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Left behind in Covid times: the impact of the pandemic on job loss and job finding rates of vulnerable groups in Serbia

Marko Vladisavljevic

*Faculty of Economics, University of Belgrade, Belgrade, Serbia and
Institute of Economic Sciences, Belgrade, Serbia, and*

Lara Lebedinski

Institute of Economic Sciences, Belgrade, Serbia

Abstract

Purpose – This paper aims to analyse COVID-19's effects on job loss and job finding rate in Serbia, focusing on groups with already low employment before the pandemic, such as youth, women, low-educated and rural areas.

Design/methodology/approach – The authors exploit the panel structure of the Labour Force Survey (LFS) data for Serbia to analyse if the impact of the pandemic on transition probabilities was different for vulnerable groups and their counterparts during the first year of the pandemic.

Findings – The results indicate that stagnation in overall employment growth in Serbia during the first year of the COVID-19 crisis resulted from decreases in new hiring rather than increases in job losses. However, trends differed for vulnerable groups. Young workers faced the highest increase in job losses, partly due to their higher shares in informal wage employment. In contrast, decreases in job finding rates were particularly high among low-educated and in rural areas.

Practical implications – After the first year of the COVID-19 pandemic, employment opportunities of vulnerable groups further deteriorated, and already existing labour market inequalities were exacerbated. These effects are partially due to policies implemented to mitigate the crisis, which focused on preserving permanent employment while leaving vulnerable workers and groups unprotected.

Originality/value – The authors investigate the annual effects of the first year of the pandemic in a country with a large informal sector and explore the role of vulnerable groups' job characteristics in transition changes.

Keywords Inequality, Serbia, COVID-19, Labour market transitions

Paper type Research paper

1. Introduction

The COVID-19 pandemic has slowed economic activity and impacted labour markets (Eurostat, 2022). Vulnerable workers, such as informally and temporarily employed,

self-employed and workers in small firms, were more likely to be negatively affected due to lower job security or liquidity (Kochhar, 2021). Additionally, high-contact services were severely hit, whereas other sectors experienced a demand surge (Canton *et al.*, 2021). Groups such as low-educated, youth and women, who already had lower employment before the crisis, were more likely to be affected, as they are more likely to work in vulnerable jobs (Casarico and Lattanzio, 2020; Cowan, 2020). Aside from working in more vulnerable jobs, these vulnerable groups cluster more in high-contact services (Montenovo *et al.*, 2022; Soares and Berg, 2022). Increased responsibilities in the household were an additional burden for the working women (Alon *et al.*, 2020a; Farré *et al.*, 2020), whereas rural population was also more vulnerable due to high shares of informal and seasonal work and as the lockdowns caused massive disruption to agricultural activities (Rawal *et al.*, 2020).

The impact of the pandemic varied between developed, middle-income and developing countries (Alon *et al.*, 2020b; Perugini and Vladisavljević, 2021). From the comparative perspective, Serbia is an interesting case due to high levels of vulnerable types of employment and significant disparities in employment rates for different demographic groups before the pandemic (such as youth and low-educated). Although the overall employment rate in Serbia remained stagnant in 2020, this represented an interruption of favourable trends from previous years. Additionally, employment of young people and low-educated decreased, thus increasing employment disparities between age and education groups. The clustering of the youth, low-educated and those residing in rural areas into vulnerable jobs and sectors apply to the Serbian case as well (Vladisavljević and Lebedinski, 2023). Thus, decreases in the employment of vulnerable groups were likely linked to their precarious position in the labour market. In addition, the policies implemented to mitigate the COVID-19 crisis in Serbia focused on permanent employment, with retention subsidies applied across the entire private sector, regardless of anticipated risks or financial results. Conversely, support measures were not in place to protect vulnerable jobs and groups.

Since the onset of the crisis, many papers have estimated the short-term impacts of COVID-19 on labour market outcomes (Casarico and Lattanzio, 2020; Cowan, 2020; Lemieux *et al.*, 2020; Montenovo *et al.*, 2022), mainly focusing on the initial period of the pandemic. Changes in employment stem from two sources: (1) changes in job loss rates; and (2) changes in opportunities of finding a new job. Soares and Berg (2022) and Koczan (2022) studied the initial phases of the pandemic and found that women, youth and less educated workers were affected more negatively than other groups in terms of higher job loss rates and lower job-finding rates.

Containment measures and interruptions in distribution channels destroyed many jobs and halted the creation of new positions during the pandemic, thus impacting both transitions to and from employment. At the onset of the COVID-19 crisis, there was a dramatic drop in new vacancy postings (Forsythe *et al.*, 2020a; Hensvik *et al.*, 2021; Holgersen *et al.*, 2020) while at the same time, the job search efforts of the unemployed decreased (Balgova, 2021; Forsythe *et al.*, 2020b). Lower job search activity is not common during periods of economic downturns and is explained by fear of infection, limitations in activities of employment services, benefits receipts and other reasons (OECD, 2021). Besides academic, the distinction between changes in job losses and job-finding rates is important as they have different policy implications and require different interventions.

This paper analyses the effects of the COVID-19 pandemic on job loss and job finding rate in Serbia during the first year of the pandemic, focusing on vulnerable groups, such as youth, low-educated, women, and persons from rural areas. We exploit the Labour Force Survey (LFS) panel for Serbia to analyse if the impact of the COVID-19 pandemic on transition probabilities was different for vulnerable groups and their counterparts during

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the first year of the pandemic. We contribute to the literature in several ways. Firstly, we expand the understanding of the distributional and differential impact of the COVID-19 health crisis on a country with a large informal sector. Secondly, by considering the labour market transitions throughout 2020, we investigate the annual effects, which enables us to control for seasonal effects, compared to the previous studies, which only study the initial impact of the pandemic (Koczan, 2022; Soares and Berg, 2022). Thirdly, in contrast to other studies, we systematically compare job losses and job finding of vulnerable groups and empirically explore the role of vulnerable groups' job characteristics in transition changes.

The results indicate that COVID-19 decreased the chances of finding a new job in Serbia, with no changes in the overall job loss rate. However, younger workers (20–29) faced increases in job losses during the first year of the pandemic, partially due to their high shares in informal wage employment. Conversely, the job-finding rate decreased for most groups analysed, with the highest decreases for low-educated and rural areas. These decreases are mainly due to fewer temporary and informal jobs created in agriculture. The results imply that increased employment inequalities after the first year of the COVID-19 pandemic are, at least partially, due to less secure jobs of vulnerable groups and the fact that implemented policies to mitigate the crisis, while extensive efforts to preserve permanent employment have not protected more vulnerable segments of the labour market.

2. Data, variables and sample for the analysis

To analyse the changes in labour market transitions after the first year of the pandemic, we use LFS data from 2017 to 2020. LFS provides nationally representative data on the labour market and is conducted quarterly by the Statistical Office of the Republic of Serbia (SORS). Each rotating group is an independent representative subsample of the population of Serbia (SORS, 2021). The panel structure of the LFS enables us to follow individuals in the same quarters for two consecutive years and record the change in their labour market status, thus controlling for the high seasonality of labour market transitions (Bell and Smith, 2002).

Labour market transitions are defined as outflows from the initial status (in period $t - 1$) towards the final status (in period t) (Eurostat, 2022). Our first dependent variable, *job loss*, takes the value 1 if the person employed [1] in period $t - 1$ does not have a job in period t and value 0 if the person remains employed in period t. Conversely, our second dependent variable – *job finding* – takes the value 1 if the person not employed in period $t - 1$ has found the job in period t and value 0 if still out of work in period t. When used in transition models as dependent variables, these variables are defined as probabilities of losing and finding a job and formally are defined as P ($Unemp_t|Empl_{t-1}$) and P ($Empl_t|Unemp_{t-1}$). As we are primarily interested in changes in employment, we group unemployed and inactive into one group – non-employed, and later investigate differences in their transitions.

To estimate the impact of the pandemic, we compare the 2019/20 transitions, which represent the treatment (COVID-19 pandemic) and the 2018/19 transitions, which represent the control period. We further use 2017/18 transitions to conduct a placebo test and check for any time trends in the years before the pandemic. We limit the sample to individuals aged 20 to 64 [2] and exclude pensioners based on self-declared status in the LFS. The final sample includes 28,703 (17,017 employed and 11,686 non-employed) for 2018 and 26,003 (16,073 employed, 9,930 non-employed) for 2019. [3]

Data indicate that compared to those who remain employed, those who lost their jobs were more likely to be young (20–29) or older (55–64), to have primary or secondary education, to be married and have children aged 5–9 and less likely to live in urban areas. On the other hand, compared to those who remained out of work, those who found a job are less

likely to belong to the older group (55–64), less likely to have primary and more likely to have tertiary education and less likely to be female (for more details see Tables A2 and A3 in the Online Appendix [4]).

Descriptive statistics indicate that the increase in the job loss rate in 2020 was negligible by 0.2 percentage points (p.p.) (from 5.8% to 6%). Conversely, the decrease in job finding rate in 2020 was significant – 3.1 p.p. (from 24.5 to 21.3%, Table 1). Detailed transition probabilities suggest that the job loss rate increased only for young workers (by 2 p.p.), whereas for other groups, it remained unchanged. On the other hand, the job-finding rate decreased in most of groups, with the highest decrease for rural areas (5.3 p.p.), men (4.5 p.p.) and those with primary education (3.6 p.p., for more details and significance of the difference, see Table A4 in the Online Appendix). These changes represent descriptive statistics, and in the next section, we describe the econometric model that estimates the changes in transitions by accounting for differences between the groups.

		Transition period $(t-1/t)$	
Variable	Definition	2018/19	2019/20
Job loss rate	$P(\text{Unemp}_t \vert \text{Empl}_{t-1})$	5.8%	6.0%
Job finding rate	$P(\text{Empl}_t \vert \text{Unemp}_{t-1})$	24.5%	21.3%
Source: Authors' calculation based on LFS data			

Table 1.
Transition probabilities in 2019 and 2020

3. The changes in labour market transitions of vulnerable groups during the pandemic

3.1 Baseline econometric model

We use a heterogeneous impact analysis to identify which groups faced the most significant changes in the labour market transitions due to the pandemic. To estimate the impact of the pandemic, we compare the 2019/20 transitions, which represent the treatment (COVID-19 pandemic), to the 2018/19 transitions, which represent the control period. To estimate if the impact of the pandemic was heterogeneous, we compare vulnerable groups (those more likely to be hit by the pandemic) and their non-vulnerable counterparts based on their socio-demographic characteristics (less likely to be hit by the pandemic). We analyse the difference in changes between age groups (vulnerable: young: 20–29 and old: 55–64 workers), education levels (vulnerable: primary), settlement types (rural – vulnerable) and genders (women – vulnerable). We use the same baseline model for both likelihoods of losing and finding a job.

More formally, we estimate the following models:

$$\Delta s_{it} = \beta_0 + group_{it}'\beta_1 + \beta_2 T_{19/20} + \left(group_{it} * T_{19/20}\right)'\beta_{12} + X_{it}'\delta + \lambda\, IMR_i + \varepsilon_{it},$$
$$i = 1, \ldots, n; t = 18/19, 19/20 \tag{1}$$

where Δs_{it} represents transition probability for individual i in the period t. Depending on the initial status, this is the likelihood of losing (for employed in $t-1$) or finding a job (for non-employed in $t-1$). Indicator variable $T_{19/20}$ takes the value 1 for 2019/20 transitions and 0 for 2018/19. The vector X_{it} contains the above-mentioned demographic characteristics (age, education, settlement and gender) as well as region-fixed effects (NUTS 2 regions), marital

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status and the number of children (detailed definitions of variables used in the models with are available in Table A1 in the Online Appendix).

Coefficient β_{12} next to the interaction term $group_{it} * T_{19/20}$ estimates the heterogeneous impact of the pandemic on transition probabilities for vulnerable and non-vulnerable groups. We estimate the heterogeneous effects for each of the four demographic characteristics separately. In each estimation, group affiliation interacts with the time variable $T_{19/20}$ to capture the difference in transition changes for each group. For example, when we focus on differences in transition changes of different age groups, the term $group_{it}$ represents two indicator variables – for prime-age (those aged between 30 and 54 years) and older workers (aged 55–64 years), with young workers (aged 20–29) representing the baseline category. We present our main results as *change in the probability of losing and finding a job* after the first year of the pandemic, i.e. the marginal effect of $T_{19/20}$ variable overall and for each demographic group we analyse.

The final term λIMR_i in equation (1) represents correction for sample bias due to selection into employment. As mentioned previously, the sample for job loss model consists of employed, whereas the sample for job finding model includes those who were not employed in the initial period $(t - 1)$. As the selection into employment is non-random, we correct for potential selection bias by using a two-step Heckman correction (Heckman, 1979). In the first step, we estimate the probability of employment separately for each period and gender, conditional on age group, district, quarter, educational level, marital status and number of children. In the second stage, we compute the inverse Mills ratio (IMR_i) and add it to equation (1), with the effect of employment selection λ estimated jointly with other model components. Identification in the selection model relies on the inclusion of more detailed territorial structures, which account for employability in local labour markets, and is further strengthened by estimating selection equations separately for each gender, quarter and year, with additional identification stemming from the functional form of first stage regressions. The coefficients in equation (1) are estimated using the probit model, with a Huber/White/sandwich correction for the potential bias in the standard errors (White, 1980).

As part of a robustness check, we conducted a placebo test to investigate whether there were any pre-COVID time trends. In the placebo test, we use 2017/2018 as a pseudo-control period and transitions in 2018/19 as a pseudo-treatment period. In other words, we want to test if the changes that occurred between 2018/19 and 2019/20 can be attributed to the pandemic or represent the long-term dynamics of the labour market in Serbia.

3.2 Baseline results

The estimates from equation (1) for the job loss and job finding model are presented in Table 2. In the first column (*overall*), we estimate the coefficients from equation (1) without the interaction term to calculate the average change in transition probabilities. In Columns 2–5, the titles of the columns represent the group we are focusing on within that estimation, i.e. group which is interacted with $T_{19/20}$ time variable in equation (1), as we investigate differences between groups separately for each demographic characteristic.

We use the estimated coefficients from Table 2 to calculate the marginal effects of the time variable ($T_{19/20}$) overall and for each group, i.e. the changes in the probability of losing and finding a job after the first year of the pandemic. Marginal effects are presented in Figure 1. After the first year of the pandemic, the likelihood of losing a job increased by insignificant 0.4 p.p. On the other hand, the likelihood of finding a job decreased by 3.1 p.p. (Figure 1, column overall). The results, thus, indicate that interruption of overall employment growth in Serbia in 2020 resulted from a decrease in possibilities of finding a job while, on average, job losses were not more frequent than in the previous period.

Table 2 (panel job loss model) suggests a heterogeneous effect of the pandemic on job loss for age groups, whereas we find no evidence of differences in effects for education

	1 All	2 Age	3 Education	4 Settlement	5 Gender
Job loss model					
$T_{19/20}$	0.034	0.139**	0.015	0.025	0.034
Aged 30–54 $* T_{19/20}$		−0.127**			
Aged 55–64 $* T_{19/20}$		−0.125*			
Secondary ed. $* T_{19/20}$			0.017		
Tertiary ed. $* T_{19/20}$			0.042		
Urban $* T_{19/20}$				0.016	
Female $* T_{19/20}$					−0.001
Observations	31,722	31,722	31,722	31,722	31,722
Job finding model					
$T_{19/20}$	−0.105***	−0.071	−0.081*	−0.171***	−0.146***
Aged 30–54 $* T_{19/20}$		−0.038			
Aged 55–64 $* T_{19/20}$		−0.068			
Secondary ed. $* T_{19/20}$			0.030		
Tertiary ed. $* T_{19/20}$			0.050		
Urban $* T_{19/20}$				0.127***	
Female $* T_{19/20}$					0.074
Observations	15,059	15,059	15,059	15,059	15,059

Table 2.
Estimation of the job loss and job-finding model

Notes: Table displays the coefficients from job loss and job finding models estimation (equation (1), probit estimates). Estimates in rows $T_{19/20}$ represent β_2 coefficients, while other rows represent of the interaction coefficients β_{12}. Full estimation with robust standard errors, effects of covariates and goodness of fit statistics are presented in Tables A5 and A6 in the Online Appendix. Significance levels: ***$p < 0.01$, **$p < 0.05$, * $p < 0.1$
**Source:** Authors' calculation based on LFS data

groups, settlement types and genders. When translated into changes in transition probabilities, results suggest that the job loss rate increased significantly during the first year of the pandemic for young people (by 1.9 p.p.), whereas there were no significant changes for prime-age and older workers or other demographic groups (Figure 1, left).

Conversely, the COVID-19 pandemic had a different impact on job finding for settlement groups, while for other groups interaction is insignificant (Table 2, panel job finding model). When translated into changes in transition probabilities (Figure 1, right), results indicate that in the first year of the COVID-19 pandemic job finding rate decreased in rural areas (by 5.3 p.p.), whereas in urban areas the effect was insignificant. Although interaction effect in Table 2 for education, age and gender are not significant marginal effects (Figure 1, right) indicate (1) a higher decrease in the job-finding rate for workers with primary (by 3.9 p.p.) and secondary education (by 3.2 p.p.), than for tertiary education where the effect insignificant; (2) a higher effect for the prime and older age groups (by 3.1 and 3.6 p.p.), whereas for the youth the decrease of 2.3 p.p. was not significant; and (3) higher effect for men – by 4.6 p.p. than for women – 2.0 p.p., although estimation results in Table 2 suggest this difference is not statistically significant.

Before continuing, we briefly focus on the covariates' effects (for estimates, see Tables A5 and A6 in the Online Appendix). The results indicate that losing a job is more likely for younger (aged 20–29), low-educated workers, in urban areas, among singles, and those with children aged zero to four years. On the other side, the likelihood of finding a job decreases with age and education and is higher in Belgrade, urban areas, for men and married persons. Selection terms in both equations have expected signs: inverse Mills ratio for selection into employment has a positive association with job losses, indicating that losing a job is more likely for the person with lower
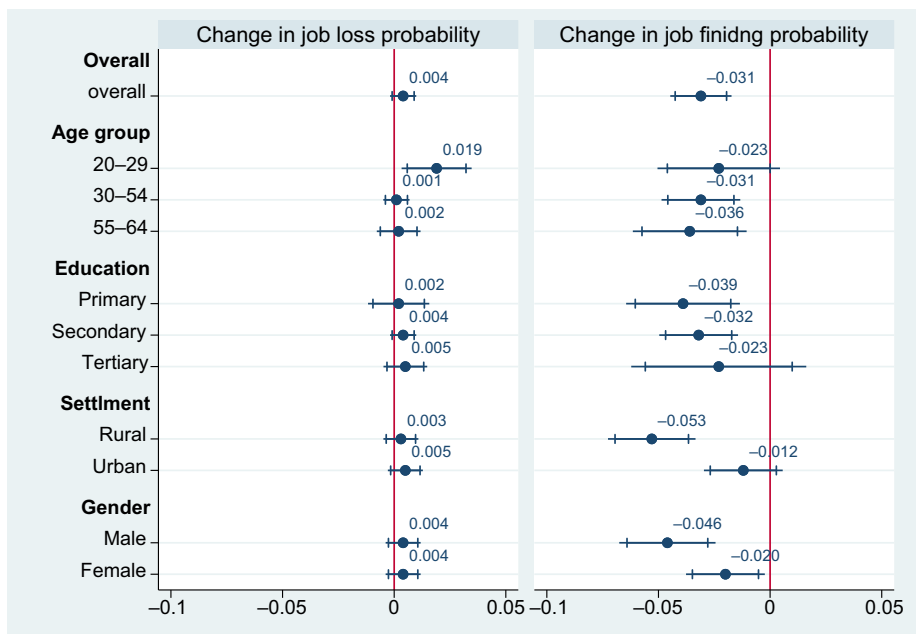
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Notes: Dots represent marginal effects calculated based on the probit model (in percentage points). Lines represent a 90% (line between vertical markings) and 95% confidence intervals (full line). Based on estimation results available in Table 2
Source: Authors' calculation based on LFS data

employment probability, and negative correlation with job finding, indicating that finding a job is more likely for persons with a higher employment probability.

Placebo test which analyses the changes in the job loss and job finding rates between 2017/18 and 2018/19, suggests that overall, there were no changes in the likelihood of job loss and job finding between 2017/18 and 2018/19, thus confirming the parallel trends assumption. Results also suggest that there were no significant changes in the job loss or job finding rates for the groups we analysed (Figure A1 in the Online Appendix).

3.2.1 Splitting the sample of non-employed into unemployed and inactive. In the previous part of the analysis, unemployed and inactive are put into one group – non-employed to study overall changes in the job loss and job finding rates. This decision was made as we focus on overall changes in employment rather than the labour market status after the job loss or prior to job finding.

In this section, we first split the analysis of transitions from employment (i.e. job losses) to transitions from employment to unemployment and from employment to inactivity. The results suggest that transition from employment to unemployment during 2020 was lower than in the previous year, by 0.4 p.p., transition from employment to inactivity increased by 0.8 p.p. (Figure A2 in the Online Appendix). This indicates that during the first year of pandemic workers who lost their jobs were more likely to choose inactivity than unemployment by about 1.2 p.p. than in a stable period. This finding is in line with the evidence of lower job search efforts during the pandemic (Balgova, 2021; Forsythe *et al.*, 2020a; Hensvik *et al.*, 2021). The same pattern of

results applies to most of the groups. One exception is young people whose transitions to inactivity increased, with no decrease in transitions to unemployment.

Secondly, we split the analysis of transitions to employment (i.e. job finding) to the analysis of transitions from unemployment to employment and from inactivity to employment. Results suggest that overall there are no differences between the trends. Likelihood of transitions to employment decreases by about 2.5 p.p. in 2020, regardless of transitions arising from unemployment or inactivity (Figure A3 in the Online Appendix). These results are replicated for all groups, although in many of the cases the coefficients do not reach significant levels due to smaller sample size. Again, the exception is youth, where change in transitions from unemployment to employment is insignificant and estimated at 0 p.p., whereas the change in transitions from inactivity to employment is estimated at 2.3 p.p. (marginally significant decrease). This might indicate that transitions to employment for youth were mainly impacted by hurdles in transitions from education to employment.

4. Vulnerable jobs as determinants of changes in transitions of vulnerable groups during the first year of the pandemic

Results from Section 3 suggest that COVID-19 crisis in Serbia had a significant impact only on decreasing creation of new jobs, whereas on average job losses have not increased. Job loss increase was significant only for youth (by 1.9 p.p., Figure 1), whereas job finding decrease was present for almost all groups, but particularly high for low-educated and in rural areas. One of the main reasons of vulnerable groups' deteriorating outcomes during economic downturns is the fact that they work more frequently in vulnerable jobs and sectors. In this section, we investigate how vulnerable jobs are associated with higher likelihood of losing a job and lower likelihood of finding work during 2020.

We analyse the implication of demographic group's differences in statuses, sectors, and firm sizes. Differences in employment status/contract type are defined within 5 status categories: 1) permanent formal wage employment; 2) formal self-employment 3) temporary formal wage employment; 4) informal wage employment; and 5) informal self-employment. Secondly, based on NACE classification we differentiate between 6 sectors: Agriculture (Nace Sector A, baseline), Industry (B-F), Trade (G), Contact-Intensive Services (H-I, R-U), Remote-friendly services (J-N) and Public Sector (O-Q). This classification is defined in line with OECD estimates of vulnerability of different sectors in initial stages of the pandemic (Canton *et al.*, 2021). Finally, dummy variable for firm size distinguishes between medium and large firms (11 or more employees) and small firms (10 employees or less) [5].

4.1 Vulnerable jobs and changes in job loss rates of vulnerable groups

To estimate if the increases in job losses of vulnerable groups during 2020 can be explained by differences in statuses, sectors and firm sizes, we extend equation (1) to include the vector of job characteristics (*job_char$_{it}$*) and interact them with the time variable ($T_{19/20}$). The extended model now reads:

$$\Delta s_{it} = \beta_0 + group'_{it}\beta_1 + \beta_2 T_{19/20} + \left(group_{it} * T_{19/20}\right)'\beta_{12} + job\_char'_{it}\beta_3$$
$$+ \left(job\_char_{it} * T_{19/20}\right)'\beta_{13} + X'_{it}\delta + \lambda IMR_i + \varepsilon_{it},$$
$$i = 1, \ldots, n; t = 18/19, 19/20 \tag{2}$$

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The vector of job characteristics (job_char_{it}) includes three sets of indicator variables: status, sector and firm size, which enter equation (2) simultaneously. The interaction term $job\_char_{it} * T_{19/20}$ accounts for the changes in job losses during the COVID-19 pandemic that can be associated with different jobs. If the increase in job loss for vulnerable groups can be explained by the fact that they work in more vulnerable jobs, changes in job losses of vulnerable groups estimated based on equation (2) will be lower than those estimated based on equation (1), where we do not include job characteristics.

Changes in probabilities of losing a job for workers in different statuses, sectors and firm sizes are presented in Figure 2. Likelihood of losing a job for informal wage employees in the first year of the pandemic increased by 4.1 percentage points, whereas the changes in job-finding rates for other statuses were insignificant. From sectorial perspective, the first year of the pandemic increased job losses only in contact intensive sectors (NACE sectors H-I, R-U) by about 1.7 p.p. when compared to the previous year. Finally, we do not observe any changes in the likelihood of losing a job for workers from small and medium and large firms.

On average, young workers are more likely than their counterparts to work as informal wage workers (for more details, see Table A8 in the Online Appendix), and this should, at least partially, account for their higher job losses during the first year of the pandemic. They are also more likely to work as temporary workers; however, this category has not suffered increased
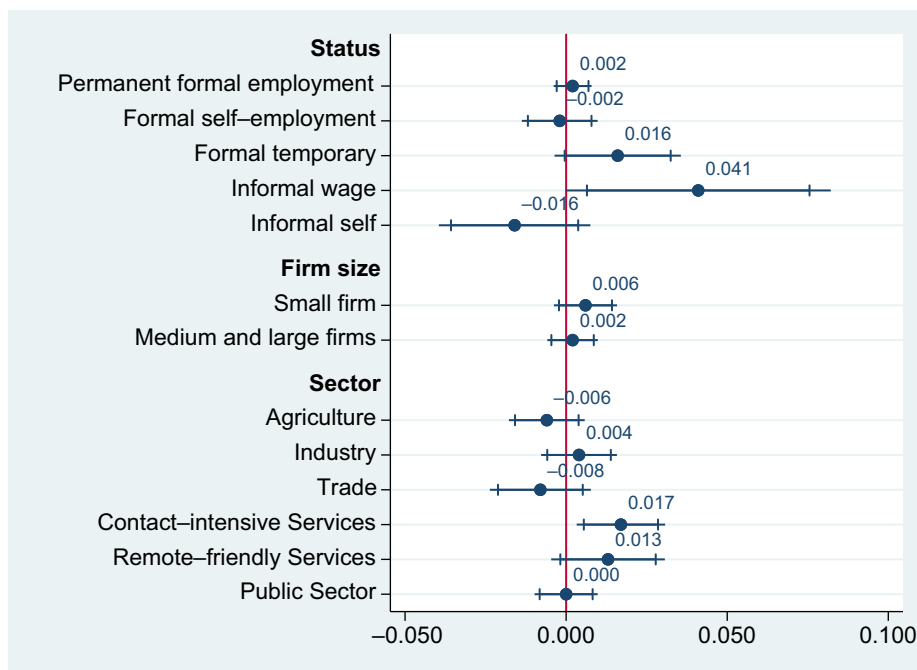
Notes: Dots represent marginal effects calculated based on the probit model (in percentage points). The lines represent 90% (line between vertical markings) and 95% confidence intervals (full line). Based on estimation results available in Table A7 in the Online Appendix
Source: Authors' calculation based on LFS data

Figure 2.
Changes in the job
loss rates by status,
firm size and sector

job losses. On the other hand, vulnerable groups are not more likely to work in contact-intensive sectors for which job losses increased during the first year of the pandemic.

In Figure 3, we compare the changes in job losses overall and for different groups calculated based on equation (1), where we do not control for job characteristics and equation (2), where job characteristics are included. Results indicate that out of 1.9 p.p. of the increased likelihood of losing a job for young workers, about one-third (0.6 p.p.) is due to working in vulnerable sectors. The unexplained part of the increase in job loss for younger workers (1.3 p.p.) can be due to their low tenure, which lowers the costs of their dismissals for employers in terms of lower severance payments and lost employee training. This conclusion could not formally be confirmed as the age groups and working experience are significantly correlated, so including both variables in equation (2) would cause multicollinearity.
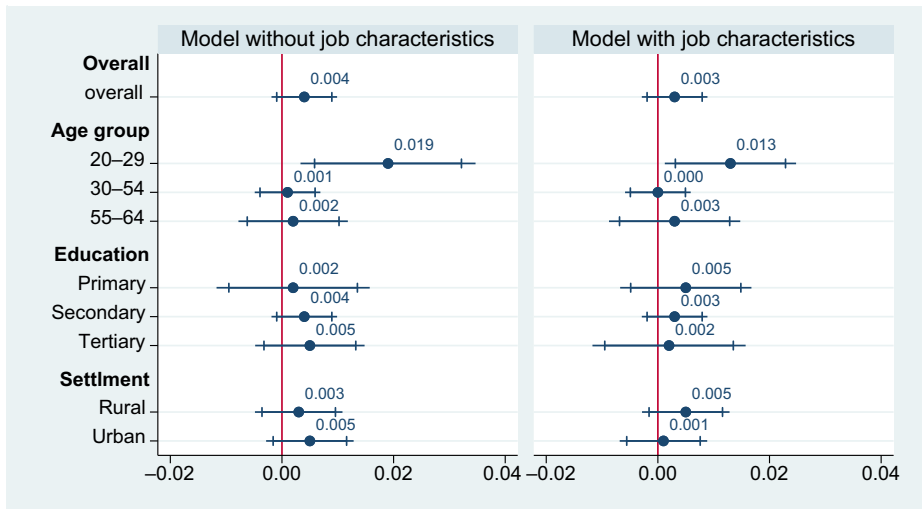

Figure 3.
Changes in the probabilities of losing a job (marginal effects and percent change) in the models without and with interactions with job characteristics

Notes: Dots represent marginal effects calculated based on the probit model (in percentage points). Lines represent 90% (line between vertical markings) and 95% confidence intervals (full line). Based on estimation results available in Tables A1 and A7 in the Online Appendix
Source: Authors' calculation based on LFS data

4.2 Job characteristics and lower likelihood of finding a new job
Transitions to employment decreased for most of the groups investigated, but the decrease was particularly pronounced among low educated and in rural areas. In this section, we analyse for which statuses and sectors this decrease was the highest and how these decreases were distributed across groups. To that end, we extend equation (1) to study transitions to different statuses, firm sizes and sectors:

$$\Delta s_{kit} = \beta_0 + group'_{kit}\beta_1 + \beta_2 T_{19/20} + \left(group_{kit} * T_{19/20}\right)'\beta_{12} + X'_{kit}\delta + \lambda IMR_{it} + \varepsilon_{kit},$$
$$i = 1,\ldots,n; = 0,1,\ldots,K; = 1,\ldots,n; t = 18/19, 19/20 \qquad (3)$$

Compared to equation (1), equation (3) differs only in dependent variable Δs_{kit}, which is now multinominal rather than binary. We estimate separate models for transitions to employment in different statuses (5), firm sizes (2) and sectors (six categories). For each model, estimated via multinominal probit, baseline category ($k = 0$) are persons still out of work in year t. As before, we use estimated coefficients to calculate the marginal effects of time variable ($T_{19/20}$) overall and for the different groups to analyse the changes in transitions during 2020.

Essentially, by estimating equation (3) and calculating the marginal effects, we decompose the overall effect on job-finding rates (Figure 1, right). Thus, for example, the sum of the changes in transitions to employment in different statuses should approximately be equal to the overall estimated change in the job-finding rate. We focus on the impact on youth, low-educated and rural areas (Table 3). Marginal effects have the interpretation of the change in the probability of finding a job in particular status and sector after the first year of the pandemic.

The overall decrease in job finding rate after the first year of the pandemic was 3.1 p.p. By status, the biggest decreases in job finding were recorded among formal temporary workers – by 0.9 and formal self-employed and informal wage employees – by 0.6 p.p. (row *overall* in Table 3). These three statuses account for about two-thirds of the decrease (2.1 out of 3.1 p.p.). From the sectorial perspective, the biggest decreases in job-finding rates were recorded in Agriculture, which accounts for about half of the overall decrease (1.6 p.p. out of 3.1 p.p., Table 2), while decreases for other sectors are insignificant.

For low educated, possibilities of finding a new job were reduced the most in informal wage (by 1.5 p.p.) and formal self-employment (by 0.9 p.p.), whereas, for rural areas, the decrease in job acquisitions was split across all statuses. Interesting trends are observed for youth, for whom there is a lower likelihood of finding jobs in informal wage employment (by 1.4 p.p.), whereas the overall effect is not significant. While practically all the groups were hit by lower availability of jobs in agriculture, this was particularly prominent for low-educated and youth, as it accounts for almost their entire decrease in transitions to

	Overall	Youth	Low ed.	Rural
Change in the likelihood of finding a job	–0.031***	–0.023	–0.039***	–0.054***
Change in the likelihood of finding a job in				
Formal permanent wage employment	–0.004	0.006	–0.005	–0.009**
Formal self-employment	–0.006**	–0.002	–0.009**	–0.013***
Formal temporary employment	–0.009**	–0.010	–0.008	–0.012**
Informal wage employment	–0.006*	–0.014**	–0.015**	–0.010**
Informal self-employment	–0.006	–0.003	–0.001	–0.010
Change in the likelihood of finding a job in				
Agriculture (A)	–0.016***	–0.022***	–0.033***	–0.026***
Industry (B-F)	–0.004	–0.012	–0.011	–0.007
Trade (G)	–0.002	0.010	0.003	–0.010**
Contact-intensive Services (H-I, R-U)	–0.005	–0.002	0.003	–0.001
Remote-friendly Services (J-N)	–0.001	0.001	–0.001	–0.005*
Public sector (O-Q)	–0.002	–0.002	0.001	–0.004

Notes: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors, detailed notes and results for all groups are presented in Table A9 in the Online Appendix. Coefficients represent marginal effects of time variable in equation (3) and have the interpretation of a change in the probability of finding a job in particular status and sector after the first year of the pandemic
Source: Authors' calculation based on LFS data

Table 3.
Changes in the likelihood of transitions from non-employment to different employment statuses in 2018/19 and 2019/20 periods, overall and for selected groups (in percentage points)

employment. Interestingly, only about half of the lower job availability for rural population is in agriculture (2.6 out of 5.4 p.p.), whereas significant effects were recorded in trade and remote-friendly services.

5. Summary, conclusions and policy implications

In this paper, we have analysed the changes in the labour market transitions of the vulnerable groups in Serbia during the first year of the pandemic. Unlike previous studies, which focus on short-term transitions within the first months of the pandemic, we expand the time frame of the analysis to one year and compare vulnerable groups' transitions in the 2019/20 period to the period before the pandemic – 2018/19. Furthermore, we explore the role of vulnerable groups' job characteristics in these transitions.

Results indicate that the interruption of employment growth after the first year of the COVID-19 pandemic is the consequence of a decrease in transitions to employment, i.e. the chances of finding a job (by 3.1 p.p.), whereas the job loss rate remained unchanged. Lower transitions into employment are in line with previous findings indicating lower job vacancies, which are typical for economic downturns and decreases in job search intensity which were specific for the COVID recession (Hensvik *et al.*, 2021; Forsythe *et al.*, 2020b; Balgova, 2021).

Although the average increase in job losses was insignificant, young workers (20–29) faced a significant increase in the job loss rate of 1.9 p.p. during the first year of the pandemic. This increase can partially be attributed to their higher shares in informal wage employment, which is not protected by contracts. In the case of Serbia, lower youth employment during 2020 cannot be attributed to increases in unemployment benefits which led to increased voluntary unemployment among youth in many countries (Martins, 2021), as unemployment benefit was not increased in Serbia.

Lower transitions into employment were observed for almost all subgroups but were particularly pronounced among the low-educated and in rural areas. Lower transitions to employment were mainly caused by lower job availability in the temporary and informal work in the agriculture sector. Although agriculture was not at high risk, the lockdown measures applied across the country impacted the creation of new jobs in this sector. This finding aligns with findings from an independent survey, which indicated that about 31% of job seekers during the pandemic faced difficulties finding seasonal or occasional work that they could perform before the pandemic (Vladisavljević and Lebedinski, 2023). For many of these workers, employment is transitory, and the pandemic has put a significant hurdle in their usual labour market dynamics.

From a broader policy perspective, our results underline the need to address the employment of vulnerable groups during economic downturns. As mentioned, the policies implemented to mitigate the COVID-19 crisis in Serbia focused on permanent employment, with employment retention subsidies applied across the entire private sector, regardless of anticipated risks or financial results during the lockdown. Conversely, those working in informal or formal temporary jobs were left without assistance. As these jobs are typically performed by youth, low-educated and workers from rural areas, they were double disadvantaged: they worked in less secure jobs, thus more prone to lower employment and were not protected by employment retention subsidies or other measures. Therefore, an unintended consequence of employment subsidies was the deepening of labour market inequalities, as vulnerable groups already had low employment rates. While it can be argued that lower informal and temporary employment is positive, the short-term well-being of these workers was not addressed during the pandemic.

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The income stability of these workers could have been preserved to a greater extent by temporarily granting financial support to all unemployed persons registered with the National Employment Service and/or by providing temporary public sector jobs through public works or other activities that produce public goods or services during the pandemic that could have benefited the society. Although these measures could be rather costly, the government has implemented almost universal employment retention measures towards preserving permanent employment, which were also very expensive and whose effectiveness is doubtful and was not a subject of any ex ante estimation. At the same time, it was clear that some industries, such as IT, communications and others, were not under the impact of the COVID-19 crisis. Therefore, better targeting of assistance towards permanent employment could have provided funds to finance programmes targeting vulnerable jobs and preventing further deterioration of the vulnerable group's position and well-being during the first year of the pandemic.

5.1 Limitations

Although SORS regularly indicates non-comparability of series of LFS data (for example, data are not comparable before 2014 and after 2020), in their communication for LFS data from 2020, SORS does not indicate methodological or sampling issues in 2020 that would make data incomparable to previous years (SORS, 2021). Given that recent papers indicate that many countries have had methodology changes (Discenza *et al.*, 2021), this could have also been the case in Serbia. However, there is no information we could use to account for possible changes, and we do not know if this also applies to the case of Serbia.

Notes

1. LFS applies ILO definition of employed; employed are persons who worked at least one hour in the reference week, as well as persons who had employment, but who were absent from work during that week (SORS, 2021).

2. The age variable available in LFS is divided into five-year intervals.

3. Total sample sizes after age and retirement conditions are 66,921 and 61,748 for 2018 and 2019, respectively. The sample for each year consists of nine rotating groups, which rotate on a 2-2-2 principle, which means that each group is (1) selected into the sample for two quarters, (2) than is out of the sample for the two quarters, (3) then once again in the sample for two quarters and (4) out of the sample for good. Effectively four groups rotate into the next year, meaning that about 44.4% of the sample is would be reproduced if there is no attrition, if the groups are equal in sizes. Our final sample represents about 42% of the sample, which indicates that roughly round 2% of the sample is due to the "true attrition", i.e. the fact that the respondents did not answer the LFS questions again. However, as the group information is not available this is only an estimate of the attrition.

4. Interested reader can see tables and figures we refer to in the paper in the Online Appendix available at https://drive.google.com/file/d/1uxVwh-NVv8D3dtylGJQQk78gpuPsJo7i/view?usp=sharing

5. Although there is a more differentiated scale on firm size in LFS, the respondents have options for answers: "don't know, but more than 11 employees" and "don't know but less than 10 employees" and about 11% of the respondents choose this answer. To include all of the respondents, we opted for using only one indicator variable in line with these answers, whereas other answers are recoded in line with them. Firm size is defined based on the question "How many persons including you work at your place of work?"

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Corresponding author
Marko Vladisavljevic can be contacted at: marko.vladisavljevic@ien.bg.ac.rs