployed reached nearly 700 thousand, constituting a very high unemployment rate of 25%. Even at the first glance, presented data reveal several major issues, which will be discussed in more detail.

First of all, one can argue that the number of economically active population is low. In Fig. 2 one can observe that, since the first Labour Force Survey was conducted in 2004, the activity rate has declined by 6 percentage points, standing at 60% in 2012. Given that an unemployment rate is this high, low and declining or stagnating activity rate may not seem as a huge problem. However, since the number of economically active persons depicts the supply of labour, once the Serbian economy steps out of the recession, its growing prospects may be somewhat limited due to the low activity rate.
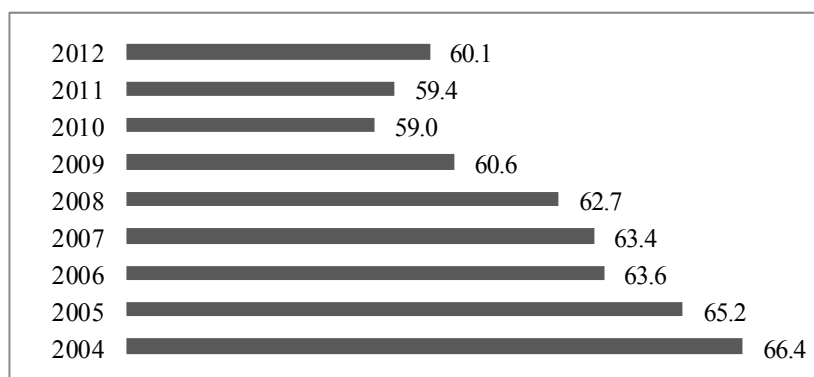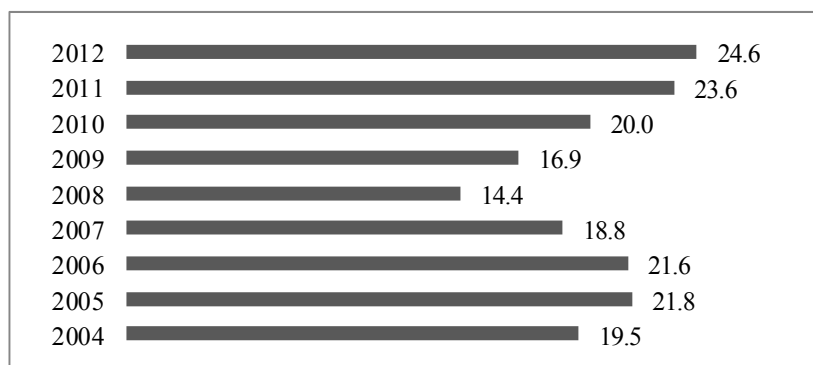

Figure 2: Activity rate for population aged 15-64, in %

Source of data: Statistical Office of Serbia. 2013. Labour Force Survey 2012. Bulletin No. 564. Retrieved from http://www.stat.gov.rs.

Ognjenović and Branković (2012a, pp. 395) show that these trends are in line with the developments in other parts of the Western Balkan region. However, the situation in Serbia seems to be particularly aggravated, since a decrease in the activity rate has been more prominent than elsewhere. They also argue that tendencies in the Western Balkan countries regarding the activity rate have been opposite to the ones in the European Union. Namely, throughout the 2001-2011 period the activity rate in EU-27 has been on an increase, and it has been substantially higher than in Serbia, standing at around 70%.

The most important problem related to the Serbian labour market is a very high unemployment rate. This rate, measured as ratio between the number of unemployed persons of working age (15-64) and the number of economically active persons of the same age, was as high as 24.6% in 2012. As of mid-2000s it started to decrease, but as the global financial crisis occurred, it swiftly started to increase again (Fig. 3). Thus, unemployment rate has increased by as much as 10 percentage points in just four years (from 2008 until 2012).

Year	Value
2012	24.6
2011	23.6
2010	20.0
2009	16.9
2008	14.4
2007	18.8
2006	21.6
2005	21.8
2004	19.5

Figure 3: Unemployment rate for population aged 15-64, in %

Source of data: Statistical Office of Serbia. 2013. Labour Force Survey 2012. Bulletin No. 564. Retrieved from http://www.stat.gov.rs.

As far as the total employment among the 15-64 age group is concerned, we have already mentioned that the employment rate in 2012 stood at 45.3%, which is the lowest recorded rate since 2004. As in the case of an unemployment rate, as of mid-2000s indicators on employment began to improve, but since the outbreak of the global financial crisis in 2008, they have started to deteriorate again (Fig. 4).
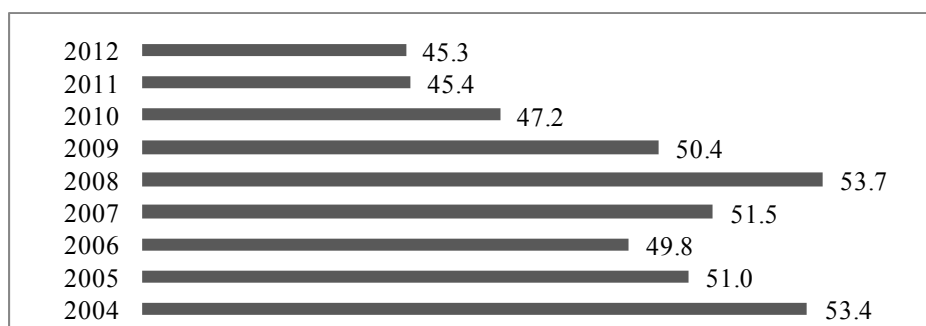
Figure 4: Employment rate for population aged 15-64, in %

Source of data: Statistical Office of Serbia. 2013. Labour Force Survey 2012.
Bulletin No. 564. Retrieved from http://www.stat.gov.rs.

Data on employment by economic activities show that major employers in the Serbian labour market originate from the sectors of agriculture and manufacturing. Share of each of these activities in the total number of employed persons of working age (15-64) stood at 18% in 2012. Another major employer is the sector of trade, so that these three sectors combined employed precisely a half of the employed persons aged 15-64. These data are presented in Fig. 5.
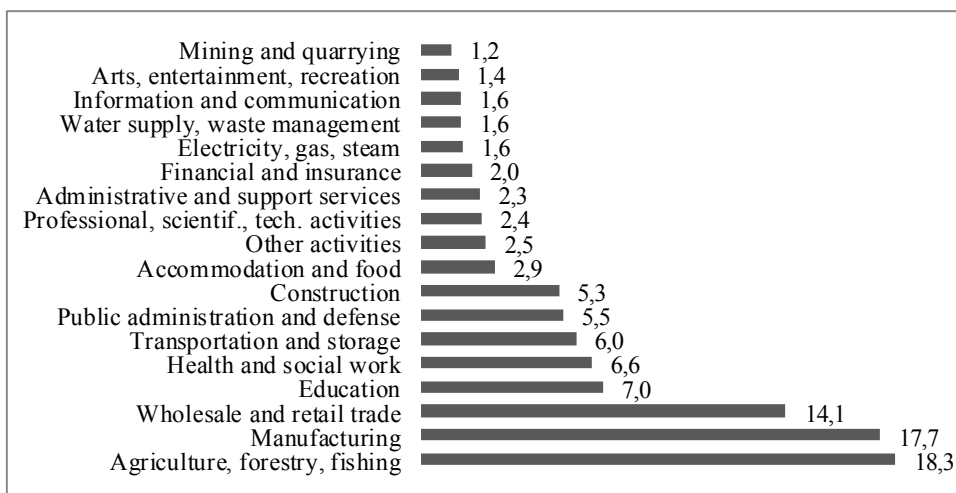

Figure 5: Structure of employment by economic activities for population aged 15-64, 2012, in %

Source of data: Statistical Office of Serbia. 2013. Labour Force Survey 2012.
Bulletin No. 564. Retrieved from http://www.stat.gov.rs.

Such a structure of employment is not atypical for the region of the Western Balkans. Analysis of Ognjenović and Branković (2013a, pp. 589) shows that in 2010 the shares of agriculture and industry were comparable to each other not only in the case of Serbia, but also in cases of Bosnia and Herzegovina and FYR Macedonia.

Particularly vulnerable group in the labour market are young persons, whose prospects of finding work when an unemployment rate is this high are not particularly good. Using available data from the Labour Force Survey, we have calculated that in 2012 the number of unemployed persons below 30 years of age was 230 thousand, while the corresponding unemployment rate was as high as 42.3%. If we separate them into age groups, we can observe than within the age group 15-19 nearly two thirds of economically active persons is unemployed, while in the case of age groups 20-24 and 25-29 these shares stand at around one half and one third, respectively. These shares can be observed in Fig. 6.
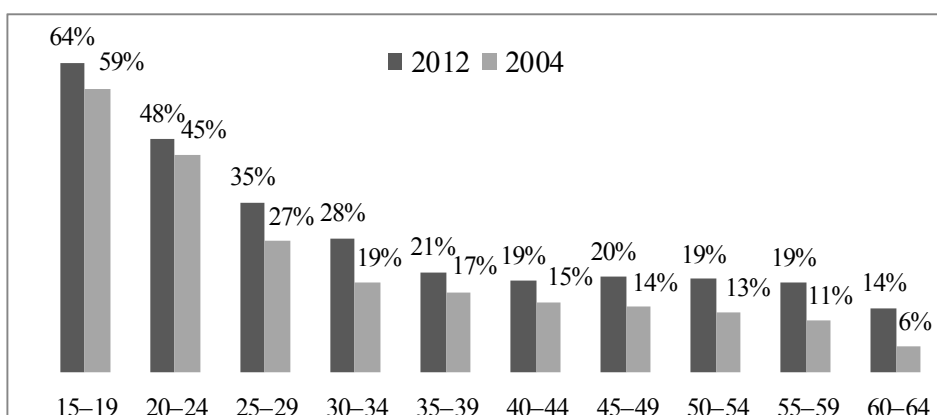

Figure 6: Unemployment rates by age groups, in %

Sources of data: Statistical Office of Serbia. 2013. Labour Force Survey 2012. Bulletin No. 564 and Statistical Office of Serbia2006. Labour Force Survey 2004. Bulletin No. 451. Retrieved from http://www.stat.gov.rs.

We can also note that within all age groups unemployment rates have worsened in 2012 in relation to 2004. Although we have shown that unemployment rates for persons younger than 30 have been extremely high, deterioration of these rates has been, in relative terms, more prominent in the case of some other age groups. This is particularly true for older persons (age groups 55-59 and 60-64), and persons aged 30-34. In the case of the latter group unemployment rate recorded the highest increase of 9 percentage points in 2012 in relation to 2004. The fact that the highest increase in the unemployment rate was recorded for persons in their early 30s is particularly troublesome, because a substantial portion of these persons have a family and little children to support.

The structure of unemployed persons according to age reveals that they are evenly distributed among certain age groups. Namely, in 2012 a third of the total number of unemployed persons of working age (15-64) belonged to the age group 15-29, another third referred to the age group 30-44, while the remaining third of the unemployed included persons over 45 years of age. The structure of unemployed persons according to age groups is presented in Fig. 7. We can also note that, if we observe 5-year age groups, the highest share within the total number of unemployed relates to persons aged 25-29 years, but also to those who fall within 20-24 and 30-34 age groups.
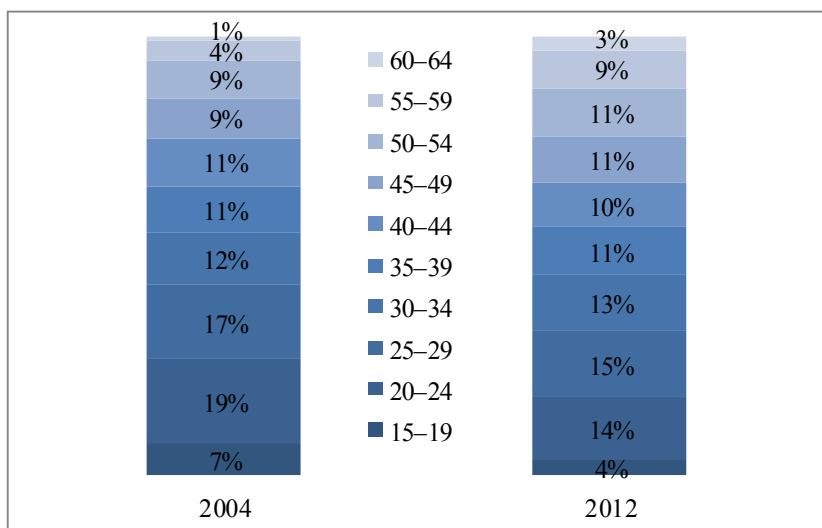

Figure 7: Structure of unemployed persons by age groups, in %

Sources of data: Statistical Office of Serbia. 2013. Labour Force Survey 2012. Bulletin No. 564 and Statistical Office of Serbia. 2006. Labour Force Survey 2004. Bulletin No. 451. Retrieved from http://www.stat.gov.rs.

Fig. 7 also reveals that one of the notable changes in 2012 in relation to 2004 is that the share of persons under 30 years of age has decreased by 10 percentage points, while the share of those aged 30-44 years in the total number of unemployed persons of the working age has remained unchanged. This means that, although unemployment rates have been highest among young persons, the relative position of some other age groups has worsened more. This is true for age groups above 45, which have all witnessed an increasing share in the structure of unemployed persons of working age in 2012 in relation to 2004; but this is also true for those persons who fall within the 30-34 age range, because their share has also increased in relation to 2004.

Another group considered to be vulnerable in the labour market are women. As evident from Table 1, all the labour market indicators are worse for women than

for men, indicating that the female participation in the labour market is substantially legging behind the male one. Presented data show that in 2012 only a half of women of working age was economically active.

Table 1: Selected labour market indicators for men and women aged 15-64, in %

		Activity rate	Employment rate	Unemployment rate
2012	Male	68.8	52.4	23.9
	Female	51.2	38.1	25.6
2004	Male	75.1	63.1	15.9
	Female	57.9	44.0	24.1

Sources of data: Statistical Office of Serbia. 2013. Labour Force Survey 2012. Bulletin No. 564 and Statistical Office of Serbia. 2006. Labour Force Survey 2004. Bulletin No. 451. Retrieved from http://www.stat.gov.rs.

Labour Force Survey does not reveal reasons for such a small percentage of women who are economically active, but some answers may be obtained by analysing data from the 2011 Census (Statistical Office of Serbia, 2013b). Analysis of the structure of inactive women of working age (15-64), presented in Fig. 8, shows that the majority them (36%) are those who are staying at home and performing activities for their families. Out of these female home-makers of the working age, 16% are women below 30 years of age, while 44% refers to persons aged 30-49 years. We can expect that within these two age groups a certain number of women may be willing to become economically active and engage in the labour market, provided that in the future the overall economic situation and prospects of finding work improve.
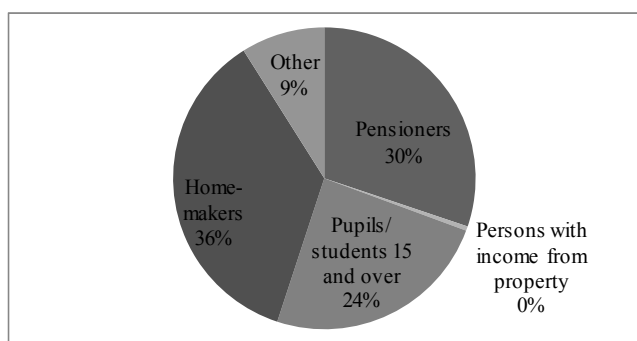

Figure 8: Structure of female inactive population aged 15-64, in %

Source of data: Statistical Office of Serbia. 2013b. Book 7: Population – Economic Activity. 2011 Census of Population, Households and Dwellings in the Republic of Serbia. Retrieved from www.popis2011.stat.rs.

Data from Table 1 show that 38% of the total number of women aged 15-64 years has been employed in 2012. This is substantially lower than in the case of men, where the corresponding indicator was also low, but stood at 52%. However, as far as the unemployment rate is concerned, differences have been much less prominent, so that in 2012 the unemployment rate for women aged 15-64 was 25.6%, which is just slightly above the unemployment rate for men (23.9%).

The Table 1 also contains data that refer to 2004, so that certain tendencies in the labour market can be observed. These tendencies are partly associated with the transformation of the economy, but are probably dominantly driven by the effects of the global financial crisis. Both male and female participants in the labour market have been negatively affected by the crisis, but, given that the gender gap related to some of the indicators has decreased, we can argue that, in relative terms, men have been more severely hit by the crisis then women. Namely, the gap in employment rates of men and women of working age has decreased in 2012 in relation to 2004 by 5 percentage points, while in the case of unemployment rates it has narrowed by 6.5 percentage points. This is due to the fact that the rate of female unemployment increased only from 24.1% to 25.6%, while in the case of men this change has been much more striking, since the unemployment rate deteriorated by 8 percentage points, reaching 23.9% in 2012.

FACTORS DETERMINING LABOUR FORCE PARTICIPATION

METHODS AND DATA

The binary choice probit model is employed in the analysis of the participation in the labour force. Following the approach presented in Greene (2000), the probit model has the form:

$$P(y_i = 1 | x_i) = \Phi(x_i' \beta), i=1,\ldots,N. \tag{1}$$

In equation (1) y represents an indicator variable that takes two values, one and zero, depending on one's decision to participate in the labour force, x and β are k-dimensional vectors of the independent variables, i.e. predictors (the first element of x is unity) and unknown parameters, respectively, while $\Phi(.)$ denotes the standard normal distribution. N is the number of the sample units. The maximum likelihood (ML) estimator of the probit model strongly relies on the distributional assumptions about the error term. In the parametric approach, it is assumed that the errors are normally distributed around zero mean and that their variance is a constant set at unity. The usual assumption implies that the errors are independent on a set of explanatory variables x. If those assumptions are violated, the ML estimator does not yield consistent estimates of the unknown parameters β in the probit model. Then, in order to obtain the consistent estimates of the unknown parameters β, one of the possibilities is to employ the semiparametric approach (Martins, 2001; Ognjenović, 2013).

The data used in the analysis of the participation in the labour force in Serbia are taken from the Living Standard Measurement Survey. The survey was carried out by the Strategic Marketing and Media Research Institute from Belgrade in 2002. The data set is provided by the Statistical Office of Serbia. We decided to use this data set instead of the Labour Force Survey data due to the availability of a broader set of the household based variables, as for instance sources of the total household income. According to the labour supply theory, this variable is an important explanatory factor, especially for women's decisions to participate in the labour force (Heckman, 1974).

Table 2: Descriptive statistics of the sample

Variable	Total sample		Female		Male	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
LF_participation	0.69	0.46	0.58	0.49	0.81	0.40
Child_06	0.30	0.60	0.31	0.61	0.28	0.59
Child_14	0.36	0.66	0.38	0.67	0.34	0.64
D_married	0.72	0.45	0.76	0.43	0.68	0.47
Ln_hincome	8.93	0.97	8.95	0.96	8.92	0.98
Age	3.96	1.16	4.00	1.16	3.92	1.16
Agesq	17.03	9.29	17.32	9.41	16.73	9.15
D_urban	0.59	0.49	0.61	0.49	0.57	0.49
Region						
Belgrade	0.19	0.39	0.20	0.40	0.19	0.39
Vojvodina	0.27	0.44	0.26	0.44	0.27	0.44
Šumadija_West	0.29	0.45	0.29	0.45	0.29	0.45
South_East	0.25	0.43	0.25	0.43	0.26	0.44
Education						
Primary	0.26	0.44	0.31	0.46	0.21	0.40
Vocational_3	0.22	0.42	0.17	0.37	0.28	0.45
Vocational_4	0.33	0.47	0.33	0.47	0.33	0.47
Gymnasium	0.03	0.17	0.04	0.19	0.02	0.14
University	0.16	0.36	0.16	0.36	0.15	0.36

Notes: Standard deviation (S.D.).

Source: Authors' calculations.

The sample contains data on 7,938 individuals of the working age (15-64 years of age), out of which 4,085 and 3,853 are females and males, respectively. In terms of the distribution by gender, the total sample includes 51.5% females and 48.5% males. In the total sample, 68.8% are participants in the labour force, while divided by gender, 57.6% and 80.6% of the total number of women and men in the sample are those who participate in the labour force, respectively (Table 2). Individuals who are engaged in any kind of self-employment or in-household activities, as well as farmers, are excluded from the sample. Hence, the total sample includes those individuals who belong to the interval of the working age population, but who are not enrolled in pursuing further education, and who are capable of work.

Table 2 illustrates descriptive statistics of the total sample used, as well as a breakdown of the sample by gender. Means and standard deviations are provided for continues variables, while proportions and standard deviations illustrate distributions of the categorical variables. The figures provided in Table 2 illustrate the main differences between the subsamples used in the analysis. *LF_participation* is a binary choice dependent variable that takes value one if an individual actively participate in the labour force and zero otherwise. The set of independent variables (predictors) includes continues variables, such as the number of children in the family under six and fourteen years of age (*Child_06* and *Child_14*), age and age squared (*Age* and *Agesq*), and natural logarithm of the total household's income excluding wages of the employed members (Ln_hincome). The set of independent categorical variables includes the following ones: marital status that associate value one to those who has a spouse and zero otherwise (*D_married*), the variable that indicates who are residents of the urban areas (*D_urban*), four regional dummies excluding the Kosovo and Metohija region (the province of Vojvodina is the reference category), and five educational dummies (primary education and less is the reference category).

RESULTS

The results of the ML estimation of the probit model for the participation in the labour force in Serbia are presented in Table 3 below. We have estimated three independent models, based on the total sample, as well as on the subsamples of female and male participants in the labour force, respectively. The selection of the independent variables for the probit models is based, in general, on the data available in the sample used, but also on the theoretical background about the female labour supply following the approaches given by Mincer (1962) and Heckman (1974).

Table 3: Probit estimates of the labour force participation equations

Independent Variable	Total sample		Female		Male	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
Intercept	-3.67*	0.25	-3.90*	0.36	-3.01*	0.37
Child_06	-0.05***	0.03	-0.15*	0.04	-0.01	0.05
Child_14	-0.02	0.03	-0.04	0.03	-0.02	0.04
D_married	-0.06	0.04	-0.34*	0.06	0.53*	0.07
Ln_hincome	-0.08*	0.02	-0.06*	0.02	-0.07**	0.03
Age	2.15*	0.10	2.18*	0.15	1.87*	0.16
Agesq	-0.25*	0.01	-0.26*	0.02	-0.21*	0.02
D_urban	0.04	0.04	0.21*	0.05	-0.10***	0.06
Region						
Vojvodina	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Belgrade	0.10	0.11	0.25***	0.14	0.05	0.19
Šumadija_West	0.12	0.08	0.14	0.11	0.11	0.13
South_East	0.15**	0.08	0.07	0.10	0.26***	0.13
Education						
Primary	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Vocational_3	0.74*	0.09	0.61*	0.13	0.43*	0.13
Vocational_4	0.90*	0.08	0.99*	0.10	0.57*	0.13
Gymnasium	1.15*	0.23	1.08*	0.28	1.13*	0.40
University	1.40*	0.12	1.46*	0.15	1.20*	0.24
Joint significance of interacted terms (education and region)						
χ^2 (12)	23.44**	0.02	13.84	0.31	19.15***	0.08
No. of observations	7938		4085		3853	
Log L	-4187.06		-2246.99		-1536.30	
Pseudo-R^2	0.15		0.19		0.19	
% correctly predicted	82.44		62.15		90.97	
LM test for normality						
χ^2 (2)	4.08	0.13	3.73	0.15	3.89	0.14

Notes: The standard errors (S.E.) of the coefficient estimates are corrected for the heteroscedasticity of unknown form. (*, **, ***) indicate statistical significance at the 1%, 5%, and 10% level, respectively. Reference categories (Ref.) for the categorical variables Region and Education are dummies created for the province of Vojvodina and for primary education, respectively. The Pseudo-R^2 is defined as 1-(Log Lconstrained/Log Lunconstrained).

Source: Authors' calculations.

As already mentioned above, the three probit models are specified in order to estimate outputs of the participation in the labour force for a given set of predictors. We initially focus our analysis on the diagnostics reported for the estimated models. As the results of the Lagrange Multiplier (LM) tests show, all the three estimated models satisfy the strong assumption about the normality of the residuals, confirming the relevance of the use of the ML method. In addition, the standard errors of the coefficient estimates are corrected for the presence of the heteroscedasticity of unknown form, following the procedure based on the adjustment of the appropriate matrix of variances and covariances (Greene, 2000). The Pseudo-R^2 indicates that all the estimated models perform well in terms of the selected predictors. Percent of correctly predicted probabilities seems reliable for all the three estimated models as well. Based on these findings, we can rate our models as satisfactory for the analysis of the participation in the labour force in Serbia.

The estimated probit model for the participation in the labour force, based on the total sample, indicates that the presence of children of the preschool age in the household significantly decreases the probability of the participation in the labour force, while the presence of children under fourteen years of age is not an important factor for one's decision to participate in the labour force. The unearned income also significantly constrains an individual's decision to participate in the labour force, while the marital status and residence in the urban area are not important factors of the participation for the total sample of working age individuals. Living in a particular region does not necessarily affect one's decision to take an active role in the labour market, while only citizens of the Southern and Eastern Serbia region, in comparison to those who live in the province of Vojvodina, are more likely to participate in the labour force. This is probably related to a reduced number of other opportunities for the engagement of an individual outside of the labour market. All the levels of education, relative to primary education and less, significantly increase the probability of the participation in the labour force. We can notice that the effect rises with the level of attained education, which is related to the expected returns to education. All the estimated coefficients are significant at the 1% level. The interacted terms of education and region indicate the joint significance at the 5% level.

In accordance with the theory of the female labour supply, the presence of small children under six and marital status significantly reduce the probability of the female participation in the labour force. Both coefficient estimates are significant at the 1% level. Other sources of the household income, also, significantly reduce the probability of the participation in the labour force, but the effect of this factor is smaller in comparison to the one in the male participation equation. The age of women follows a concave path and indicates a stronger positive effect than in the male participation equation. Also, women who live in urban areas are more likely to participate in the labour force than those who live in other areas. All the coefficient estimates are significant at the 1% level. Women who live in Belgrade are more likely to actively participate in the labour force than those who live in the province of Vojvodina, while no significant effects are found

for women living in other regions in Serbia. The level of education strongly determines the probability of the female participation in the labour force. The estimated coefficients for educational dummies are significant at the 1% level. An interesting finding shows that the effects of education are higher across almost all levels, except for general secondary education, i.e. for those women who completed gymnasium, than in the male participation equation. This finding is related to the rising level of women's education in Serbia, in particular of those women who completed university education, but, in general, educational attainment of men is better in comparison to the one of women of the same age. It was interesting to find out if there are any differences in the interacted influence of education and region on the probability of the female participation in the labour force. These variables are used to approximate the differences in the level of education of the labour force participants and their wiliness to be economically active across the regions. However, the test statistic for the joint significance of the estimated coefficients does not indicate a significant influence of the interacted variables in the female labour force participation equation.

Opposite to the findings for women's participation in the labour force, the presence of small children of the preschool age, as well as of children under fourteen years of age, does not significantly constrain men's decision to participate in the labour force. However, those men who are married are more likely to participate in the labour force, which is expected and contrary to the findings obtained for married women's participation in the labour force. The estimated coefficient is significant at the 1% level. The unearned income, also, reduces the men's probability of the participation in the labour force, but the effect of this factor is greater than in the female participation equation; the estimated coefficient is significant at the 5% level. This finding indicates that men of the working age population, probably, put more value on other sources of the household income, in particular the one originating from capital and other assets of the household. The age of men, also, follows the concave path in the participation in the labour force, but the estimated coefficients show smaller influence than in the female participation equation. Men who live in urban areas are less likely to participate in the labour force in comparison to those who live in other areas, while living in some particular region does not significantly determine men's decisions to participate in the labour force, with the exception of those men who live in the Southern and Eastern Serbia region. All the levels of education significantly increase the probability of men's participation in the labour force. As the test of the joint significance of the interacted influence of education and region indicates, there are certain differences in the level of male education across the regions that affect the probability of the participation in the labour force.

DISCUSSION

On the demand side for labour, one can notice that the conditions for new jobs creation in Serbia have been unfavourable for years, as assessed from the perspective of companies (Ognjenović and Branković, 2013b). Furthermore, this indicates slow dynamics of the rates of job creation and job destruction, inducing the presence of certain constraints that suppress faster dynamic of the net employment growth in Serbia (Ognjenović and Branković, 2012b). However, certain changes are present in the supply of labour, as it was shown in previous sections. First of all, the rates of the economically active population for both women and men were characterized by decreasing trends.

As the analysis in this section shows, all the levels of education, in comparison to primary education and less, are the factors that significantly increase the probability of the participation in the labour force, for both women and men. Comparison with the similar research for other transitional economies indicates that the labour market participation was decreasing during the transition, but the return to education, in particular, of those individuals with completed higher and university education was significantly improved relative to the pre-transition period (Orazem and Vodopivec, 1997). In the countries of the European Union, an educational attainment, also, significantly increases the probability of the participation in the labour force and this is particularly emphasized for the female subpopulation (Martins, 2001). As we can notice from the analysis given above, women may expect more gains from higher and better education than men in Serbia. However, interacted effects of education and region play an important role for the male participation in the labour force, while it is not confirmed by the analysis in the case of the female participation. Educated people may have more benefits from the fact that they are economically active, as for instance the higher chances to be enrolled in the programs of active labour market policies and better employment opportunities (Ognjenović, 2007).

CONLUSIONS

In this work we have estimated three probit models in order to analyse the factors that most likely increase or constrain the probability of the participation in the labour force in Serbia. As the results indicate, there are certain differences between factors that determine participation of both men and women. The presence of small children in the household, marital status and the unearned income are the main constraining factors of the participation of women in the labour force. In contrast, marital status significantly increases the probability of the participation of men in the labour market, while the unearned income is an important constraining factor. Education is an important factor of economic activity for both women and men and the effects rise with the level of attained education almost linearly. The results that we obtained for Serbia are in line with the similar research for the transition economies, as well as with the expectations of the labour supply theory.

This work also contains analysis of the latest tendencies related to the labour force in the Republic of Serbia. The analysis is based on data from the Labour Force Survey and a 2011 Census. Based on it, we can draw several conclusions.

We can observe that the continuous decline in the number of inhabitants in Serbia has been translated into a decreasing number of working age population, and worsening of the age structure of labour force. Namely, while the share of the working age population (15-64 years of age) did not change in 2011 in relation to 2002, the share of those older than 65 has increased on behalf of the declining share of children below 15 years of age. This means that the share of the working age population will decrease until the next Census.

Also, one can note that labour force indicators, such as activity, employment and unemployment rates, have deteriorated since the outbreak of the global financial crisis. Due to that, unemployment rate in Serbia in 2012 within the working age population has been as high as 24.6%.

We have also analysed positions of two vulnerable groups in the labour market: young persons and women. We have concluded that indicators for young persons (below 30 years of age) have been worse than in the case of other age groups, and the same conclusion is drawn related to relative position of women against men. However, it seems that, in relative terms, the global crisis has more severely affected persons older than 30 than youngsters, and also men in relation to women. To illustrate this, we have calculated that the share of persons below 30 years of age in the structure of unemployed persons aged 15-64 has declined in 2012 in relation to 2004. Also, during the same period, the increase in the unemployment rate for women has been relatively negligible (1.5 percentage points) in relation to the one for men (8 percentage points).

REFERENCES

[1] Greene, H. W. (2000), *Econometric Analysis, Fourth Edition*. Upper Saddle River, N.J.: Prentice Hall International, Inc.

[2] Heckman, J.J. (1974), "Shadow Prices, Market Wages, and Labor Supply". Econometrica, 42 (4), 679-694.

[3] Martins, M.F.O. (2001), "Parametric and Semiparametric Estimation of Sample Selection Models: An Empirical Application to the Female Labour Force in Portugal". *Journal of Applied Econometrics*, 16 (1), 23-39.

[4] Mincer, J. (1962), "Labour Force Participation of Married Women: A Study of Labour Supply", in *Aspects of Labour Economics*. Princeton, N.J.: Princeton University Press for National Bureau of Economic Research.

[5] Ognjenović, K. (2007), "The Use of Propensity Score-Matching Methods in Evaluation of Active Labour Market Programs in Serbia". *Economic Annals*, 52 (172), 21-54.

[6] Ognjenović, K. (2013), "A Semiparametric Approach to the Analysis of Young Women's Participation in the Labour Force in Serbia", *forthcoming* in *Proceedings of the12th International Symposium on Operations Research in Slovenia*, Dolenjske Toplice, Slovenia.

[7] Ognjenović, K., Branković, A. (2012a), "Employment Policy in the Western Balkan Countries and Their Perspectives in the Process of European Integration", in Teixeira, P., Duarte, A.P., Redžepagić, S., Erić, D., Andrejević, S. (Eds.) *European Integration Process in Western Balkan Countries*. Coimbra: Faculty of Economics of the University of Coimbra, pp. 389-415.

[8] Ognjenović, K., Branković, A. (2012b), "Job Creation and Employment in a Time of Crisis", in Andrade, J.S., Simões, C.N.M., Stošić, I., Erić, D., Hanić, H. (Eds.), *Managing Structural Changes: Trends and Requirements*. Coimbra: Faculty of Economics of the University of Coimbra, pp. 375-396.

[9] Ognjenović, K., Branković, A. (2013a), "Shifts in Occupational and Skill Needs in the Western Balkan Region – a Slow Adjustment", in Hanić, H., Özer, M., Grubišić, Z., Domazet, I. (Eds.) *Post Crisis Recovery*. Belgrade: Belgrade Banking Academy, pp. 581-602.

[10] Ognjenović, K., Branković, A. (2013b), *Forthcoming* "Employment Change and Business Prospects in Serbia". *Industry*.

[11] Orazem, P.F., Vodopivec, M. (1997), "Value of Human Capital in Transition to Market: Evidence from Slovenia". *European Economic Review*, 41 (3), 893-903.

[12] Statistical Office of Serbia, (2006), *Labour Force Survey 2004*. Bulletin No. 451. Retrieved from http://www.stat.gov.rs.

[13] Statistical Office of Serbia, (2012a), *Statistical Yearbook 2012*. Belgrade: Statistical Office of Serbia.

[14] Statistical Office of Serbia, (2012b), *Book 2: Population – Age and Sex*. 2011 Census of Population, Households and Dwellings in the Republic of Serbia. Retrieved from www.popis2011.stat.rs.

[15] Statistical Office of Serbia, (2013a), *Labour Force Survey 2012*. Bulletin No. 564. Retrieved from http://www.stat.gov.rs.

[16] Statistical Office of Serbia, (2013b), *Book 7: Population – Economic Activity*. 2011 Census of Population, Households and Dwellings in the Republic of Serbia. Retrieved from www.popis2011.stat.rs.

[17] Statistical Office of Serbia, (2013c), *Book 9: Population – Migrations*. 2011 Census of Population, Households and Dwellings in the Republic of Serbia. Retrieved from www.popis2011.stat.rs.