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EXPLORING THE LINK BETWEEN THE COVID-19 CRISIS AND NON-EMPLOYMENT IN SERBIA: WHO WAS LEFT BEHIND?

ABSTRACT: *The global health crisis that began in early 2020 also affected Serbia. The national lockdown and subsequent social distancing measures had a considerable effect on both the economy and the population. The quarantine, followed by social distancing measures, had a significant impact on the economy and population. Despite the overall satisfactory performance of the labour market, there are signs that the majority of workers who were not protected by the government's measures either lost their jobs or even left the labour market and moved into inactivity. Therefore, instead of focusing on unemployment, the aim of the paper is to analyse the impact of the health crisis on non-employment (unemployment and inactivity). Applying the probit model to LFS data, we examined the probability of non-employment in the years before and during the COVID-19 outbreak. Controlling for the individual characteristics, we found that young and old people as well as those with a lower level of education fared slightly worse than the overall population. While the active labour market measure 'My First Salary' probably helped to improve the relative position of youth, the position of elderly and people with a low level of education deteriorated further in 2021.*

KEY WORDS: *COVID-19, labour market, non-employment, vulnerable groups, Serbia.*

JEL CLASSIFICATION: J08, J38, J63, J64.

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1. INTRODUCTION

The COVID-19 pandemic was a major challenge for policymakers around the world, who had to respond quickly and efficiently. Like other countries, Serbia also faced this challenge. The first case of infection was registered at the beginning of March 2020, and by the end of the same month there were already over 1,000 confirmed cases. In an effort to stop the spread of the virus, a state of emergency was declared on March 15 (Government of the Republic of Serbia [RS], 2020a). Under the given circumstances, the state had the right to impose working conditions, restrict the right to strike, and also issue decrees during the state of emergency. In the second wave of the crisis that followed in the fall, major restrictions on freedom of movement were largely avoided. Instead of a nationwide quarantine, the spread of the virus was prevented by measures such as social distancing.

The impact of the pandemic on the Serbian economy was layered. Economic agents in the so-called high-contact sectors (tourism, hospitality, transportation, personal services, etc.) were particularly affected by the supply shock that occurred at the beginning of the epidemic. The impact then spilled over to the demand side, which fell due to reduced income caused by job losses, reduced working hours, and general uncertainty about the duration and intensity of the crisis and delayed spending. In this respect, it can be said that the health crisis affected all sectors of the economy and had significant social consequences. To mitigate the negative impact of the health crisis, the government developed the most comprehensive economic support packages in recent history. The support packages comprised several measures, including an increase in healthcare costs, the creation of a state guarantee scheme for bank loans to small and medium-sized enterprises, direct subsidies to preserve jobs, and the deferral of tax and contribution payments (International Monetary Fund [IMF], 2021).

Although Serbia was not an exception regarding the negative impact of the pandemic, the response of the labour market was noticeably different to that on a global level. While unemployment rose in most countries during the first wave of the crisis, unemployment in Serbia remained at roughly the same level. Moreover, the year-on-year unemployment rate actually fell slightly under 2%. Serbia was one of only three countries in Europe where the annual unemployment rate fell, with the decline in Serbia being by far the sharpest.

Parallel to the decline in unemployment, inactivity also increased. In other words, the adjustment pattern in Serbia was such that only a small portion of laid-off workers moved into unemployment, while most of them moved into inactivity. In this respect, it would be misleading to focus solely on the link between the pandemic and unemployment. Instead, one would get a broader picture by looking at non-employment – a single term for unemployment and inactivity.

Despite the government's efforts to minimise the negative effects, the pandemic created winners and losers in the labour market, which became increasingly apparent over time. This is consistent with the findings of studies confirming that the pandemic particularly affected vulnerable groups – groups that were at risk even in times of economic prosperity (Lariau & Liu, 2022). In this regard, the main objective of this paper is to examine the impact of the pandemic on the labour market as a whole, but also on some of its structures and participants. To achieve this, we will conduct an empirical analysis estimating the probability of non-employment in the period 2019–2021. The first year will serve as a benchmark for the regular year, which will be compared with 2020, when the impact of the crisis was most severe, and 2021, when the negative effects were still present but less pronounced. By controlling for individual characteristics, we can see how COVID-19 affected the labour market transition of different vulnerable groups.

The paper contributes to the existing literature in several ways. First, in contrast to the few previous studies for Serbia, which focus on the outcome in 2020, we have extended the analysis to 2021 to assess the longer-term impact of COVID-19 on the Serbian labour market. Second, Serbia is one of the few countries where unemployment did not increase during the pandemic. Considering the nature of the labour market response in Serbia, we decided to analyse the impact of COVID-19 on the unemployed and the inactive together. Instead of relying on unemployment only, which is a standard approach, we calibrated the model to adapt it to the current situation. Third, we found that COVID-19 did not have a significant structural impact on the labour market in Serbia when it comes to the probability of being non-employed.

The paper is organised in the following manner. This introductory section will be followed by an overview of the most important studies that have dealt with this

topic. In the third part, we will take a detailed look at the measures adopted by the Serbian government to neutralise the negative consequences of the health crisis. To provide a glimpse of labour market performance in the period analysed, the subsequent section will be dedicated to the trend of the most common labour market indicators. The fifth part is reserved for the description of the data used for the empirical analysis and the presentation of the methodology. In the sixth section, we present the main results of the estimated econometric model, while the last section of the paper is devoted to the conclusions.

2. LITERATURE REVIEW

The impact of the COVID-19 pandemic on labour market outcomes for vulnerable groups has been widely studied, with findings that highlight its diverse effects. However, the literature is largely centred on developed countries, with significantly more research available on economies with stronger institutional frameworks and social safety nets. In contrast, studies focusing on developing countries, including Serbia, remain scarce. This lack of research on developing countries leaves an important gap in understanding how vulnerable groups, such as workers who are young and with a low level of education, were affected in economies with weaker labour protections and limited financial support.

Certain studies focused on evaluating the pandemic's effects within a single country, providing in-depth insights into localised labour market impacts. For instance, Lariau and Liu (2022) provided evidence that the pandemic exacerbated existing inequalities, particularly affecting certain groups on the Spanish labour market. Using a combination of labour force data and quantitative modelling, the study highlights that women, youth, and workers in precarious or temporary employment faced the greatest challenges. The authors attribute these trends to the pandemic's disproportionate impact on sectors such as hospitality and retail. They also evaluate policy interventions, such as job retention schemes, and discuss their effectiveness in mitigating these inequalities. Bruckmeier et al. (2021) introduced a method to evaluate the distributional effects of macroeconomic shocks and policies in real time, applied to Germany during COVID-19. By integrating various models, the analysis reveals a decline in gross labour income across all income levels, while tax-benefit systems and crisis responses helped stabilise disposable incomes, benefiting lower-income groups and slightly impacting higher-income households. The paper highlighted that the

rapidly evolving nature of the COVID-19 crisis created significant challenges for policymakers in implementing timely income-stabilising measures. Lee et al. (2021) examined the employment effects of COVID-19 in the United States using a linear regression model based on Current Population Survey data. Their findings indicate that young workers (aged 20–35) were hit the hardest at the end of the first quarter of 2020, with unemployment rates increasing by 13 percentage points and non-participation rates rising by around 4.5 percentage points year-over-year. Even after controlling for other factors, the study found that the negative employment effects were more pronounced for young workers, women, and those with lower levels of education. This aligns with findings from Serbia and the Visegrad region, emphasising the global vulnerability of these groups to economic shocks. Additionally, Cortes and Forsythe (2023) examined how the COVID-19 pandemic impacted employment distributionally in the United States, focusing on its onset and subsequent months. Using data from the Current Population Survey, they found that the pandemic worsened existing inequalities. Job losses were more severe and persistent in lower-paying sectors, disproportionately affecting Hispanic and non-white workers. These disparities were not solely due to overrepresentation in low-paying roles but also higher probabilities of job displacement. Additionally, the study showed that black workers faced widening job displacement gaps compared to white workers, and that the pandemic also accelerated retirement rates among older workers.

Some studies, particularly those conducted by international organisations, offer comparative analyses of how the pandemic affected labour market outcomes across different countries. The IMF's departmental paper (Ando et al., 2022) on European labour markets found that women, young workers, and those with low education levels faced significant disruptions. The pandemic amplified existing structural issues, such as sectoral shifts and skill mismatches. The study revealed that policies such as targeted wage subsidies played a key role in cushioning employment shocks but revealed gaps in coverage, especially for gig and self-employed workers. The study published within the World Bank (Khamis et al., 2021) showed that the COVID-19 pandemic-induced economic crisis significantly curtailed mobility and economic activity, severely impacting global labour markets. The study examined the crisis's early effects in nearly 40 countries. Key findings reveal that work stoppages were more common in industry and services than agriculture, emphasising the negative impact of the

pandemic for rural women, youth and workers with a low level of education in terms of the rise in unemployment and inactivity rates. The Western Balkans regular economic report published by the World Bank (2020) shows that the pandemic disproportionately impacted women, young workers, and those in low-skill and informal sectors. These groups experienced higher rates of job losses and income reductions due to their overrepresentation in precarious or contact-intensive occupations. This trend aligns with global observations on labour market inequalities exacerbated by the pandemic. In the Western Balkans, the report also reveals that agriculture showed greater resilience compared to the industrial and service sectors, where employment disruptions were more pronounced. Tourism-dependent economies within the region, for example Croatia and Montenegro, faced particularly severe challenges. The report highlights that countries such as Serbia implemented substantial economic support measures to mitigate income losses, including wage subsidies and social transfers. These efforts were partly successful in preventing a sharp rise in poverty and inequality but could not fully shield vulnerable groups from the economic shock. In countries such as Kosovo[1] and Albania, high migration rates and lower labour force participation compounded the challenges during the pandemic, highlighting the need for policies to strengthen workforce integration and retention. Zieliński (2022) analysed the impact of the pandemic on labour markets in the Visegrad countries (Czech Republic, Hungary, Poland, and Slovakia) using descriptive statistics and quarterly observations. The study found that while the pandemic did not lead to a deterioration in employment among women, it significantly affected young workers (aged 15–24), older workers (55–64), and those with lower education levels. Among the observed countries, Poland experienced the strongest negative effects on youth employment.

It is particularly important that the literature on the impact of COVID-19 on the labour market in Serbia is scarce, with only few papers addressing this issue, to the best of our knowledge. Vladisavljević and Lebedinski (2023a) examined job loss rates and job-finding probabilities among vulnerable groups in Serbia. Their analysis, based on labour force survey panel data and transition probabilities, revealed that while the overall increase in job losses was insignificant, young workers (aged 20–29) faced a significant rise in job loss rates by around 2

[1] This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999.

percentage points during the first year of the pandemic. This finding highlights the heightened vulnerability of younger workers to economic disruptions, possibly due to their lower job security and a higher prevalence of temporary contracts. A similar study by the same authors (Vladisavljević & Lebedinski, 2023b) utilised a difference-in-differences methodology to compare employment outcomes before (2019) and after (2020) the pandemic. Their findings indicate that while individuals aged 30–64 experienced no significant changes in employment, youth employment declined by 3 percentage points in the second quarter of 2020. However, this effect appeared transitory, as no significant differences were observed in the fourth quarter. In contrast, the study found that individuals with lower education levels faced persistent employment reductions in both the third and fourth quarters, with declines of 2.4 and 3.0 percentage points, respectively. This suggests that individuals with lower education levels bore a heavier burden in terms of labour market disruptions, possibly due to their concentration in sectors with lower job stability and fewer opportunities for remote work.

3. THE GOVERNMENT STIMULUS MEASURES

In this section, we will take a closer look at the Serbian government's aid package and its relief potential. It did not take long after the declaration of the state of emergency for the government to launch the first and most generous fiscal stimulus. According to the World Bank, the total size of the stimulus programme is estimated at around 13% of GDP (World Bank, 2021). In early April 2020, the 'Decree on tax breaks and direct benefits for private sector companies and financial support for citizens to mitigate the economic consequences of the COVID-19 disease' was adopted (Government of RS, 2020b). The decree included measures aimed at mitigating the consequences of COVID-19 on several levels.

In order to protect jobs, the government created two different types of subsidies: one for small businesses and entrepreneurs and one for large companies. The first type of subsidy meant that every full-time employee was paid the net minimum wage during the three months of the state of emergency. This subsidy was paid to more than one million workers employed by entrepreneurs, micro, small and medium-sized private enterprises, excluding those in the financial sector. The subsidy amounted to a uniform amount of just under 300 euros per month per

employee and was not dependent on the activity, previous salary or estimated losses of the individual company. In order to receive the subsidy, companies were not allowed to reduce the number of their employees by more than 10% compared to the number at the beginning of the state of emergency. The same group of beneficiaries went through this procedure again for the next two months, but this time the subsidy amount was 60% of the net minimum wage, i.e. around 200 euros. The second type of subsidy involved the payment of half of the minimum wage to any employee who received a decision to suspend work activity during the state of emergency. This type of subsidy was one of the measures to protect jobs in large companies.

With the second series of measures, the government created the possibility of postponing taxes. During the state of emergency, the payment of taxes and social security contributions on wages and income was postponed until the beginning of January 2021. In addition, the advance payment of corporate income tax for the months of March, April, and May 2020 was postponed until the submission of the final income tax return for 2020, for which the deadline was the end of June 2021. As a third form of support, the government set up guarantee schemes through commercial banks aimed at subsidised loans to maintain operating capital and liquidity of small and medium-sized enterprises and agricultural producers.

In an effort to provide additional assistance to the most severely affected industries in the field of tourism, hospitality, and passenger transportation, the state approved around 160,000 vacation vouchers in locations across Serbia. A similar practice continued until the end of the year, with a greater emphasis on direct support for vulnerable companies in the affected sectors. Companies operating in these sectors were able to apply for loans from the Development Fund of the Republic of Serbia on more favourable terms in order to maintain their operating capital and liquidity.

In addition to initiatives to directly support the economy and protect jobs, the government introduced a one-time programme of universal financial support of 100 euros for all adult residents of the Republic of Serbia to stimulate demand and indirectly help businesses. The Ministry of Finance estimates that more than 6.1 million citizens received this support (Ministry of Finance of the RS, 2020).

The generosity of the measure is also confirmed by the results of a study that ranked this measure among the top 10 most inclusive measures in the world, as around 90% of the population benefited from it (Almenfi et al., 2020). Furthermore, additional financial assistance was granted to all pensioners on two separate occasions in 2020.

Although the consequences of the pandemic were much milder in 2021, the government largely maintained its original decision in favour of universal rather than selective support for the economy and population. However, due to limited fiscal space, the support package in 2021 was less generous. Although on a relatively small scale, selective assistance was granted to sectors most affected by social distancing, such as catering businesses, travel agencies, and transport companies. Universal assistance to the population also continued in 2021, with the distribution of 60 euros to all adults and 50 euros to those over 65 years of age being particularly noteworthy. In addition, all registered unemployed were granted one-off additional assistance of 60 euros.

From the workers' point of view, the most important measure taken by the government was the subsidy to preserve jobs in non-large businesses. Although the subsidies were paid to the companies, the imposed condition of the ban on reducing the number of employees had a direct impact on the position of the workforce, primarily protecting the employees in the workforce. Above all, this contributed to widening the already noticeable gap between the employed on the one side and the unemployed and inactive on the other. With the intention of maintaining the overall level of employment in the country, the government subsidies thus created a barrier between the employed and the non-employed. On the one hand, companies did not need to hire unemployed due to falling demand; on the other hand, they had no incentive to lay off existing employees due to the aforementioned subsidy condition. These circumstances significantly hindered transition on the labour market. The non-employed were therefore mainly helped by direct cash transfers to the overall population, which could only partially contribute to their income preservation, and later by modest financial aid reserved for the registered unemployed.

4. LABOUR MARKET PERFORMANCE

In the early phase of COVID-19, an international study assessed the impact of the health crisis on the labour market across the Western Balkan region (International Labour Organization [ILO], 2020). In the case of Serbia, the rapid assessment highlighted women and youth as the two demographic groups potentially most affected by the negative impact of COVID-19. Therefore, Table 1 presents three basic labour market indicators for selected groups that are most commonly used as a reference for labour market performance.

Table 1. Labour market indicators for different groups of population

	Year	Working age population (15–64)	Male	Female	Young population (15–24)
Activity rate	2019	66.1	73.1	59.0	28.6
	2020	65.7	72.8	58.6	27.9
	2021	69.7	76.8	62.6	33.0
Employment rate	2019	58.3	64.9	51.8	20.2
	2020	59.1	65.7	52.5	20.3
	2021	61.7	68.6	54.8	24.4
Unemployment rate	2019	11.7	11.2	12.2	29.3
	2020	10.1	9.7	10.5	27.3
	2021	11.5	10.7	12.5	26.0

Source: Labour Force Survey 2019-2022, Statistical Office of the Republic of Serbia (SORS).

Despite the negative effects of the crisis, the number of employed people fell by only nine thousand compared to 2019, with the decline among men being slightly higher than for women. The employment rate of the working-age population increased by 0.8 percentage points compared to the previous year, which is due to an extremely small decline in employment and a significant trend of depopulation. It can be seen that there was no gender discrimination in the change in the employment rate. Even if the quantitative indicators give the impression that women did not fare any worse than men, this is not necessarily the case, as there are some issues that this data cannot reveal. For example, the transition to working from home during the national quarantine disproportionately jeopardised the position of women, who had to balance professional and private commitments.

From the unemployment standpoint, the labour market in Serbia performed even better, with annual unemployment falling by more than 50,000. The trend in gender dynamics was the reverse of that observed in employment, with women experiencing a greater decline in unemployment – around 55% of the total decline. This trend also contributed to the decline in the overall unemployment rate of the working-age population. The annual unemployment rate fell by around 1.6 percentage points, approaching a single-digit figure (10.1) for the first time in recent history. Compared to other countries, Serbia was one of the few countries in Europe where the unemployment rate fell.

However, the decline in unemployment has a less favourable aspect if one also considers the data on labour market transition. The decline in economic activity of around 0.4 percentage points compared to the previous year can best explain the fall in unemployment. Due to the very low demand for labour as a result of the health crisis, the majority of the unemployed stopped actively looking for work and thus moved into inactivity. The former can be seen very clearly in the quarterly data. In the second quarter, there was a significant decline in both activity and unemployment, although the employment rate fell only slightly. This decline was mainly due to the implementation of stricter curfews during the state of emergency. Therefore, the increase in the inactive population in the second quarter was mainly due to the transition of the unemployed into the population outside the labour force.

The statistics on the inactive population by main source of income also confirm the previous assertion. According to the quarterly Labour Force Survey (LFS) data, the number of inactive people among those whose main source of income is their spouse's salary or pension increased significantly in Q2 of 2020, precisely when the impact of the crisis was strongest and movement was most limited. As early as the following quarters, this category of inactive people decreased by more than 150,000, i.e. by one-fifth, returning to pre-crisis levels. In order to reduce the costs associated with looking for work, so-called secondary workers, those who could rely on the income of other household members, stopped searching for work and became inactive. As the measures to restrict freedom of movement eased, these people rejoined the labour market. This was clearly visible from the trend in the number of inactive people by income type. According to the Eurostat data, while the number of inactive people whose main source of income is

earnings/pensions of spouses, parents, or other household members rose sharply in the second quarter (by around 150,000), it returned to pre-crisis levels in the third quarter and continued to fall over time.

Compared to young people in the European Union (EU), young people in Serbia consistently have a much weaker position on the labour market. Moreover, the differences in the Serbian labour market between the young and adult populations are also greater than in other EU countries. The health crisis further worsened the already unfavourable starting position of young people in Serbia, as the young population performed worse than the working-age population in all labour market indicators. As far as the data for 2020 is concerned, there was a sharper decline in the youth employment rate, a more intense increase in the inactivity rate among young people, and a smaller decline in the unemployment rate compared to the working-age population. In 2021, the opposite was the case – young people experienced a stronger upswing than the working-age population. Not only did the activity and employment rates among young people rise faster in relative terms, but the unemployment rate for this group also fell, despite the rise in the unemployment rate of the broader working-age population.

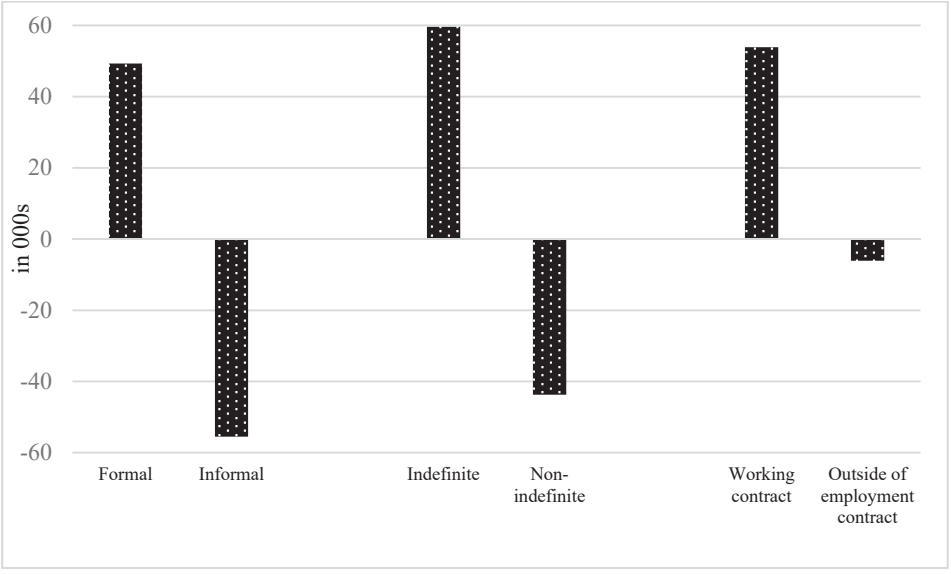
In addition to the groups traditionally vulnerable due to their demographic characteristics, several other groups emerged during the pandemic. Although the employed fared much better than the other two categories of population, the negative effects of COVID-19 were unevenly distributed within the group of employed. It is a well-known fact that employment is a very heterogeneous category. It includes anyone who carries out a particular activity, regardless of the type of engagement. Depending on the form in which they are employed, their job security varies. The most favourable arrangement is working through a standard employment contract. Workers engaged under non-standard arrangements outside an employment relationship, for example under a service contract, have a significantly higher risk of losing their job.

Similar to the type of work arrangement, the job security of employees also varies depending on the type of contract. From the company's perspective, it is most difficult to dismiss employees with a permanent contract, followed by those with fixed-term contracts, while it is easiest to part with employees hired through service contracts. Finally, the concept of employment in the LFS includes both

employees engaged in formal employment and those in informal employment. It is quite clear that the latter category does not enjoy any employment protection and as such is the easiest to dismiss in times of recession.

Figure 1 shows the annual changes in employment based on the various forms of employment discussed above. As can be seen, all three observed forms of precarious employment (informal, non-indefinite, and employment outside formal arrangements) decreased in 2020 compared to 2019. In contrast, all three favourable employment categories increased compared to 2019. This development is probably a direct consequence of the design of subsidies to preserve jobs. As already mentioned, companies that did not lay off more than 10% of their employees relative to the beginning of the pandemic did not have to repay the subsidy. However, it turned out to be important that only employees with permanent contracts were included in this 10%. This left companies free to lay off informal workers and workers working outside of an employment arrangements without hindrance. Similarly, companies were not obliged to renew the contracts of employees whose fixed-term contracts expired.

Figure 1. Year-on-year change in various categories of employment, 2020/2019 (in 000s)



Source: Authors' calculations based on LFS (first two indicators) and CROSO (last indicator).

5. METHODOLOGY AND DATA

To examine how the COVID-19 pandemic affected certain vulnerable groups on the labour market in Serbia in terms of non-employment, the paper utilises the following empirical strategy. The estimated probit model takes the form:

$$NonEmployed_i = \alpha + \beta_1 Gender_i + \beta_2 Loc_i + \beta_3 Age_i + \beta_4 Edu_i + \beta_5 Reg_i + \varepsilon. \quad (5.1)$$

The model (5.1) is used to determine how selected characteristics affect the probability that the person will be non-employed in the observed year. In the model (5.1):

(1) $NonEmployed_i$ is a dependent dummy variable that takes the value 1 if the person is non-employed, where the non-employment refers to persons that are unemployed or inactive;
(2) $Gender_i$, Loc_i, Age_i, Edu_i, Reg_i are independent variables that refer to the gender of the person, the location of the person, the age group to which the person belongs, educational level of the person, and the region of Serbia in which the person lives, respectively;
(3) α and ε represent the constant and random error of the model, respectively.

Using the probit regression model specified in equation (5.1), the average marginal effects of various selected characteristics on the likelihood of being non-employed were calculated. In terms of characteristics that were included in the empirical analysis, the model consists of variables that refer to gender, location, age group, educational level, and region since these characteristics are usually linked with higher vulnerability on the labour market. Equation (5.1) was evaluated for 2019, 2020, and 2021. The key idea is that by evaluating three probit equations for the year before and during the different intensities of the COVID-19 crisis, the possible impact of the corona crisis on certain vulnerable groups in the labour market can be identified. By comparing the differences in the estimated marginal effects for two periods, 2020 in relation to 2019 and 2021 in relation to 2020, it is possible to obtain an indicative picture of whether and in what way the COVID-19 pandemic affected the non-employment of certain groups on the Serbian labour market.

The variables were selected based on several theoretical frameworks which are familiar within labour economics and have been confirmed empirically. For instance, the labour market segmentation theory claims that many labour markets are segmented, often along gender lines, and that women are disproportionately represented in low-paid, part-time, or precarious jobs with limited opportunities for advancement (Peck, 1989). Research shows that women, on average, earn less than men and face higher unemployment rates globally, and that women are also more likely to be in informal employment, with less job security and fewer benefits. In addition, according to spatial mismatch theory, rural residents are often geographically distant from job opportunities, particularly those in high-growth sectors (e.g., technology and finance), which tend to cluster in urban areas (Arnott, 1998). Data shows that unemployment rates are generally higher in rural areas. Rural workers often have fewer high-paying job opportunities and are more dependent on seasonal or agricultural work, which is vulnerable to economic and environmental shifts. Conversely, human capital theory asserts that lower levels of education and skills reduce employability and wage potential, as higher education often correlates with job-relevant skills and knowledge. Individuals with a low education level have higher unemployment rates and are more likely to work in low-wage, low-skill jobs with limited job security. They are also less resilient to economic shocks, as they lack the qualifications to transition easily to new industries (Young et al., 2007). Studies indicate that individuals with limited formal education face slower wage growth and fewer promotion opportunities compared to their more highly educated counterparts. Dual labour market theory posits that young workers are more likely to enter secondary labour markets characterised by insecure, low-paid, and part-time jobs rather than stable, well-paid, primary market jobs (Ashton & Maguire, 1984). Data consistently shows that the youth unemployment rate is higher than the general unemployment rate in many countries, reflecting the barriers youth face in finding stable employment. The 'scarring effect' is also documented, where periods of unemployment or underemployment early in life can have long-term negative impacts on future job stability and earning potential (Gregg & Tominey, 2005). All of this suggests that gender, location, education, and age group can influence a person's likelihood of being non-employed. Lastly, since Serbia is known for significant regional disparities, a variable related to the region in which a person lives is also included in the model. The list of variables included in the model with a description is given in Table 2.

Table 2. Description of variables included in estimation of the model (5.1)

Variable	Description
Dependent variable	
NonEmployed	1 if the person is unemployed or inactive, 0 otherwise
Independent variables	
Female	1 if the person is female, 0 otherwise
Rural	1 if the person lives in rural area, 0 otherwise
YoungAge	1 if the person belongs to the young age group (15–29), 0 otherwise
MiddleAge	1 if the person belongs to the middle age group (30–54), 0 otherwise
OldAge	1 if the person belongs to the old age group (55+), 0 otherwise
LowEducation	1 if the highest level of education of the person is primary education, 0 otherwise
SecondaryEducation	1 if the highest level of education of the person is secondary education, 0 otherwise
HighEducation	1 if the highest level of education of the person is tertiary education, 0 otherwise
Belgrade	1 if the person lives in Belgrade, 0 otherwise
Vojvodina	1 if the person lives in Vojvodina, 0 otherwise
SumadijaWest	1 if the person lives in Sumadija or West Serbia, 0 otherwise
SouthEast	1 if the person lives in South or East Serbia, 0 otherwise

Empirical estimates were performed based on LFS cross-sectional databases for Serbia. In the paper, three LFS survey waves for Serbia were used, from 2019 to 2021 (Statistical Office of the Republic of Serbia, 2021), with 2020, as the year in which the COVID-19 pandemic occurred, being the reference year. The analysis was conducted at the individual level, allowing for the identification of factors that influence the probability of non-employment on the labour market of certain groups recognised as vulnerable. The sample size ranges from 98,500

observations in 2021 to 110,000 in 2019. Among the non-employed in the sample for the years observed, the number of unemployed is 5,562; 4,081; and 5,015, while the number of inactive individuals is 56,441; 52,919; and 53,542, respectively. For each year, the probit regression that follows the model (5.1) was assessed with estimated average marginal effects. The individual weights were included in the estimation, and the robust standard errors were estimated. As for the restriction of the sample, it should be noted that the analysis includes observations of individuals aged 15 and over. To check the robustness of the results, probit regressions were separately evaluated in all three years for the female and young population. Table A1 in the Appendix provides the descriptive statistics.

6. RESULTS AND DISCUSSION

The results of the probit regression evaluation in terms of estimated average marginal effects within the defined model for years 2019–2021 for the total population in Serbia are presented in Table 3. Table A2 in the Appendix provides the estimates of the probit regressions. The results indicate that in all three years observed, all the selected variables that are related to greater vulnerability in the labour market in terms of the probability of being non-employed are statistically significant (except for some regions in certain years, e.g. in the case of the variable SumadijaWest for 2020 and 2021).

The results for the reference year 2020 show, for instance, that females, young and old age groups, people with a low education level, and people from urban areas were especially vulnerable on the Serbian labour market regarding the probability of being non-employed, which is expected. Characteristics such as gender, low education level, and young and old age group are positively associated with the probability that the person will be non-employed. In contrast, characteristics such as high education level and rural area appear to be negatively correlated. Regarding the magnitude of these marginal effects, age group stands out. If a person is female, the probability of being non-employed increases by 10 percentage points, on average, compared to the case for a male person. In addition, people in the young and old age groups have a higher probability of being non-employed than those in the prime age group, with estimated average marginal effects of 0.34 and 0.39, respectively. In contrast to people with a secondary education, the probability that a person with a low level of education

will be non-employed increases by around 14 percentage points, while it decreases by 10 percentage points in the case of people with a high level of education, on average. In addition, people from the Vojvodina region are less likely to be non-employed than their counterparts from the Belgrade region, with an observed average marginal effect of -0.05.

Table 3. Empirical estimation of factors affecting probability of being non-employed in Serbia, 2019–2021, adult population – 15+ (marginal effects)

Dependent variable	Probability of being non-employed					
Independent variables	2019		2020		2021	
	Marginal effect	95% Conf. interval	Marginal effect	95% Conf. interval	Marginal effect	95% Conf. interval
Female	0.107*	[0.102,	0.099*	[0.094,	0.100*	[0.095,
	(0.003)	0.112]	(0.003)	0.105]	(0.003)	0.105]
Young	0.338*	[0.331,	0.341*	[0.333,	0.276*	[0.269,
	(0.003)	0.345]	(0.004)	[0.348]	(0.004)	0.283]
Old	0.383*	[0.378,	0.392*	[0.388,	0.401*	[0.397,
	(0.002)	0.387]	(0.002)	0.396]	(0.002)	0.405]
LowEducation	0.139*	[0.133,	0.144*	[0.138,	0.171*	[0.165,
	(0.003)	0.144]	(0.003)	0.150]	(0.003)	0.177]
HighEducation	-0.118*	[-0.125,	-0.102*	[-0.109,	-0.122*	[-0.129,
	(0.004)	-0.111]	(0.004)	-0.095]	(0.004)	-0.116]
Rural	-0.128*	[-0.133,	-0.128*	[-0.133,	-0.093*	[-0.099,
	(0.003)	-0.122]	(0.003)	-0.122]	(0.003)	-0.088]
Vojvodina	0.003	[-0.004,	-0.049*	[-0.056,	0.029*	[0.022,
	(0.004)	0.011]	(0.004)	-0.041]	(0.004)	0.037]
SumadijaWest	-0.033*	[-0.040,	-0.002	[-0.009,	-0.004	[-0.011,
	(0.004)	-0.025]	(0.004)	0.006]	(0.004)	0.004]
SouthEast	-0.010**	[-0.017,	0.007***	[-0.001,	-0.023*	[-0.030,
	(0.004)	-0.002]	(0.004)	0.015]	(0.004)	-0.015]
N	110,320		100,008		98,473	

Notes:
(1) average marginal effects from probit regression are estimated;
(2) *, **, *** refer to statistically significant impact at 1%, 5% and 10 % significance levels, respectively;
(3) robust standard errors were estimated;
(4) standard errors in parentheses;
(5) individual weights were included in the estimation;
(6) the reference variables are male, middle age, secondary education, urban area, Belgrade region.
Source: Authors' calculations based on LFS data.

To assess whether the COVID-19 crisis was associated with higher vulnerability of certain groups on the labour market in terms of being unemployed or inactive (non-employment), the results from 2020 were compared with those from 2019, the year preceding the crisis, and with those from 2021, the year immediately following it. The results in Table 3 show that certain groups in 2019 and 2021 were more vulnerable in terms of the probability of being non-employed, with similar estimated average marginal effects compared to 2020. This indicates that the COVID-19 crisis did not have significant negative effects on specific groups classed as vulnerable on the labour market in Serbia. This conclusion follows from the fact that the probability of being non-employed did not change significantly for most of the observed groups before and after the crisis compared to 2020. For example, the estimated average marginal effect for women is about 0.10 and for people with a higher education level around -0.11 in all three years observed.

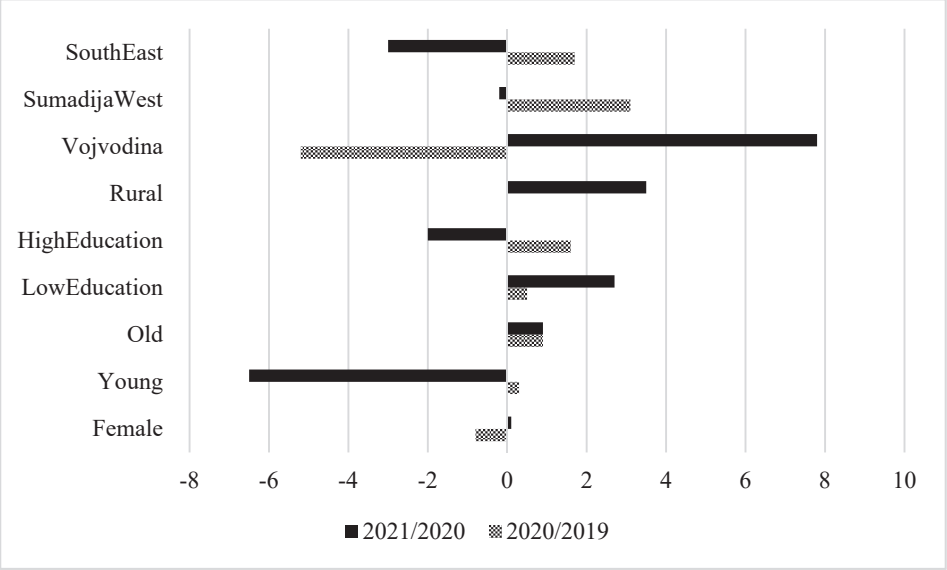
A better insight into the differences in the observed marginal effects is provided by Figure 2, which depicts the differences between the marginal effects for 2020 compared to 2019, and for 2021 compared to 2020. In the case of the female population, a slight negative change in 2020/2019 (-0.8) indicates that women unexpectedly faced slightly better outcomes on the labour market than men during this period, with a negligible positive change in 2021/2020. The higher share of women employed in the public sector (education, health and social care, etc.) could possibly explain why women's relative position improved during the crisis. Unlike in the private sector, layoffs in the public sector were rare, if any, and the public sector served as a shield against non-employment. People from the old age group in both periods experienced an increase in the probability of being non-employed by around 1 percentage point. Therefore, unlike the consistent improvement of the relative position in the case of women, the vulnerability of older workers worsened during the pandemic. Young people experienced a negligible increase in the probability of being non-employed in 2020/2019 (+0.3). But a significant decline in 2021/2020 of -6.5 percentage points is observed, highlighting a substantial positive change in the likelihood of young people being outside employment. The increase in the non-employment probability of young people in 2020 was in line with expectations, as companies usually adopt a last-in-first-out approach during recessions to reduce the cost of layoffs. The sharp decline in this probability in 2021, on the other hand, was likely a consequence of the active labour market measure ‘My First Salary’, the full implementation of

which began in 2021. The measure provided work engagement for more than 10,000 young people, which contributed to the reduction in their inactivity.

In terms of education level, the marginal effects increased by 0.5 percentage points for people with a low education level and by 1.5 percentage points for those with a high level in 2020/2019. In the next period observed, the probability of being non-employed then increased for people with a low education level by almost 3 percentage points, while it decreased for those with a high level by 2 percentage points. One possible explanation for the increase in the probability for people with a low education level in 2021 is related to the nature of the crisis. In contrast to the first phase, which was characterised by national quarantine, the second phase, which took place at the end of 2020 and in the first half of 2021, was marked by social distancing measures. As a result, people with low levels of education, who are overrepresented in the high-contact sectors (tourism and hospitality, manufacturing, personal care, etc.), fared relatively worse in 2021. The opposite is the case for people with higher education levels. For rural workers, the figure shows no change in marginal effects of being non-employed in 2020/2019 and a deterioration in 2021/2020 as marginal effects increased by 3.5 percentage points. As regards the region, the only region where significant changes in the marginal effects of being outside employment occurred is Vojvodina. In the case of people from this region, the likelihood of being non-employed decreased by 5 percentage points in 2020/2019 and then increased by almost 8 percentage points in 2021/2020. One explanation for this phenomenon lies in the economic structure of the region. Of all the regions observed, Vojvodina has the highest share of the agricultural sector. Even during the strictest lockdown, some exemptions were made for agricultural workers due to the low risk of infection. The lower restriction on movement and the higher ability to work reduced the probability of being non-employed in Vojvodina in 2020. With the easing of movement restrictions in 2021, the probability increased. In closing, the figure shows that for most groups on the labour market in Serbia the difference in the two periods observed was moderate (less than 5 percentage points). Among the analysed categories, statistically significant differences in both periods were found for older workers, individuals with higher education levels, residents of the Vojvodina region, and those from the SouthEast region. Additionally, for female workers, no significant difference was found between the two periods, suggesting relative stability in their labour market outcomes.

Certainly, the most notable change occurred among young people in the 2020–2021 period, in which a very strong statistical significance was observed.[2]

Figure 2. Differences in the estimated marginal effects between years (in pp), total population



Source: Authors' calculations based on LFS data.

Similar to our findings, Vladisavljević and Lebedinski (2023a, 2023b) reported that young workers in Serbia faced an increase in job loss rates during the first year of the pandemic, although this effect was found to be transitory. These authors also found no significant gender disparities for the Serbian labour market in employment effects due to the pandemic; thus, their findings align with our results in the sense that women were not disproportionately affected. Finally, similar to our study, Vladisavljević and Lebedinski (2023a, 2023b) showed that workers with low levels of education experienced a significant decline in employment during the crisis. Considered in the broader context of comparison, the study by Lariau and Liu (2022) examined labour market inequalities in Spain during the COVID-19 crisis, and the authors indicated that women, young

[2] The conclusion on statistical significance is based on the confidence intervals presented in Table 3.

individuals, and workers with a lower level of education were the most affected by the pandemic-induced labour market disruptions. Additionally, another study (Zieliński, 2022) examined the impact of the COVID-19 pandemic on the labour markets of four Central European countries and showed that while the pandemic did not significantly worsen the labour market situation for women, greater challenges were faced by youth, old workers, and people with lower education levels. Thus, the findings of these studies align with the conclusions of our study, highlighting the increased labour market vulnerability of certain groups during the pandemic.

Probit regressions were separately estimated for the female and young population and are presented in Table 4 and Table 5[3]. The probit regression estimation in the case of the female population shows that all the variables included are statistically significant with the expected sign. The results show, for instance, that women from the young and old age groups and women with low education levels experience a higher probability of being non-employed, and that women with higher levels of education and women from rural areas have better chances on the labour market. This is the case in all three years observed, whereby the estimated average marginal effects are particularly pronounced in relation to age, indicating that young and old women are especially vulnerable on the Serbian labour market. For example, in 2020, a young female had a significantly higher likelihood of being outside of employment compared to a prime-aged female, with an estimated average marginal effect of 0.34.

In the case of the young population, the results again show that all the variables included are statistically significant with the expected impact. The probit regression estimation indicates that young women and young people with a low level of education experience a higher probability of being non-employed. The opposite is the case for young people with a high level of education and young people from rural areas. This conclusion is valid in all the three years observed. Among the young population, those with a low level of education represent a particularly vulnerable group, according to the value of the estimated average marginal effect. In 2020, for instance, the fact that a young person had a low level

[3] Unlike in the case of the main model, the estimated coefficients of these probit regressions are not presented here to conserve space but are available upon request.

of education increased the probability of being non-employed by almost 40 percentage points in comparison to a young secondary-educated person.

Table 4. Empirical estimation of factors affecting probability of being non-employed in Serbia, 2019–2021, female population (marginal effects)

Dependent variable	Probability of being non-employed					
Independent variables	2019		2020		2021	
	Marginal effect	95% Conf. interval	Marginal effect	95% Conf. interval	Marginal effect	95% Conf. interval
Young	0.330*	[0.320,	0.337*	[0.326,	0.263*	[0.253,
	(0.005)	0.340]	(0.005)	0.347]	(0.005)	0.273]
Old	0.358*	[0.352,	0.360*	[0.353,	0.357*	[0.351,
	(0.003)	0.363]	(0.003)	0.366]	(0.003)	0.362]
LowEducation	0.129*	[0.121,	0.139*	[0.130,	0.170*	[0.161,
	(0.004)	0.137]	(0.004)	0.147]	(0.004)	0.178]
HighEducation	-0.159*	[-0.169,	-0.138*	[-0.148,	-0.155*	[-0.163,
	(0.005)	-0.150]	(0.005)	-0.129]	(0.005)	-0.146]
Rural	-0.107*	[-0.114,	-0.108*	[-0.116,	-0.070*	[-0.078,
	(0.004)	-0.099]	(0.004)	-0.101]	(0.004)	-0.063]
Vojvodina	0.011**	[0.001,	-0.045*	[-0.056,	0.019*	[0.009,
	(0.005)	0.022]	(0.005)	-0.035]	(0.005)	0.029]
SumadijaWest	-0.034*	[-0.044,	-0.009***	[-0.019,	0.003	[-0.007,
	(0.005)	-0.024]	(0.005)	0.002]	(0.005)	0.013]
SouthEast	-0.014*	[-0.024,	0.013*	[0.002,	-0.025*	[-0.035,
	(0.005)	-0.004]	(0.005)	0.024]	(0.005)	-0.015]
N	57,131		51,976		51,223	

Notes:
(1) average marginal effects from probit regression are estimated;
(2) *, **, *** refer to statistically significant impact at 1%, 5% and 10 % significance levels, respectively;
(3) robust standard errors were estimated;
(4) standard errors in parentheses;
(5) individual weights were included in the estimation;
(6) the reference variables are middle age, secondary education, urban area, Belgrade region.

Source: Authors' calculations based on LFS data.

The previous results, unrelated to the pandemic, show that in the labour market of Serbia, young women and young people with a low education level are the groups whose position is the worst in terms of being employed. This is consistent with the findings of the official statistics and results of previous studies dealing

with this issue. It would be expected then that these groups would be more vulnerable to crises, and that the negative effects of the pandemic should be particularly pronounced for these groups. To test this assertion, the differences in the observed marginal effects in 2020 versus 2019 and in 2021 versus 2020 were calculated to gain an insight into the changes that occurred in these two periods.

Table 5. Empirical estimation of factors affecting probability of being non-employed in Serbia, 2019–2021, young population – 15–29 (marginal effects)

Dependent variable	Probability of being non-employed					
Independent variables	2019		2020		2021	
	Marginal effect	95% Conf. interval	Marginal effect	95% Conf. interval	Marginal effect	95% Conf. interval
Female	0.144* (0.006)	[0.131, 0.156]	0.149* (0.007)	[0.136, 0.163]	0.151* (0.007)	[0.137, 0.164]
LowEducation	0.352* (0.007)	[0.338, 0.366]	0.380* (0.008)	[0.364, 0.395	0.379* (0.008)	[0.363, 0.394]
HighEducation	-0.192* (0.009)	[-0.210, -0.174]	-0.188* (0.010)	[-0.206, -0.169]	-0.197* (0.010)	[-0.217, -0.177]
Rural	-0.123* (0.006)	[-0.136, -0.110]	-0.121* (0.007)	[-0.134, -0.107]	-0.119* (0.007)	[-0.133, -0.105]
Vojvodina	-0.029* (0.010)	[-0.048, -0.010]	0.058* (0.010)	[0.038, 0.077]	0.087* (0.010)	[0.066, 0.107]
SumadijaWest	0.056* (0.009)	[0.038, 0.075]	0.086* (0.010)	[0.067, 0.106]	-0.004 (0.011)	[-0.025, 0.017]
SouthEast	0.062* (0.009)	[0.043, 0.080]	-0.004 (0.010)	[-0.024, 0.016]	0.036* (0.010)	[0.016, 0.057]
N	17,160		14,799		14,313	

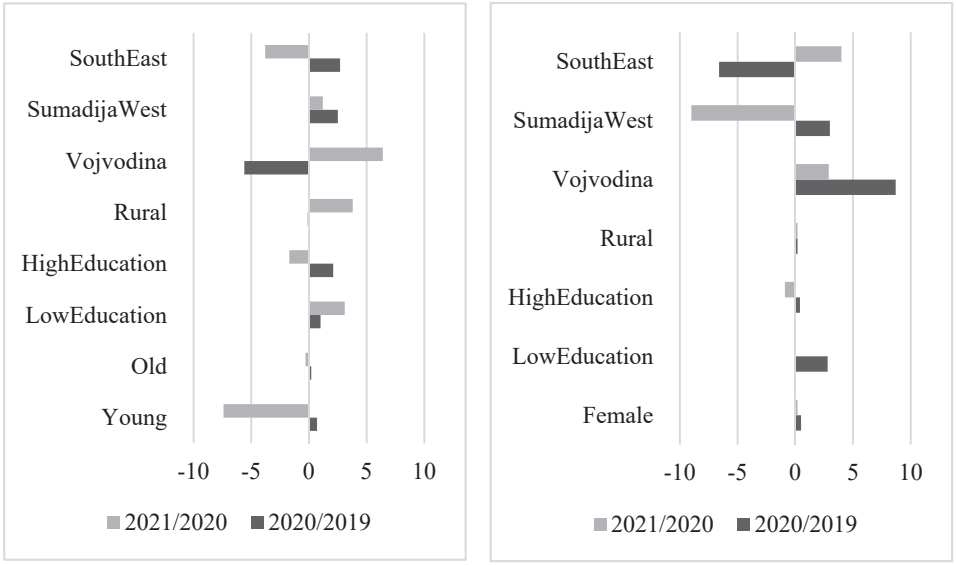
Notes:
(1) average marginal effects from probit regression are estimated;
(2) *, **, *** refer to statistically significant impact at 1%, 5% and 10 % significance levels, respectively;
(3) robust standard errors were estimated;
(4) standard errors in parentheses;
(5) individual weights were included in the estimation;
(6) the reference variables are male, secondary education, urban area, Belgrade region.

Source: Authors' calculations based on LFS data.

Figure 3 depicts the differences in the estimated marginal effects obtained from the probit regressions for the female and the young populations. The figure in the left panel shows than in 2020 compared to 2019, the likelihood of being non-

employed did not increase for various groups within the female population on the labour market in Serbia. When examining the difference between 2021 and 2020, it can be observed that in the case of young women, the probability of being non-employed decreased by 7.5 percentage points (the reference category is prime-aged women). The figure in the right panel indicates that, in 2020 compared to 2019, the difference in marginal effects was not substantial for most subgroups within the young population, except for young people in the Vojvodina region, who experienced an increase in the probability of being non-employed of almost 7 percentage points.

Figure 3. Differences in the estimated marginal effects between years (in pp), female population (left panel) and young population (right panel)



Source: Authors' calculations based on LFS data

7. CONCLUSION

The health crisis facing the world in 2020 was an unprecedented global challenge for at least two reasons. First, the last pandemic of this magnitude, the Spanish flu outbreak, had occurred more than 100 years earlier, with the result that there was insufficient institutional memory to prepare states for an effective response. Second, the world was far less globalised and interconnected at the time of the

Spanish flu outbreak, which means the measures to prevent the spread of the virus must have been markedly different. Like other countries in the world, Serbia faced uncertainty in two respects – how to prevent the spread of the virus, and what measures to implement to mitigate the impact of the health crisis on the economy and population.

The aid package introduced by the Serbian government was extremely generous, with the decision to give more weight to universality than selectivity when designing the measures. Guided by the logic that insisting on a precise targeting of vulnerable groups in a short period of time would lead to major inclusion and exclusion errors, they opted for universality, at least when it came to the most important stimulus measures for the economy and the population. Since the share of the population/workers in most of the key measures was relatively high, it was obvious that the performance of the economy would largely depend on the measures themselves.

Seen from this distance in time, it can be said that the government was relatively successful with its intentions. Gross domestic product fell only slightly in 2020, while the key indicators on the labour market actually improved – the employment rate of the working-age population rose and the unemployment rate fell. Nevertheless, it is already clear from the macro data that certain groups on the labour market fared significantly worse than others. Although overall employment remained unchanged, a large number of precarious workers, for example, lost their jobs, i.e. those engaged through non-standard work arrangements, on fixed-term contracts, and employees working in the informal labour market.

Despite the decline in unemployment, however, there was a significant increase in inactivity. This is an important fact that distinguishes the pandemic crisis from other recessions in economic history (Organisation for Economic Co-operation and Development [OECD], 2021). To find out which groups of workers were most affected by leaving employment, it was necessary for us to look beyond the macro data. Therefore, we carried out an econometric analysis based on microdata from the LFS. As it turns out, the COVID-19 pandemic did not have a strong negative impact on most vulnerable groups, as the probability of being non-employed for most of them did not differ significantly before and during the

pandemic years. However, some deterioration in the relative position was observed for young and older people, as well as those with a lower level of education. A strong government response helped young people to reduce the probability of non-employment even below the pre-pandemic level. On the other hand, the government's measures were not as effective when it came to targeting the elderly and people with low levels of education, which is why their relative position deteriorated further in 2021.

It is fair to say that the groups we have singled out as most affected by the crisis would likely have fared much better if the state had opted for selective measures aimed at them. The following represent some of these possible options: subsidies for the most vulnerable companies instead of all companies, including those operating in the online environment even under regular conditions; a more generous programme for young people, such as 'First Chance' in 2009, which guaranteed employment, instead of 'My First Salary', which did not include a work obligation; more support for the unemployed, especially those from such hard-to-employ categories as older people and people with a low level of education, instead of universal support for the entire population. However, this type of government response would most likely result in somewhat slower economic growth and lower overall labour market performance. It was the strong universal stimulus to the population that primarily helped to maintain and perhaps even increase aggregate demand. Without it, the selective measures on the supply side would certainly have been less effective.

REFERENCES

Almenfi, M., Gentilini, U., Orton, I., & Dale, P. (2020*). Social Protection and Jobs Responses to COVID-19: A Real-Time Review of Country Measures*. Washington, DC: World Bank.

Ando, M. S., Balakrishnan, M. R., Gruss, B., Hallaert, M. J. J., Jirasavetakul, L. B. F., Kirabaeva, K., Klein, N., Lariau, A., Liu, L. Q., Malacrino, D., Qu, H., & Solovyeva, A. (2022). *European Labor Markets and the COVID-19 Pandemic: Fallout and the Path Ahead*. Washington DC: International Monetary Fund.

Arnott, R. (1998). Economic theory and the spatial mismatch hypothesis. *Urban Studies*, *35*(7), 1171–1185.

Ashton, D. N., & Maguire, M. J. (1984). Dual labour market theory and the organisation of local labour markets. *International Journal of Social Economics*, *11*(7), 106–120.

Bruckmeier, K., Peichl, A., Popp, M., Wiemers, J., & Wollmershäuser, T. (2021). Distributional effects of macroeconomic shocks in real-time: A novel method applied to the COVID-19 crisis in Germany. *The Journal of Economic Inequality*, *19*(3), 459–487.

Cortes, G. M., & Forsythe, E. (2023). Heterogeneous labor market impacts of the COVID-19 pandemic. *ILR Review*, *76*(1), 30–55.

Government of the Republic of Serbia. (2020a). *Odluka o proglašenju vanrednog stanja* [Decision on declaring a state of emergency]. *The Official Gazette of the Republic of Serbia*, No. 29/2020.

Government of the Republic of Serbia (2020b). *Uredba o fiskalnim pogodnostima i direktnim davanjima privrednim subjektima u privatnom sektoru i novčanoj pomoći građanima u cilju ublažavanja ekonomskih posledica nastalih usled bolesti Covid-19* [Decree on tax breaks and direct benefits for private sector companies and financial support for citizens to mitigate the economic consequences of the COVID-19 disease]. *The Official Gazette of the Republic of Serbia*, No. 54/2020.

Gregg, P., & Tominey, E. 2005. The wage scar from male youth unemployment. *Labour Economics*, *12*(4), 487–509.

International Labour Organization. (2020). *Covid-19 and the World of Work: Rapid Assessment of the Employment Impacts and Policy Responses – Serbi*a. https://www.ilo.org/publications/covid-19-and-world-work-rapid-assessment-employment-impacts-and-policy-1

International Monetary Fund. (2021, July 2). *Policy responses to Covid-19.* https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19

Khamis, M., Prinz, D., Newhouse, D., Palacios-Lopez, A., Pape, U., & Weber, M. (2021). *The early labor market impacts of COVID-19 in developing countries.* (Policy research working paper, 9510). World Bank.

Lariau, A., & Liu, L. Q. (2022). *Inequality in the Spanish labor market during the COVID-19 crisis.* (IMF Working Paper, WP/22/18).

Lee, S. Y. T., Park, M., & Shin, Y. (2021). *Hit harder, recover slower? Unequal employment effects of the COVID-19 shock*. (Working paper No. w28354). National Bureau of Economic Research.

Ministry of Finance of the Republic of Serbia. (2020, June 8). *Mali: Završava se isplata 100 evra, ispunili smo dato obećanje* [Mali: The payment of 100 euros is completed, we have fulfilled our promise]. https://mfin.gov.rs/aktivnosti/mali-zavrsava-se-isplata-100-evra-ispunili-smo-dato-obecanje

Organisation for Economic Co-operation and Development. (2021). *OECD Employment Outlook 2021: Navigating the COVID-19 Crisis and Recovery*. Paris: OECD Publishing.

Peck, J. A. (1989). Labour market segmentation theory. *Labour & Industry*, *2*(1), 119–144.

Statistical Office of the Republic of Serbia. (2021). Labour Force Survey 2019-2021.

Vladisavljevic, M., & Lebedinski, L. (2023a). Left behind in Covid times: The impact of the pandemic on job loss and job finding rates of vulnerable groups in Serbia. *Applied Economic Analysis*, *31*(93), 147–161.

Vladisavljevic, M., & Lebedinski, L. (2023b). *Social Stability in Serbia Challenged? Effects of the First Year of COVID-19 Pandemic on The Labour Market and the Position of Vulnerable Groups in Serbia*. Belgrade: Institute of Economic Sciences.

World Bank. (2020). *Western Balkans regular economic report, no. 17, spring 2020: The economic and social impact of COVID-19.* https://openknowledge.worldbank.org/server/api/core/bitstreams/c333579d-5027-5bb1-8120-a7b5e97d8977/content

World Bank. (2021). *Western Balkans regular economic report, no. 19, spring 2021: Subdued recovery.* https://openknowledge.worldbank.org/server/api/core/bitstreams/fef49f21-9a11-5d1b-9d70-5adea226e601/content

Young P. Hong, P., & Pandey, S. (2007). Human capital as structural vulnerability of US poverty. *Equal Opportunities International*, *26*(1), 18–43.

Zieliński, M. (2022). The effect of the COVID-19 pandemic on the labor markets of the Visegrad countries. *Sustainability*, *14*(12), 7386.

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APPENDIX

Table A1 Descriptive statistics, 2019–2021 (15+)

2019					
Variable	Obs	Mean	Std. Dev.	Min	Max
Employed	110320	.489	.499	0	1
NonEmployed	110320	.510	.499	0	1
Male	110320	.482	.499	0	1
Female	110320	.517	.499	0	1
Young	110320	.190	.392	0	1
Old	110320	.408	.491	0	1
Middle	110320	.400	.490	0	1
LowEducation	110320	.290	.453	0	1
MiddleEducation	110320	.513	.499	0	1
HighEducation	110320	.196	.397	0	1
Urban	110320	.599	.490	0	1
Rural	110320	.400	.490	0	1
Belgrade	110320	.242	.428	0	1
Vojvodina	110320	.267	.442	0	1
SumadijaWest	110320	.276	.447	0	1
SouthEast	110320	.212	.409	0	1
2020					
Employed	100008	.491	.500	0	1
NonEmployed	100008	.509	.500	0	1
Male	100008	.482	.500	0	1
Female	100008	.518	.500	0	1
Young	100008	.189	.391	0	1
Old	100008	.410	.492	0	1
Middle	100008	.401	.490	0	1
LowEducation	100008	.282	.450	0	1
MiddleEducation	100008	.518	.500	0	1
HighEducation	100008	.199	.399	0	1
Urban	100008	.589	.492	0	1
Rural	100008	.411	.492	0	1
Belgrade	100008	.244	.430	0	1
Vojvodina	100008	.276	.447	0	1
SumadijaWest	100008	.212	.408	0	1
SouthEast	100008	.268	.443	0	1

2021					
Employed	98,473	.486	.499	0	1
NonEmployed	98,473	.509	.499	0	1
Male	98,473	.482	.499	0	1
Female	98,473	.517	.499	0	1
Young	98,473	.186	.389	0	1
Old	98,473	.411	.492	0	1
Middle	98,473	.401	.490	0	1
LowEducation	98,473	.275	.446	0	1
MiddleEducation	98,473	.518	.499	0	1
HighEducation	98,473	.205	.404	0	1
Urban	98,473	.585	.492	0	1
Rural	98,473	.414	.492	0	1
Belgrade	98,473	.245	.430	0	1
Vojvodina	98,473	.210	.407	0	1
SumadijaWest	98,473	.267	.442	0	1
SouthEast	98,473	.275	.446	0	1

Source: Authors' calculations based on LFS data.

Table A2 Probit regression estimates, 2019–2021

2019					
NonEmployed	Coef.	St.Err.	[95% Conf. interval]		Sig.
Female	.345	.008	.329	.361	*
Young	1.09	.013	1.065	1.114	*
Old	1.234	.009	1.216	1.253	*
LowEducation	.447	.01	.428	.467	*
HighEducation	-.381	.012	-.404	-.358	*
Rural	-.411	.009	-.429	-.394	*
Vojvodina	.011	.013	-.014	.036	
SumadijaWest	-.105	.012	-.13	-.081	*
SouthEast	-.032	.012	-.056	-.007	**
Constant	-.666	.013	-.69	-.641	*
Pseudo R-squared	0.200				
Number of obs.	110320				

** p<.01, ** p<.05, *** p<.1*

2020					
NonEmployed	Coef.	St.Err.	[95% Conf. interval]		Sig.
Female	.324	.009	.307	.341	*
Young	1.109	.014	1.083	1.136	*
Old	1.277	.01	1.257	1.296	*
LowEducation	.469	.011	.448	.49	*
HighEducation	-.332	.012	-.356	-.308	*
Rural	-.415	.01	-.434	-.397	*
Vojvodina	-.158	.013	-.184	-.133	*
SumadijaWest	-.005	.013	-.031	.02	
SouthEast	.023	.013	-.004	.049	***
Constant	-.686	.013	-.712	-.66	*
Pseudo R-squared	0.204				
Number of obs.	100008				

** p<.01, ** p<.05, *** p<.1*

2021					
NonEmployed	Coef.	St.Err.	[95% Conf. interval]		Sig.
Female	.339	.009	.322	.357	*
Young	.94	.014	.913	.967	*
Old	1.366	.01	1.345	1.386	*
LowEducation	.582	.011	.561	.604	*
HighEducation	-.417	.012	-.441	-.393	*
Rural	-.318	.01	-.337	-.299	*
Vojvodina	.1	.013	.074	.126	*
SumadijaWest	-.012	.014	-.039	.014	
SouthEast	-.077	.013	-.103	-.052	*
Constant	-.759	.013	-.786	-.733	*
Pseudo R-squared	0.231				
Number of obs	98473				

** p<.01, ** p<.05, *** p<.1*

Source: Authors' calculations based on LFS data.