Educational attainment as a predictor of poverty and social exclusion: Empirical analysis of Serbian case

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Abstract: This study examines the impact of education on the risk of poverty and social exclusion in a single-country framework. Relying on household and individual level data from the annual EU-SILC survey obtained in Serbia in 2020, we estimate the market and non-market benefits of education in the context of combating poverty and social exclusion in developing countries. Based on a representative sample of the adult population in Serbia, we explore to what extent the risk of poverty and social exclusion can be predicted by the levels of educational attainment. Econometric estimations indicate that educational underachievement acts as a significant driver of poverty and social exclusion. Probit regression analysis indicates that the risk of experiencing poverty and social exclusion decreases substantially with higher education levels. We include three model specifications that calculate the predicted probability of being at risk of poverty, severely materially deprived and exposed to combined risks. Holding other predictors constant, the decrease in poverty and social exclusion probability attributed to a one level increase in educational attainment amounts up to 7.96% (for unemployed women with only primary education). The analysis confirms that the highest gains from schooling are materialized for the categories of respondents who are not active in the labor market and those with the lowest levels of educational attainment. Besides this, self-perceived health and labor market activity significantly affect the risk of poverty, material deprivation and social exclusion. The impact of age differs across our model specifications, indicating that age increases the probability of severe material deprivation and the combined risk of poverty and deprivation, while older age appears to go in hand with a lower risk of poverty itself. These results offer relevant information that should be considered when determining the optimal level of social investment in education.

Keywords: Poverty, social exclusion, education, Serbia.

JEL Classification: I32, D63, P36.

Introduction

The potential contribution of human capital to economic growth and social well-being has been the subject of extensive academic research, resulting in diverse and widely debated results. One line of research focuses on market-based outcomes of investing in education, drawing upon the human capital theory (Becker, 1964; Mincer, 1962) and the assumptions that higher educational attainment results in productivity increases, which are ultimately reflected in higher earnings. Other studies,

drawing upon the theory of endogenous growth (Barro, 2001), emphasize market returns of schooling at the level of society at large. Educational underachievement is widely recognized as both the cause and the consequence of household poverty and social exclusion (Atkinson, 1998; Comer, 1988; Levitas, 2006). Education helps economically and socially marginalized and deprived adults and children to escape poverty traps and engage in productive social activities. Numerous studies indicate that children who grow up in poverty are more likely to experience emotional problems, adverse health conditions, problematic behavior and low educational outcomes in adult life (Bolger et al., 1995; Haveman & Wolfe, 1995). Some of them (Feinstein, 1998) confirmed that educational underachievement is a key mechanism of turning early-life deprivation into poor achievements later in life, increasing the risk of social exclusion. This is not to exclude the numerous potential determinants of poverty and social exclusion, whose intertwined effects are very complicated to identify and measure. The comprehensive assessment of both market and non-market returns to education represents an invaluable input for determining the optimal level of social investment in education (Haveman & Wolfe, 2002).

In this study, we focus on the private market and non-market benefits of education, aiming to contribute to the literature on the determinants of poverty and social exclusion. We perform a single country study belonging to the region of Western Balkans, as the efforts to reduce poverty and social exclusion in the countries of the region are even more important due to the more pronounced and persistent problems of socio-economic development than in any European country. The educational outcomes of the Western Balkan countries are known to be among the lowest in Europe, with pronounced education inequalities between socio-economic groups. The labor markets in these countries cope with considerable skills mismatch and underutilization of labor. Serbia, among the countries of the region, represents an example of an economy facing significant challenges in developing social infrastructure while coping with considerable social and economic inequalities. Such developments confirm the specific importance of exploring the links between education and socio-economic disadvantages. Relying on household-level analysis,

we examine the impact of educational attainment on the risk of poverty or social exclusion in Serbia. By analyzing data from the Survey on Income and Living Conditions (EU-SILC), we tend to identify significant relationships between the levels of individual educational attainment and the risk of poverty and social exclusion. We hypothesize that higher levels of educational attainment are associated with a lower risk of poverty or social exclusion and analyze the underlying factors accounting for the variance in the risk rates. Evidence on these issues has important implications for public education policies and the optimal financing of educational services.

This paper is organized as follows: Section 1 reviews the context for the research by discussing the importance of education for combating poverty and social exclusion, along with a review of literature on the various market and social benefits of education. Section 2 describes the data, choice of variables and estimation methods. Section 3 presents and discusses the results of empirical analysis. Section 4 summarizes the findings and offers concluding remarks.

1. Theoretical background
1.1 Market and non-market benefits of education

The dominant approach in the analysis of the returns to education relies on the human capital theory (Becker, 1964; Mincer, 1962). From this perspective, knowledge and skills obtained through education or training increase the productivity of individuals, which then materializes into higher earnings as returns to education. Higher educational attainment is assumed to increase the likelihood of securing a well-paid job and avoiding unemployment (Kampelmann et al., 2018). Low educational attainment correlates significantly with the risk of unemployment and results in lower earnings, while labor market inactivity, in the long run, increases the risk of social exclusion (European Commission, 2010; OECD, 2010; OECD, 2022; Walker & Walker, 1997). Research evidence confirms a significant impact of low compulsory education outcomes and labor market exclusion of individuals at early working age (Parsons & Bynner, 2002). According to this argumentation, individuals face a high risk of poverty due to the absence of education and training possibilities and inadequate skills (Jennings,

1999). In other words, a higher risk of poverty and social exclusion threatens persons with low educational attainment, scarce work experience and unstable labor market position.

On the other hand, it should be accounted for that education is but one determinant of the probability of social exclusion. Some authors claim that only a small part of the variations in individual earnings and participation in the labor market can be explained by education and that low income and unemployment do not correlate strongly with social exclusion (Darity & Underwood, 2021; Dearden, 1998; Saraceno, 2001). Education and income may correlate since both are embedded in individual abilities.

According to the literature on endogenous growth, the market returns to education can be measured at the level of society at large. Education quality and quantity, used to operationalize the availability of human capital, along with other production factors, determine the per capita national output (Haveman & Wolfe, 2002). Education is positively associated with research and innovation, development and diffusion of technology (Foster & Mark, 1996). Society benefits from technology and innovations (discovery, adaptation and use of new knowledge in industry, medicine, and science).

Non-market benefits involve both individual-level non-market effects as well as spillover effects at the societal level. Only one part of the well-being gains that people obtain from education are reflected in labor market returns. Wolfe and Zuvekas (1995) identify several non-market effects of education, ranging from improved personal health to increased efficiency in making different personal choices. Previous research indicates that life expectancy is strongly associated with the level of education (OECD, 2013). There is also a positive relationship between education and individual health status (Sander, 1995), as well as the health of family members (King & Hill, 1993). Higher levels of education increase the likelihood of finding less stressful jobs and encourage individuals to develop healthy life habits and eat more nutritious food. Individuals with higher levels of education are less dependent on social transfers (Haveman et al., 2001). Previous research confirmed educational levels attained by parents significantly determine a child's educational achievement and cognitive development (Duniform et al., 2001). Schooling also contributes to more efficient consumer activities (Morton et al., 2001), fertility choices, family planning (Owens, 2004).

Lower educational levels are associated with decreasing intensity of citizen participation and lower voter turnout (Parsons & Bynner, 2002). Increased levels of democratization, protection of human rights and political stability are also related to increased education (McMahon, 2000). Low education and consequent labor market exclusion initiate exclusion in other domains – political and social life. Employment is not only the source of earnings but also the space for various social interactions. Along with the lack of interest in politics and lower voter turnout, less educated individuals also have a lower rate of participation in community organizations. Higher education levels are associated with higher levels of generalized trust and membership in community organizations (Costa da et al., 2014; Helliwell & Putnam, 1999). Education levels correlate significantly with the amount of money, effort, and time spent in charitable activities (Hodgkinson & Weitzman, 1998), which may positively affect social cohesion. Higher levels of social cohesion are characteristic of societies where citizens actively participate in civic activities and trust others. On average, adults with higher levels of education report stronger civic engagement in terms of volunteering, voting, interest in politics, and interpersonal trust than those with lower levels of educational attainment (OECD, 2013).

According to McMahon (2000), human welfare depends not only on earnings but also thrives from reducing poverty and crime, clean environment and other non-monetary outcomes that could be linked to education in various ways. Mingat and Tan (1996) list the following social benefits of education: improving social equity, strengthening social cohesion, reducing environmental degradation through the effects of education on fertility and population growth and lowering crime rates. Schooling is associated with reduced criminal activity (Lochner & Moretti, 2001), as educated young people with good prospects of finding a well-paid job are less likely to engage in criminal activities. Higher levels of education lead to lower fertility rates in females and eventual net population growth, especially in less developed countries. This, in turn, is associated with reduced water pollution and environmental protection. Sen and Acharya (1997) point out that policies oriented

towards education have positive effects on poverty reduction and health, especially for the poor. Schooling is related to reduced alienation and social inequalities (Comer, 1988).

Extensive research on both the market-based effects of education and those not covered by market benefits indicates the relevance of education for various social and economic outcomes.

1.2 Study area

Among the Western Balkan economies, Serbia appears to be the example of a country that has failed to improve its performance in the areas of social inclusion and social protection as strongly as compared to its economic growth (Kahlert & Sandu, 2021). In order to enable advances in social progress and achieve sustainable and inclusive growth, strengthening the social protection, labor, and education market system remains a significant challenge for the region's countries. Regarding most of the principles of the European Pillar of Social Rights (European Commission, 2021a), Serbia is performing well below the EU average. In Serbia, at-risk-of-poverty and income inequality indicators are high compared to average EU 27 values. In 2021, the total share of the population exposed to the risk of poverty is 21.2%, while 28.4% face at-risk-of-poverty or social exclusion. The situation is similar in other Western Balkan countries, also being significantly below the EU average. The data are somewhat more favorable for Croatia, where the at-risk-of-poverty rate is 18%, while the at-risk-of-poverty-and-social-exclusion rate mounts up to 20.9%. Among the surrounding countries, Slovenia is the best performer, with an at-risk-of-poverty rate of 12.1% and an at-risk-of-poverty-and-social exclusion rate of 13.3%. The risk of poverty rate among the employed is significantly lower in Croatia (4.9%) and Slovenia (4.8%) than in Western Balkan countries. The at-risk-of-poverty rate among the employed is 9.2%, indicating that some persons cannot cope with financial difficulties despite employment. Children and young people between 18 and 24 years of age face at-risk-of-poverty rates of 20.8% and 27.7%, respectively. The Gini coefficient has been reduced to 33.3, but it remains among the highest in Europe.

In the field of equal opportunities and access to labor market, Serbia performs below average (Arandarenko, 2020). In the last few decades, Serbia has launched several reforms to meet a growing demand for more equitable and higher-quality education. Both primary (mandatory) and secondary education are free, while access to higher education is guaranteed to all under equal conditions. However, despite efforts, the Serbian education system is still faced with the problem of ensuring equity and equality. Education is generally inclusive, although some vulnerable groups (Roma children and children with disabilities) are underrepresented in the education system.

The education system is not providing an equal quality of education to the students compared to the EU countries. Its most recent outcomes are well below the EU average, as reflected in the results from the 2018 OECD PISA assessment (OECD, 2020). In Serbia, the average achievement on the reading literacy scale was 439, compared to 487 in the OECD, with a gap of 48 points. Compared to OECD countries, the competencies of Serbian pupils on the mathematical literacy scale were lower by 41 points (489 compared to 448). Competences of OECD pupils (489) are higher by 49 points on the science literacy scale compared to Serbian pupils (440), which indicates a one-and-a-half year lag behind OECD countries. According to these results, every third student in Serbia did not reach the functional literacy threshold, 38% of students did not reach the basic level of literacy in reading, 40% in mathematics, and 38% in natural sciences. The finding that more than 80% of students from three-year secondary vocational schools (compared to 21–25% in OECD countries) are below that level is considered particularly worrying. Socio-economic status is a strong predictor of performance in various segments of literacy in PISA participating countries, while the variation in mathematical and science literacy scores shows a weak relation. Disadvantaged students in Serbia lag around two years behind their peers from wealthier families in the reading domain of PISA 2018. Socio-economically advantaged students outperformed disadvantaged students in reading by 73 points. In summary, PISA assessments revealed that a significant number of pupils in Serbia complete their education without acquiring the necessary skills. These issues urge the redefining of funding policies and the introduction of changes aimed at enhancing

Tab. 1: Investment in education (2019)

Country	Government expenditure on education, total (% GDP)	Government expenditure on education (% of government expenditure)
Serbia	3.6	8.6
World	4.3	12.6
CE & Baltics	5.1	10.7
EU	5.1	10.4
OECD	5.3	10.9
Middle income countries	4.1	15.2

Source: The World Bank (2020)

the quality of teaching and learning. The inadequately resourced education system (Tab. 1) has limited capacity to provide high-quality and equitable education.

Investment in education as a % of GDP in Serbia (3.6) is below the average for the group of countries with the same income (middle-income countries). It is significantly below the EU average (4.6%), the OECD average (5.0), and Central Europe and the Baltics (5.1). Serbia also lags in government expenditure on education as a % of total government expenditure. The cumulative expenditure per student is USD 24,290 (PPP adjusted) over the lifetime in compulsory education, as opposed to USD 90,000 average in the EU (OECD, 2017). Education in Serbia is also faced with the problem of inadequately supplied material sources – 49.4% of students are reported to have hindered learning outcomes by the lack of textbooks, library and laboratory resources, and ICT equipment, while 16.3% of computers do not have access to internet, with one computer available to 3.3 students (CEB, 2021). These facts put Serbia at a high risk of getting into the low value-added growth trap, hindering its transition to a digital society and building the workforce with skills and competencies for future labour market demands.

2. Research methodology
2.1 Data and variables
In our analysis, we use the annual European Union Statistics on Income and Living Conditions (EU-SILC) as a widely used source of multidimensional microdata in research studies on income, poverty, social exclusion and other living conditions. We utilize the cross-sectional data obtained in Serbia in 2020, based on a nationally representative sample of the population residing in private households within the country. A total of 5,158 private households and 13,855 persons aged 16 and over have participated in the survey. The data obtained at the household level relates to social exclusion and housing conditions, while individual-level data provides information about labor, education, and health conditions. Income and calculation of basic EU-SILC instruments is based on data collected both at personal and household level (European Commission, 2021b).

In the first step, we identify the households exposed to the risk of poverty and social exclusion. Our measure represents the number of individuals living in households that are either at risk of poverty or severely materially deprived (Tab. 2):

i) For the measure of poverty, we use the at-risk-of-poverty rate, which represents the share of individuals who have an equivalized disposable income below the risk-of-poverty threshold, set at 60% of the national median equivalized disposable income (after social transfers).

ii) For measuring social exclusion, we equate being socially excluded with material deprivation, which is manifested in the inability to meet basic needs, having problematic debts or payment arrears. In our case, this is measured by the severe material and social deprivation rate (SMSD): the proportion of the population experiencing an enforced lack of at least 7 out of 13 deprivation items (6 related to the individual and 7 related to the household).

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Tab. 2: **Individuals at risk of poverty or severe material deprivation in Serbia**

Variable		Frequency	Valid (%)
At risk of poverty	Yes	2,835	21.4
	No	10,388	78.6
	Total		100.0
Severely materially deprived	Yes	3,645	27.6
	No	9,578	72.4
	Total		100.0
At risk of poverty or severely materially deprived	At least one	4,732	35.8
	None	8,491	64.2
	Total		100.0

Source: Eurostat EU-SILC (2020)

In the next step, we select a set of individual-level explanatory variables that serve as risk factors of poverty and social exclusion. We address the abundant literature on potential causes and predictors of poverty and social exclusion (Burchardt et al., 2002; Jehoel-Gijsbers & Vrooman, 2007; Levitas, 2006) to identify the social indicators that influence the likelihood of becoming poor or socially excluded. Besides individual-level risk factors (low income, poor health, low education level, unskilled labor, gender, old age), it is documented that poverty and social exclusion can be a consequence of the actions not only of the afflicted persons but also other individuals or corporate actors, government policies or result from more general socio-economic developments (economic recessions, demographic transitions, cultural changes). For this study, we focus on the risk factors that operate on the micro-level of individuals. Our main variable of interest is the level of educational attainment. In addition, we include in the model various sociodemographic, labor market and health-related variables as risk indicators (Tab. 3).

Tab. 3: **Variables, definitions and data sources**

Variable	Definition	Source
Education	Educational attainment level: the highest ISCED level successfully completed	Eurostat EU-SILC
Health	Self-perceived general health	
Employment	Self-defined main activity status	
Age	Age in completed years at the time of the interview	
Gender	Self-declared personal characteristics	

Source: own

In our analyses, we presume a one-sided causality by estimating to what extent the risk factors increase the probability of poverty and exclusion. The empirical literature, however, implies that the relations between the causes and manifestations of social exclusion can be reciprocal. Based on the available cross-sectional data that we operate with, we do not attempt to estimate the two-way causal effects that are not to be neglected.

2.2 Estimation procedure

We begin by transforming our response variable into a set of observations with two unique values (0, 1), where 1 denotes the occurrence of our expected outcome (individuals at risk of poverty and social exclusion). Next, we fit a regression model that relates our dependent variable to selected predictor variables, both quantitative and categorical. The procedure of choice for modelling dichotomous or binary outcome variables is the probit analysis (Aldrich & Nelson, 1984). In this procedure, the inverse standard normal distribution of the probability is modelled as a linear combination of the predictors. We examine the variables related to sociodemographic, health and labor related characteristics of the respondents to assess their impact on the probability of being in the risk category. The model we fit is:

$$\Pr(\text{at risk} = 1) = \Phi\ (\beta_0 + \beta_1 \text{education} + \beta_2 \text{health} + \beta_3 \text{employment} + \beta_4 \text{age} + \beta_5 \text{gender}) \quad (1)$$

where: Φ – the standard normal cumulative distribution.

We perform Likelihood ratio tests to test the significance of the coefficients in three different model specifications. Based on the obtained coefficients, we calculate the predicted probability of risk of poverty and social exclusion for different levels of educational attainment of the respondents.

3. Results and discussion

In this section, we present the results of a fitted probit regression model, where we test the impact of education and selected demographic, health-related and labor market variables on the risk of poverty and social exclusion. Three different model specifications are included: (1) with the risk of poverty as a dependent variable; (2) with severe material deprivation as a dependent variable; and (3) the specification that calculates the predicted probability of being both at risk of poverty and severely materially deprived (at least one of the risks). Based on the model fitting information that compares a model that includes the specified predictor variables to the one that simply fits an intercept to predict the outcome variable, likelihood ratio chi-square tests confirm that at least one of the predictors' regression coefficients is not equal to zero in all models. According to the chi-square statistics, all the models are significant at the 0.01 level. The response variables predicted by the model are binary (at risk/not at risk of poverty and social exclusion), so the models predict the probability of individuals being at risk given the values of the predictors in the model.

The results do not differ largely across these three specifications, indicating that education plays an important role in predicting the risk of poverty and social exclusion, along with several individual-specific factors. Tab. 4 summarizes the results of three different model specifications, reporting the estimated coefficients along with corresponding standard errors in parentheses.

We hypothesized a direct effect of educational attainment level on reducing the risk of poverty and social exclusion. The regression coefficients in each model indicate that an increase in the educational attainment level significantly decreases the predicted probability of poverty and exclusion. Regression coefficients show the expected direction and are statistically significant ($p < 0.01$). Educational attainment level plays a significant role both in reducing the risk of poverty and material deprivation. The variable keeps its significance in the model that predicts the probability of either poverty or deprivation. Holding all predictors in the model constant at their means or median values (except gender and activity status), a one-level increase in educational attainment affects the probability of poverty and social exclusion in the following manner (Tab. 5).

Our analysis highlights the importance of education for alleviating the risks of exclusion and poverty. As indicated by the probabilities presented in the table, the decrease in the probability of poverty and social exclusion attributed to a one-level increase in educational attainment amounts up to 7.96% (for unemployed women with only primary education). The highest gains from schooling are materialized for the categories of respondents that are not active in the labor market and those with the lowest levels of educational attainment, these categories are also most vulnerable to the risk of poverty and exclusion. However, it appears that higher educational achievements reduce the risk of poverty and social exclusion, irrespective of the starting position or the activity status of the respondents. In other words, it always pays off to have a better education,

Tab. 4: Probit regression estimates

Parameters	At risk of poverty (1)	Severely deprived (2)	At risk of poverty or severely deprived (3)
Intercept	0.066	−0.421***	0.112*
	(0.0700)	(0.0686)	(0.0641)
Education	−0.002***	−0.003***	−0.002***
	(0.0001)	(0.0001)	(0.0001)
Health	0.237***	0.316***	0.290***
	(0.0170)	(0.0166)	(0.0161)
Employment	−0.726***	−0.629***	−0.704***
	(0.0286)	(0.0289)	(0.0276)
Age	−0.003***	0.006***	0.004***
	(0.0009)	(0.0009)	(0.0009)
Gender	−0.130***	−0.046*	−0.076***
	(0.0264)	(0.0258)	(0.0243)
Observations	13,274	13,274	13,274
Chi-square (df)	1,740.623 (5)	2,830.567 (5)	2,736.323 (5)
Sig.	0.000	0.000	0.000

Note: SE in parenthesis; ***significant at 0.01 level; *significant at 0.1 level.

Source: own (based on Eurostat (EU-SILC))

regardless of the individuals' labor market position or the highest level of education completed.

The results are in line with previous research studies that marked lower educated individuals (no education, primary schools) at higher risk of social exclusion (Chung et al. 2019; van Bergen et al. 2014). Educational underachievement acts as a factor that marginalizes individuals

Tab. 5: Predicted probabilities of being at risk of poverty and social exclusion (%)

ISCED level completed	Employment (inactive)		Employment (active)	
	Men	Women	Men	Women
Less than primary	65.93	63.11	38.46	35.59
Primary	58.34	55.36	31.09	28.46
Lower secondary	50.42	47.39	24.40	22.08
Upper secondary	42.49	39.54	18.58	16.62
Post secondary non-tertiary	34.85	32.08	13.71	12.11
Short cycle tertiary	27.28	25.29	9.79	8.54
Bachelor or equivalent	21.50	19.34	6.77	5.83
Master or equivalent	16.12	14.34	4.52	3.84
Doctorate or equivalent	11.71	10.29	2.92	2.45

Source: own (based on Eurostat (EU-SILC))

by hindering their opportunities at the labor market and limiting their ability to participate in the decision-making processes in society (Gomez-Torres et al., 2019). Some studies emphasize the dominating indirect effects of poor education and mechanisms of their influence on social exclusion – via low income, poor health, poor digital skills or poor command of language in the case of migrants and ethnic minorities (Jehoel-Gijsbers & Vrooman, 2007). Their analysis of 860 Dutch households has revealed the significance of education and ethnic origin as key background variables for explaining the process of social exclusion. Research from the Western Balkans also confirms that individual characteristics, such as education, account for the differences in social well-being. In a study of labour market challenges in Western Balkan countries (Bartlett et al. 2020), low educational levels of young people are proved to act as barriers to their employment. Strong correlations between poverty and poor education (primary or less) have been recorded throughout Western Balkans (Matković, 2017). In a household-level analysis of subjective perceptions of poverty in the countries of emerging Europe, Koczan (2006) finds that individuals with higher educational attainment are less likely to subjectively grade themselves as poor, have higher expectations of future income and report higher amounts of minimum income necessary for their subjective well-being.

Our analysis also confirms the importance of multiple factors that affect the risk of poverty and social exclusion. The impact of education is assumed to work to a large extent through the labor market, as higher education enables employment (Klein, 2015). Poor education increases the probability of individuals' low labor market position (worse working conditions, low wages for the employed, unstable employment in the informal sector, seasonal jobs or unemployment). In our model, we have included the variable that reflects individuals' self-defined activity status to assess the effects of being unemployed, unable to work due to health reasons or disabilities or generally inactive on the risk of poverty and social exclusion. As expected, this variable significantly predicts the probability of being at risk of poverty or severe material deprivation. The negative sign of the employment status coefficients indicates that belonging to a non-active category

is associated with a significantly higher risk of poverty and exclusion. Employment not only provides financial resources, but also access to other social resources (Waddell & Burton, 2006). Not having paid work, being on social assistance or disability benefit are considered to be the basic risk factors of poverty and social exclusion (Walsh et al., 2017), although there is a possibility that some jobs are more socially excluding than being jobless (Atkinson, 1998). A specificity of the Western Balkan countries is that a large share of unemployed live in households where the income is shared between household members, so the largest risk of poverty and exclusion is among the unemployed living in households with low work intensity (Matković, 2006). In addition, not any kind of employment is significant for reducing the risks of poverty, but better paid jobs in the formal sector of the economy.

Self-perceived health status enters the model with the expected sign, indicating that poor health increases the probability of being in the risk category. These findings fit general patterns in terms of health being considered a rather robust determinant of social well-being in previous research (Sacker et al., 2017). In addition, poor educational achievement along with poor self-perceived health are found to be significant risks of unemployment (Bell & Marmot, 2017).

In summary, estimation results underline the important role of individual level characteristics as fundamental risk determinants. A somewhat unexpected finding is that women in our model do not appear to be at higher risk of poverty or social exclusion. This result contradicts the most common results of previous research that finds women to be at higher risk of social exclusion (Becker & Boreham, 2009), especially in the areas of material resources, access to information, civic participation and cultural activities (Kneale, 2012). The impact of age differs across our model specifications, indicating that age increases the probability of severe material deprivation and the combined risk of poverty and deprivation, while older age appears to go in hand with a lower risk of poverty itself. A recent study (Nilsen et al., 2022) indicates that educational attainment acts as a factor of exclusion at an older age, indirectly through non-employment and health problems, and directly causing exclusion from social and civic activities.

Conclusions

This study examined the relationship between educational attainment levels and the social well-being of individuals, using cross-section data from a representative sample of the population in Serbia. The results indicate that several fundamental determinants shape poverty and social exclusion, yet underlining the importance of education as an important risk factor of poverty and social exclusion.

The research question of our study addressed to what extent the achieved levels of education can predict the risk of poverty and social exclusion. Our findings indicate significant influence of educational attainment, along with other risk factors that can be directly or indirectly affected by education (labor market activity, health status). It could be argued that educational underachievement increases the risk of exclusion in several life domains. We found that increasing levels of education significantly decreases the probability of both poverty and severe material deprivation, affecting mostly the individuals with the lowest levels of educational attainment and those inactive in the labor market. As expected, individuals at the highest risk of poverty and social exclusion are those with less than primary education, inactive in the labor market, with men being exposed to a slightly higher risk than women.

Our findings highlight the importance of optimizing investment in various levels of education. From the policy perspective, equally challenging endeavors seem to be increasing the share of budget expenditures for education and addressing the identified deficiencies of the education system in terms of strengthening quality. It is clear from the sampled data that the poor have low education levels, which can be related to the problem of universal access to primary education. In Serbia, there is a guaranteed right to education, the rate of early school leavers is low (decreased to 5.6% in 2020; EC, 2021), but an intervention is needed regarding the underrepresentation of certain vulnerable groups in education. Efforts aimed at increasing the participation of disadvantaged students at all levels of education, especially primary and secondary, could effectively build an inclusive and equitable education system. Increasing the participation of adults in lifelong learning, especially low-skilled individuals, which is below the EU standards, could

contribute to reducing the risks of poverty and social exclusion.

As our study indicates higher returns to education at secondary levels in terms of reducing poverty and social exclusion, expanding investment in secondary education would be a reasonable policy reaction. Investment in higher levels of education should account for the increasing demand for skilled workers and be adjusted to the labour market requirements. In Serbia, secondary education is not mandatory, which might be a cause of a relatively large percentage of the population without completed secondary education (around 16%; Arandarenko, 2020). Although the education levels of the population in Serbia have been increasing in recent years, the latest PISA assessments raise concerns about the quality of education, urging for policies that would assure high-quality teaching and improve teaching practices.

Highlighting the relevance of various fundamental determinants of poverty and social exclusion besides education, our findings indicate the need for an approach to integrate different policy areas and target a wide range of risk factors for poverty and social exclusion.

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