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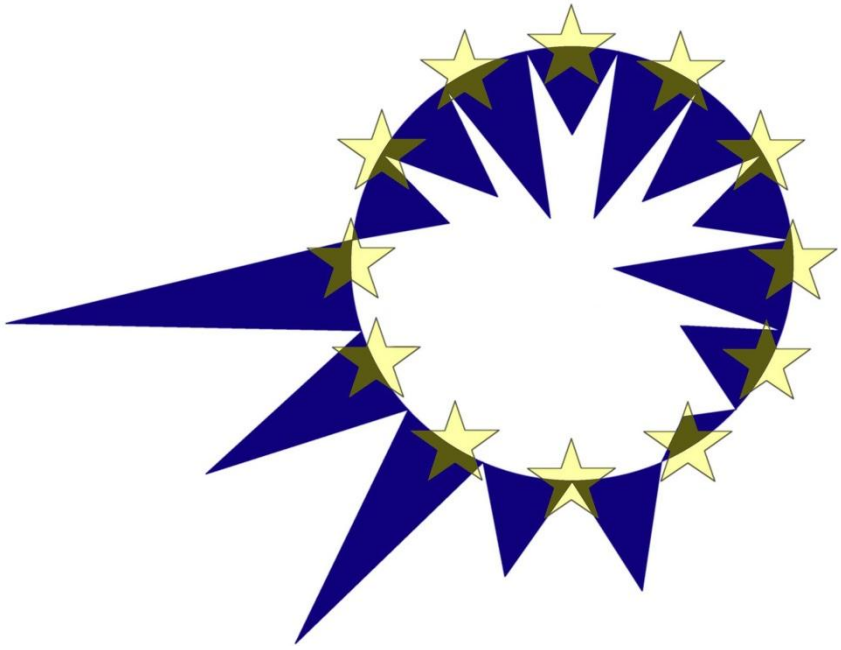

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Improving Work Incentives: Evaluation of Tax Policy Reform Using SRMOD

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Improving Work Incentives: Evaluation of Tax Policy Reform Using SRMOD[1]

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Abstract

Inactivity and unemployment rates as well as informal employment rates in Serbia are particularly high among low-paid labor. Labour tax wedge is average at higher wage levels, but high at lower wage levels. The relatively high labour tax burden for low-paid employees is due to several reasons. The most important one is the existence of mandatory minimum base for social security contribution (SSC). This paper uses the tax and benefit micro-simulation model for Serbia (SRMOD), which is based upon EUROMOD platform, in order to evaluate the effects of the abolishment of mandatory minimum SSC base on labour supply incentives. We found that this policy reform would reduce effective average tax rates by more than it would reduce marginal tax rates implying a larger participation response than hours-of-work response. A decrease in both tax rates is most pronounced for lower income groups.

JEL Classification: H24, H31, J22
Keywords: micro-simulation, labour tax reform, low-paid labour

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[1] This paper used SRMOD 1.0, a tax benefit model that has been constructed using EUROMOD version 2.8 as a platform. EUROMOD is continually being improved and updated and the results presented here represent the best available at the time of writing. More details about EUROMOD are available at: http://www.iser.essex.ac.uk/research/euromod. For more details about SRMOD construction, see Žarković-Rakić (2010). Any remaining errors, results produced, interpretations or views presented are the authors' responsibility.

1. INTRODUCTION

High labour force participation rate is important for competitiveness, especially with an aging population. This is also the reason why the European Union (EU) Lisbon strategy – now replaced by the EU 2020 strategy – sets a target of 75% labour force participation of the population aged 20 to 64. In Serbia, however, inactivity rate for working age population (15-64) is among the highest in Europe – in the first quarter of 2012 it amounted to 40.3%. The country also faces high informal employment rate of 18% (LFS (2012)).

In this paper, we argue that high levels of informality and inactivity in the Serbian labour market are due to the specific design of the tax and benefit system. High labour tax wedge for low-wage earners and a sudden withdrawal of social benefits once a person receives some sort of regular income are the main contributors to high opportunity costs of formal work. Those taking up low-paid employment often see that large part of their gross earnings is consumed by income taxes and/or social contributions, as well as followed up by a reduction in social benefits. Therefore, the so-called mini-jobs and midi-jobs (mainly part-time jobs) are not economically feasible for low-wage earners. This effectively excludes a substantial part of the Serbian working-age population from formal employment and coverage by the social secutiry (i.e., pension and health insurance). Therefore, informality and inactivity might not only be a deliberate choice of exit, but are also a matter of "exclusion".

This paper uses the tax and benefit micro-simulation model for Serbia (SRMOD)[2] in order to simulate a tax policy reform and evaluate its effect on labour supply incentives by calculating effective average and marginal tax rates. We also calculate distributional effects of the reform.

With its socio-demographic structure, Serbia can be seen as a typical Western Balkan country. Also, given that tax and labour market structures of these economies share many similarities, especially among former Yugoslav republics, the qualitative results of this analysis could be of interest to a wider range of countries in the region.

[2] SRMOD is based upon EUROMOD which is tax and benefit micro-simulation model for the European Union developed and maintained by the micro-simulation unit of the Institute for Social and Economic Research (ISER), University of Essex. More details are available at: http://www.iser.essex.ac.uk/research/euromod. For more details about SRMOD construction, see Žarković-Rakić (2010).

The paper is structured as follows. After this introduction, Section 2 gives a brief description of characteristics of labour taxes and social benefits in Serbia which provide disincentives for labour market participation, particularly among the low-skilled individuals. Data and methodology are given in Section 3. Section 4 includes the simulation results whereas the last section concludes.

2. INSTITUTIONAL SETTING

Inactivity rates in Serbia are particularly high among low-educated individuals. A recent study showed that inactivity rates for those with primary education (50.9%) are significantly higher than for those with secondary (32.1%) and tertiary education (20.4%) (Arandarenko et al., 2012). At the same time, women with low education attainment are in a particularly difficult labour market position. On average, they have 19 percentage points higher inactivity rates and 2 percentage points higher unemployment rates than men. The highest differences among men and women are found for those with the lowest level of education (Table 1).

Table 1: Inactivity and unemployment rates by education and gender (%)

Level of education	Inactivity rate		Unemployment rates	
	Men	Women	Men	Women
Primary	32.4	64.4	21.5	25.1
Secondary	24.5	40.9	22.4	26.5
Tertiary	18.0	22.4	15.5	14.2

Source: Labour Force Survey, 2011, age: 25-64

The lack of working experience is an additional contributing factor to high unemployment and inactivity rates, and again especially for women. For example, 55% of women among those who are inactive and with primary education have no working experience (Table 2).

Table 2: Proportion of unemployed and inactive without work experience by education and gender (%)

	Unemployed		Inactive	
Level of education	Men	Women	Men	Women
Primary	35.1	42.3	14.9	55.0
Secondary	18.8	26.0	12.3	22.0
Tertiary	30.0	38.2	6.3	14.7

Source: Labour Force Survey

Low-education attainment coupled with lack of work experience generates low earnings capacity in the labour market. When earnings or potential earnings are low, incentives to seek employment or stay in employment are usually limited. Incentives problems are aggravated by high tax burdens on labour income and by cuts in social benefits designed to provide at least some safety-nets for those with no, or very low income (Immervoll and Pearson, 2009). This section provides a closer investigation of the Serbian tax and benefit system, which will suggest that those taking up low-paid employment often see that a large part of their gross earnings is consumed by income taxes, social contributions and/or reduced social benefits.

The tax wedge in Serbia is average at higher wage levels, but high at lower wage levels. the relatively high labour tax burden for low-paid employees is due to several reasons. The most important one is the existence of a mandatory minimum base for social security contribution (SSC). This is a peculiar feature of social security contribution systems in the Western Balkan region. The most drastic example is Macedonia, where mandatory base is set as high as 50% of average wage. In Serbia, the minimum base is set at 35% of the average wage and given that it is not adjusted for hours actually worked, it implies that low-paid part time workers are also subject to it.

Additionally, the labour tax reform which was introduced in 2001 brought the abolishment of fringe benefits. Two very important benefits of this kind were cash allowances in the form of hot meal (paid monthly) and annual leave (called ‘regres’). Given that both fringe benefits were untaxed and paid in equal amounts to each worker, the abolishment of these benefits contributed to the regressive character of the labour tax system which was in effect up until 2007 (Arandarenko and Vukojević, 2008). In 2005, the tax wedge was 47.1% of the total labour costs at 50% of the average wage, but 42.2% for a person earning an average wage. In

2006, the mandatory minimum SSC base was reduced from 40 to 35% of the average wage making tax wedges constant across wage levels, as can be seen in Table 3.

Table 3: Comparison of Tax Wedge in Serbia, Western Balkan Countries and EU

% of the average wage		50%	67%	100%	167%
Country	Year				
Serbia	2006	42.3%	42.3%	42.3%	42.3%
	2007	37.6%	38.4%	39.2%	39.7%
Albania	2006	34.1%	27.9%	28.9%	29.8%
Montenegro	2007	36.3%	38.6%	40.9%	42.8%
BiH Federation	2006	30.6%	29.3%	32.3%	35.3%
R. of Srpska	2007	31.7%	31.6%	32.5%	33.2%
Macedonia	2007	41.2%	37.8%	38.6%	39.2%
EU-27	2008		37%	40.6%	45.1%
EU-15	2008		38.1%	42.4%	47.6%
NMS-12	2008		35.6%	38.5%	42%

Note: tax wedge for a single person as a percent of total labour costs

Source: Data for Macedonia, Serbia, Albania, Montenegro and Bosnia (Leibfritz, 2008). Other data from Eurostat

The labour tax system was last modified in 2007 when the personal income tax rate was reduced from 14 to 12% and the zero tax bracket (of 5000 RSD, or 30% of the minimum wage) was introduced. The base for minimum mandatory social security contributions was reduced from 40% to 35% of average wage. However, the burden on labour did not change considerably given that the social security contributions dominate the tax wedge.[3] Comparison with other Western Balkan countries, given in Table 1, shows that for a single worker, who earns only half of the average wage, tax wedge in Serbia is 37.6%, with only Macedonia having higher tax wedge at this wage level. The tax wedge increases by only 1.6 percentage points going from 50% to 100% of the average wage.

[3] In 2001 contributions were set at 32.6% of the gross wage, equally split between employers and workers. The first increase in mandated contributions occurred in 2003 with an increase of 1 percentage point. Next modification was done in 2004 and currently the overall social security tax rate amounts to 35.8% of gross wage: 22% for old age, disability and survivors pensions, 12.3% for health insurance, and 1.5% for unemployment insurance.

The introduction of a personal tax allowance, however modest, and the reduction of minimum mandatory SSC in 2007 have contributed to the introduction of some progressivity – which was entirely lacking beforehand - in the labour taxation system, and to a reduction of the tax wedge for workers with lower wages. However, compared to other countries, the Serbian's labour tax system low progressivity stands out. In most countries displayed in Figure 1 labour taxes increase significantly with the wage level and for many countries by over 10 percentage points between 33 and 100% of the average wage level. In Serbia, however, labour taxes increase by only 2.6 percentage in the same wage range (33 and 100%; World Bank 2010). The introduction of personal tax allowance, however modest, and the reduction of minimum mandatory SSC in 2007 have contributed to the introduction of some progressivity – which was entirely lacking beforehand - in the labour taxation system, and to a reduction of tax wedge for workers with lower wages.

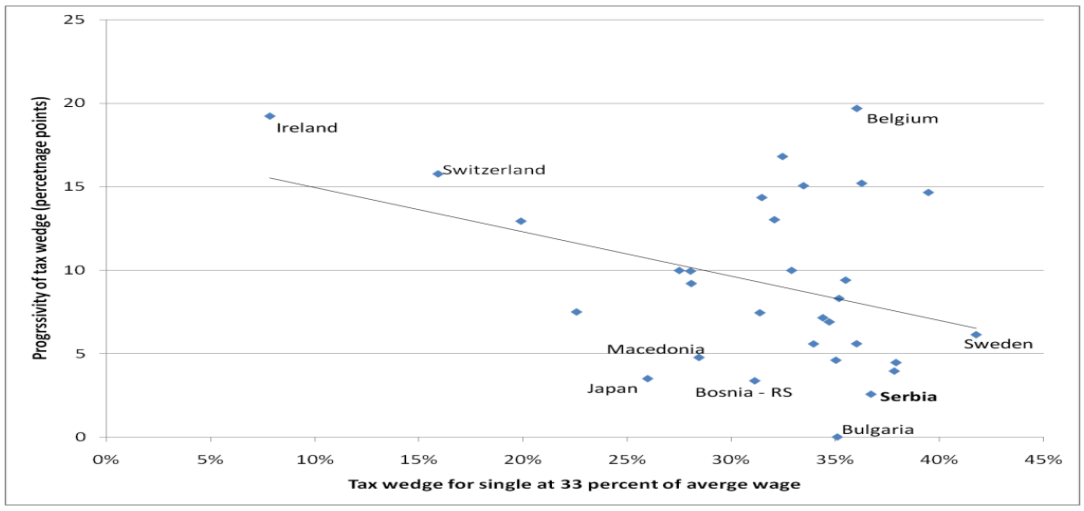

Figure 1 Scatter plot of tax wedge for a single at 33 percent of average wage (percent) versus progressivity of tax wedge (percentage point change) for select European countries (2008)
Source: World Bank (2010, p. 12).

Beside labour taxation, the design of social benefits is another piece in the puzzle of high levels of inactivity and informality among the working age population in Serbia. Once a person has formal income on tax records, major income-tested benefits, social assistance and child allowance in particular, will be decreased for the total amount of earned income or completely withdrawn. This can be shown by calculating marginal effective tax rate (METR)

which measures at a given wage levels how much of an *additional* dinar earned in formal gross wage is taxed away, either as labour tax or in the form of withdrawn social benefits. Marginal effective tax rate at wage levels below 10% of average wage shows that every dinar earned is subtracted from entitlements to social assistance. Hence, 100% of any additional dinar earned is taxed away. Therefore, so-called mini-jobs and midi-jobs (mainly part-time jobs) are not economically feasible for low-wage earners (World bank, 2010).

3. DATA AND METHODOLOGY

To evaluate the effects of social security contributions reform on labour supply incentives and income distribution we use tax and benefit micro-simulation model for Serbia (SRMOD) which is based upon EUROMOD platform. As other tax-benefit models, SRMOD operates on a micro-data for a representative sample of households, within a population to be observed. Living Standards Measurement Survey (LSMS) from 2007 is currently used as the SRMOD dataset. This dataset was chosen since it includes detailed information both on various sources of income and on paid taxes and claimed benefits. This allows for the conducting of micro-validation (comparison of simulated and real values of benefits at the household level) with greater accuracy, and thus for a more reliable estimates of the model's conformity with the actual tax system and benefit policies. No structural changes have occurred in the tax-benefit system between 2007 and 2011, hence there is no time inconsistency between the 2007 simulated system and observed behaviours.

Using elements of income from the survey data and combining them with simulated taxes and benefits, the model calculates disposable income for each household (see Table 1). The basic SRMOD output therefore consists of information on changes in disposable incomes of households after certain policy reforms are introduced. The model shows distributions of household original and disposable income and the tax-benefit income components by deciles.[4] Additional statistics provided in the model include the percentage of people below the poverty line (headcount ratio) in the overall population and within selected groups, as well as the Gini coefficient for equivalent original and disposable income.

[4] Decile groups are formed by ranking according to equalised household disposable income using the modified OECD-equivalence-scale and weighted by household size

Table 4 Main Income Concepts in EUROMOD

Original income (employment and self-employment income, income from agriculture, income from capital, income from property (rent))
+ *Social benefits* (family benefits, pensions, unemployment benefit, social assistance benefits, housing benefits)
- *Social Insurance Contributions* (employee, self-employed)
- *Personal Taxes* (income and other direct taxes)
= Disposable Income

Source: Paulus et al. (2009)

Since the baseline tax-benefit policy year and income data reference period are the same, there was no need for income up-rating. The only modification to the original dataset was net-to-gross imputations. Namely, since the original dataset recorded incomes net of taxes, we have performed tax-benefit calculations in order to compute gross incomes.

In our reform scenario we assume that there is no mandatory minimum social security contributions base. In other words, contributions are paid on the reported (real) amount of employment income, unless gross wage exceeds the maximum social security contributions base (in that case, contributions are calculated on that maximum base). We expect that this reform would bring a significant relief on the labour tax burden especially for low-income individuals.

4. SIMULATION RESULTS

4.1 Work incentives: effective average and marginal tax rates

In this section, we analyze the effects of our reform scenario on the effective average (AETR) and marginal (EMTR) income tax rates. Effective tax rates capture the net tax burden resulting from the interaction of different types of taxes and contributions on one hand and benefit payments on the other. Average effective tax rates (AETRs) express the resulting net payments as a fraction of the income on which they are levied. Marginal effective tax rates (METRs), on the other hand, measure the degree to which any *additional* income would be 'taxed away'. METR is, therefore, usually used as an indicator of labor supply incentives.

Changes in effective average tax rates are of special interest for the extensive labour supply margin (labor force participation) which seems to be more important for particular subgroups at the bottom of the income distribution than the intensive margin (hours-of-work response), which is affected by the effective marginal tax rate (Immervoll, 2002). Differences between these two tax rates are driven by the degree of nonlinearity in the tax-transfer schedules, particularly important at the lower end of the income distribution.

Marginal tax rates could be found analytically by taking first differences of the relevant effective tax schedule, that is:

$$t_m = \frac{dT(y)}{dy}$$

where t_m is marginal tax rate, *y* stands for income, and *T* for the tax schedule. However, this is not feasible in practice, as tax-benefit systems are characterised by discontinuities. Therefore, METRs are numerically derived by altering income by certain percentage, then using a tax-benefit model to re-compute relevant taxes and benefits and finally comparing the results with the original situation.

To calculate METR in this paper, for the working population, the income being changed refers to employment and self-employment income. For each individual in the household, earnings are increased in turn by 3%, while the change in all benefits and taxes (including social insurance contributions) is observed at the household level.

To calculate EMTR, we use the following formula:

$$EMTR_i = 1 - \frac{\Delta X_j}{d_i}$$

where d_i is the income increment for individual *i* and X_j disposable income of household *j* to which this individual belongs. The effective average tax rate is also calculated for the working age population as:

$$EATR_i = \frac{T_i}{Y_i}$$

where T_i is total tax payments and Y_i stands for the market income of individual *i.*

Effective marginal tax rates for the baseline and the reform scenario are given in Table 5 Abolishment of the minimum social security contribution base decreases the effective marginal tax rates for all decile groups. As expected, the reduction is most pronounced for lower deciles given that they are the most affected by the minimum contribution base. Decrease in EMTRs is expected to lead to increasing labour supply incentives, i.e. to increase in the number of working hours.

Table 5 Distribution of effective marginal tax rates by decile groups (%)

Decile	Baseline	Reform scenario	Change
1	20.6	19.5	-1.11%
2	23.2	21.9	-1.28%
3	22.2	21.1	-1.15%
4	21.9	21.2	-0.76%
5	21.2	20.7	-0.51%
6	21.4	20.6	-0.77%
7	20.4	19.9	-0.55%
8	21.7	21.3	-0.38%
9	20.4	19.8	-0.60%
10	21.3	20.8	-0.54%

Source: own calculation using SMROD

Results displayed in Table 5 show that policy reform would reduce average tax rates by more than it would reduce marginal rates. In isolation, this generates a larger participation response than hours-of-work response. We also observe that EATR are reduced for all income groups.

Table 6 Distribution of effective average tax rates by decile groups (%)

Decile	Baseline	Reform scenario
1	52.5%	43.3%
2	46.1%	44.4%
3	47.4%	44.7%
4	46.4%	44.9%
5	47.0%	45.1%
6	45.5%	45.3%
7	45.9%	45.4%
8	46.2%	45.7%
9	46.3%	45.8%
10	46.5%	46.2%

Source: own calculation using SMROD

As shown in Figure 2, the first decile would experience the largest decrease in EATR, that is, the strongest incentive to participate in the labour market.

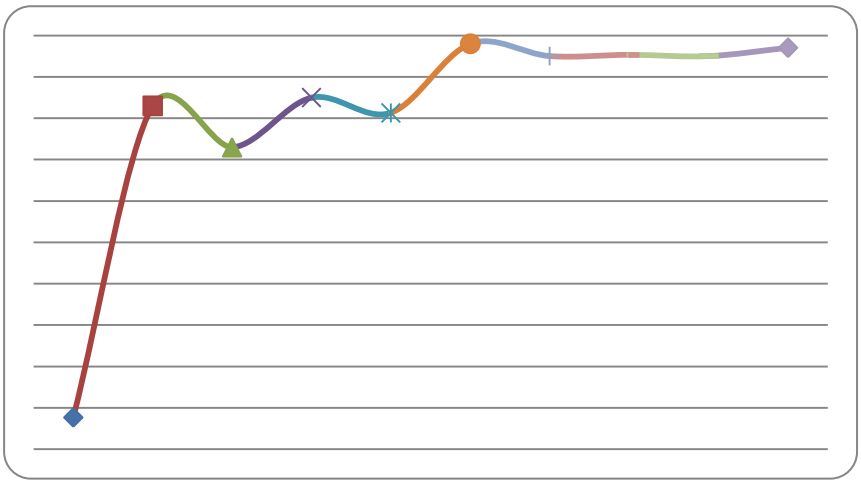

Figure 2 Change in effective average tax rates by decile groups after the reform

Source: own calculation using SMROD

4.2 Distributional effects

The problem of the optimal design of tax policy is usually related to the existence of efficiency-equity trade-off. Since the analysed reform of social contributions system would apparently improve efficiency (reduce METR and AETR, and thus provide more working incentives), we will now investigate the impact of policy reform on equality.

The information on Gini coefficient (measured on the basis of disposable income) illustrates the total income inequality in the country, which is result of market processes and public policies. Results presented in the Table 7 indicate that the inequality, stemming from market processes, is relatively high in Serbia, but still within the range in other European countries. Namely, Gini coefficient measured on the basis of original (market) income amounts to 47.03. At the same time, average before-tax and before-transfers "market income" Gini coefficient in developed countries ranges between 34 and 54 (average value is 44). The results also suggest that the tax and benefit policies in Serbia make a significant impact on reduction of inequality of income distribution, i.e. the total inequality (measured based on disposable income) is reduced by approximately 25%. However, according to the data for OECD countries, tax and benefit policies in these countries cut Gini coefficient by approximately 33%, which suggests that there is a room for further improvement of redistributive features of Serbian tax and benefit policies. As Table 4 shows, the abolishment of minimum social contributions base would reduce inequality, the decrease being relatively small (Gini coefficient on disposable income would drop from 34.82 to only 34.75).

Table 7 Gini coefficient, before and after tax and benefit policy in Serbia

	Baseline	**Reform scenario**
Gini coefficient - original income	47.03	47.03
Gini coefficient - disposable income	34.82	34.75

Source: own calculation using SMROD

The analysis of redistribution effects of tax reform based on Gini coefficient provides information on the size and direction of change in inequality, but still provides no information

on losers and winners from the reform. This can be determined based on the information on the change in income distribution before and after tax reform across the deciles.

Table 8 Distribution of disposable income per deciles

Decile	*Baseline*	*Reform scenario*	*Change (%)*
Quintile share ratio (80/20)	6.81	6.81	
1	2.0%	2.1%	0.01%
2	4.1%	4.1%	-0.01%
3	5.5%	5.5%	0.03%
4	6.7%	6.7%	0.01%
5	7.9%	7.9%	0.03%
6	9.2%	9.2%	-0.02%
7	10.6%	10.6%	0.00%
8	12.5%	12.5%	0.00%
9	15.4%	15.4%	-0.01%
10	26.2%	26.1%	-0.05%

Source: own calculation using SMROD

Results given in Table 5 indicate that policy reform would only slightly trigger income distribution in the country. Share of disposable income for each decile group would remain almost the same.

5. CONCLUSION

Labour taxation in Serbia puts relatively high burden on low paid labour and increases its risk of unemployment or employment in the informal sector. The extremely low level of progressivity of labour taxation is mainly due to existence of a mandatory minimum social security contribution base, which amounts to 35% of the average wage in Serbia. Mandatory SSC rates have been used primarily as an efficient fiscal instrument, at the same time providing the employees, especially in small private firms practicing double payrolls, with access to basic benefits and social services. However, especially if they are higher or better enforced than the minimum wage rules, mandatory SSC rates raise the relative costs of low

wage labor, which deter the employers (or self-employed) in the informal sector from formalization, and puts a potentially heavy additional burden on the formal employers in low-wage labor intensive sectors.

For the purpose of this paper, we analyzed the efficiency and distributional effects of the abolishment of the minimum social security contribution base. Simulation results indicate that this policy reform would reduce average tax rates by more than it would reduce marginal rates. As expected, a decrease in both tax rates is most pronounced for lower income groups given that they are the most affected by the minimum contribution base. On the other hand, our results show no change in income distribution after the introduction of the policy reform. With positive efficiency and no adverse distributional effects, the policy of the abolishment of the minimum contribution base could be recommended.

One should bear in mind that simulations were performed using static tax and benefit model. It enables the calculation of effective average and marginal tax rates which serves as rough indicators of labor supply incentives. Namely, a reduction of the effective marginal tax rate implies increasing incentives but does not necessarily lead to an increase in labour supply. To simulate labor supply responses to the tax change one need to have behavioral model. This provides an interesting avenue for future research.

REFERENCES

Atkinson A (2009) 'An Enlarged Role for Tax-benefit Models' in: Orsolya, L. and Sutherland, H., ed.: *Tax and Benefit Policies in the Enlarged Europe: Assesing the Impact with Microsimulation Models*. Surrey, UK: Ashgate

Arandarenko M. and Vukojević V (2008) 'Labor Costs and Labor Taxes in the Western Balkans', Available at: http://siteresources.worldbank.org/INTECAREGTOPHEANUT/Resources/Betcherman&Arandarenkolabor_taxes_western_balkans.pdf. [Accessed 01/06/09]

Arandarenko M, Vladisavljević, M and Žarković-Rakić J (2012*)* 'From inactivity to work: *analysis* of the *public policies impact and factors affecting inactivity', FREN Study, Belgrade*

Immervoll H (2002) 'The Distribution of Average and Marginal Effective Tax Rates in European Union Member States', *EUROMOD Working Paper No. EM2/02, October 2002*

Labor Force Survey, April 2012 (2012), Statistical Office of the Republic of Serbia

Leibfritz W (2008) 'Increasing employment in FYR Macedonia: The role of labour taxation', *A Policy Note prepared for the World Bank*.

Paulus, A, Čok, M, Figari, F, Hegedus, P, Kump, N, Lelkes, O, Levy, H, Lietz, C, Lupsik, S, Mantovani, D, Morawski, L, Sutherland, H, Szivos, P and Vork A (2009) 'The Effects of Taxes and Benefits on Income Distribution in the Enlarged EU', in: Orsolya, L and Sutherland, H ed.: *Tax and Benefit Policies in the Enlarged Europe: Assesing the Impact with Microsimulation Models*. Surrey, UK: Ashgate

World Bank. (2010) 'Does formal work pay in Serbia? The role of labor taxes and social benefit design in providing disincentives for formal work'. Technical Note.

Žarković-Rakić J (2010) *First Serbian Tax-Benefit Microsimulation Model – SRMOD', The Quarterly Monitor of Economic Trends and Policies in Serbia*, Issue 20, Jan-Mar 2010.