

The Distributional Impact of Serbia's Taxes and Social Spending

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Abstract

In the context of economic recovery and structural reforms to boost Serbia's living standards, understanding the impact of fiscal policy on inequality and poverty is key to inform policy choices. This paper's key research question is to analyze the redistributive effect of fiscal policy on income distribution and poverty in Serbia. It advances on the previous literature by comprehensively assessing the individual and combined effects of taxes and social spending on both inequality and poverty in Serbia, using the Commitment to Equity Assessment approach. The findings suggest that Serbia's fiscal system is redistributive, reducing the Gini coefficient of income once taxes, transfers, and in-kind benefits in education and health are taken into account.

However, the inequality-reducing impact of the fiscal system in Serbia is somewhat smaller than what is observed in other countries in Central and Eastern Europe and Latin America, where similar analysis has been applied. Moreover, and like in some other countries in Europe and Central Asia, the fiscal system increases poverty. Direct social transfers in Serbia are pro-poor and inequality reducing, but their impacts are not large enough to fully offset those of taxation since spending on these programs is small. This analysis of fiscal incidence in Serbia provides a useful basis for assessing the impacts of potential changes in taxes or benefits, which can inform options to mitigate short-term adverse impacts and build support for reforms.

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I. Introduction

Serbia's economic reform agenda aims to accelerate economic growth and boost convergence in living standards with the European Union. To support that process, macroeconomic sustainability and fiscal policy for inclusive growth are an important part.² Serbia achieved notable fiscal consolidation efforts in 2015-2019 to bring down high public debt and stabilize its macroeconomic foundations, and economic growth and labor market improvements during this period benefitted the population. Yet more structural reforms are needed to boost private sector dynamism and jobs, improve welfare of citizens, and strengthen the middle class in Serbia. In 2019, 23.2 percent of Serbia's population was still considered at risk of poverty, defined as living below 60 percent of the median per-adult-equivalent income. The COVID-19 pandemic and economic crisis brought earlier progress to a halt and underscored the need for a green, resilient, and inclusive recovery.

In this context, understanding the impact of the fiscal system on inequality and poverty is key to inform policy choices. To better understand how the government redistributes resources and the potential equity and distributional impacts of any future fiscal reform, it is useful to have a comprehensive assessment of the redistributive effect of the current tax-benefit system. The equity impacts should be considered along with other goals of fiscal policy, such as efficiency and sustainability.

This paper's key research question is to analyze the incidence of fiscal policy in Serbia, that is, the impact of government spending and tax collection on households and on poverty and inequality. The results will shed light on the extent to which the government redistributes resources, which can serve as an input into the public policy debate about whether a tax or a benefit, or what combination, is desirable. To our knowledge, this is the first paper that analyzes and presents a comprehensive assessment of how the distribution of household income is affected by each type of tax or social transfer and by the whole system in Serbia. The paper advances on the previous literature as follows. Earlier work has looked at the impact of direct taxes and direct transfers using SRMOD, a version of the EUROMOD model (Randjelovic and Zarkovic, 2013) and estimated the effects of fiscal instruments on income inequality using a decomposition approach (Krstic and Zarkovic, 2017). However, these studies did not include indirect taxes, which are a major source of revenue collection, and did not look at poverty impacts. This paper incorporates these aspects and, in addition, includes in-kind transfers such as education and health, which are major components of social spending, in assessing impacts on inequality.

This paper follows the Commitment to Equity Assessment (CEQ) approach³ and, to our knowledge, is the first to apply the methodology and generate new findings for Serbia. Compared to other approaches, using the CEQ has the benefits of assessing the comprehensive fiscal system as a whole, assessing impacts for various types of households, and comparison with the many countries where this same approach has been applied. The paper uses the household survey data available at the time of analysis, namely the 2017 Survey of Income and

² World Bank (2020). Serbia Systematic Country Diagnostic Update.

³ The Commitment to Equity Assessment (CEQ) toolkit provides a solid methodological framework for answering these questions; see <https://commitmenttoequity.org/publications-ceq-handbook>. This approach has been implemented in many countries across different regions of the world. For methodological details, see Lustig, Nora (editor). 2018. *Commitment to Equity Handbook. A Guide to Estimating the Impact of Fiscal Policy on Inequality and Poverty*. Brookings Institution Press.

Living Conditions (SILC), with 2016 income data, and 2016 budget and administrative data from the Statistical Office of Serbia, Ministry of Finance, Ministry of Education, Science and Technological Development, and Ministry of Health. It examines the following main questions: How much redistribution and poverty reduction are accomplished through social spending, subsidies, and taxation in Serbia? How progressive are revenue collection and government spending? Based on the data available, the analysis covers fiscal components that represent about 65 percent of direct taxes (83 percent of contributions), 50 percent of indirect taxes revenues, and 82 percent of spending. As with many other CEQ studies, certain categories such as corporate tax and spending on infrastructure are excluded due to the difficulty of assigning the benefit or burden to individual households based on the available information.

Our findings show that Serbia's fiscal system reduces inequality, though it has a poverty-increasing effect. The system is redistributive, reducing the Gini coefficient of income from 0.38 at market income to 0.35 at final income, including the benefit of public expenditures on education and health. However, poverty, measured as per-capita income below \$5.5/day in 2011 PPP, is estimated to increase by about 7 percentage points, from 15.3 percent in market income (including pensions as deferred income) to 22.4 percent in consumable income after reflecting direct and indirect taxes and transfers. Serbia's social benefits are inequality-reducing. Direct taxes in Serbia are overall slightly progressive, and their impact on lowering inequality is smaller than that of direct transfers and the impact observed in other countries. The flat personal income tax gives little progressivity while regressivity of Value-Added Tax (VAT) with respect to current income increases inequality. With respect to consumption when looking at welfare over the life cycle, the incidence of VAT is much less regressive. Future analyses can assess the impacts of potential changes to a tax or a benefit, or a combination of several changes, in the system. Simulating such changes would demonstrate further use of this analysis for policy making.

The paper is organized as follows. The next section describes the system of taxes and social spending. Section III presents the data, assumptions, and methodology in estimating the impact, combining household survey, national accounts, and administrative data. Sections IV and V show the results regarding the impact of the net fiscal system and of each fiscal intervention, respectively. The following section concludes with direction for further use of the analysis.

II. The structure of taxes and social spending in Serbia

Fiscal revenue

The public finance system in Serbia consists of:

- i)* central government (Budget of the Republic of Serbia, Social security funds – Pension and Disability Insurance Fund, Health Insurance Fund and National Employment Service, and regulatory bodies);
- ii)* local self-governments;
- iii)* central-level state owned enterprises (e.g. Electric Power Company, Roads of Serbia, etc.) and local-level state owned enterprises (utility companies).

The structure of tax revenues in Serbia is presented in Table 1, and Appendix 3 includes detailed description of the taxes and spending system.

Indirect taxes and social contributions make up the bulk of fiscal revenue. In 2016, indirect taxes made up approximately 49.8 percent of total tax receipts of the general government, direct taxes (personal and corporate income tax) 15.5 percent, while social security contributions 34.7 percent. Two main sources of tax revenues are value added tax (VAT) and social security contributions (SSC), together accounting for 64 percent of total tax collections. Our analysis is focused on the major tax items, including personal income taxes, SSC, VAT, and excise duties.⁴ These taxes account for 92 percent of total tax revenues in Serbia in 2016.

Direct taxes and social security contributions

Personal income tax (PIT) revenues amounted to 3.8 percent of GDP in 2016. PIT in Serbia applies to wages/salaries, income from self-employment (including entrepreneurs and farmers), and income from authorship and intellectual property rights. The Serbian tax system does not provide for the option of joint, synthesized taxation, which means that all sources of income are assessed separately. Taxation of wages/salaries is the main component of the PIT system, accounting for 73 percent of PIT revenue.

The employment PIT rate in Serbia is flat at 10 percent,⁵ and it applies to wage income exceeding a personal allowance of RSD 11,604 per month (approximately 19 percent of average gross wage) in 2016. Income from self-employment is also subject to 10 percent PIT. Income from capital, rental income and capital gains are taxed at 15 percent. Income from authorship and intellectual property rights are taxed at 20 percent. Old-age pensions and social benefits are exempted from taxation. Individuals whose total annual net income from employment, self-employment, authorship and intellectual property rights and other income exceeds a threshold (three times the average annual wage in Serbia) need to pay annual income tax at the rates of 10 percent (on taxable income between three and six times the average annual wage in Serbia) and 15 percent (on income above six times the average annual wage in Serbia).

⁴ Corporate income tax has not been included in the analysis as it is difficult to estimate incidence of tax burden across households. That should not significantly affect the accuracy of our results as corporate income tax revenues account for approximately 4.5 percent of total tax revenues.

⁵ In 2013, the employment income tax rate was reduced from 12 percent to 10 percent, at the same time, the pension insurance contributions rate was increased by 2 percentage points.

Table 1. Serbia general government revenue, 2016

	Fiscal data		Included in analysis (SILC and HBS)		
	bn RSD	% GDP	Yes/No	bn RSD	% GDP
Total revenue	1,765.90	42.5			
<i>Direct taxes</i>	235.5	5.7			
Personal income tax	155.1	3.8	Yes	101.5	2.5
Wages/Salaries	113.0	2.8	Yes	89.7	2.2
Self-employment income	6.5	0.2	Yes	9.0	0.19
Capital income	11.9	0.3	Yes	0.2	0.0
Rental income	3.8	0.1	Yes	2.2	0.1
Capital gains	0.7	0.0	No		
Other income	13.0	0.3	No		
Annual income tax	6.0	0.1	Yes	0.4	0.0
Corporate income tax	80.4	1.9	No		
<i>Social contributions</i>	527.5	13.0	Yes	455.1	11.3
Pension and disability insurance	354.7	8.8	Yes	313.2	7.7
Health insurance	132.7	3.3	Yes	124.1	3.0
Unemployment insurance	19.3	0.5	Yes	17.8	0.5
<i>Indirect taxes</i>	755.5	17.7	Yes	363.0	8.9
VAT	453.5	11.2	Yes	267.7	6.6
Excise taxes	265.6	6.5	Yes	95.3	2.4
Other indirect taxes (customs)	36.4	0.9	No		
Other revenues	247.4	6.1	No		

Sources: Authors' calculations based on Ministry of Finance

Note: "Included in analysis" refers to the items that can be identified in the household data for this analysis and the amount that can be estimated and reflected in the analysis.

Social security contributions (SSC) represent a large source of public revenues in Serbia, at 13 percent of GDP (pension contributions – 9.15 percent of GDP, health contributions - 3.4 percent of GDP and unemployment contributions – 0.6 percent of GDP). The social security system in Serbia consists of three components: pension and disability insurance, health insurance, and unemployment insurance. This is a Bismarckian social security system financed

from mandatory contributions payable on personal income. In 2016, the contribution rate for pension and disability insurance was 26 percent (14 percent employee and 12 percent employer), health insurance 10.3 percent (5.15 percent employee and 5.15 percent employer), and unemployment insurance contributions 1.5 percent (0.75 percent employee and 0.75 percent employer). All social contributions are paid on employment income and also on part of self-employment income (“entrepreneur’s salary”). Income from authorship and intellectual property rights is subject to pension contributions, while health insurance contributions are paid only if taxpayer is not employed. Health insurance contributions are also paid on pensions (the payment is made by the Pension Fund - see Appendix 3).

Indirect taxes

Indirect taxes are the largest source of revenue, of which VAT is the largest single component, amounting to 11.2 percent of GDP (25.6 percent of total tax revenues) in 2016. The standard VAT rate levied on most goods and services in Serbia is 20 percent. The reduced VAT rate of 10 percent is applied to basic food (bread, milk, meat, etc.), water, natural gas, drugs, books, concerts tickets, culture/art magazines, etc. (see Appendix 3).⁶

Excise duties generated revenues of 6.5 percent of GDP in 2016. Excise duties are levied on tobacco and tobacco products, coffee, alcoholic drinks, and oil/oil derivatives. Starting from August 2015, excise duties are also charged on electricity.

Social spending

Overall public expenditures in Serbia amounted to 47.3 percent of GDP in 2016. Spending on social transfers (contributory and non-contributory benefits) was 15.2 percent of the GDP, out of which the largest share was for contributory social insurance (12.8 percent of GDP). Spending on education was 3 percent of GDP and health 5.9 percent of GDP (Table 2). Thus, total social spending (social transfers, education, and health) was 24 percent of the GDP. The analysis includes major social spending measures and covers 82 percent of social spending.

The main non-contributory social assistance programs that can be analyzed in the available data include the following. This description pertains to the year of analysis (2016), noting some of the changes introduced in 2018.

1. *Financial social assistance* represents a means-tested last resort social assistance program for individuals (living alone) or families (including those with children) whose

⁶ The VAT system was introduced in Serbia in 2005, at the standard rate of 18 percent and reduced rate of 8%. However, through the fiscal consolidation in 2013, the standard rate was increased to 20 percent, while the reduced rate being increased in 2014 to 10 percent.

income is below a minimum income threshold. The benefit amount depends on household characteristics and size.

2. *Foster care benefits* provide cash aid for caregivers (monthly remuneration for their work) and persons placed in foster care (children, elderly). *Caregiver allowance* refers to monthly payments to individuals who require care and assistance with regards to her/his basic needs, due to the nature and level of injury or illness. Individuals who are insured with the mandatory pension and disability insurance and retirees, who meet conditions for caregiver allowance, receive the allowance from the Republic Pension and Disability Insurance Fund (“the Pension Fund”). All other individuals who meet criteria for receiving caregiver allowance receive that allowance from the Ministry of Labour, Employment, Veteran and Social Affairs.
3. *Family benefit programs* include child allowance, parental allowance, and wage compensation during maternity leave. There is also a subsidy for pre-school program attendance. Child allowance, as a means-tested program, was previously limited to the first four children in the family, aged 0-19. In 2018, changes to the Law on Financial Support for Families with Children were introduced. Since 2018, it can be granted to four children in total at the time, allowing families with a larger number of children to apply for child allowance for a younger child when the oldest becomes ineligible due to the age limit. A child can receive a benefit after age of 19 years if he/she is under prolonged parental right (until age 26) and participates in further education and training. The child allowance is conditional on school enrollment for those older than the age of 7. Parental allowance refers to a one-off payment to the mother for giving birth to the first child, and payment in 24 equal monthly installments for giving birth to the second, third, and fourth child. With the law changes in 2018, the government increased the allowance amounts and extended the benefit period for the third and fourth child. Now the allowance can be received until child reaches 10 years of age. Finally, changes to the wage compensation during maternity leave increased the length of the employment period prior to the leave that is taken into account for the calculation of the wage compensation. Also, the benefit was extended to the group of mothers in vulnerable employment (working in agriculture, on flexible contracts).
4. *War veterans benefits*. There are many care benefits for veterans, disabled veterans, and their family members. The major ones are: cash compensations for disabled members of the military, personal compensation for disability acquired at war paid by post offices, personal compensation for disability acquired at war paid through the municipalities, wage subsidies for working veterans, cash payments to military veterans living abroad, annual compensations, and benefits for civilians who have acquired disability at war.
5. *Local government benefits*. Many local governments provide additional benefits in the form of cash assistance to low-income groups. Some of those benefits are included in the analysis in the form of one-off assistance, heating allowances, utility and education allowance (Table 2).

In Belgrade, which has the largest social assistance program, most spending goes to one-off cash payments to pensioners with lowest incomes and subsidies for utility bills. Also, there is cash assistance to war veterans and their associations. Cash supplements are provided to parents of newborn children. There are also food packages for the poor, and benefits for students (grants, subsidies for schoolbooks).

Table 2. General government spending, 2016

	Administrative data		Included in the analysis	
	mil RSD	% of GDP	mil RSD	% of GDP
Total expenditures	1,899,719.70	47.3		
Social spending	991,743.00	24.7	815,132.00	20.22
Contributory social insurance benefits	517,018.58	12.8	440,122.90	10.90
Pensions	494,209.89		456,101.47	
Old-age pensions	325,582.75	8.1	304,997.43	7.50
Family pensions	82,693.56	2.0	63,679.24	1.58
Disability pensions	85,933.57	2.1	67,591.23	1.67
Agricultural pensions			19,166.52	0.46
Survivors pensions for children			667.05	0.016
Pension from abroad			45,774.39	1.13
Unemployment benefit	12,545.28	0.3	3,958.44	0.09
Sickness leave	10,263.42	0.3	3,544.66	0.08
Non-contributory benefits	97,076.91	2.3	51,363.20	1.30
Financial social assistance	14,276.85	0.3	12,356.35	0.30
Foster care benefits	3,408.62	0.1	895.38	0.02
Caregivers allowance	9,840.18	0.2	11,679.35	0.28
War Veterans benefits	13,557.44	0.3	1,305.09	0.03
Parental allowance	7,221.66	0.2	3,025.86	0.12
Child allowance	12,446.15	0.3	8,100.46	0.19
Wage compensation during the maternity leave	30,435.53	0.7	10,012.08	0.23
Heating allowance			316.15	0.01
Utility allowance			324.35	0.007
Education allowance			2,387.43	0.05
One-off assistance			378.41	0.01
Other	5,890.49	0.1	582.30	0.01
Compensation for the loss of employment			4,228.26	0.09
Severance payment			403.79	0.008
Education	111,138.26	3.0	111,138.26	3.03
Pre-school education	2,037.64	0.1	2,037.64	0.05
Primary education	69,890.00	1.7	69,880.00	1.74
Secondary education	25,636.21	0.6	25,636.21	0.63
Tertiary education	25,189.33	0.6	25,189.33	0.61
Health	212,508.95	5.9	212,508.95	5.90
Health Insurance Fund	212,508.95	5.9	212,508.95	5.90

Sources: Authors' calculations based on Ministry of Finance data

Regarding in-kind transfers, social spending on health amounted to 5.9 percent of GDP in 2016. Health care in Serbia is provided on a near universal basis through a compulsory health insurance for all employed and self-employed individuals and their families. The state also provides insurance for pensioners, unemployed and their family members, workers from loss-making state-owned enterprises, refugees, and certain vulnerable groups (e.g., single parents). According to data from the Health Insurance Fund, only around 3 percent of the total population is not covered by health insurance. Mandatory health insurance covers the whole basic range of health services. The central government (Ministry of Health) or local governments (for primary protection) pay for investments in facilities and equipment from general tax revenues. The Health Insurance Fund covers current expenditures (salaries, utility expenses, medical supplies, etc.) and is mainly financed through health contributions.

Spending on education amounts to 3 percent of GDP. Preschool (for 5 to 6-year-olds) and primary school (up to age 15) are mandatory. Most students are in free public schools. The public education system has the largest enrollment with 91 percent of the children enrolled in pre-school programs, 99 percent in primary schools, 98 percent in secondary schools, and 87 percent at higher education institutions. Preschools are financed by the local self-governments, so the parent fee depends on the extent to which daycare is subsidized by the local government. In the capital, Belgrade, 80 percent of the full price is subsidized by the city government that, since 2015, started to subsidize daycare in private pre-school institutions as well.

III. Data and methodology

Data sources

This analysis combines household survey data with data from the national accounts, Ministry of Finance public finance data, and reports of the Statistical Office of the Republic of Serbia. The household surveys used as the basis for the analysis are the Survey on Income and Living Conditions (SILC) for 2017 (which refers to 2016 income) and Household Budget Survey (HBS) for 2016. The SILC is the most comprehensive survey used in the European Union countries to collect microdata on income, poverty, social exclusion and living conditions. The SILC has been the basis for officially monitoring household welfare, poverty, and social inclusion in Serbia since 2013. The HBS contains both income and expenditure data, but the level of details on income components and benefits received is less than the SILC, and the sample size is smaller. Therefore, this analysis is primarily based on the SILC while household consumption information in the HBS is used to estimate the impacts of indirect taxes. Appendix 4 explains how value added tax and excises are estimated from the HBS and imputed for each household in the SILC data.

Approach

This paper follows the Commitment to Equity (CEQ) approach developed by Lustig (2018) to analyze the distributional impacts of fiscal interventions. For each household, we define the following income concepts and calculate them for each household in the survey data:

- 1) **Market income** includes gross income from labor (wages and income from self-employment, both from informal⁷ and formal employment), capital income, income from private transfers, self-production consumption as well as imputed rent
 - a. **Labor income** includes: income from dependent employment, different types of self-employment (entrepreneurship, agriculture, professional practices, household help, selling or reselling products, private services and other business activities)
 - b. **Capital income** includes: income from rent, dividends and interest
 - c. **Income from private transfers** includes: net (amount received minus amount paid) financial assistance and alimony paid by the household, remittances and private pensions
 - d. **Imputed rent** includes estimated value of monthly rent that the house-owners would pay if they had to rent their living space
 - e. **Self-produced consumption** is the market value of goods produced for own consumption deducted from expenses incurred in the process of production of goods for own consumption
 - f. **Other income** includes reported income for which no source was reported and labor income for children under 16 years of age
- 2) **Market income plus pensions** is calculated based on the Market income (1) from which the total amount of pension contributions is deducted, while pensions (old-age, disability, survivors, agriculture and abroad) are added
- 3) **Net market income** is based on Market income plus pensions (2) from which we deduct direct taxes, health and unemployment insurance contributions
- 4) **Disposable income** is calculated as the sum of the Net market income (3) and direct transfers
- 5) **Consumable income** is calculated as the difference between Disposable income (4) and indirect taxes and indirect subsidies (heating and utility allowance)
- 6) **Final income** is calculated as the sum of Consumable income (5) and in-kind health and education benefits

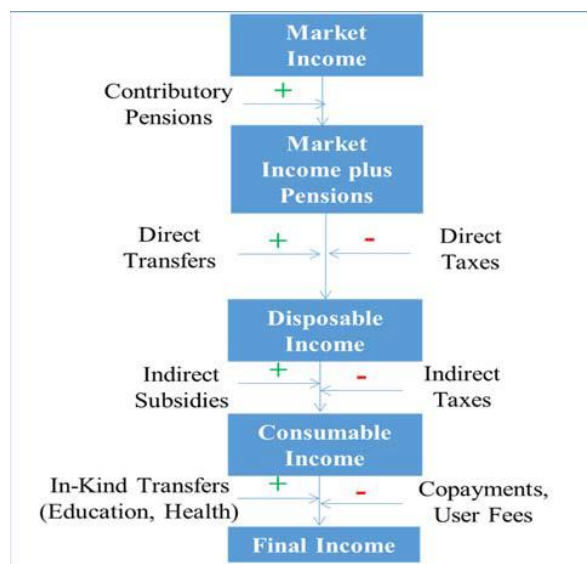
Comparing the income distribution across these different income concepts helps to evaluate the impacts of the fiscal system and of specific fiscal intervention on inequality and poverty. Market income in this analysis includes imputed rent value for owner-occupied housing to enable cross-country comparison, following the Commitment to Equity method in the Guidebook. The poverty and inequality estimates differ slightly from official estimates based on the SILC, which do not include imputed rent in the income aggregate. Appendix 2 includes a robustness analysis for when imputed rent is excluded, where the direction of the results remains valid even though the levels can differ.

The treatment of pensions and pension contributions is often not straightforward. There is no clear consensus: on the one hand, contributory pensions can be treated as personal savings or deferred income; on the other hand, pensions can be treated as government transfers. Pensions

⁷ Informally employed in this context are workers who do not have a written contract with their employer or workers not paying pension and health insurance contributions.

are contributory in Serbia, though the Pension Insurance Fund also receives some transfers from general tax revenues to make up for shortfalls in revenues. Contributions still form the main source of pension financing and usually account for approximately two thirds of the Pension Fund expenditures. Therefore, we present the main results based on treating pensions as deferred income and contributions treated as savings while also showing the effect on inequality when pensions are treated as transfers.⁸

Figure 1: Income concepts in the CEQ fiscal incidence analysis



Source: Lustig, 2018. *Commitment to Equity Handbook*. CEQ Institute.

Assumptions

This methodology evaluates the first-order effects, keeping everything else constant, and does not take into account behavioral responses to fiscal policies. It assumes that the incidence of direct taxes and contributions is borne by the income earner, and the burden of indirect taxes borne by consumers. In addition, this type of standard fiscal incidence analysis does not capture the long-term effects of excise duties on products with negative health consequences such as tobacco and alcohol.

PIT and SSC are simulated based on reported income data, using tax legislation parameters described in Appendix 3. The results depend on the accuracy of reported income data, in particular the extent of informality, and reflect the de jure impact of tax policy based on statutory rates.

Indirect taxes (VAT and excise duties) were estimated by applying statutory rates to the detailed consumption data in the HBS. For excise duties, we apply statutory rates to the reported consumption of alcohol, tobacco, fuel and coffee, to estimate the burden of these excises across households. Following the survey-to-survey imputation technique (see Appendix 4), we assign indirect tax burdens to households in the SILC. For both direct and indirect taxation, we employ statutory rates. The paper's main results will show the incidence of indirect taxes with respect to current income, based on household income as the main

⁸ An alternative scenario in which pensions are treated as government transfers, and contributions treated as a direct tax, is presented in the *Commitment to Equity Handbook*, Figure 6-2, p. 244.

measure of welfare, as used by Serbia's official poverty and inequality indicators. Appendix 1 explores an alternative question about the incidence of indirect taxes over the life cycle with respect to household consumption as a proxy for permanent income, using adjustments by the income-consumption ratio. The estimated value of indirect taxes that can be included in the analysis reflects the extent of information available in the HBS. In most countries, total consumption of households in the household surveys (HBS) represents a fraction of household consumption reported in the National Accounts. In this application of the methodology to Serbia, the fraction of indirect taxes that can be captured in the analysis (Table 1) closely reflects the fraction of consumption that is captured in the HBS (close to 60 percent, see also Appendix 4). Due to the lack of an available input-output table in Serbia, this analysis has not been able to estimate indirect effects of indirect taxes.

On the spending side, the SILC includes detailed information on who received payments from contributory and non-contributory social protection programs. Among contributory benefits, the data includes all types of pensions (old-age, disability, survivor's, agricultural, pension from abroad, pensions from private schemes), unemployment benefit, and sickness benefit. The non-contributory benefits included in the survey are financial social assistance, child allowance, parental allowance, foster care benefits, war veteran benefits, severance payments, one-off assistance paid by local governments, heating and utility bills allowance. Wage compensation during maternity leave is not defined as such in the data, but we use the question "Did you receive any pregnancy-puerperal benefits" for this purpose. Caregiver allowance is placed in one variable, so it is not possible to distinguish what is contributory and received through the Pension Fund and what is noncontributory and received from the Ministry of Labour, Employment, Veteran and Social Affairs. We used the reported values from the SILC database for all the benefits.⁹

Assigning the value of public spending on education follows the government cost approach. Since the education system is mostly public, we calculate per beneficiary input costs by level of education as total government spending divided by the number of pupils in each level of education. This per pupil expenditure is then assigned as education benefit to each student. We use the number of students from the SILC data for tertiary education since it includes post graduate students. For the other levels of education, the number of students from the SILC is almost equal to the numbers from administrative data. For health expenditures, since access to services is near universal, we follow the cost of insurance approach and assign per capita expenditures (obtained by dividing total expenditure by the total population in Serbia) for each person in the dataset.¹⁰

⁹ For the financial social assistance, reported values are used, complemented by imputed values for some households. Validation results indicate that the number of individuals that report receiving the financial social assistance in the SILC data roughly corresponds to the number of beneficiaries in the administrative data. However, total expenditures in the survey are underestimated by about 50 percent. After careful investigation of the reported amounts, this underestimation seems to be largely due to reporting the monthly, instead of yearly as asked, amounts in the SILC data set. For those that report amounts close to the monthly benefit levels (about 35 percent of the total population that report the receipt of the benefit), we impute administrative benefit amounts. After this correction, the total value of financial social assistance from the SILC equals 86 percent of its value in administrative data.

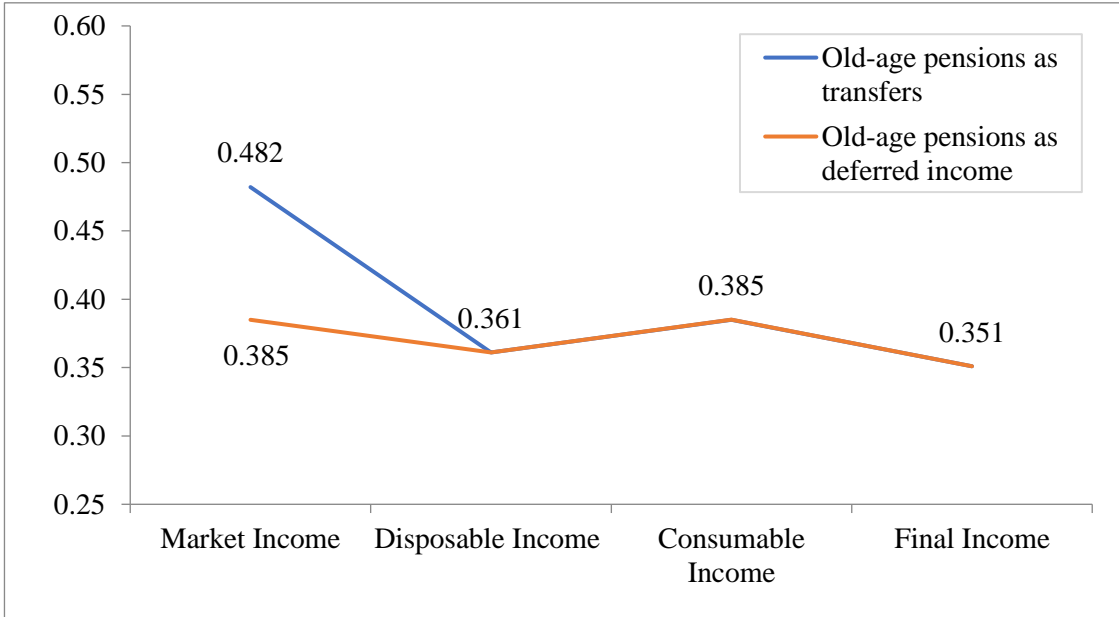
¹⁰ The values for education and health benefits are scaled so that the ratio of benefit to income is the same in the administrative data (budget divided by household income) and survey data (benefit divided by market income) (following the CEQ Handbook).

IV. Impact of overall taxes and social spending on inequality and poverty

Impacts on inequality

Government intervention through taxes, social benefits, and in-kind transfers reduces inequality by almost 10 percent, or 0.03 Gini points. Without fiscal intervention, the Gini coefficient of market income inequality (when pensions are treated as deferred income) in Serbia stands at 0.385. After government intervention in the form of direct and indirect taxes, social contributions, social benefits and in-kind transfers (healthcare and education), inequality falls to 0.351 (Figure 2). The largest contribution to the reduction of inequality comes from in-kind transfers (in health and education), which is reflected in the fall of the Gini from 0.385 for consumable income to 0.351 for final income. The effects of direct taxes (personal income tax and social security contributions) and social transfers (contributory and non-contributory benefits) are slightly smaller, bringing the Gini down from 0.385 for market income to 0.361 for disposable income. Indirect taxes (VAT and excise duties) tend to increase inequality with respect to current income, which is reflected in the increase of the Gini from disposable to consumable income. Over the life cycle, the incidence of indirect taxes with respect to household consumption as a proxy for permanent income is much less regressive, as discussed in Appendix 1.

Figure 2. Serbia: Change in inequality (Gini coefficient) from market to final income



Source: Own estimations using HBS and SILC data

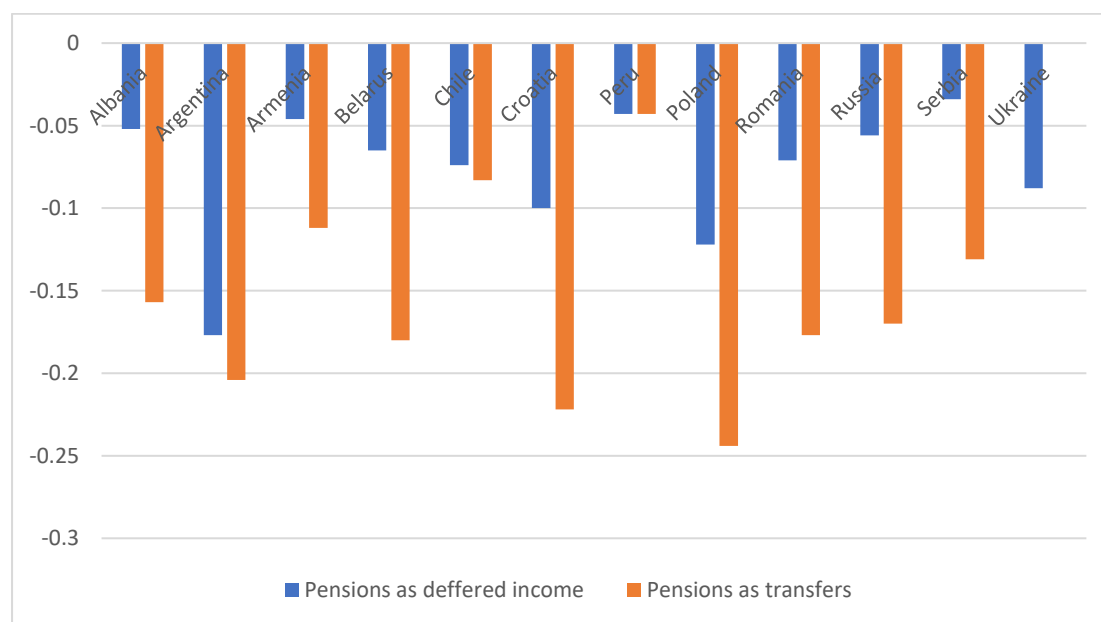
Note: The poverty and inequality estimates differ slightly from official estimates based on the SILC because imputed rent is included in the income aggregate, and the direction of the results is robust to whether imputed rent is included.

The reduction of inequality in Serbia due to fiscal intervention is smaller than that in several countries in Central and Eastern Europe, some neighboring countries, and Latin American countries of similar income level where the CEQ analyses have been conducted. When

pensions are treated as deferred income, the scale of inequality-reducing redistribution through the tax and transfer system in Serbia of 0.034 Gini points is lower than in Albania (0.052), Montenegro (0.072), Romania (0.071), and Croatia (0.102).¹¹ It is also lower than in Armenia, Poland, Belarus, the Russian Federation, Ukraine, and several Latin American countries with similar income level as Serbia. Strict comparability across countries can be difficult due to the use of income versus consumption as the main welfare aggregate to represent disposable income.

As previously mentioned, the main analysis in Serbia treats pensions as deferred income since Serbia has a pay-as-you-go pension system and the entitlement to pensions is linked to payment of contributions during employment. Figure 2 also shows the impact on inequality when pensions are treated as government transfers instead of deferred income. In that scenario, market income inequality in Serbia amounts to 0.482, which is somewhat lower than in Albania (0.49), Croatia (0.51), and Montenegro (0.53). The overall reduction in inequality due to fiscal intervention in Serbia is equivalent to 0.131 Gini points from market income to final income when old-age pensions are treated as transfers but again lower than in most of the countries in Figure 3 (0.24 in Poland, 0.22 in Croatia, 0.17 in Romania, 0.15 in Albania).

Figure 3. Decline in inequality (Gini coefficient) from market to final income



Source: CEQ Standard Indicators. <https://commitmenttoequity.org/datacenter/>¹¹

¹¹ Commitment to Equity Institute Data Center on Fiscal Redistribution, 2019. Based on information from: ALBANIA (Davalos et al., 2018); ARGENTINA (Rossignolo, 2018); ARMENIA (Younger et al., 2019); BELARUS (Bornukova et al., 2017); BOLIVIA (Paz Arauco et al., 2014); BRAZIL (Higgins, Pereira and Cabrera, 2014); BURKINA FASO (World Bank, 2018); CHILE (Martinez-Aguilar et al., 2018); COLOMBIA (Melendez and Martinez, 2019); COLOMBIA (Melendez and Martinez, 2019); COMOROS (World Bank, 2017); COSTA RICA (Sauma and Trejos, 2014); CROATIA (Inchauste and Rubil, 2017); DOMINICAN REPUBLIC (Aristy-Escuder et al., 2019); ECUADOR (Llerena et al., 2015); EGYPT (Lara Ibarra et al., 2019); EL SALVADOR (Beneke, Lustig, and Oliva, 2018); ETHIOPIA (Hill et al., 2017); GEORGIA (Cancho and Bondarenko, 2017); GHANA (Younger et al., 2018); GUATEMALA (Icefi, 2017a); GUINEA (World Bank, 2019); HONDURAS (Icefi, 2017b); INDONESIA (Jellema, Wai-Poi, and Afkar, 2017); IRAN (Enami, Lustig, and Taqdiri, 2017); JORDAN (Alam, Inchauste, and Serajuddin, 2017); KENYA (Pape and Lange,

Direct taxes and social benefits in Serbia are less equalizing than in a few Central and Eastern Europe (CEE) countries where similar analysis has been conducted. Based on the CEQ analysis for other countries¹², and disaggregating effects by policy instruments, the equalizing effects of direct taxes and social benefits in Serbia are somewhat stronger than in non-European developing countries, but still considerably smaller than in those CEE economies. The marginal contribution of all direct transfers in Serbia is to reduce the Gini (when pensions are treated as deferred income) by 0.0139. In Russia, Romania, and Croatia, they reduce inequality by 0.022-0.024 points. Direct transfers in Armenia and Albania also have a higher capacity to reduce inequality, with the marginal contribution of 0.019 and 0.17, respectively. At the same time, the impact of indirect taxes in Serbia on inequality is close to the average of the CEE countries and non-EU developing countries with available CEQ results.

The equalizing effects of in-kind transfers in Serbia is comparable with the effects in those CEE countries. The effects of health and education spending in Serbia are considerably stronger than in non-European developing countries which may be the result of its free and universal primary and secondary schooling and almost universal healthcare scheme.

Impacts on poverty

Government intervention through taxes and benefits is associated with an increase in poverty in Serbia, mostly due to indirect taxes. Using household income and standardized international poverty lines of \$1.9, \$3.2, and \$5.5/day (2011 PPP), the results suggest that the poverty rate decreases after direct taxes and social benefits are taken into account but increases upon the imposition of indirect taxes. In other words, social transfers cannot fully offset the burden of taxes on poverty. Table 3 shows that the share of the population whose consumable income is below a poverty line is higher than that for market income, except for the extreme poverty line of \$1.9/day. The same trend applies if poverty is anchored on the national relative poverty line at 60 percent of median equivalized income.

Similarly, poverty gap and poverty severity are reduced when direct taxes and social benefits are introduced, but the effects are reversed after considering indirect taxes. This finding is robust across different absolute poverty lines and the relative poverty line. Since households do not observe the monetary value of health and education transfers, these items are not included in the computation of the poverty headcount, following standard practice.

2018); MALI (Hounsa, Coulibaly and Sanoh, 2019); MEXICO (Scott, 2014); MEXICO (Scott et al., 2018); MEXICO (Scott et al., 2018); MONGOLIA (Freije and Yang, 2018); NAMIBIA (World Bank, 2017); NICARAGUA (Icfei, 2017c); NIGER (Hounsa, Coulibaly and Sanoh, 2019); PANAMA (Martinez-Aguilar, 2018); PARAGUAY (Gimenez et al., 2017); PERU (Jaramillo, 2014); PERU (Jaramillo, 2019); POLAND (Goraus and Inchauste, 2016); ROMANIA (Inchauste, et al, 2016); RUSSIA (Popova, 2019); SOUTH AFRICA (Inchauste et al., 2017); SRI LANKA (Arunatilake, 2019); TANZANIA (Younger, Myamba, and Mdadila, 2019); TUNISIA (Jouini et al., 2018); UGANDA (Jellema et al., 2018); UKRAINE (Bornukova et al., 2019); URUGUAY (Bucheli, 2019) and VENEZUELA (Molina, 2016).

¹² <http://commitmenttoequity.org/publications-crosscountrystudies/>

Table 3. Serbia: Changes in poverty rates due to government intervention

		Market Income + Pensions	Disposable Income	Consumable Income
Poverty Headcount	\$1.9 PPP	5.1%	2.8%	4.9%
	\$3.2 PPP	8.0%	5.9%	10.3%
	\$5.5 PPP	15.3%	14.4%	22.4%
	60% of median equivalized disposable income	22.9%	22.8%	34.4%
Poverty Gap	\$1.9 PPP	2.7%	1.4%	2.4%
	\$3.2 PPP	4.2%	2.6%	4.5%
	\$5.5 PPP	7.3%	5.7%	9.4%
	60% of median equivalized disposable income	10.2%	8.8%	14.0%
Poverty severity	\$1.9 PPP	1.9%	1.0%	1.7%
	\$3.2 PPP	3.0%	1.7%	2.8%
	\$5.5 PPP	4.9%	3.3%	5.6%
	60% of median equivalized disposable income	6.5%	4.9%	8.1%

Source: Own estimations using HBS and SILC data

The finding that fiscal policy is estimated to increase poverty in Serbia is similar to that in most available analyses in Europe and Central Asia. Only in some countries in the CEQ sample, such as Russia and several countries in Latin America, poverty is reduced or remains mostly unchanged after accounting for direct and indirect taxes and transfers.¹³ Poverty, measured as per-capita income below \$5.5/day in 2011 PPP, is estimated to increase by about 7 percentage points in Serbia, from 15.3 percent in market income (including pensions as deferred income) to 22.4 percent in consumable income. In Armenia, poverty increases by 6.6 percentage points while in Romania 1.5. Other studies using slightly different international poverty lines also indicate poverty increases after fiscal interventions in Albania, Montenegro, Croatia, and Poland.

V. Progressivity and marginal effects of individual taxes and transfers

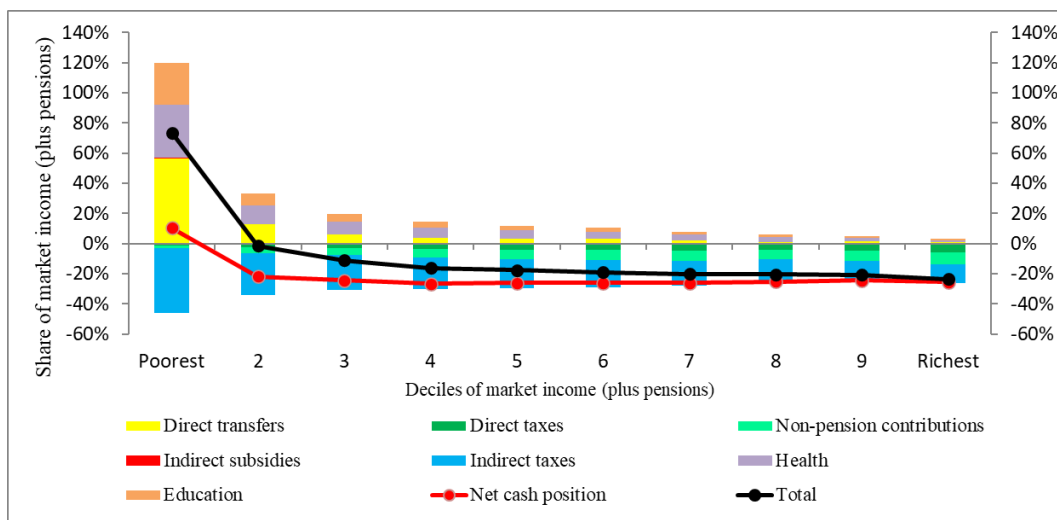
This section discusses how each component of the tax and benefit system contributes to the system's overall impacts on poverty and income inequality. The influence of individual fiscal interventions may be different from the influence of the overall fiscal system. Both the size and progressivity of a tax or expenditure item determine its marginal effects on inequality and poverty measures. For example, a highly progressive but small government transfer may have a small marginal effect on inequality and, therefore, small redistributive impacts. We first show how taxes and transfers affect household income across the distribution to illustrate their distributional impact. We then analyze the marginal effect of each individual tax and benefit component on the Gini coefficient and the poverty headcount.

¹³ Based on the data from the CEQ data center: <https://commitmentoequity.org/datacenter/>.

Figure 4 shows different tax and transfer categories as a share of households' pre-fiscal income (market income plus pensions) across income deciles. The shares for the bottom first decile are large because their pre-fiscal incomes (denominators) in this decile are small. Direct transfers and in-kind education and health benefits are progressive: they make up a larger share of household income among the poor than among the rich. Direct transfers represent a sizable share of household income mainly for the first income decile, reflecting the good targeting, especially of the financial social assistance program. Direct taxes and contributions represent a smaller share of income in the bottom deciles. They are progressive, with their share in the income of the top 10 percent is five times that for the bottom 10 percent. With respect to current income, indirect taxes are regressive, accounting for larger shares of income among the lower income deciles.

The poorest households are net beneficiaries of the fiscal system. Households in the first decile of the income distribution receive a net benefit from the combined fiscal system on a cash basis and including in-kind transfers. For this decile, the positive effects of transfers outweigh the large negative effect of indirect taxes. The net cash position of all the other income deciles is negative. This means that the majority of individuals were net payers to the budget in 2016 since the taxes they paid exceeded the cash benefits received.

Figure 4. Distributional Impact of the Tax and Benefit System in 2016



Source: Own estimations using HBS and SILC data

Several standard indicators can illustrate the effects of specific fiscal interventions, as summarized in Table 4. The extent to which individual tax or expenditure items are progressive is shown by their concentration coefficients or Kakwani index. To assess the extent to which a particular fiscal intervention is equalizing, we compare inequality with and without this tax or transfer. This difference is called the marginal effect, that is, the change in market income due to adding or subtracting only the given benefit or tax from it.

- **Concentration coefficient:** an index that ranges from -1 to 1, derived from the concentration curve that relates the cumulative percentage of households (from poor to rich ranked by market income) on the horizontal axis and the cumulative percentage of tax (transfer) paid (received) by each centile. The coefficient of concentration is used jointly with the pre-fiscal income Gini to construct the Kakwani index.

- **Kakwani index:** A Kakwani index for taxes will be positive (negative) if a tax is globally progressive (regressive). A Kakwani index for transfers is positive if a transfer is progressive in relative terms. For taxes, the index is defined as the difference between the concentration coefficient of the tax and the Gini for pre-fiscal (market) income. For social transfers, it is defined as the difference between the Gini for market income and the concentration coefficient of the transfer.
- **Marginal contribution:** The marginal contributions of each tax and transfer component to reducing the Gini and the poverty headcount, respectively, show the redistributive effect and poverty-reducing effect. It is calculated as the difference between the Gini coefficient or the poverty rate with and without particular tax or transfer. In case of a positive value, there is a redistributive effect of a tax or a transfer and a decline in the Gini coefficient. A positive marginal contribution to poverty reduction captures a poverty-reducing effect. It is useful to calculate the marginal contribution since a progressive tax is not necessarily equalizing, depending on certain characteristics of the fiscal system, and the marginal contribution can show impacts on reducing poverty.

Table 4. Serbia: Marginal Contributions to Reducing Inequality in 2016

	Relative Size with respect to Market Income + Pensions	Concentration Coefficient	Kakwani Index	Marginal Contribution to Redistributive Effect	Marginal Contribution to Poverty Reduction
Disposable income	91.7%				
All contributory pensions	23.08%	0.3432	0.0417	0.0792	0.1540
Sick leave	0.16%	0.0327	0.3522	0.0002	0.0004
Unemployment benefit	0.18%	-0.1185	0.5034	0.0006	0.0006
Parental allowance	0.14%	-0.2095	0.5944	0.0008	0.0004
Child allowance	0.37%	-0.6047	0.9896	0.0036	0.0058
Financial social assistance	0.57%	-0.7479	1.1328	0.0059	0.0070
Other social assistance	0.03%	-0.1675	0.5524	0.0001	0.0003
War veterans benefit	0.06%	-0.3191	0.7040	0.0002	0.0003
Care allowances	0.54%	-0.0003	0.3852	0.0014	0.0028
Wage compensation during the maternity leave	0.46%	0.0059	0.3790	0.0011	0.0014
Foster care for children	0.04%	-0.4141	0.7990	0.0003	0.0004
Education related benefits ¹⁴	0.11%	0.0000	0.3849	0.0002	0.0007
All direct transfers excl contributory pensions	2.93%	-0.2441	0.6290	0.0139	0.0216
All direct transfers incl contributory pensions	26.01%	0.2771	0.1078		
Capital tax (per capita) - dividend	0.00%	0.4916	0.1067	0.0000	0.0000
Capital tax (per capita) - interest	-0.01%	0.6110	0.2260	0.0000	0.0000
Capital tax (per capita) - rent	-0.10%	0.5278	0.1429	0.0001	-0.0001
Personal income taxes	-4.55%	0.4916	0.1067	0.0047	-0.0038
Contributions - Pensions	-14.47%	0.4580	0.0731	0.0073	-0.0228
Contributions - Health insurance	-5.73%	0.4580	0.0731	0.0038	-0.0050
Contributions - Unemployment insurance	-0.83%	0.4608	0.0759	0.0006	-0.0006
All direct taxes	-4.68%	0.4948	0.1098	0.0050	-0.0039

¹⁴ This education-related benefit under direct transfers is separate from the in-kind education benefit.

All contributions	-21.04%	0.4581	0.0732	0.0070	-0.0410
All direct taxes and contributions	-25.72%	0.4648	0.0799	0.0071	-0.0591
Consumable income	75.1%				
All indirect subsidies	0.03%	0.1238	0.2611	0.0001	0.0000
Total VAT	-12.30%	0.2650	-0.1199	-0.0171	-0.0459
Total Excises	-4.38%	0.2143	-0.1706	-0.0078	-0.0134
All indirect taxes	-16.68%	0.2517	-0.1332	-0.0272	-0.0685
All taxes	-21.36%	0.3049	-0.0800	-0.0228	-0.0782
All taxes and contributions	-42.40%	0.3809	-0.0040	-0.0344	-0.2100
Final income	81.6%				
In-kind health benefits	4.24%	0.0000	0.3849	0.0157	
In-kind education benefits: preschool	0.04%	-0.0991	0.4840	0.0002	
In-kind education benefits: primary level	1.22%	-0.2043	0.5892	0.0068	
In-kind education benefits: secondary level	0.51%	-0.1533	0.5382	0.0026	
In-kind education benefits: tertiary level	0.50%	0.1275	0.2574	0.0012	
All education transfers	2.27%	-0.1175	0.5024	0.0108	
All in-kind transfers	6.51%	-0.0410	0.4259	0.0257	

Direct and indirect taxes

Table 4 shows that direct taxes and social contributions in Serbia have a small contribution to reducing inequality. They are slightly progressive, as shown by the positive Kakwani coefficient. They are also inequality-reducing. However, the marginal contributions of direct taxes to redistributive effect of 0.005 is smaller than that observed in other countries, for example, 0.007 in Albania (2015) and 0.03 in Croatia (2014).¹⁵ The flat personal income tax with a tax allowance gives little progressivity. Since taxes and contributions take away from market income, they are poverty increasing, as shown by the negative marginal contribution to poverty reduction (poverty is measured using the US\$5.5/day in 2011 PPP poverty line).

On the other hand, with respect to current income, indirect taxes are regressive (negative Kakwani index). They contribute to an increase in both poverty and inequality. Both VAT and excise taxes are regressive. Excises have a smaller negative impact on poverty and inequality than VAT since they are smaller in size. Appendix 1 analyzes the incidence of indirect taxes with respect to consumption, i.e., looking at welfare over the life cycle. Indirect taxes taken together in Serbia are relatively unequalizing with their marginal contribution to reducing inequality of -0.027 Gini points. While the effect is smaller than that for Croatia, it is more unequalizing than many Latin American and developing countries.¹⁶

Social spending

All contributory and non-contributory benefits are progressive. They contribute to reducing both poverty and inequality, as shown in the positive marginal contributions of these items (Table 4, which shows the results for the main social benefits as captured in the data). Among

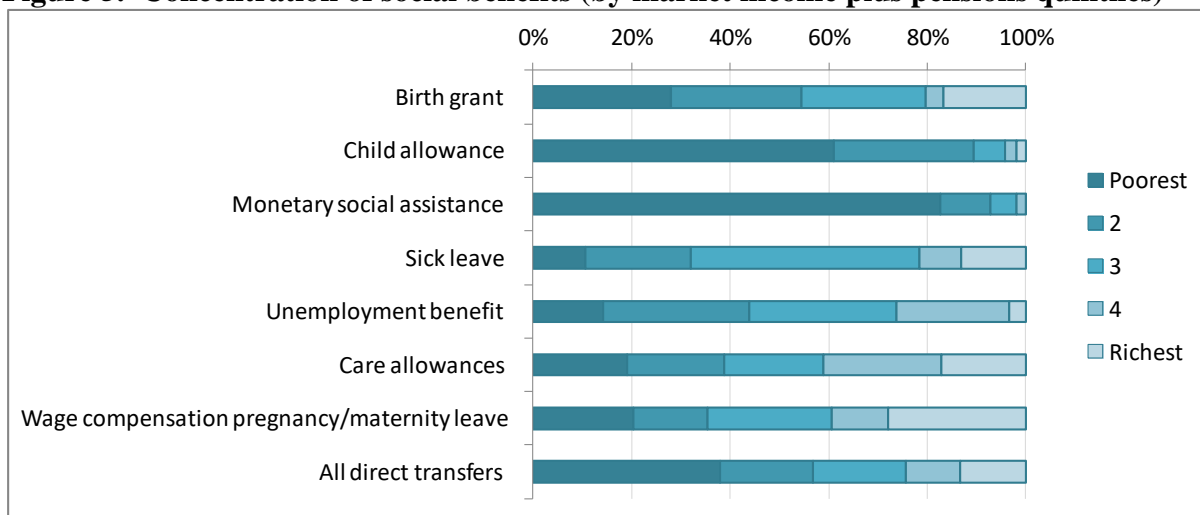
¹⁵ Inchauste and Rubil (2017). "The Distributional Impact of Taxes and Social Spending in Croatia". World Bank Policy Research Paper #8203.

¹⁶ Inchauste and Rubil (2017). "The Distributional Impact of Taxes and Social Spending in Croatia". World Bank Policy Research Paper #8203.

social benefits, child allowance and financial social assistance have the biggest inequality-reducing and poverty-reducing effects. These programs are well targeted to the poor. Almost 93 percent of the financial social assistance and 90 percent of the child allowance is concentrated at the bottom 40 percent of the distribution of market income (including pensions as deferred income). Half of all the spending on parental allowance goes to bottom 40 percent of the population in terms of market income (Figure 5).¹⁷ However, the marginal effects of social benefits on poverty and inequality-reducing are constrained by the relatively small coverage of the most targeted transfers. The marginal contributions of all direct transfers (excluding contributory pensions) are to reduce the Gini by 0.0139 points and the poverty headcount by 0.0216.

It should be noted that the different benefit programs may have different intentions. Not all programs necessarily have a redistributive or poverty-reducing objective, for example, sick leave and wage compensation during maternity leave. Almost 40 percent of the wage compensation during maternity leave goes to top 40 percent of the market income distribution.

Figure 5. Concentration of social benefits (by market income plus pensions quintiles)



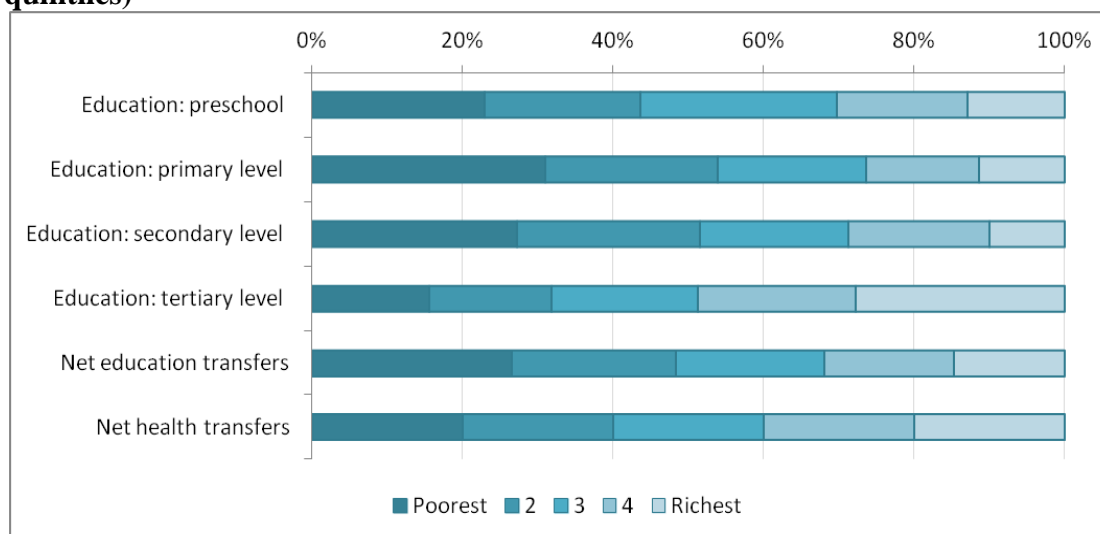
Source: Own estimations using HBS and SILC data

Education and health in-kind benefits have inequality-reducing effects. As noted earlier, we assume that the benefit received by the individual is equal to the amount spent per capita. Figure 6 shows that overall education spending is progressive, with primary education being the most redistributive (Table 4). The concentration coefficient for all levels of education except tertiary is negative, suggesting that a larger share of expenditures goes to the lower deciles. However, these results do not capture heterogeneity in the quality of services. For example, the PISA 2018 results¹⁸ suggest that in reading, socio-economically advantaged students outperformed those from more disadvantaged background by 73 score points. Though this is still smaller than the average difference between the two groups across OECD countries (89 score points), the performance gap in Serbia had increased since 2009 when it was 66 points (87 points on average across OECD countries). Health spending is equally distributed across the income quintiles, given the way health benefits are assigned, but is progressive in relative terms since it makes up a larger share of income at the bottom of the distribution.

¹⁷ This result is based on quintiles of market income plus pensions per capita that excludes pregnancy and maternity allowance, which may differ from other studies looking at targeting based on quintiles of disposable income.

¹⁸ https://www.oecd.org/pisa/publications/PISA2018_CN_SRB.pdf

Figure 6. Concentration of education and health (by market income plus pensions quintiles)



Source: Own estimations using HBS and SILC data

VI. Concluding remarks

The analyses presented in this paper show that Serbia's fiscal system as a whole reduces inequality, though it has a poverty-increasing effect. The system is redistributive, reducing the Gini coefficient of income by 0.03 points, from 0.38 at market income to 0.35 at final income, when taxes, transfers, and in-kind benefits in education and health are taken into account. The inequality-reducing impacts of the fiscal system in Serbia is somewhat smaller than what is observed in other countries in Central and Eastern Europe and Latin America where similar analysis has been applied. However, social transfers cannot fully offset the burden of taxes on poverty, resulting in a net poverty-increasing effect of these measures combined. On the expenditure side, social transfers in Serbia are well-targeted to the poor and reduce inequality by 0.014 Gini points. Their poverty and inequality-reducing impacts are constrained by the relatively small coverage of the most targeted transfers, i.e., the poverty-targeted financial social assistance and child allowance. Therefore, expanding coverage of these targeted programs can increase the poverty reduction and redistributive impacts of social transfers.

On the revenue side, direct taxes in Serbia are overall slightly progressive. Their impact on lowering inequality is much smaller than that of direct transfers. The flat personal income tax gives little progressivity while the regressivity of VAT with respect to current income increases inequality. Poverty, measured as per-capita income below \$5.5/day in 2011 PPP, is estimated to increase by about 7 percentage points, from 15.3 percent in market income (including pensions as deferred income) to 22.4 percent in consumable income after reflecting direct and indirect taxes and transfers. The same trend applies if poverty is anchored on the national relative poverty line at 60 percent of median equivalized income. The poorest households are net beneficiaries of the fiscal system.

This analysis of fiscal incidence in Serbia provides a basis for future analyses to assess the potential impacts of changes to a tax or a benefit in the system, or a combination of simultaneous policies. Simulating such changes would demonstrate further use of this analysis for policy making. Understanding poverty and distributional impacts helps identify potential winners and losers from fiscal reforms, inform how to protect the poor and vulnerable in case of adverse short-term impacts, and help build support and momentum for reforms.

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APPENDIX 1

Incidence of indirect taxes from a life-cycle perspective: VAT corrections

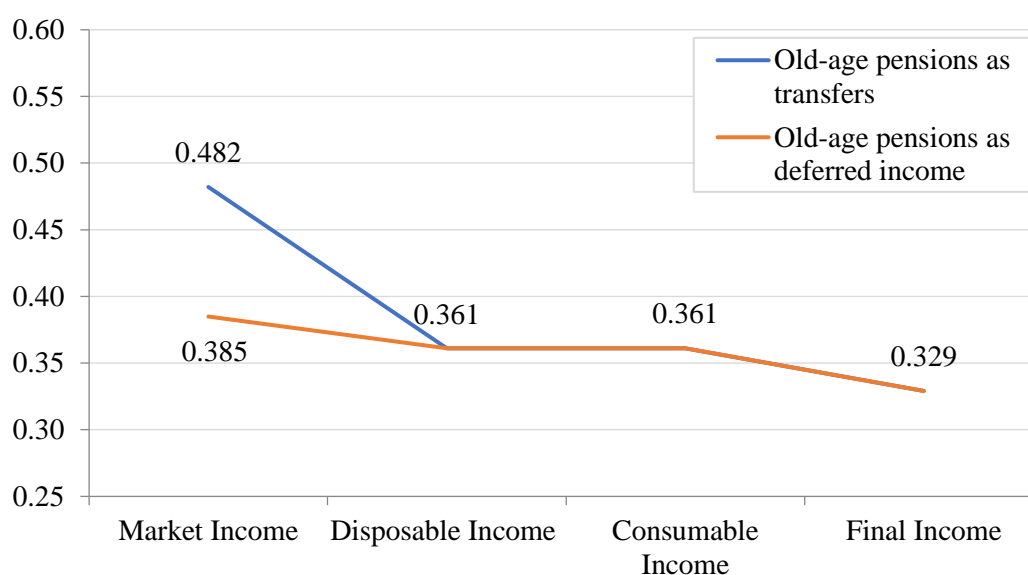
The main results presented in the paper are based on household income as the main measure of welfare (as used for official welfare statistics in Serbia), thus showing the distributional impact of taxes with respect to current household income. This is considered relevant for policy making purposes in the short to medium term. An alternative question, explored further in this Appendix, is to understand the incidence of taxes over the life cycle with respect to household consumption as a proxy for permanent income. Assessing the incidence of indirect taxes from a life-cycle perspective is possible through adjustments by the income/consumption ratio, which is the VAT correction as per the Commitment to Equity guidebook.

For the permanent income concept of welfare, standard life-cycle theory argues that consumption is a good proxy. With respect to consumption, taxes at a fixed rate on consumption like VAT should in theory be a neutral tax over the life cycle. The other motivation for adjustments comes from negative consumable income observations. In cases when the reported consumption is much higher than reported income, either due to underreporting of income, dissaving, or borrowing, some of the households with consumption much higher than reported income end up with negative consumable income. In the case of SILC 2017 data for Serbia, the number of those with negative consumable income is very small, only 0.2 percent.

Adjustments take the form of scaling VAT values by the income/consumption ratio. After computing the amount of indirect taxes paid as in the main results scenario (using the imputation explained in Appendix 4), we multiply this by the income/consumption ratio to arrive at the adjusted indirect taxes paid in this alternative scenario.

In the main results, as showed in Figure 2, consumption taxes (VAT and excise duties) tend to increase inequality, which is reflected in the increase of the Gini from 0.361 for disposable income to 0.385 for consumable income. After the implementation of VAT corrections, reflecting the lifetime perspective, the Gini coefficient for consumable income is unaffected.

Figure A1.2. Serbia: Change in inequality (Gini coefficient), with VAT corrections



Source: Own estimations using HBS and SILC data

The effect of indirect taxes on poverty is smaller with VAT corrections (Table A1.3) compared to the baseline scenario (Table 3). At the \$1.90 PPP/day poverty line, the poverty rate after indirect taxes increases to 3.5 percent while in the baseline scenario to 4.9 percent. The results based on other poverty lines (\$3.2 PPP/day, \$5.5 PPP/day or relative poverty line) show that indirect taxes increase poverty in the model with VAT corrections but by less compared to the scenario without corrections.

Table A1.3. Serbia: Changes in poverty rates due to government intervention, with VAT corrections

		Market Income + Pensions	Disposable Income	Consumable Income
Poverty Headcount	\$1.9 PPP	5.1%	2.8%	3.5%
	\$3.2 PPP	8.0%	5.9%	8.2%
	\$5.5 PPP	15.3%	14.4%	19.6%
	60% of median equivalized disposable income	22.9%	22.9%	31.3%
Poverty Gap	\$1.9 PPP	2.7%	1.4%	1.7%
	\$3.2 PPP	4.2%	2.6%	3.3%
	\$5.5 PPP	7.3%	5.7%	7.5%
	60% of median equivalized disposable income	10.2%	8.8%	11.8%
Poverty severity	\$1.9 PPP	1.9%	1.0%	1.3%
	\$3.2 PPP	3.0%	1.7%	2.1%
	\$5.5 PPP	4.9%	3.3%	4.3%
	60% of median equivalized disposable income	6.5%	4.9%	6.5%

Source: Own estimations using HBS and SILC data

After the VAT adjustments, the exact net cash position for the first six income deciles looks better than in the main scenario, due to the mechanical adjustment applied. The deciles are intact as based on market income plus pensions. Poorer households in Serbia tend to be of larger size and have more children. Households in the poorest income decile are still net beneficiaries of the fiscal system, with a positive net cash position while it remains negative for the rest of the deciles. After the implementation of VAT corrections, indirect taxes account for only slightly larger shares of income among the lower deciles. They are less regressive with respect to consumption, reflecting the lifetime perspective, than with respect to current income.

Figure A1.6. Distributional Impact of the Tax and Benefit System, with VAT corrections

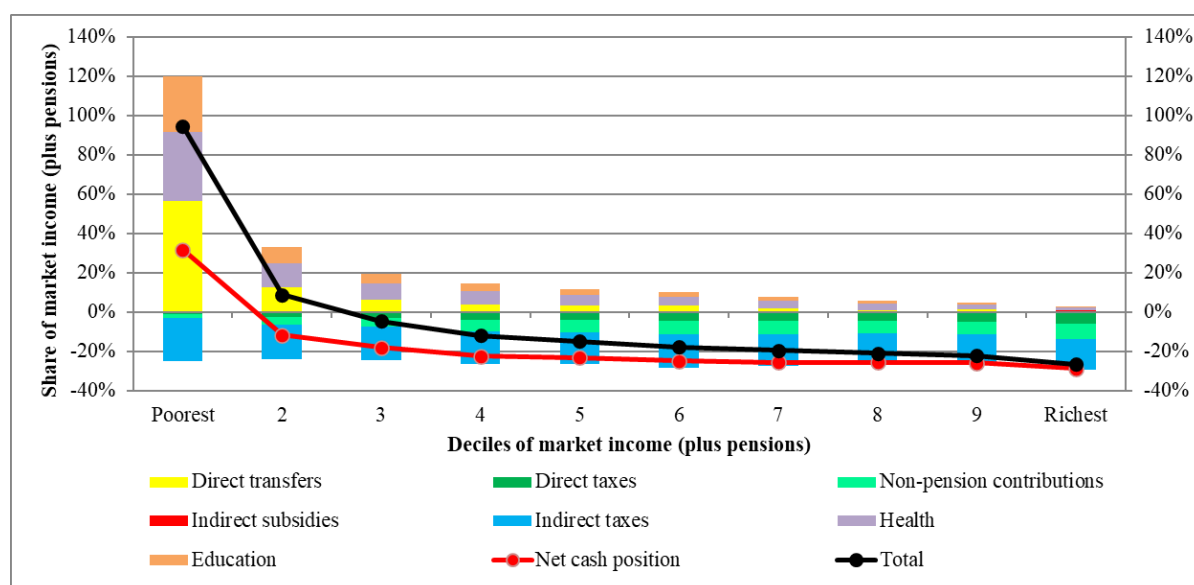


Table A1.4 shows that after the adjustments indirect taxes are still regressive, given the negative Kakwani index, but much less than in the case without adjustments: for VAT, the index is -0.01, compared to -0.119 in the main results. Excises are still more regressive than VAT, as in the case with no corrections, and the Kakwani index is -0.05, compared to -.017. Indirect taxes after VAT corrections continue to contribute to an increase in inequality and poverty but to a smaller degree than in the case with no adjustments.

Table A1.4. Serbia: Marginal Contributions to Reducing Inequality and Poverty, with VAT corrections

	Relative Size with respect to Market Income + Pensions	Concentration Coefficient	Kakwani Index	Marginal Contribution to Redistributive Effect	Marginal Contribution to Poverty Reduction
Total VAT	-11.74%	0.3748	-0.0101	-0.0019	-0.0257
Total Excises	-4.42%	0.3322	-0.0527	-0.0025	-0.0089
All indirect taxes	-16.16%	0.3632	-0.0217	-0.0054	-0.0425
All taxes	-20.84%	0.3927	0.0078	0.0000	-0.0528

APPENDIX 2

Robustness checks on imputed rent

The results in the main paper included imputed rent in the market income, according to the CEQ methodology guidelines. Imputed rent is also known as “income from owner-occupied housing.”¹⁹ The SILC survey asks families who own their homes to report the amount they think they would be paying in rent for the same dwelling, or for how much they would rent it out. This Appendix analyzes the imputed rent values in the SILC data, which appear reasonable when compared to actual rental prices, and presents the results in an alternative scenario of excluding imputed rent from market income for robustness checks.

According to the SILC data, only about 4 percent of the households (and 4 percent of all individuals) pay rent for their apartments/houses. The remaining households are either homeowners (in about 80 percent of the cases) or are living in their homes free-of-charge (16 percent). Imputed rent in the SILC takes into account both the returns to home ownership, in the sense that the main residence is an asset, as well as the in-kind transfers accruing to those who live free-of-charge.

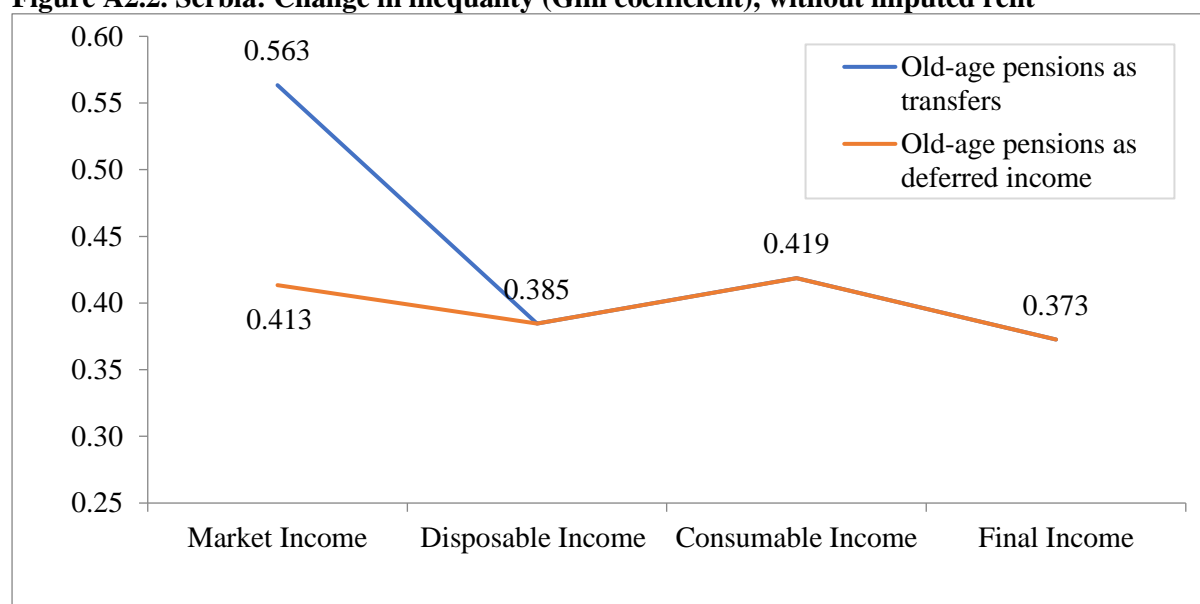
Imputed rent is registered based on the question “To rent an apartment you live in or similar to yours, what do you think you would have to pay on the monthly level?” The respondents had an option to respond in RSD, EUR, CH or USD. All the answers were recoded to RSD using the average exchange rate for 2016 and aggregated to yearly levels. Given the number of households who do not pay rent and the relatively sizeable amount of rent, imputed rent represents a significant portion of both market (about 15 percent) and disposable income (about 16 percent).

Descriptive statistics indicate that the non-zero average imputed monthly rent is 15.060 RSD (about 122 EUR), which corresponds to the average renting prices in Serbia. The range is also plausible, ranging from 20 RSD (people who do not think that it is possible to rent their home at all) to about 84000 RSD (about 680€). Detailed analysis suggests that the rent in the SILC data is higher in Belgrade than in other regions and higher in urban than in rural areas, which is also in line with expectations.

Without imputed rent, the broad results of impacts on inequality remain similar. The Gini coefficient for all income concepts is larger than in the main results scenario with imputed rent, but the direction of impact remains as shown in Figure 2.

¹⁹ Lustig, Nora (editor). 2018. *Commitment to Equity Handbook. A Guide to Estimating the Impact of Fiscal Policy on Inequality and Poverty*. Brookings Institution Press.

Figure A2.2. Serbia: Change in inequality (Gini coefficient), without imputed rent



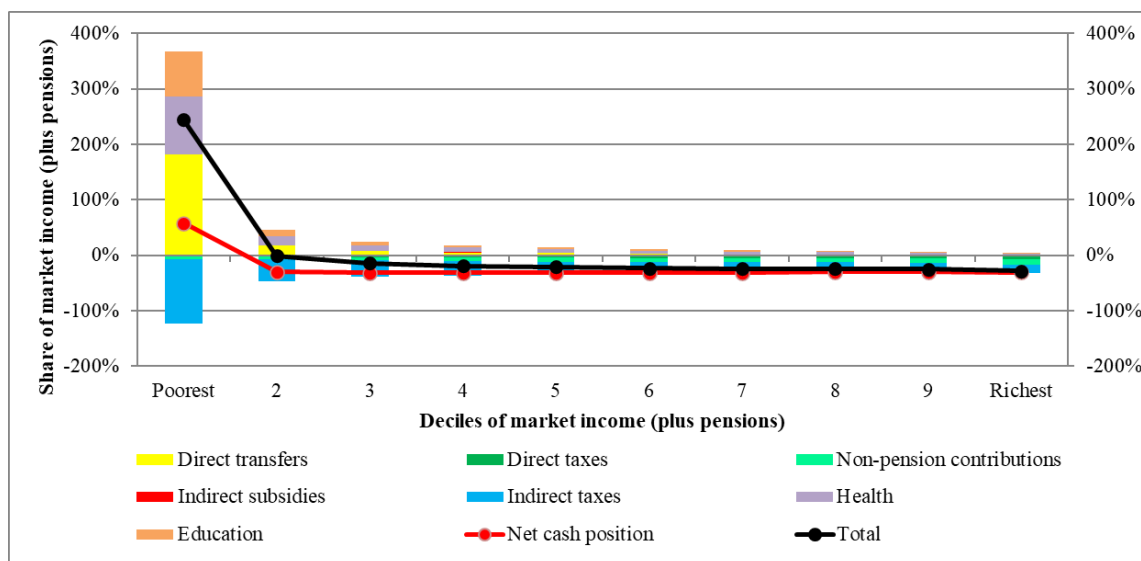
The result that the fiscal system increases poverty is robust. In the scenario without imputed rent, all poverty indicators are higher than in the main scenario with imputed rents. But the main results of impacts on poverty are similar (Table A2.3).

Table A2.3. Serbia: Changes in poverty rates due to government intervention, without imputed rent

		Market Income + Pensions	Disposable Income	Consumable Income
Poverty Headcount	\$1.9 PPP	9.1%	6.3%	10.7%
	\$3.2 PPP	12.7%	11.0%	18.5%
	\$5.5 PPP	21.6%	22.2%	34.9%
	60% of median equivalized disposable income	25.0%	25.3%	39.0%
Poverty Gap	\$1.9 PPP	6.7%	4.1%	6.6%
	\$3.2 PPP	8.4%	5.8%	9.8%
	\$5.5 PPP	12.0%	10.2%	16.8%
	60% of median equivalized disposable income	12.9%	11.1%	18.2%
Poverty severity	\$1.9 PPP	5.9%	3.5%	5.3%
	\$3.2 PPP	7.0%	4.5%	7.2%
	\$5.5 PPP	9.1%	6.9%	11.4%
	60% of median equivalized disposable income	9.6%	7.3%	12.1%

The findings regarding the incidence of taxes and social transfers as assessed against their share in the market income (plus pensions) remain robust. The exact shares, however, differ when imputed rent is not part of the market income since market income is lower than in the main results with imputed rents (Figure A2.6).

Figure A2.6 Distributional Impact of the Tax and Benefit System in 2016, without imputed rent



As shown in Table A2.4, the Kakwani index for transfers is higher when imputed rent is not included in the income aggregate, so transfers look more progressive compared to when imputed rent is included. This is due to, as displayed in Figure A2.6, an increase in the shares of social transfers relative to market income without imputed rent. The marginal contribution of all direct transfers (excluding contributory pensions) to the redistributive effect is somewhat increased whereas the marginal contribution to a poverty headcount is almost unchanged.

The Kakwani index for all direct taxes remains positive but is somewhat lower than in the main results, meaning that its progressive feature is less when imputed rent is not part of the market income. The share of direct taxes relative to market income increases much more for the first income decile compared to the rest of the income distribution when market income concept lacks imputed rent.

The marginal contribution of all direct and indirect taxes to poverty headcount is higher than in the main results, meaning that without imputed rent, their contribution to increase in poverty is larger. The marginal contribution of all indirect taxes to redistributive effect is also higher after the elimination of the imputed rent from market income, whereas for direct taxes, it remains almost unchanged.

Table A2.4. Serbia: Marginal Contributions to Reducing Inequality and Poverty, without imputed rent

	Relative Size with respect to Market Income + Pensions	Concentration Coefficient	Kakwani Index	Marginal Contribution to Redistributive Effect	Marginal Contribution to Poverty Reduction
All direct transfers excl contributory pensions	3.53%	-0.2355	0.6490	0.0170	0.0217
All direct transfers incl contributory pensions	31.32%	0.2556	0.1578		
All direct taxes	-5.63%	0.5186	0.1052	0.0058	-0.0084
All indirect subsidies	0.04%	-0.0263	0.4397	0.0001	0.0000
Total VAT	-14.81%	0.2706	-0.1429	-0.0251	-0.0732
Total Excises	-5.28%	0.2196	-0.1938	-0.0108	-0.0257
All indirect taxes	-20.09%	0.2572	-0.1562	-0.0398	-0.1035
All net in-kind transfers	7.84%	-0.0366	0.4500	0.0322	0.0444

The concentration of social benefits is almost the same as in the case with imputed rent. The bottom 40 percent of the income distribution have the same share in public spending on child allowance and financial social assistance. Only the share of spending on unemployment benefit going to the bottom 20 percent is higher by 10 percentage points when imputed rent is not included in the market income.

APPENDIX 3

Description of the tax and benefit system (2016)

TAXES

PERSONAL INCOME TAX

Tax unit

A taxpayer of the personal income tax is a resident or non-resident individual who generates income. Residents are taxed at their worldwide income, while non-residents are taxed in Serbia only on their income generated in Serbia. There is no possibility for joint taxation.

Taxable income

For tax purposes, incomes are divided into 7 groups: wages, self-employment income, authorship, industrial property and other property-based rights income, capital income, real estate rental income, capital gains and other income.

Incomes from the following sources are exempted from taxation: social benefits for disabled persons, veterans, foster care, financial social assistance, child allowances and special assistance for supplies for babies, assistance in the event of destruction or damage of property as a result of natural disasters or other extraordinary events, compensations paid from health insurance, except for wage compensation, organized social and humanitarian assistance, state awards established by law, pensions, students scholarship, etc.

Taxation of income during the year (at the moment income is generated)

1. Wages

Taxpayer

Individual earning wages/salaries is obliged to pay personal income tax. This tax is withheld and paid by an employer, on behalf of employee.

Wages are also subject to social security contributions (see section on SSC).

Tax base

Tax base is gross wage (paid in money or in the form of in-kind benefits), reduced by the non-taxable amount. Non-taxable amounts are indexed annually: in 2015 – RSD 11,433; in 2016 – RSD 11,604; in 2017 – RSD 11,790; in 2018 – RSD 15,000.

Tax rate

Starting from June 2013, the flat tax rate of 10% is applied.

Tax reliefs

There are several types of income paid to employee, which are to limited amount or to full amount exempted from income tax. These, inter alia, include: commuting costs, coverage of business trip costs, jubilee awards, Christmas presents for children of employees, etc.

2. Self-employment income

Taxpayer

Individual earning income based on independent business activities, including activities in agriculture, are obliged to pay tax on self-employment income.

Part of self-employment income (personal salary) is subject to social security contributions.

Tax base

If taxpayer makes business records, the tax base is taxable profit, calculated in accordance with the rules for computation of the corporate income tax base. Taxpayer may decide to declare part of her/his taxable income as personal wage (subject to wage tax and social contributions).

Taxpayers who generate total annual income from business activities of less than RSD 6 million per year, may opt for lump-sum taxation. This means that the Tax Administration makes assessment of her/his tax base and tax liability, so that a taxpayer does not need to maintain business records. This option is not available to registered VAT payers, to individuals providing accounting and related advisory services, individuals doing business in tourism and hospitality, etc.

Tax rate

Tax rate is flat and amounts to 10% and there is no personal allowance as with the wage employment.

3. Income from authorship, industrial and other property rights

Taxpayer

Individual earning income based on authorship, industrial and other property rights are obliged to pay tax on their income.

Income from authorship, industrial and other property rights is subject to pension and disability insurance contributions (26%). If taxpayer is not employed, she/he also needs to pay the health insurance contributions on this income (10.3%).

Tax base

The tax base is gross income, decreased by costs taxpayer incurred through generating income. The full amount of costs can be deducted, if these costs are properly documented. Otherwise, if the costs are not documented, the tax base is decreased by standard deductions amounting to 34%, 43% or 50% of gross income (deductions are differentiated by the type of rights).

Tax rate

Tax rate is flat and amounts to 20%

Tax reliefs

If taxpayer was working for more than one year on creation of the respective rights, income earned based on these rights can be divided into the respective number of years (up to five years), so that the tax is not paid on entire income immediately, but rather proportionally deferred.

4. Income from capital

Taxpayer

Individual earning income from interests, dividends, distribution of profit, return to investment units are obliged to pay tax on capital income.

Tax base

The tax base is gross amount of income.

Tax rate

Tax rate is flat and amounts to 15%.

Tax reliefs

Interest income based on investments in central or local government bonds and securities of the central bank, as well the interest income based on bank deposits in dinars, are exempted from taxation.

5. Rental income

Taxpayer

Individual earning income from rent of immovable property is obliged to pay tax on rental income.

Tax base

The tax base is gross amount of income.

Tax rate

Tax rate is flat and amounts to 20% in 2018, while in 2015 it amounted to 15%.

Tax reliefs

There are no tax reliefs.

6. Capital gains

Taxpayer

Individual earning capital gains from sale of shares/stakes, other securities, immovable property or authorship and industrial property rights, are obliged to pay capital gains tax.

Tax base

The tax base is the positive difference between the selling price and acquisition price. The selling price is a price stated in the selling contract or the market price assessed by the Tax Administration, if contractual price is lower than the market price.

Tax rate

Tax rate is flat and amounts to 15%.

Tax reliefs

Capital gains generated based on transfer of property through inheritance or between the first line relatives are exempted from taxation. Also, capital gains generated by selling immovable

property in which individual resides is exempted from capital gains tax, if sale proceedings are reinvested within 90 days in other immovable property in which individual will reside.

7. Other incomes

Taxpayer

Individual earning income from free-lance contracts, rent of movable property, lotteries, life insurance, as well individuals earning income from sports, etc. are obliged to pay tax on other income.

Free-lance contract income is subject to pension and disability insurance contributions (26%). If taxpayer is not employed, she/he also needs to pay the health insurance contributions on this income (10.3%).

Tax base

The tax base is gross income. In case of lottery winnings, there is non-taxable amount on each winning up to RSD 11,165. In case of free-lance contract, the tax base is the gross income decreased by standard deductions of 20% (of gross income).

Tax rate

Tax rate is flat and amounts to 15% on income from life insurance and 20% on other incomes.

Annual income tax

In addition to this, tax residents whose total annual income exceeds stipulated threshold are obliged to pay annual income tax as well.

Following types of income are included in the annual income tax b: salary, income from self-employment, income from royalties and authorship rights and related rights, real estate income, income from renting movable property, income from insurance of individuals, income of sportsmen and other income.

Non-taxable threshold for annual income tax purposes is three times average annual salary in Serbia in the respective year (RSD 2,201,220 in 2015).

Individual's total annual net income, exceeding this limit, may be decreased by standard deductions:

- Personal deduction (40% of the average annual gross salary in Serbia – RSD 293,496 in 2015); and
- For dependent family members (15% of average annual gross salary in Serbia – RSD 110,061 in 2015 per dependent family member).

The total amount of standard deductions cannot exceed 50% of taxable income. If two or more family members are obliged to pay annual income tax deductions for dependents may be used only by one family member. If one family member is using part of these deductions remaining (unused amount) may not be transferred to the other family member.

Individual's total net annual income, exceeding stipulated (non-taxable) threshold and decreased by the abovementioned deductions, is subject to annual income tax at following schedule:

- 10% on taxable income between 3 and 6 average annual salaries in Serbia and
- 15% on income above 6 average annual salaries in Serbia).

Annual income tax is to be paid by individual (i.e. individual's employer does not have any duties related employee's annual income tax). Annual income tax return is to be submitted with the Tax Administration by 15 May of the year following the year in which income is generated.

SOCIAL SECURITY CONTRIBUTIONS

Social security contributions comprise of: a) pension and disability insurance contributions, b) health insurance contributions and c) unemployment insurance contributions.

There is no compulsory private pension or health insurance in Serbia (there is only voluntary private pension and health insurance).

Pensions and disability insurance

The pension system in Serbia is based on two pillars: a) PAYG mandatory pension and disability insurance scheme, and b) supplementary, voluntary private scheme.

Payers

All employees, self-employees, earners of free-lance income or authorship, industrial and other property rights are obliged to pay pension insurance contributions, under PAYG scheme.

Base

The base for calculation is employee's gross wage (net wage + wage tax + social security contributions on behalf of employee). Serbian Law on Contributions for Mandatory Social Insurance stipulates minimum and maximum base for calculations of social security contributions. Minimum base for calculation of social security contributions equals 35% of average wage in the Republic of Serbia, paid out in previous quarter (published by the Statistical Bureau of the Republic of Serbia). According to the official information, minimum base for calculation of (monthly) social security contributions in Serbia, in 2016 was ranging from RSD 21,552 to RSD 22,400. Therefore, if employee's monthly gross salary is below this threshold, social security contributions are calculated on this threshold. Maximum base for calculation of social security contributions equals five times average gross wage in Serbia, according to the latest information of the Statistical Bureau of the Republic of Serbia. Further to the official information, maximum (monthly) base for calculation of social security contributions in 2016 was ranging from RSD 278,815 to RSD 353,815. Therefore, if employee's monthly gross wage exceeds this amount, social security contributions are paid only on this amount (gross salary exceeding this limit is subject to salary tax only).

There is also the maximum *annual* base for calculation of social security contributions, equal to five times average annual gross salary in Serbia, in year in which contributions are paid. In 2016, the maximum annual base amounted to RSD 3,808,4400. Therefore, if individual's

annual gross wage and other types of income, which are subject to social contributions in total exceed this annual threshold, that individual may claim refund of social security contributions paid on income exceeding the annual threshold.

Self-employed individuals pay social insurance contributions by themselves, on their personal salary as defined by the Personal Income Tax Law.

The same rule on the base for calculation of social security contributions apply also to health insurance and unemployment insurance contributions.

Rates

Since August 2014, pension and disability insurance contributions are paid at the total rate at 26% (14% - on behalf of employee and 12% - on behalf of employer).

Before August 2014, the total rate of contributions for pension and disability insurance amounted to 24%, split half-half between employee and employer.

Health insurance

Payers

All employees and self-employees are obliged to pay health insurance contributions on their income. Also, earners of free-lance income or authorship, industrial and other property rights income are obliged to pay health contributions on their income, if they are not employed.

Base

Health insurance contributions are payable on the same base as pension and disability insurance contributions.

Rates

Since August 2014 health insurance contributions are payable at the total rate of 10.3% (5.15% on behalf of employer and 5.15% on behalf of employee).

Before August 2014, the total rate of contributions for health insurance amounted to 12.3%, split half-half between employee and employer.

Insurance of retired and unemployed individuals

Retired people participate in health insurance scheme based on their retirement status. The Pension Fund is obliged to pay health insurance contributions at the statutory rates (for health insurance of retirees) to the Health Insurance Fund. Contributions are to be calculated on the amount of pensions.

Unemployed individuals (registered with the National Employment Service) are covered with health insurance, based on their unemployment status. The National Employment Service is obliged to pay health insurance contributions, at the statutory rates, on the amount of unemployment benefit, paid to registered unemployed individuals.

Unemployment insurance

Payers

All employees are obliged to pay health insurance contributions on their income.

Base

Unemployment insurance contributions are payable on the same base as pension and disability and health insurance contributions.

Rates

Unemployment insurance contributions are payable at the total rate of 1.5% (0.75% on behalf of employer and 0.75% on behalf of employee).

INDIRECT TAXES

Value Added Tax

General consumption in Serbia is taxed with the Value Added Tax (VAT), which was introduced in 2005, replacing the retail consumption tax. VAT system in Serbia is generally aligned with the EU directives. There are two VAT rates: one standard rate and once reduced rate. The standard rate is 20 percent, and the reduced rate is 10 percent.²⁰ The VAT Law stipulates the finite list of goods and services which are taxed at the reduced rate, while supply of all other goods and services is taxed at the standard rate. The list of goods and services which are taxed at the reduced rate is disclosed in the Table A3.1.

Table A3.1. Goods and services taxed at the reduced VAT rate

VAT at 10 percent
daily newspapers and periodical magazines
monographs (books) and other serial publications;
textbooks and other teaching materials
drugs for humans and animals; dialysis material; orthotic and prosthetic materials;
drinking water;
milk and milk products; eggs;
bread and pastries; cereals; wheat; rice sugar; honeycooking oil; fat; butter and margarine
fruits; vegetables; meat; fish;
heating energy; natural gas; heating wood;
tickets for cinema, theatre, fairs, circus, entertainment parks, concerts, exhibitions, sports events, museums, galleries, zoo and botanical gardens;
transportation of people;
accommodation in hotels and other hospitality institutions;

²⁰ Starting from October 1st, 2012 the standard VAT rate was increased from 18% to 20%, while the reduced rate was increased from 8% to 10% from January 1st, 2014.

waste managements; waste water management; maintenance of public space; cemetery management;

first sale of apartments;

In the computation of VAT paid by households, we had to make a couple of assumptions:

- All books have the content that qualifies them for the 10 percent rate.
- In the Household Budget Survey (HBS), expenditures for cinema, theatre and concert tickets are reported together, as one expenditure category. We assume that the structure of expenditures is: 50, 20 and 30 percent for cinema, theatre and concerts, respectively.
- All drugs are qualifying them for the 10 percent rate.
- All white sugar is crystal sugar, qualifying it for the 10 percent rate.
- All periodical magazines have the content that qualifies them for the 10 percent rate.

Excise duties

Excise duties are charged on sale/consumption of alcohol, tobacco and tobacco products, coffee, oil derivatives and electricity. Excise duties are charged at the moment the goods are dispatched from the certified warehouse of producer or at the moment the goods have been imported.

Producer or importer is obliged to calculate, report and pay the excise duties. Excise duties are included in the base for calculation of VAT. Retail consumers are paying full price, which includes excise duties and VAT.

Excise duties on alcohol

Excise duties are charged on consumption of rakia/brandy made of fruit or cereals, strong brandies and liquors, beer and low-alcoholic drinks.

Considering the prevalence and structure of consumption of alcoholic drinks, the excise duties rates on rakia and whisky and beer are presented in the Table A3.2. Excise duties rates are stated in the specific form, defined as the amount of RSD per unit (liter).

Table A3.2. Goods and services taxed at the reduced VAT rate

Excise duties rates on alcoholic drinks		
<i>Type or product</i>	<i>Year</i>	<i>Rate (RSD/lit)</i>
Fruit rakia	2015	121.89

	2016	121.89
	2017	125.98
	2018	129.76
Cereals brandy (whisky)	2015	309.23
	2016	309.23
	2017	321.05
	2018	330.68
Strong alcoholic drinks and liquors	2015	198.19
	2016	198.19
	2017	206.24
	2018	212.43
Beer	2015	23.04
	2016	23.04
	2017	24.38
	2018	25.11
Low-alcoholic drinks	2015	20.35
	2016	20.35
	2017	21.33
	2018	21.97

Excise duties on tobacco and tobacco products

Excise duties are charged on consumption of cigarettes, finely cut tobacco and cigars/cigarillos as described in the Table A3.3. Specific rate of excise duties are increased twice per year (usually January and June), to reflect inflation and real increase in tax burden on tobacco and tobacco products, in accordance with the tax schedule, agreed between the government and the producers/importers of tobacco and tobacco products.

Finely cut tobacco is subject to ad valorem excise duties only, the tax rate amounting to 41% in 2015 and 43% starting from January 2016. The tax base is the retail price.

Ad valorem rate of tax on cigarettes amounts to 33% of the producer's/importer's retail price. In addition, specific tax rates (disclosed in the Table A3.3) are charged.

Cigars and cigarillos are subject to specific excise duties only, tax rates being presented in Table A3.3.

Table A3.3. Excise Duties on Tobacco Products

Excise duties rates on cigarettes		
<i>Type or product</i>	<i>Period</i>	<i>Rate</i>
Cigarettes (RSD per pack of 20 pieces)	1 Jan- 30 Jun 2015	53.01
	1 Jul – 31 Dec 2015	55.61
	1 Jan- 30 Jun 2016	59.07
	1 Jul – 31 Dec 2016	61.72
	1 Jan- 30 Jun 2017	64.00
	1 Jul – 31 Dec 2017	65.5
	1 Jan- 30 Jun 2018	67.33
	1 Jul – 31 Dec 2018	69.19
Cigars and cigarillos (RSD per piece)	2015	21.90
	2016	22.23
	2017	22.58
	2018	23.26

For the purpose of calculation of quantitative amounts of consumption of cigarettes, the following weighted average prices per pack can be used: in 2015 – RSD 197.5, in 2016 – 211.9, in 2017 – RSD 224.60 and in (Jan-July) 2018 – RSD 242.30.

Excise duties on coffee

Consumption of coffee is subject to excise duties. The tax rates are defined in the specific form (RSD per kg), presented in the Table A3.4. Considering that the roasted coffee is the most commonly type of coffee consumed in Serbia, the rates of tax on roasted coffee are presented.

Table A3.4. Excise Duties on Coffee

Excise duties rates on coffee		
<i>Type or product</i>	<i>Period</i>	<i>Rate</i>
Roasted coffee	2015	103.94

(RSD per kg)	2016	105.50
	2017	107.18
	2018	110.39

Excise duties on electricity

Starting from August 1st, 2015 excise tax on electricity is introduced. The tax rate is 7.5%. The tax base is the net price of electricity.

Excise duties on oil derivatives

Excise duties are to be paid on consumption of petrol, diesel, natural gas, heating oil and other derivatives. The tax rate is stated in the specific form and indexed annually (Table A3.5). Propane-butane is exempted from excise duties.

Table A3.5. Excise Duties on Oil Derivatives

Excise duties rates on oil derivatives		
<i>Type or product</i>	<i>Period</i>	<i>Rate (RSD/lit or kg)</i>
Unleaded petrol	Jan-Dec 2015	50.00
	Jan 2016 – Jan 2017	52.50
	Feb 2017 – Feb 2018	53.34
	Mar 2018 -	54.94
Diesel	Jan-Dec 2015	50.00
	Jan 2016 – Jan 2017	54.00
	Feb 2017 – Feb 2018	54.86
	Mar 2018 -	56.50
Liquid petrol gas	Jan-Dec 2015	40.00
	Jan 2016 – Jan 2017	41.00
	Feb 2017 – Feb 2018	41.65
	Mar 2018 -	42.90
	Jan-Dec 2015	50.00

Heating oil	Jan 2016 – Jan 2017	54.00
	Feb 2017 – Feb 2018	54.86
	Mar 2018 -	56.50

The quantity of petrol is derived by dividing the petrol expenditure by the average price of petrol. Publicly available data on the price of oil derivatives in 2015 are disclosed in the Table A3.6.

Table A3. 6. Retail Price of Oil Derivatives

	<i>January 2015</i> <i>(RSD per lit)</i>	<i>December 2015</i> <i>(RSD per lit)</i>	<i>2015 average</i> <i>(RSD per lit)</i>
Unleaded petrol	129.10	131.90	130.50
Diesel	141.33	143.40	142.37
Liquid petrol gas	78.51	68.50	73.50
Heating oil	139.90	143.50	141.70

Other indirect taxes

Non-life insurance premium tax

Non-life insurance premium tax is payable at the rate of 5%, applied to the net premium (e.g. if third-party responsibility car insurance net premium is 10,000 RSD per year, additional 500 RSD should be paid for consumption tax). This tax is charged and collected by insurance company, so that the buyer of insurance is paying the total amount, gross of tax. Insurance premium is not subject to VAT.

Social Spending

Transfers included in the analysis are described in Section II.

APPENDIX 4

Imputation of Indirect Taxes

This Appendix explains how value added tax and excises are estimated from the HBS and imputed for each household in the SILC data. In the HBS, consumption data are collected based on the two sources of information:

- 1) *household diary of consumption* – households reports information consumption of goods and services
- 2) *household interview* – where household members answer the questions about the expenditures on durables (in the last 12 months) and semi-durables (in the last 3 months), as well as on household monthly income

The available consumption data are organized by detailed COICOP classification of goods and services, which enables the detail identification of products and services. The data also contain household weights used for the calculation of the population estimates of income and consumption.

The HBS organized in 4 databases:

- 1) *diary* – information on each of the household purchases within the 15 days
- 2) *region* – information on region, type of settlement, municipality and weights
- 3) *demographics* – information on household members' characteristics
- 4) *rest* – durables and semi-durables expenditure information and information on income

The expenditure on COICOP groups 1 (Food and non-alcoholic beverages) and 2 (Alcohol Beverages and Tobacco) is based on the diary information, while the expenditure on all other consumption groups is based on the information from the “*rest*” database. Expenditures from the diary were aggregated on the household level and multiplied by 2 to arrive to monthly levels. On the other hand, expenditure on semi-durables and durables was divided by 3 and 12 respectively, to arrive to the monthly levels of expenditures. Table A4.1 presents the comparison between the calculated average (weighted) values of consumption groups from the data and the official SORS communication on the HBS from 2015²¹ (SORS, 2015). Table A4.1 suggests that calculated values largely correspond to the official values reported in SORS.

²¹ Available at <http://publikacije.stat.gov.rs/G2016/Pdf/G20161080.pdf>

Table A4.1: Comparison of weighted average values of consumption from the data and consumption reported by HBS.

	Type of data	Weighted average from data	Official HBS 2015 values (SORS)	difference
Group 1	Non-durables and services	20,911	20,959	48
Group 2	Non-durables and services	2,724	2,723	-1
Group 3	Semi-durables	2,954	2,955	1
Group 4	Semi-durables	9,280	9,786	506
Group 5	Semi-durables and durables	2,667	2,666	-1
Group 6	Semi-durables	2,429	2,430	1
Group 7	Semi-durables and durables	5,631	5,633	2
Group 8	Semi-durables and durables	3,150	3,148	-2
Group 9	Semi-durables and durables	3,054	3,051	-3
Group 10	Semi-durables	718	718	0
Group 11	Semi-durables	1,620	1,621	1
Group 12	Semi-durables	3,360	3,362	2
Total		58,500	59,052	

The only substantial difference in the average values is in the group 4 - *Housing, Water, Gas, Electricity and Other Fuels*. The difference arises due to exclusion of the imputed rent from the expenditures in this group (it cannot be a subject of taxes), and results in about 500 RSD lower calculated (weighted) average for this group than the one presented in the official SORS reports. Consequently, our estimate of the total monthly expenditure – 58,500 RSD – is also by about 500 RSD lower than the one from the official SORS report (59,052).

There are two VAT rates: one standard rate (20%) and one reduced rate (10%). The VAT Law stipulates the finite list of goods and services which are taxed at the reduced rate, while supply of all other goods and services is taxed at the standard rate.

To estimate VAT, we first extract the expenditure on products and services which are taxed with a reduced rate from the expenditure on other items within that COICOP group. We then apply the 10 and 20 percent VAT rates to the respective product groups to calculate total VAT.

The average consumption from the HBS represents about 58 percent of the household consumption based on the statistics from the National accounts.²² The estimated value of VAT based on the HBS data amounts to about 268 billion RSD (yearly level), or 59 percent of the VAT reported in the official statistics²³. This suggests that the discrepancy between our estimate of VAT and the one reported in the official statistics is almost entirely due to underestimation of the household consumption by HBS.

²² In 2015 total yearly household consumption in the National Accounts amounted to 2,982 billion RSD, while the population consumption estimate based on the HBS amounts to 1,748 billion RSD (available at <http://publikacije.stat.gov.rs/G2016/Pdf/G20161260.pdf>)

²³ According to Bulletin Public Finances VAT in 2015 amounted to 416.1 billion RSD.

Excises are partially charged *ad valorem*, and partially based on the quantities of the goods. Diary data, which contain information on COICOP groups 1 (Food and non-alcoholic beverages) and 2 (Alcohol Beverages and Tobacco), beside the expenditures, also provide the quantities of the goods purchased, which are, similarly to expenditures aggregated at the household level and multiplied by 2. For the products which are not collected in the diaries, the quantities are not directly available but are calculated as the ratio between the expenditure of these products and the average prices of these products in 2015.

Ad valorem excises were calculated by multiplying the expenditure of the goods with the respective percentage rate, while the excises based on quantity were calculated by multiplying the quantities with the respective per unit rates.

The total estimated value of excises based on the HBS data is 87.4 billion RSD and they represent about 37 percent of the excises reported in the administrative data²⁴. Lower value of precision of excise estimate (compared to VAT) could be due to the fact that the consumption of excised goods is not socially desirable (e.g. cigarettes and alcohol), so people tend to underestimate the consumption of these goods more, compared to other goods.

Imputation procedure consists of three steps

We first use the data from HBS to estimate the share of VAT and excises in the total household income conditional on income. We use natural logarithm and add powers of natural logarithm, until we reach the specification which does not increase explanatory power of the model

$$v = VAT/income = \beta_0 + \beta_1 \ln(inc) + \beta_2 \ln(inc)^2 + \beta_3 \ln(inc)^3 + \dots \quad (1)$$

$$e = excise/income = \gamma_0 + \gamma_1 \ln(inc) + \gamma_2 \ln(inc)^2 + \gamma_3 \ln(inc)^3 + \dots \quad (2)$$

We drop extreme values by first dropping VAT and excise shares higher than 2 and additionally use the procedure suggested by Cameron and Trivedi (2010) to eliminate influential observations which fall within the first or last percentile of the distribution. In all regression estimates we use population weights. The results of different specifications of models 1 and 2 are presented in the next table.

VARIABLE	v	v	v	e	e	e
S	(1)	(2)	(3)	(1)	(2)	(3)
Ln_y	- 0.06406 ***	- 0.62895* **	- 1.48871* **	- 0.02893* **	- 0.25349* **	- 0.96181* **
	(0.0015 0)	(0.03060)	(0.37046)	(0.00126)	(0.02564)	(0.29476)
ln_y²		0.02872* **	0.11719* **		0.01143* **	0.08455* **
		(0.00155)	(0.03802)		(0.00130)	(0.03034)

²⁴ According to Bulletin Public Finances total excises in 2015 were 235.8 billion RSD.

lny3			- 0.00302* *			- 0.00250* *
			(0.00130)			(0.00104)
lny4						
Constant	0.78318 ***	3.55012* **	6.32265* **	0.34040* **	1.43956* **	3.71560* **
	(0.0148 7)	(0.15040)	(1.20003)	(0.01246)	(0.12596)	(0.95194)
Observations	6,441	6,441	6,441	6,439	6,439	6,439
R-squared	0.22048	0.25976	0.26038	0.07605	0.08696	0.08778
F	1821	1130	755.4	529.8	306.5	206.4
r2_a	0.220	0.260	0.260	0.0759	0.0867	0.0874

The results suggest that level and square of the log income per capita are sufficient to predict VAT and excises and that inclusion of the other powers increases the explanatory power of the model only marginally. The values of R squares are higher than the ones estimated for Croatia using the same methodology (0.2429 and 0.0632 for VAT and excises respectively).

In the second step, we use the coefficients from the specifications (2) for both VAT and excise shares and apply these coefficients to the SILC disposable income to obtain the imputed values of VAT and excise shares, which we then multiply by household specific income to obtain the total imputed values of VAT and excises for all households in the SILC database.

APPENDIX 5

List of Social Benefits in the Analysis

Social Benefit Program	
Financial social assistance	Novčana socijalna pomoć
Foster care benefits	Naknade za hranitelje
Caregiver allowance	Dodatak za negu i pomoć
Child allowance	Dečiji dodatak
Parental allowance	Roditeljski dodatak
Wage compensation during maternity leave	Naknada zarade za vreme porodijskog odsustva
War veterans benefits	Naknade za ratne veterane
Heating allowance	Subvencije za plaćanje grejanja
Utility allowance	Subvencije za plaćanje komunalnih usluga
Education allowance	Naknade za učenike i studente
One-off assistance	Jednokratna novčana pomoć
Severance payment	Otpremnina
Unemployment benefit	Naknada za nezaposlenost