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PARENTHOOD AND LABOUR MARKET OUTCOMES IN SERBIA

ABSTRACT: *Using the Labour Force Survey data for the period 2014 to 2018 for Serbia, this paper explores the effect of parenthood on the labour market trajectories of parents, the so-called 'parenthood penalty'. We find that mothers are less likely than non-mothers to be active in the labour market when their children are very young, but this effect is transitory, and mothers of older children are actually more likely to be active than non-mothers. Similarly, we observe that mothers of small children are less like-ly to work overtime than non-mothers, but also that both parents of older children are more likely to engage in overtime work than men and women without children. We find a motherhood penalty in terms of hourly wages for mothers with younger children, but the penalty is not significant as children become older. By contrast, fathers are more likely to be active than non-fathers. We do not find an effect of fatherhood on hours worked or hourly wages. Overall, our results suggest that the motherhood penalty is present in Serbia in the early stages when children are young, but motherhood does not seem to have lasting effects on the labour market participation, hours worked, or wage rates of mothers. We do not find evidence of a fatherhood bonus, but we find that fathers are more likely to be active than non-fathers.*

KEY WORDS: *motherhood penalty, female employment, household economics*

JEL CLASSIFICATION: J16, J13, J31.

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1. INTRODUCTION

Women in Serbia are in a worse position in the labour market than men: they are less likely to hold a job and their salaries are lower than those of their male counterparts. According to the Labour Force Survey, in 2019 the female labour market participation rate in Serbia was 47.1%, while the male participation rate was 62.8%. In 2015 the raw (unadjusted) gender hourly wage gap in Serbia was 5.7% and the adjusted gender hourly wage gap was 12.5%, both in favour of men (Anić and Krstić, 2019).

This paper aims to understand whether and to what extent childbirth affects the labour market position of parents in Serbia and whether it can be related to the gender inequality in the labour market. The evidence from other countries suggests that the motherhood penalty is responsible for at least some of the gender pay gap (Kleven et al., 2019). There are different margins where the difference between females and males can emerge. The extensive margin refers to the level of female labour force participation, the intensive margin refers to the number of hours worked, and there is also the difference in hourly wages. To understand how motherhood changes the labour market opportunities of women we first look at differences between mothers and non-mothers. We then separate mothers into three groups based on the age of the youngest child and compare their labour market outcomes with those of females without children. We rely on cross-sectional data from the Labour Force Survey for the years 2014 to 2018 and control for a large number of individual and regional characteristics. To compare how labour market outcomes change after childbirth for women and men we provide additional evidence on fathers, using the same specification as for mothers.

Our findings suggest that, on average, the labour force participation of mothers does not differ from the participation of non-mothers. However, there is heterogeneity among mothers based on the age of the youngest child. Mothers with younger children are less likely to be active in the labour market and the participation rate increases as their children become older. Mothers of children aged 7 to 15 years are actually more likely to participate in the labour force than non-mothers. In contrast to mothers, fathers are more likely to be active in the labour market than non-fathers and their participation rate does not depend on the age of the child. This suggests that fathers' engagement with children does not vary substantially with the age of the child. Regarding hours worked, we observe that

mothers of younger children work less than non-mothers, but as children become older mothers increase their hours and when their child is aged 7 to 15 they work even more than non-mothers. For males we find that fathers work significantly more hours than non-fathers when their child is in the age group 7 to15. We find a significant hourly wage penalty for mothers of very young children compared to non-mothers, but this difference becomes smaller and insignificant as the children grow older. No hourly wage penalty is observed for fathers.

We contribute to the literature on the motherhood penalty by studying the case of Serbia. Countries have different histories, traditions, and institutional settings, and it is important to understand how these different factors interplay and affect women's position in the labour market in specific settings. This study is the first in the literature to focus on whether motherhood is correlated with female labour market outcomes in Serbia. Our study of the case of Serbia shows that the motherhood penalty need not be persistent over time, in contrast to the literature focusing on Western Europe (Kleven et al., 2019). Additionally, and again contrary to the literature on Western Europe, we show that in Serbia non-mothers and non-fathers have lower participation rates than females and males with children, so lower caring responsibilities seem to enable more leisure time.

Our findings suggest two relevant policies for the Serbian context which should be further explored. First, increasing the availability of childcare for children below the age of three would help mothers of young children increase their labour force participation. Second, a share of parental leave exclusively reserved for fathers should be considered. It has been shown in other countries that this policy can increase fathers' involvement in childcare and housework and make the within-household division more equitable, which in turn can help women focus on paid work in the labour market.

This paper proceeds as follows. Section 2 reviews the related literature, section 3 summarizes the Serbian context, section 4 describes the dataset and provides the descriptive statistics, section 5 gives the methodology, section 6 describes our findings, and section 7 discusses the results and concludes.

2. LITERATURE REVIEW

Childbirth affects the labour supply of women in the short term and reduces their life-time earnings. A large number of papers study this phenomenon, known as the motherhood penalty. Differences in the labour market participation and wages of mothers and non-mothers are found in all OECD countries, but the extent varies (OECD, 2012). The two most important factors affecting the motherhood penalty are policies that affect the work–family balance and cultural norms.

Maternity and parental leave policies and availability of childcare are the most relevant policies shaping female labour supply. A lack of job protection after childbirth can push women out of the labour force (Blau and Kahn, 2013) if they have to decide between career and family. However, the duration of maternity leave should not be too long, because a long leave can worsen mothers' position in the labour market (Schönberg and Ludsteck, 2014). The availability of childcare is a necessary condition for women to be able to return to work. Both the availability and the price of childcare affect female labour supply. Childcare subsidies are an important and effective policy to incentivize women to return to the labour market after childbirth (Givord and Marbot, 2015; Simonsen, 2010), and the quality of available childcare also affects women's decision to return to work. If mothers know that formal childcare meets the needs of their child they will be more willing to use it and return to the labour market. Other policies such as paternity leave and lower marginal tax rates on second earners can also encourage women to return to the labour market (Budig et al., 2016).

Cultural norms shape the institutional setting in each country, but institutional factors cannot explain all the differences between countries in maternal labour force participation. Aside from the indirect effect of institutions, traditions and social norms directly affect mothers' decision of whether, when, and to what extent to return to the labour market. Mothers' employment, and hence the gender gap, is affected by the cultural roles of males and females in the household and at work. In fact, Budig et al. (2012) provide evidence from a cross-sectional study that cultural attitudes amplify associations between parental leave, publicly funded childcare, and maternal employment. If in a setting there is cultural acceptance of working mothers, then supportive policies reinforce maternal employment. However, policies favouring maternal employment are less effective in

conservative settings where mothers are expected to be responsible for childcare and housework.

Most papers studying the effect of parenthood on the gender pay gap discuss this phenomenon from the perspective of mothers. However, there is also evidence that fathers experience a "baby bonus" after childbirth (Hodges and Budig, 2010). There are three potential explanations in the literature for fathers having higher earnings than non-fathers. First, Becker's specialization hypothesis (Becker, 1981) posits that men specialise in market work while women specialise in household work. Alternatively, Gray (1997) provides evidence that more productive men sort into marriage. Evidence from European countries suggests that fathers spending more paternal time report higher earnings than fathers spending less time with their children. This suggests that fathers are either involved in both paid work and childcare or are not involved in either (Smith Koslowski, 2011). Lastly, fathers have higher expenses than non-fathers and have to earn more when children are born. As a result, fathers are incentivised to work and consequently earn more after childbirth.

In recent years, long panel datasets on earnings have become available to researchers, making it possible to study the income of mothers and fathers over a relatively long period after childbirth (e.g., 10 to 20 years). Bertrand et al. (2010) were the first to show how gender differences in earnings emerge after completion of education and at the onset of young professionals' careers. While males and females have similar earnings shortly after completing education, they find that 10 to 16 years after completing an MBA, males have an advantage of 60 log points in terms of earnings. Kleven et al. (2019) use long-spanning panel data to estimate long-term cumulative earnings after childbirth for both fathers and mothers. The authors aim to understand to what extent motherhood and the motherhood penalty (or the equivalent child penalty for mothers) can explain the persistent gender inequality in the labour market. They examine three margins in which mothers can experience penalties in earnings: the extensive margin of labour supply (employment), the intensive margin of labour supply (hours worked), and the wage rate. They find that in the Scandinavian and Germanic countries the extensive margin effects are smaller than the earnings effects, while in the Anglo-Saxon countries (the UK and US) the employment penalty is the main driver of the earnings penalty. Kleven et al. (2020) use the methodology from Kleven et al. (2019)

to study 60 years of parental leave and childcare policy experimentation in Austria. Surprisingly, they find that parental leave and childcare policies do not reduce the gender gap. They argue that gender inequalities are driven by equilibrium features of the labour market and not by public policies.

Cross-country evidence on the motherhood and parenthood penalty is relatively scarce, and estimates are typically based on the data for one country. One important recent study is a meta-analysis of the motherhood penalty by Cukrowska-Torzewska and Matysiak (2020). They analyse studies estimating the motherhood penalty and find that the average motherhood wage gap is around 3.6% to 3.8%. They also find that the residual gap in wages is smallest in Nordic countries, slightly larger in Belgium and France, and largest in "post-socialist countries of Eastern and Central Europe" (specifically Poland and Ukraine) and Anglo-Saxon countries. They also stress that women in the post-socialist countries have among the lowest employment rates in Europe, but despite low childcare availability return to full-time work relatively quickly.

Other evidence on post-socialist countries suggests that after childbirth women in Russia initially experience strong employment penalties (a reduction in employment levels of between 40 and 65 percentage points), and while these penalties are lasting they stabilise at about 6% after five years (Lebedinski et al., 2020). The same study finds no penalties in terms of working hours or hourly wages. The authors explain these findings in terms of the limited availability of non-standard employment options such as part-time jobs, which are a mechanism frequently used in the EU and US to balance family and work life. The authors conclude that in Russia the options for women are limited to either completely withdrawing from the labour force or returning to their previous work.

3. CONTEXT

In Serbia the fertility rate has been falling since the 1990s. In 2020 the average age of first-time mothers was 28.7 years and in 2018 the fertility rate was 1.5 (SoRS, 2019a). Compared to other European countries, the length of maternal and parental leave and the monetary compensation in Serbia are generous. The maternity leave period starts 45 to 28 days before the due date and lasts 3 months. Maternity leave is followed by a parental leave period which lasts 9 months. Maternity leave can only be taken by mothers, while parental leave can be taken by one

of the two parents or shared between them. The compensation for working parents during maternity and parental leave is 100% of monthly average earnings in the 18 months preceding the leave. After the birth of a child, fathers get paid leave of up to 5 working days. While fathers can take parental leave, it is rare that they do so. In 2019, out of a total of 64,399 births, only 328 fathers took parental leave.

One important factor determining the participation rate of mothers of young children is the availability and quality of childcare. Children in Serbia can enter childcare at 6 months. In 2019 the enrolment rate was 28.1% for children aged 0 to 2 years, and 66.4% for children aged 3 to 5 years (excluding the compulsory preschool programme) (SoRS, 2020b). The enrolment rate in compulsory preschool education from age 6 to 7 was 97.4% in 2019 (SoRS, 2020b). The childcare enrolment rate of children aged 0 to 2 is similar to the OECD average (35% in 2017: OECD, 2020), but the preschool enrolment rate is more than 20 percentage points below the OECD average (87.2% in 2017). Public childcare facilities and preschools in Serbia are oversubscribed and availability of preschool places can be an obstacle to female labour force participation. In larger cities this problem could be partly solved by the provision of private preschool education vouchers to families that cannot get places in public preschools (SoRS, 2021). However, there is still excess demand for kindergartens, which makes it more difficult for women to search for and take a job. Preschool education quality is frequently measured by the child-to-teaching-staff ratio.[1] In 2018 the average child-to-teaching-staff ratio for the 3 to 5 year age group was 14.2 in OECD countries and 11.6 in Serbia (OECD, 2020; SoRS, 2019b). Using the child-to-teaching-staff ratio as a proxy for quality, the Serbian preschool education is somewhat better than OECD average.

Finally, let us briefly discuss the social and gender norms in Serbia. Although Serbia is a former communist country with a high female labour force participation rate, it is also a country where most of the housework and child-rearing traditionally falls to the females in the household. Data from 2015 suggest that women in

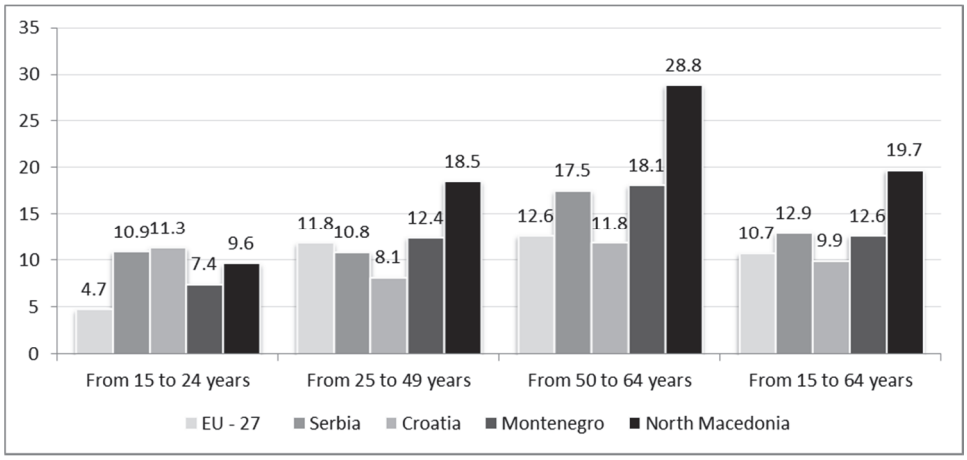
[1] This indicator does not take into account that teachers are not present throughout the working day. For instance, in Serbia, each full-time educational group has 2 full-time teachers and each of them spends 6 hours with the group and they both usually cover the period from 8am to 5pm. The two teachers actually overlap for only 3 hours.

Serbia spend 4 hours and 48 minutes on the household and family per day, while men spend 2 hours 33 minutes (Eurostat, 2019).

In the 2016 Gender Equality Index, Serbia was in the lowest tercile in Europe with a score 10.4 points lower than the EU average (Babović, 2018). The largest differences are in the domain of money, where Serbia's score is 19.4 points lower than EU average, mainly due to elderly women, women living in rural areas, women living in single households, and single mothers all being at high risk of poverty; and in the domain of time, where Serbia's score is 17 points lower than the EU average due to a significantly higher burden of housework and less time available for recreation and participation in cultural or social activities. The lowest difference with the EU is in the labour market, the focus of this paper, where Serbia is only 3.3 points below the EU average, mainly due to small participation gaps and relatively favourable work quality (Babović 2018). For example, women are employed on permanent contracts more frequently than men.

Figure 1 presents the gender employment gap in the EU, Serbia, and selected neighbouring countries in 2019. The total employment gap for the working-age population (15–64) in Serbia of 12.9 percentage points (pp) is 2 pp higher than the EU average of 10.7 pp. However, the employment gap for the 25 to 49 age group, which is closest to the sample that we use to estimate the motherhood penalty (25–45 years), is slightly lower in Serbia (10.8 pp) than the EU-27 average (11.8 pp). Therefore, on average, women aged 25 to 49 in Serbia are not in a less favourable position than women in the EU-27. A similar trend can be observed in all the countries in the region: compared to the EU the difference in gender employment gap is lower for the 25 to 49 age group, and higher for younger and older workers.

Figure 1: Gender employment gap in EU, Serbia, and selected countries, 2019, in percentage points

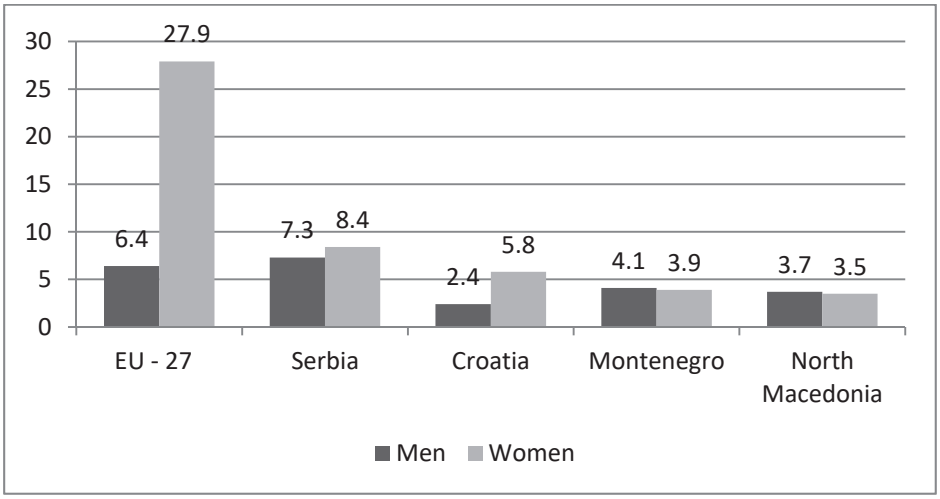


Source: Eurostat database: Labour Force Survey (lfsa_ergan indicator)

Previous research indicates that the lower employment of women in Serbia compared to men is associated with low employment opportunities among women with low levels of education, the higher disincentivizing impact of receiving social transfers, and the presence of young children in the household (Žarković-Rakić & Vladisavljević, 2016)

Figure 2 indicates that women work part-time in Serbia much less than in the EU. Part-time work is frequently used in European countries to achieve family–work balance and to re-integrate mothers in the labour market. In the EU, 27.9% of employed women age 25–49 work part-time, while in Serbia this share is only 8.4%. On the other hand, the share of male part-time workers aged 25–49 in Serbia is 7.3%, slightly higher than in the EU-27. Low shares of part-time work are also characteristic of other countries in the region.

Figure 2: Share of part-time employment by gender in EU, Serbia, and selected countries, 2019, %, age group 25–54



Source: Eurostat database: Labour Force Survey (lfsa_eppgan indicator)

A more disaggregated analysis shows that part-time work in Serbia is predominantly in the agriculture, forestry, and fishing sector, and in households as employers and undifferentiated goods and service-producing activities of households for their own use, where almost two-thirds of workers are employed part-time. In the EU the distribution of part-time work across sectors is much more uniform, with the two sectors dominant in Serbia presenting only 8% of total part-time employment. Previous research indicates that in Serbia part-time work for both genders is much more frequent in informal than formal employment (Žarković-Rakić & Vladisavljević, 2016).

In 2015 the unadjusted gender gap in hourly wages in Serbia was 5.7% (Anić & Krstić, 2019). The gap is relatively stable: it was 6.2% in 2008 and 3% in 2011 (Avlijaš et al., 2013). However, while on average women's wages are lower they have better labour market characteristics than men: higher levels of education, a more favourable occupational structure, and higher share of public sector employment (Vladisavljević et al., 2015). When controlling for these characteristics, the estimated adjusted wage gap in Serbia is higher than the simple difference in

wages. Different estimates from 2008 to 2015 suggest that the adjusted gap is between 9% and 15% (Avlijaš et al., 2013; Žarković-Rakić & Vladisavljević, 2016; Anić & Krstić, 2019).

All the above studies primarily focus on the estimation and explanation of the gender gap in wages and do not explicitly analyse the impact that children have on the wages of mothers and fathers. They account for the impact of children implicitly, typically by using this variable in the selection equation and correcting the wage equation for the effects of the selection.

4. SAMPLE AND VARIABLE DESCRIPTION AND DESCRIPTIVE STATISTICS

This study uses the Labour Force Survey (LFS) for Serbia for the years 2014 through 2018. The LFS is a nationally and regionally (NUTS2 level) representative continuous[2] survey and its goal is to monitor the labour market situation and to deliver internationally established and comparable indicators, such as employment and unemployment rates. The LFS sample is a two-stage stratified sample, with the 2011 Serbian Population Census frame used as a sample frame for the selection of enumeration areas, as first-stage sampling units and households and as second-stage sampling units (SORS, 2020a). The LFS is conducted by the Statistical Office of the Republic of Serbia.

The LFS does not ask explicitly whether adults have children and if so how many. However, the LFS household roster does collect basic socio-demographic information on all household members, including questions on the identification numbers of the child's mother and father (or legal guardian), which enables us to link information on children with their parents if they live in the same household. The LFS is conducted both in-person and over the phone; however, the household roster and basic socio-demographic information on all household members is collected in person by interviewers (SoRS, 2017), so we can be confident that our methodology identifies households with children and that household rosters are a reliable source of information on household members.[3] Using this information,

[2] The survey has been continuous since 2015 in Serbia.

[3] According to LFS estimates from 2018 there were 993,843 children aged 0 to 14 in Serbia. This is very similar to the data provided in the Demographic Yearbook, which suggests that in the same year there were 1,000,596 children (SoRS, 2019a).

we define three groups of interest: 1) mothers and fathers who have own children in the household and whose youngest child is 15 or younger, 2) non-mothers and non-fathers who do not have children (of any age), and 3) parents whose youngest child is older than 15 years, who we exclude from the analysis. The latter decision is based on the fact that older children are more able to take care of themselves and to assist in household chores. Additionally, older children are more likely to have moved out of the household, which increases the likelihood of classifying their parents as non-parents, where instead they should be dropped from the sample as parents of children older than 15.

For the purpose of this study, we restrict the sample to individuals aged 20 to 50 years. We set the lower age limit at 20 for two main reasons. First, there are very few births among women and men younger than 20 years old,[4] and second, individuals below this age are largely still in education (mostly high-school) and so are inactive in the labour market and overwhelmingly do not want to work, indicating that their labour supply is inelastic (Arandarenko et al., 2012). This is particularly true for Serbia, where small jobs that could be performed during education are practically non-existent and in general it is very difficult to balance education and work, so the determinants of their labour supply and wages would be different from those of the general population and bias the regression analysis results.

On the other hand, the decision to set the upper limit at 50 years is motivated by concerns about classifying persons in our sample as non-parents, instead of excluding them from our sample (as parents of children older than 15 years). We can only know that someone is a parent if they live in the same household as their child and we exclude from the analysis parents of children older than 15 years. Since on average there is a strong positive correlation between the age of the parents and the ages of their children (the older the parents the older their children), and since older children are more likely to have moved out of the parental home, it is reasonable to assume that the error of classifying persons as non-parents instead of parents of (absent) older children increases with age of the parents. The average home-leaving age in Serbia was between 30 and 31 years in 2014–2018

[4] The oldest child in our sample was born in 1999 and the youngest in 2018. In 1999 out of all births, only 9.2% of mothers were younger than 20 years (SoRS, 2006). In 2018, 3.8% of births were delivered by mothers younger than 20 years (SoRS, 2019a).

(Eurostat, 2021), largely due to poor financial situation (Milić and Zhou, 2015). This relatively late home-leaving age makes it possible to also include older women in our analysis, e.g., aged 45 to 50, because it is unlikely that their children have left the household.

Table 1 provides descriptive statistics for the sample of mothers and non-mothers jointly and separately. We can see that mothers are somewhat older and less-educated than non-mothers. Most mothers have two children (47.2%), followed by one child (41.1%), while a few have more than two children (11.7%). Non-mothers live with fewer adults in the household than mothers, but this difference is not large. Both mothers and non-mothers live in households with 2 to 3 household members, because many non-mothers still live with their parents. As expected, non-mothers are more prevalent in economically developed parts of the country, namely Belgrade and other urban areas.

Regarding labour market outcomes, mothers are more likely to be both active (74.2% of mothers and 62.9% of non-mothers) and employed (61.1% of mothers and 45.9% of non-mothers). That mothers are more likely to be employed than non-mothers is somewhat unexpected, but could be explained by the composition of the household and mothers' lower reservation wage. The simple comparison shown in Table 1 does not take into account the socio-demographic characteristics of mothers and non-mothers, and these characteristics could explain their different outcomes (differences in age, educational background, etc.) Non-mothers earn a marginally higher monthly salary than mothers, as they are more frequently among those with wages higher than 45,000 RSD (about 14.7% of non-mothers, as opposed to about 13.5% of mothers). At the same time, there is no difference between mothers and non-mothers in the average working hours per week. The vast majority of non-mothers live in households with at least one parent (68.0%) while this is the case for only a small fraction of mothers (10.1%). As a result, mothers have higher expenses and are willing to accept a lower wage, as confirmed by the reservation wage.

Table 1: Descriptive statistics: Mothers and non-mothers

	Total N=29,939	Mother N=13,953	Non-mother N=15,986	p-value
Socio-demographic characteristic				
Age	32.70 (±8.41)	34.80 (±6.32)	30.86 (±9.50)	<0.001
Highest completed educational level				<0.001
Primary school or less	13.1%	16.0%	10.5%	
General or VET secondary school	58.8%	57.3%	60.1%	
College, university, or higher	28.2%	26.8%	29.4%	
Married	48.3%	81.8%	19.1%	<0.001
Number of children				<0.001
No children	53.4%	0.0%	100.0%	
1 child	19.2%	41.1%	0.0%	
2 children	22.0%	47.2%	0.0%	
3 or more children	5.4%	11.7%	0.0%	
Number of adults in household	2.48 (±1.08)	2.67 (±1.09)	2.32 (±1.05)	<0.001
Nuts 2 level				<0.001
Belgrade	25.1%	23.1%	26.9%	
Vojvodina	25.0%	26.0%	24.0%	
Šumadija and Western Serbia	27.2%	27.5%	26.9%	
Eastern and Southern Serbia	22.8%	23.4%	22.2%	
Urban	61.1%	59.1%	62.9%	<0.001
Labour market outcomes				
Active	68.2%	74.2%	62.9%	<0.001
Employed (SoRS)	53.0%	61.1%	45.9%	<0.001
Monthly net wage				<0.001
Less than 17,000 RSD	5.0%	4.2%	6.0%	
More than 17,001 and less than 25,000 RSD	32.3%	33.0%	31.5%	
More than 25,001 and less than 35,000 RSD	29.8%	29.6%	30.1%	
More than 35,001 and less than 45,000 RSD	18.9%	19.8%	17.8%	
More than 45,001 and less than 60000 RSD	9.7%	9.4%	10.1%	
More than 60,001 and less than 80,000 RSD	2.6%	2.6%	2.7%	
More than 80,001 RSD	1.7%	1.5%	1.9%	
Usual numbers of hours worked in a week	41.66 (±6.52)	41.76 (±5.96)	41.55 (±7.09)	0.060

Notes: Data are presented as mean (±SD) for continuous measures, and % for categorical measures.

Table 2 compares fathers and non-fathers. Similar to mothers, fathers are somewhat older and more educated than non-fathers. Most fathers have two children (49.9%), followed by one child (37.8%), while the rest have three or more children (12.3%). In terms of regional distribution there are only small differences between fathers and non-fathers. There are no differences between fathers and non-fathers living in rural and urban settings. Fathers are both more likely to be active and more likely to be employed than non-fathers. Fathers earn more than non-fathers, but they do not work more hours. The lower activity and likelihood of being employed among non-fathers can be explained by household composition and the lower level of expenses: 81.5% of non-fathers live with their parents, whereas this is the case for only 40.3% of fathers.

The labour market outcomes of women depend on the ages of the children.[5] Mothers with younger children generally have more difficulty reconciling work and childcare and therefore they are less likely to be part of the labour force.[6] As children get older, mothers return to work, and this is also confirmed in the Serbian case. Figure 3 shows the participation rate of females and males based on the age of the youngest child. We observe that women with children aged 0 to 2 years have a similar participation rate to non-mothers and the lowest participation rate among mothers. As children age, the likelihood of entering the labour market for women increases. Notably, women with children aged 7 to 15 years have the highest participation rate among all four groups. In contrast to women, men with children have a considerably higher labour market participation rate and the age of the child does not correlate with the likelihood of men being active in the labour market.

5 See, for instance, Grimshaw and Rubery (2015).

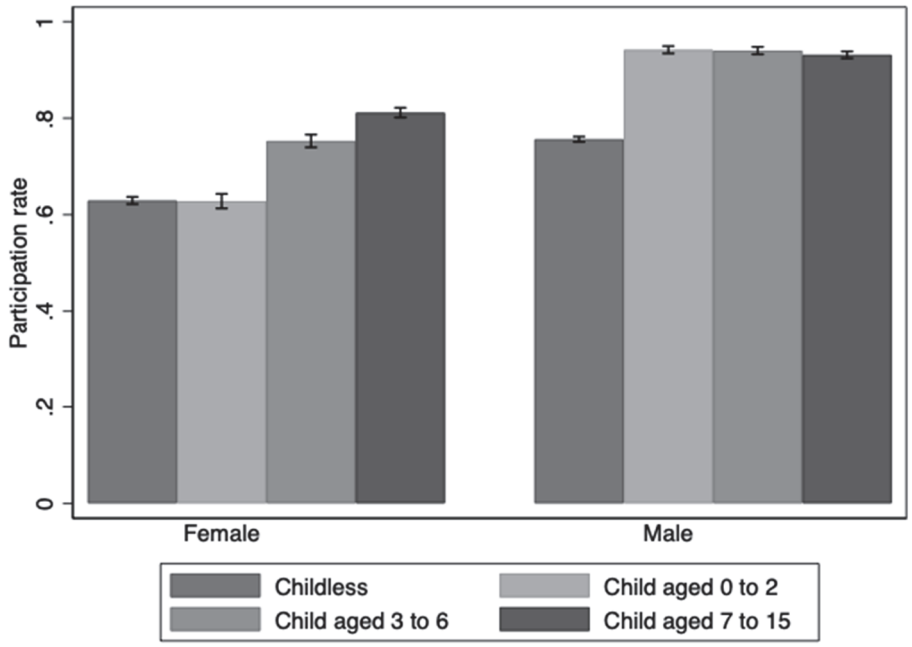
6 Note that the labour force consists of all individuals who are either employed or actively searching for work; i.e., unemployed as defined by the International Labour Organization. The labour force is considered to be the active population.

Table 2: Descriptive statistics: Fathers and non-fathers

	Total N=35,581	Father N=12,168	Non-father N=23,413	p-value
Socio-demographic characteristic				
Age	33.44 (±8.48)	37.62 (±6.05)	31.26 (±8.74)	<0.001
Highest completed educational level				<0.001
Primary school or less	14.7%	15.8%	14.1%	
General or VET secondary school	67.9%	65.4%	69.2%	
College or university or higher	17.4%	18.8%	16.7%	
Married	36.4%	88.2%	9.5%	<0.001
Number of children				<0.001
No children	65.8%	0.0%	100.0%	
1 child	12.9%	37.8%	0.0%	
2 children	17.1%	49.9%	0.0%	
3 or more children	4.2%	12.3%	0.0%	
Number of adults in household	2.45 (±1.09)	2.75 (±1.07)	2.30 (±1.07)	<0.001
Nuts 2 level				0.079
Belgrade	22.9%	22.2%	23.3%	
Vojvodina	25.0%	25.5%	24.7%	
Šumadija and Western Serbia	28.1%	28.1%	28.2%	
Eastern and Southern Serbia	24.0%	24.3%	23.8%	
Urban	57.2%	57.4%	57.0%	0.49
Labour market outcome				
Active	81.8%	93.7%	75.6%	<0.001
Employed (SoRS)	66.1%	83.0%	57.4%	<0.001
Monthly net wage				<0.001
Less than 17,000 RSD	4.5%	3.1%	5.6%	
More than 17,001 and less than 25,000 RSD	23.7%	20.6%	26.1%	
More than 25,001 and less than 35,000 RSD	34.0%	31.9%	35.5%	
More than 35,001 and less than 45,000 RSD	19.1%	21.1%	17.6%	
More than 45,001 and less than 60,000 RSD	12.4%	15.4%	10.0%	
More than 60,001 and less than 80,000 RSD	3.6%	4.7%	2.8%	
More than 80,001 RSD	2.7%	3.3%	2.3%	
Usual numbers of hours worked in a week	43.26 (±8.03)	43.34 (±7.60)	43.20 (±8.33)	0.27

Notes: Data are presented as mean (±SD) for continuous measures, and % for categorical measures.

Figure 3: Labour force participation, females and males, by age of youngest child

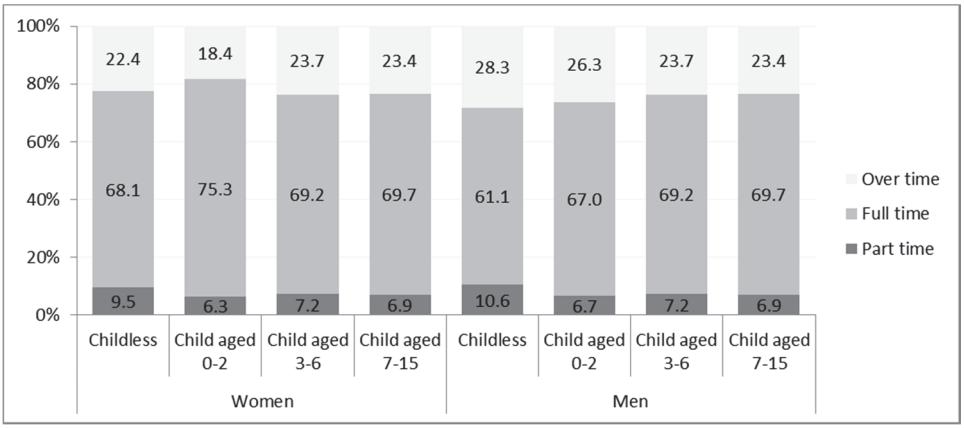


As discussed previously, part-time work in Serbia is rare, with the share of part-time workers in the sample being about 8%. The detailed distribution of the usual hours worked per week (Figure A1 in the Appendix) suggests that the distribution of working hours is highly discrete, with two peaks. More than 60% of women (both mothers and non-mothers) work 40 hours per week, while another 20% of women work 48 hours per week. Similarly, between 50% and 60% of both fathers and non-fathers work 40 hours per week, and approximately another 25% work 48 hours. Based on this distribution we divide all workers into three groups: 1) part-time workers (those working less than 35 hours per week), 2) full-time workers (those working between 35 and 44 hours per week), and 3) overtime workers (those working more than 45 hours per week).

Figure 4 presents the share of workers working part-time, full-time, and overtime, by gender and age of their youngest child. On average, about 8% of the sample works part-time, about two-thirds work full-time, and about a quarter work overtime. Overall, the differences between the groups are not prominent. Contrary to

expectations, both childless men and childless women have slightly higher shares of part-time workers than all mothers and fathers. On the other hand, women with small children work overtime less frequently (about 18% of cases) than other groups (on average about 23%). This is expected, as due to increased responsibilities at home taking care of the infant they cannot work additional hours when they return to work. Furthermore, men with children aged 3 to 6 and 7 to 15 work overtime slightly less frequently than childless men and men with small children.

Figure 4: Hours worked per week, females and males, by age of youngest child



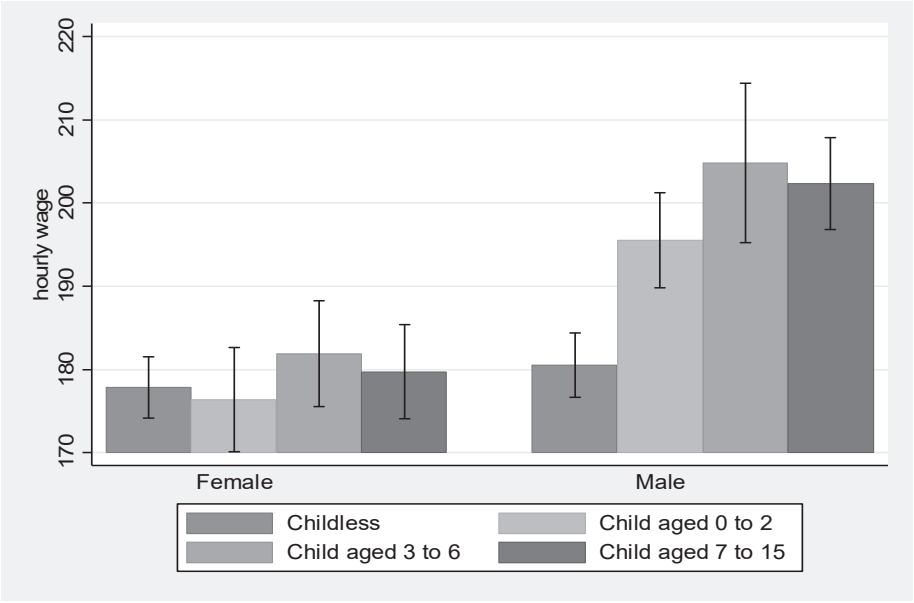
Data on wages in LFS are collected at the net monthly level, only for wage-employed workers, i.e., employees.[7] The wages are then transformed into hourly wages[8] and inflated to 2018 levels using the Consumer Price Index (2018=100). Figure 5 indicates that on average men have higher wages than women. There are no significant differences between mothers and non-mothers. On the other hand,

[7] Employees are first asked to provide the exact amount of monthly wages earned in the previous month. If they are not able or willing to provide an answer, they are asked to provide an interval for the monthly wages earned. In order to compute hourly wages, the exact amount of monthly wages is required. The potential bias in the wage equation that could occur due to omitting interval wages is accounted for by selection correction introduced in the wage equation. In total, about 61.4% of all workers who provided information on wages provided exact wages (including both those providing exact and interval wages).

[8] We divide the amount of monthly wages by 23/5 (average number of working days in a month/week) to arrive at weekly wages, and weekly wages with usual weekly working hours

fathers have higher wages than non-fathers, and the difference is most pronounced for fathers of children aged 3–6 years. In the next chapter we explain the methodology used to investigate if these hourly wage differences remain statistically significant when controlling for other relevant characteristics such as education, age, and region.

Figure 5: Hourly wage, females and males, by age of youngest child



5. METHODOLOGY

In the previous section we reported descriptive statistics of characteristics and outcomes for mothers and non-mothers and for fathers and non-fathers. The background characteristics of the groups differ both within the female group and within the male group, and in order to control for these differences in background characteristics we turn to multivariate regression analysis. This type of analysis enables us to condition on observable differences and to estimate the different labour market outcomes for mothers and non-mothers, and fathers and non-fathers.

Our baseline model comparing labour market outcomes of mothers and non-mothers relies on the following regression:

$$Y_{ri} = \alpha_0 + \alpha_1 \text{mother} + \boldsymbol{X_{ri}}\boldsymbol{B} + \mu_r + year + u_{ri} \quad (1)$$

where Y_{ri} is the outcome of interest and we consider three outcomes: participation in labour market, and, for those employed, hours worked per week and hourly log salary. Our coefficient of interest in regression (1) is the difference in outcomes between mothers and non-mothers captured by the coefficient α_1. The vector X_{ri} controls for background characteristics of the mother such as age, age squared, educational level, number of adult members in household, number of children, and whether the person lives in an urban or rural area. Additionally, for hours and wage equations we control for differences in the following job characteristics: occupation,[9] sector,[10] type of ownership (public or private), supervising position, firm size, and type of contract (permanent or temporary)[11]. Finally, μ_r

[9] We use ISCO 1-digit categorization of occupations. Category 10 – Armed forces occupations – is combined with category 2 – Professionals – due to small sample size.

[10] Based on NACE Rev. 2 classification of sectors, we group the employees into three groups working in: agriculture (sector A), industry (sectors B to F), and services (sectors G to U).

[11] In the case of the hours and wage equation, there is a potential bias in the estimates caused by non-random sample selection (Heckman, 1979). According to Heckman, sample selection bias can be viewed as the omitted variables problem, and resolved by adding a variable that represents the different characteristics of persons in the sample and persons not in the sample. Since the variables in the participation equation are also in the hours and wage equation, the exclusion restriction condition cannot be fully satisfied (at least one variable has to appear in the participation equation that is not in the hours equation). In this case it is more reasonable to adopt a model without correction, as suggested by Puhani (2000). However, initial estimates of the wage and hours equations suggested that some of the variables are not significant (see tables A2 and A3), while they are significant in the participation equation. We therefore drop the insignificant variables from the wage and hours equations and leave them in the participation equation, which enables us to fulfill the exclusion restriction condition. In this approach we first estimate the participation equation conditional on age, age squared, level of education, marital status, and number of adults and children in the household, via probit estimate. We then calculate the Inverse Mills Ratio (IMR), as a ratio of the probability density function and the cumulative probability distribution function, where the respective probability functions are derived from the participation equation (Wooldridge, 2002). This variable, according to Heckman, represents the differences in unobserved characteristics between wage employed and other groups in the labour market. Finally, we add IMR to the list of covariates in Equations (1) and (2). However, as the insignificant variables are still theoretically associated with hours of work (particularly in our framework), we opt to present the results without selection as our main results, and use estimates with selection as a robustness check.

are region fixed effects, *year* are survey year fixed effects, and u_{ri} is the random error term.

In a similar spirit, we estimate the labour market outcomes for non-mothers and the three different categories of mothers based on their youngest child:

$$Y_{ri} = \beta_0 + \beta_1 \text{mother}_{0-2} + \beta_2 \text{mother}_{3-6} + \beta_3 \text{mother}_{7-15} + \boldsymbol{X_{ri}}\boldsymbol{B} + \mu_r + year + u_{ri} \quad (2)$$

In the case of Equation (2) we are interested in coefficients β_1 , β_2, and β_3, which capture the differences between the non-mothers and mothers with children of different age groups. For instance, when estimating participation, β_1 captures whether mothers of children aged 0 to 2 years have a different participation rate than non-mothers. A positive coefficient β_1 would imply that mothers of children aged 0 to 2 are more likely to participate in the labour market, while a negative coefficient would mean that they are less likely to participate than non-mothers.

In the same way we estimate the labour market outcomes of fathers, first by grouping them together as we do for mothers in Equation (1), and then by separating them into three groups based on the age of the youngest child, as shown in Equation (2).

6. ESTIMATION RESULTS

6.1 Participation rate

As a first step towards understanding the situation of parents versus non-parents in the labour market, we estimate the participation rate and report it in Table 3. For mothers we find that there are no statistically significant differences between mothers and non-mothers, as shown in column (1) of the table. We then proceed to examining the heterogeneity among mothers based on the age of the youngest child, reported in column (2), and here it is clear that mothers of young children are less likely to be active in the labour market. Mothers with the youngest child aged 0 to 2 years are 6.4 percentage points less likely to be active than non-mothers. This is the expected result because within the household the mothers is responsible for child-rearing in the early years of a child's life and this is the period when they step back from the labour market. Mothers whose youngest child is 3

to 6 years old are not less likely to be active than non-mothers and, lastly, mothers whose youngest child is aged 7 to 15 are more likely to be active than non-mothers. One reason why mothers of older children are more likely to be in the labour market is that families with older children have higher expenses which cannot be covered by a sole earner. In all regressions we include individual characteristics affecting the propensity to be active in the labour market, regional fixed effects, and survey year fixed effects. The covariates have the expected signs and they are reported in the Appendix in Table A.1. Older and more-educated mothers are more likely to be active. The coefficient of age squared is negative and statistically significant, suggesting that prime-age mothers are the most active. The likelihood of being active in the labour market is the same for mothers with one and two children, but it is reduced for mothers with three or more children. Mothers in Belgrade and Šumadija and Western Serbia are more likely to be active than mothers from Vojvodina and Eastern and Southern Serbia.

Fathers are 8.6 percentage points more likely to be active than non-fathers. This is in line with the literature, which suggests that fathers are more likely to be working and that they earn more than non-fathers (Hodges and Budig, 2010). In terms of covariates (reported in Table A.1 in the Appendix) in the father regression, we find that older, more-educated, and married fathers are more likely to be active. The number of adults in the household is not statistically significant, but, interestingly, the propensity to be active falls with the number of children, and this is especially the case for fathers with three or more children. Fathers in rural areas and fathers residing in the poorest Eastern and Southern regions of Serbia are less likely to be active.

Table 3: Labour market participation of parents and non-parents

	Women		Men	
	(1)	(2)	(3)	(4)
Child 0 to 15	–0.002		0.086***	
	(0.008)		(0.009)	
Youngest child 0 to 2		–0.064***		0.105***
		(0.010)		(0.011)
Youngest child 3 to 6		0.006		0.083***
		(0.010)		(0.011)
Youngest child 7 to 15		0.041***		0.071***
		(0.009)		(0.010)
Individual-level controls	X	X	X	X
Regional FE	X	X	X	X
Survey year FE	X	X	X	X
Observations	29,669	29,669	35,311	35,311

Notes: Marginal effects from probit model. Individual-level controls: age, age squared, indicators for educational level, indicator for marriage status, number of adults in household, number of children in household, indicator for urban settings. Regional fixed effects: Belgrade, Vojvodina, Šumadija and Western Serbia, Eastern and Southern Serbia. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

6.2 Hours penalty

As discussed in Section 4, the distribution of working hours in Serbia is highly discrete, with over 80% of both men and women working 40 or 48 hours. Therefore, instead of analysing the continuous working hours variable, we analyse a categorical variable representing a choice between working part-time, full-time, and overtime. Due to the nature of the dependent variable, which represents three categories that can be ranked, we apply an ordinal probit estimator. Table A.2 in the Appendix presents the results of the hours worked equation. We first discuss the effects of the covariates and then turn our attention to the effect of parenthood. The results indicate that working hours are, ceteris paribus, higher for men and women with low education, in rural areas, and in regions other than Belgrade. Working hours increase for both genders linearly with age. Additionally, married women (after controlling for children) are working fewer working hours. Regarding job characteristics, workers in occupations such as sales and services and crafts have longer working hours, while longer working hours are

also observed for men working as clerks, plant and machine operators, in elementary occupations, and in industry or the services sector. Working hours are, ceteris paribus, shorter for the public sector, those working informally, and temporary workers. Additionally, men in supervisory positions work longer hours.[12, 13]

We now turn to the main focus of our paper – the effects of parenthood, which are presented in Table 4. The overall effect of motherhood is not significant, indicating that the working hours of mothers and non-mothers do not differ on average (column 1). However, when we split the motherhood effect by age of the youngest child, the results indicate that mothers of young children (youngest child aged 0 to 2) work less, while mothers of older children (7 to 14 years old) work longer hours than non-mothers (column 2). Mothers of children aged between 3 and 6 years are not significantly different from non-mothers in this respect. On average, the working hours of fathers and non-fathers do not differ (column 3), and no difference is found for fathers by age of the youngest child (column 4).

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[12] Due to the fact that all the variables in the participation equation are also in the hours equation, the exclusion restriction condition (at least one variable has to appear in the participation equation that is not in the hours equation) for the application of the selection equation is not fulfilled. In this case it is more reasonable to adopt a model without correction, as suggested by Puhani (2000). However, the estimates in Table A.2 suggest that some variables that enter the model are not significant (age and age squared for women, age squared and number of children for men), while they are significant in the participation equation. Therefore, dropping the insignificant variables from the hours equation enables us to fulfill the exclusion restriction condition. Using this approach, we estimate the hours equation with the selection correction. The results from this model (available upon request) are very similar to the ones presented here and reaffirm our conclusions. However, as the insignificant variables are still theoretically associated with hours of work (particularly in our framework), we opt to present the results without selection as our main results.

[13] The results presented in Table A2 and Tables 4 and 5 refer to age group 25 to 45. An additional robustness check of these results was performed by including persons aged 20 to 50 years. Results, available upon request, yield similar coefficients and confirm the conclusions presented here.

Table 4: Parents' and non-parents' hours worked per week

	Women		Men	
	(1)	(2)	(3)	(4)
Youngest child 0 to 15	0.022		0.019	
	(0.032)		(0.033)	
Youngest child 0 to 2		–0.098**		–0.012
		(0.041)		(0.039)
Youngest child 3 to 6		0.018		0.032
		(0.040)		(0.039)
Youngest child 7 to 15		0.076**		0.039
		(0.035)		(0.038)
Individual-level controls	X	X	X	X
Job characteristics	X	X	X	X
Regional FE	X	X	X	X
Survey year FE	X	X	X	X
Observations	13,243	13,243	17,307	17,307

Notes: Results from ordinal probit model. Individual-level controls: age, age squared, indicators for educational level, indicator for marriage status, number of adults in household, number of children in household, indicator for urban setting. Job characteristic controls: occupation, sector, ownership, informal employment, type of contract, supervising position, and firm size. Regional fixed effects: Belgrade, Vojvodina, Šumadija and Western Serbia, Eastern and Southern Serbia. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

As the size coefficients in the ordinal probit model have no meaningful interpretation, we compute marginal effects for mothers of youngest children (aged 0 to 2) and mothers and fathers of older children (aged 7 to 15). These results are presented in Table 5. The marginal effects indicate that compared to non-mothers, mothers of youngest children (aged 0 to 2) are more likely to work part-time (by about 1 percentage point) or full-time (by 1.8 percentage points) and less likely to work overtime (by 2.7 percentage points). On the other hand, mothers of older children (aged 7 to 15) are more likely to work overtime than non-mothers (by 2 percentage points) and less likely to work part-time (by 0.6 percentage points) or full-time (by 1.5 percentage points).

Table 5: Marginal effects for working hours equation for mothers

	Mothers youngest child 0 to 2	Mothers youngest child 3 to 6	Mothers youngest child 7 to 15
Part-time	0.009**	–0.001	–0.006**
	(0.004)	(0.003)	(0.003)
Full-time	0.018**	–0.003	–0.015**
	(0.007)	(0.008)	(0.007)
Overtime	–0.027**	0.005	0.021**
	(0.011)	(0.011)	(0.010)

Notes: Marginal effects at mean, based on the specification of the coefficients presented in Table A2 in the Appendix (columns 2 and 4). Values in the table represent the conditional difference in the probability of working in one of the working hours options, compared to non-mothers (for mothers) and non-fathers (for fathers). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

This result, together with the descriptive statistics presented in Figure 4 which suggest that overtime in Serbia is much more frequent than part-time work, indicates that the true choice of working hours in Serbia is between full-time and overtime, rather than part-time vs. full-time. In other words, when choosing working hours (to the extent at which this is a choice), Serbian women decide if they can work overtime and if they need to. Our results suggest that when facing increased responsibility to take care of small children, women are less likely to work overtime and more likely to work full-time (or part-time). On the contrary, women who have older children, whose care can partially be transmitted to elementary schools and who generally require less attention, can use this time to work overtime to provide for the increased financial burden on their family.

6.3 Wage penalty

Table A.3 in the Appendix presents the results of the hourly wage equation. We first discuss the effects of the covariates and then turn our attention to the effect of parenthood. In line with expectations, hourly wages are higher for persons with higher levels of education and those living in urban areas and Belgrade. Additionally, married men and women have higher wages, while wages increase linearly with age for both genders. Regarding job characteristics, top occupations such as managers or professionals are associated with higher wages, while wages are higher in industry and services than in agriculture. Hourly wages are higher in

the public sector, in supervisory positions, in large firms, and in part-time work, while being employed in informal employment or as a temporary worker decreases the hourly wage.

Table 6 reveals that the motherhood penalty in the terms of hourly wages is negative, but it does not reach statistical significance (column 1).[14] However, when this effect is split by the age of the youngest child, we find that only mothers of the youngest children suffer a statistically significant penalty in wages of about 4.4% (column 2). The effect for fathers is non-significant (columns 3 and 4), indicating that fathers and non-fathers, conditional on other characteristics, have the same average levels of hourly wage. [15]

[14] Percentage interpretation of the coefficient due to the fact that, as is customary in the literature, we use the natural logarithm of the hourly wage as the dependent variable in the wage equation (rather than levels) in order to stabilize the variance of the hourly wage variable and to account for the asymmetry in the distribution of this variable. Therefore, the estimated coefficients in the wage equation, presented in Table 6 and Table A3 in the Appendix, represent the conditional change in log wages when the independent variable changes by 1, which approximately correspond to the percentage change in wages.

[15] Due to the fact that all the variables in the participation equation are also in the wage equation, the exclusion restriction condition (at least one variable has to appear in the participation equation that is not in the hours equation) for the application of the selection equation is not fulfilled. In this case it is more reasonable to adopt a model without correction, as suggested by Puhani (2000). However, the estimates in Table A.3 suggest some of the variables that enter the model are not significant (dummy variables representing number of children), but are significant in the participation equation. Therefore, dropping the insignificant variables from the wage equation enables us to fulfill the exclusion restriction condition. By using this approach, we estimate the wage equation with the selection correction. The results from this model (available upon request) are very similar to the ones presented here and reaffirm our conclusions. However, as the insignificant variables are still theoretically associated with hours of work (particularly in our framework), we opt to present the results without selection as our main results.

Table 6: Hourly wage equation

	Women		Men	
	(1)	(2)	(3)	(4)
Youngest child 0 to 15	–0.014		–0.008	
	(0.012)		(0.017)	
Youngest child 0 to 2		–0.030**		0.004
		(0.015)		(0.018)
Youngest child 3 to 6		–0.006		–0.021
		(0.015)		(0.019)
Youngest child 7 to 15		–0.011		–0.011
		(0.013)		(0.020)
Individual level controls	X	X	X	X
Job characteristics	X	X	X	X
Regional FE	X	X	X	X
Survey year FE	X	X	X	X
Observations	6,401	6,401	8,123	8,123

Notes: Results from ordinary least squares model. Individual-level controls: age, indicators for educational level, indicator for marriage status, number of adults in household, number of children in household, indicator for urban setting. Job characteristic controls: occupation, sector, ownership, informal employment, type of contract, supervising position, and firm size. Regional fixed effects: Belgrade, Vojvodina, Šumadija and Western Serbia, and Eastern and Southern Serbia. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The wage penalty for mothers with younger children indicates that if these women do not have secure jobs to return to from maternity leave, they have difficulty finding equally paid jobs that can be aligned with the cumbersome responsibility of taking care of a child. However, we do not find evidence that they continue to suffer this penalty (compared to non-mothers) in the future, as their children become older.

6.4 Robustness of results

The main results in the Estimation Results section are estimated using the probit model (participation rate), with ordered probit (hours worked per week) or with ordinary least squares (log hourly wage). Tables 1 and 2 show that both mothers and non-mothers, and fathers and non-fathers, have significantly different background characteristics. In this section we aim to account for these differences by

applying matching methodology. We estimate the parenthood penalty, using propensity score matching to examine the robustness of the findings.

The key aim of propensity score matching is achieving balanced observable characteristics by weighting observations differently when estimating the treatment effect (in our case, parenthood). This propensity score matching requires satisfying the conditional independence assumption (CIA): the selection into treatment (parenthood) is based solely on observable characteristics. The second assumption is common support, which ensures that female/males with the same characteristics have a positive probability of being treated.

In a first stage we estimate the propensity score variable $p(X)$ using a probit model of being a mother/father using the observable characteristics. The estimator of the average treatment of the treated using the propensity score $p(X_i)$ is then given by Rosenbaum and Rubin (1983):

$$\tau^{PSM} = E\Big[E\{Y_{1i}|D_i=1, p(X_i)\} - E\{Y_{0i}|D_i=0, p(X_i)\}|D_i=1\Big]$$

where the outer distribution is over ($p(X_i)\,|\,D_i=1$) and Y_{1i} and Y_{0i} are potential outcomes in the two counterfactual situations of treatment and no treatment (parent and no parent, in our case). Stated differently, the propensity score estimator is the mean difference in outcomes of the parents and non-parents over the common support and weighted by the propensity score distribution of participants.

We now estimate again the labour market outcomes (participation rate, hours worked per week, and log hourly wage) for parents and non-parents, but in this section we use propensity score matching. Standard propensity score matching can only be applied to estimate the results for mothers/fathers as one group and it is not possible to disaggregate parents by the age of the youngest child.

The results are shown in Table 7 and confirm our main findings. We find that the participation of fathers is higher than the participation of non-fathers, while the participation of mothers overall does not differ from the participation of non-

mothers. We do not find any impact on hours worked per week and hourly wage of parents.

Table 7: Robustness: Labour market outcome of parents and non-parents

	Participation		Hours worked per week		Hourly wage equation	
	Women	Men	Women	Men	Women	Men
	(1)	(2)	(3)	(4)	(5)	(6)
Child 0 to 15	–0.020	0.027***	0.035	–0.008	–0.005	–0.046
	(0.008)	(0.011)	(0.021)	(0.021)	(0.029)	(0.025)
Individual-level controls	X	X	X	X	X	X
Regional FE	X	X	X	X	X	X
Survey year FE	X	X	X	X	X	X
Observations	29,669	35,311	13,243	17,307	6,401	8,123

Notes: Marginal effects from probit model. Individual level controls: age, age squared, indicators for educational level, indicator for marriage status, number of adults in household, indicator for urban setting. Regional fixed effects: Belgrade, Vojvodina, Šumadija and Western Serbia, and Eastern and Southern Serbia. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

7. DISCUSSION AND CONCLUSION

Women in Serbia have worse labour market outcomes than men and one channel that can explain these differences between genders is motherhood. The arrival of a child in the household brings additional responsibilities for the parents, and women usually take on more child-rearing responsibilities. This implies that not only are women detached from the labour market during parental leave, but their household responsibilities increase permanently with the arrival of a child. The difficulty of reconciling parenting responsibilities and general chores can overburden women and make it more difficult for them to compete in the labour market. The phenomenon of women's position in the labor market changing when they become mothers is called the motherhood penalty, and we explore this phenomenon, together with a similar analysis for fathers, in the Serbian context.

We find that on average there is no difference between mothers and non-mothers in terms of labour market participation. However, women with younger children

are less likely to be active in the labour market than both women with older children and non-mothers. This pattern is not found for men: to the contrary, all fathers, regardless of the age of children, have a higher propensity to be active in the labour market than non-fathers. These findings together show that a traditional 'breadwinner' model prevails in Serbia, where women are predominantly providers of childcare and stay at home, while men assume the role of primary breadwinner and increase their activity to compensate for the lower labour participation of mothers. However, as the children grow older they require less care and the burden of childcare shifts towards elementary schools, and women can return to the labour market. Indeed, women whose youngest child is aged 7 to 15 have the highest participation rate among the women in our sample. One explanation for women with older children having a higher propensity to be active than non-mothers could be that households with children have larger expenses, and when available for work mothers become active in the labour market so that they contribute to the household budget.

This finding is also reflected in the working hours of employed mothers and fathers. Contrary to the findings for countries where part-time work for women is common, in Serbia part-time work options are limited, and main distinction is between working full-time or overtime. Mothers of younger children are less likely to work overtime than non-mothers, while mothers of older children are more likely to work overtime than childless women. Similar explanations apply: young mothers need to restrict their working hours to cope with household chores, while mothers of older children have more expenses and this is reflected in the longer hours worked.

Finally, we do not find significant differences between mothers and non-mothers in terms of hourly wages. However, when mothers are grouped according to the age of the youngest child, a difference emerges between the wages of mothers and non-mothers, and in particular mothers with a very young child (aged 0 to 2). One explanation of this effect could be the difficulty women face finding jobs after maternity leave that pay the same as for women with the same characteristics and can be aligned with the cumbersome responsibilities of taking care of an infant. We do find that mothers of older children (3 to 15 years) earn slightly less than non-mothers, but this difference does not reach statistical significance. No difference in hourly wages is found for fathers and non-fathers.

To summarize our results, we find that, conditional on observables, mothers of younger children (0 to 2 years) have lower activity rates, are less likely to work overtime, and have lower hourly wage rates than non-mothers, but this difference disappears as the children get older. In fact, women with children aged 7 to 15 are more likely to be active in the labour market regarding both the extensive margin (participation in the labour market) and the intensive margin (increased working hours). Overall, in the Serbian setting, motherhood does not seem to impact the labour market trajectories of women in the long run. Although observed effects in early parenthood can account for some gender differences in labour market outcomes, other factors such as the traditional role of women in the household, labour market discrimination, and the difficult position of women in rural areas are at play. One limitation of our study is that we exclude from our sample mothers and fathers who fall into the age group 51 years or older and who have children 15 years old or younger. Our findings do not speak to this group of parents. Additionally, our sample does not include divorced fathers who do not live with their child(ren), which could potentially bias the results of the fathers' outcomes.

In some aspects the case of Serbia fits well with other results available for post-communist countries (Cukrowska-Torzewska and Matysiak, 2020; Lebedinski et al., 2020). The lack of the part-time options and low employment flexibility typically means that after an initial period of taking care of infants (children aged 0-2 years) women in Serbia return to the work they previously had, with the same working hours and wage rates. However, in contrast to findings for other post-communist countries, the penalties in Serbia do not seem to last long. Faced with the increased financial burden on the household and the generally low wages and living standards in Serbia, women are expected to contribute to the household budget, while at the same time performing most of the household and childcare duties.

Two policies should be considered based on our findings. First, increasing childcare availability for the age group 1 to 2 years could help alleviate the domestic burden and enable women to return to the labour market, as this group of women is least likely to be active. Second, paternity leave policies that allocate part of parental leave exclusively to fathers should be explored. Paternity leave policies are a prominent way to incentivize fathers to take more responsibility for childcare

and this policy could help increase fathers' involvement in the household and distribute housework more equally (Schober, 2014; Patnaik, 2019; Farré and Gonzalez, 2019).

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APPENDIX

Figure A1: Usual hours worked per week, by gender and parenthood

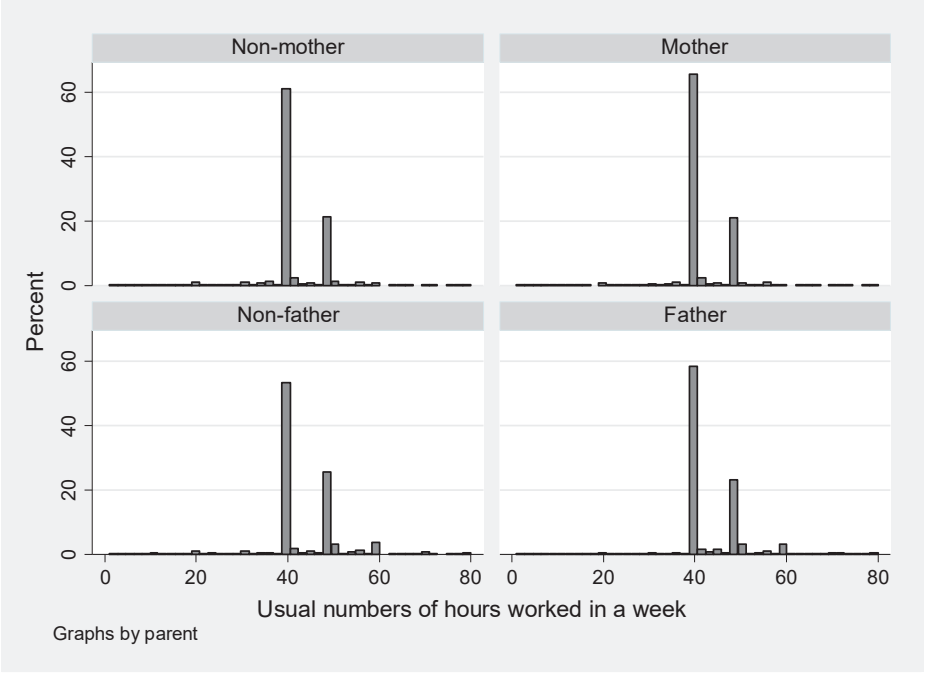

Table A1: Full estimation of the participation penalty

	(1)	(2)	(3)	(4)
	Women		Men	
Youngest child 0 to 15	0.002		0.067***	
	(0.008)		(0.008)	
Youngest child 0 to 2		–0.075***		0.070***
		(0.010)		(0.010)
Youngest child 3 to 6		0.004		0.063***
		(0.010)		(0.010)
Youngest child 7 to 15		0.063***		0.068***
		(0.009)		(0.009)
Age	0.090***	0.083***	0.051***	0.051***
	(0.006)	(0.006)	(0.004)	(0.004)

Age squared	–0.001***	–0.001***	–0.001***	–0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
General or VET secondary	0.169***	0.171***	0.088***	0.088***
	(0.008)	(0.008)	(0.005)	(0.005)
College/university or higher	0.330***	0.341***	0.147***	0.147***
	(0.009)	(0.009)	(0.007)	(0.007)
Married	–0.011	–0.002	0.055***	0.055***
	(0.007)	(0.007)	(0.006)	(0.006)
Number of adults in household	–0.003	0.000	–0.003	–0.003
	(0.003)	(0.003)	(0.002)	(0.002)
2 children	–0.010	–0.012	–0.014*	–0.013
	(0.008)	(0.008)	(0.008)	(0.008)
3 or more children	–0.070***	–0.050***	–0.041***	–0.041***
	(0.011)	(0.011)	(0.011)	(0.011)
Urban	0.001	0.004	–0.036***	–0.036***
	(0.006)	(0.006)	(0.004)	(0.004)
Vojvodina	–0.020**	–0.022***	–0.007	–0.007
	(0.008)	(0.008)	(0.006)	(0.006)
Šumadija and Western Serbia	–0.004	–0.008	–0.001	–0.001
	(0.008)	(0.008)	(0.006)	(0.006)
Eastern and Southern Serbia	–0.032***	–0.039***	–0.022***	–0.022***
	(0.008)	(0.008)	(0.006)	(0.006)
Year 2015	–0.009	–0.008	–0.007	–0.007
	(0.009)	(0.009)	(0.007)	(0.007)
Year 2016	0.004	0.004	–0.002	–0.002
	(0.009)	(0.009)	(0.006)	(0.006)
Year 2017	0.009	0.010	0.002	0.002
	(0.009)	(0.009)	(0.006)	(0.006)
Year 2018	0.018**	0.020**	0.015**	0.015**
	(0.009)	(0.008)	(0.006)	(0.006)
Observations	21,335	21,335	25,868	25,868

Table A2: Full estimation of the hours penalty

	(1)	(2)	(3)	(4)
	Women		Men	
Youngest child 0 to 15	0.022		0.019	
	(0.032)		(0.033)	
Youngest child 0 to 2		–0.098**		–0.012
		(0.041)		(0.039)
Youngest child 3 to 6		0.018		0.032
		(0.040)		(0.039)
Youngest child 7 to 15		0.076**		0.039
		(0.035)		(0.038)
Age	–0.002	–0.004**	–0.004***	–0.005***
	(0.002)	(0.002)	(0.001)	(0.001)
Primary or less (omitted)				
General or VET secondary	–0.004	–0.006	–0.133***	–0.133***
	(0.064)	(0.064)	(0.041)	(0.041)
College/university or higher	–0.187***	–0.178**	–0.313***	–0.311***
	(0.070)	(0.070)	(0.048)	(0.048)
Married	–0.109***	–0.093***	–0.010	–0.009
	(0.030)	(0.030)	(0.030)	(0.030)
Number of adults in household	0.043***	0.045***	0.030***	0.030***
	(0.011)	(0.011)	(0.009)	(0.009)
one child (omitted)				
two children	–0.006	–0.008	0.022	0.018
	(0.031)	(0.031)	(0.029)	(0.029)
three or more children	–0.091	–0.057	0.003	0.007
	(0.057)	(0.057)	(0.049)	(0.050)
Urban	–0.101***	–0.098***	–0.094***	–0.093***
	(0.027)	(0.027)	(0.021)	(0.021)
Managers (omitted)				
Professional	–0.227***	–0.226***	–0.062	–0.061
	(0.081)	(0.081)	(0.062)	(0.062)
Technicians and ass. prof.	–0.058	–0.055	0.065	0.066
	(0.083)	(0.083)	(0.065)	(0.065)
Clerical support workers	–0.124	–0.121	0.174**	0.175**
	(0.085)	(0.085)	(0.069)	(0.069)
Service and sales workers	0.741***	0.742***	0.627***	0.627***
	(0.087)	(0.087)	(0.067)	(0.068)
Skilled agricultural workers	–0.486	–0.455	0.242	0.243
	(0.409)	(0.406)	(0.167)	(0.167)
Craft and trade workers	0.447***	0.447***	0.383***	0.383***
	(0.099)	(0.099)	(0.068)	(0.068)

Plant and machine operators	0.089	0.088	0.449***	0.449***
	(0.099)	(0.099)	(0.068)	(0.068)
Elementary occupations	0.022	0.022	0.286***	0.287***
	(0.096)	(0.096)	(0.074)	(0.074)
Agriculture (omitted)				
Industry	−0.082	−0.083	0.225***	0.225***
	(0.159)	(0.159)	(0.074)	(0.074)
Services	−0.125	−0.126	0.167**	0.166**
	(0.158)	(0.158)	(0.075)	(0.075)
Public sector	−0.490***	−0.494***	−0.511***	−0.511***
	(0.028)	(0.028)	(0.020)	(0.020)
Informally employed	−0.815***	−0.821***	−0.486***	−0.486***
	(0.067)	(0.067)	(0.043)	(0.043)
supervising position	0.054	0.051	0.088***	0.087***
	(0.034)	(0.034)	(0.027)	(0.027)
temporary worker	−0.176***	−0.183***	−0.102***	−0.103***
	(0.030)	(0.030)	(0.023)	(0.023)
10 employees or less				
11 to 49 employees	−0.013	−0.012	0.030	0.030
	(0.034)	(0.034)	(0.028)	(0.028)
50 employees or more	−0.017	−0.017	−0.016	−0.016
	(0.031)	(0.031)	(0.024)	(0.024)
Belgrade (omitted)				
Vojvodina	−0.056*	−0.057*	−0.100***	−0.100***
	(0.031)	(0.031)	(0.026)	(0.026)
Šumadija and Western Serbia	0.190***	0.187***	0.063**	0.063**
	(0.032)	(0.032)	(0.027)	(0.027)
Eastern and Southern Serbia	0.038	0.033	−0.026	−0.027
	(0.033)	(0.033)	(0.027)	(0.027)
Year 2014 (omitted)				
Year 2015	0.049	0.049	−0.001	−0.001
	(0.040)	(0.040)	(0.033)	(0.033)
Year 2016	0.014	0.013	−0.062*	−0.061*
	(0.038)	(0.038)	(0.032)	(0.032)
Year 2017	0.013	0.014	−0.006	−0.006
	(0.038)	(0.038)	(0.032)	(0.032)
Year 2018	0.021	0.022	−0.049*	−0.048*
	(0.035)	(0.035)	(0.029)	(0.029)
Constant cut1	−2.338***	−2.405***	−1.997***	−2.011***
	(0.206)	(0.207)	(0.124)	(0.124)
Constant cut2	0.380*	0.315	0.298**	0.284**
	(0.205)	(0.205)	(0.122)	(0.122)
Observations	13,243	13,243	17,307	17,307

Table A3: Full estimation of the wage penalty

	(1)	(2)	(3)	(4)
	Women		Men	
Youngest child 0 to 15	–0.014		–0.008	
	(0.012)		(0.017)	
Youngest child 0 to 2		–0.030**		0.004
		(0.015)		(0.018)
Youngest child 3 to 6		–0.006		–0.021
		(0.015)		(0.019)
Youngest child 7 to 15		–0.011		–0.011
		(0.013)		(0.020)
Age	0.003***	0.003***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Primary or less (omitted)				
General or VET secondary	0.099***	0.099***	0.105***	0.105***
	(0.019)	(0.019)	(0.016)	(0.016)
College/university of higher	0.228***	0.229***	0.271***	0.270***
	(0.022)	(0.022)	(0.020)	(0.020)
Married	0.018*	0.020*	0.077***	0.077***
	(0.011)	(0.011)	(0.015)	(0.015)
Number of adults in household	–0.022***	–0.021***	–0.022***	–0.022***
	(0.004)	(0.004)	(0.004)	(0.004)
one child (omitted)				
two children	0.015	0.015	–0.015	–0.013
	(0.011)	(0.011)	(0.014)	(0.014)
three or more children	0.015	0.018	0.014	0.014
	(0.022)	(0.023)	(0.022)	(0.022)
Urban	0.042***	0.043***	0.019**	0.019**
	(0.009)	(0.009)	(0.009)	(0.009)
Managers (omitted)				
Professional	–0.157***	–0.155***	–0.070	–0.071
	(0.052)	(0.052)	(0.047)	(0.047)
Technicians and ass prof.	–0.314***	–0.312***	–0.160***	–0.161***
	(0.052)	(0.052)	(0.047)	(0.047)
Clerical support workers	–0.376***	–0.374***	–0.290***	–0.291***
	(0.053)	(0.053)	(0.048)	(0.048)
Service and sales workers	–0.567***	–0.565***	–0.346***	–0.347***
	(0.053)	(0.053)	(0.047)	(0.047)
Skilled agricultural workers	–0.323**	–0.317**	–0.346***	–0.346***
	(0.145)	(0.145)	(0.097)	(0.097)
Craft and trades workers	–0.600***	–0.598***	–0.296***	–0.296***
	(0.055)	(0.055)	(0.048)	(0.048)

Plant and machine operators	–0.495***	–0.493***	–0.277***	–0.278***
	(0.055)	(0.055)	(0.047)	(0.047)
Elementary occupations	–0.592***	–0.591***	–0.399***	–0.399***
	(0.053)	(0.054)	(0.049)	(0.049)
Agriculture (omitted)				
Industry	0.204**	0.204**	0.149***	0.149***
	(0.083)	(0.083)	(0.029)	(0.029)
Services	0.151*	0.151*	0.082***	0.082***
	(0.083)	(0.083)	(0.029)	(0.029)
Public sector	0.075***	0.075***	0.142***	0.142***
	(0.014)	(0.014)	(0.010)	(0.010)
Informally employed	–0.117***	–0.118***	–0.129***	–0.129***
	(0.025)	(0.025)	(0.024)	(0.024)
supervising position	0.115***	0.115***	0.164***	0.164***
	(0.018)	(0.018)	(0.015)	(0.015)
temporary worker	–0.102***	–0.103***	–0.090***	–0.090***
	(0.011)	(0.011)	(0.010)	(0.010)
part–time worker	0.230***	0.230***	0.128***	0.128***
	(0.035)	(0.035)	(0.044)	(0.044)
10 employees or less				
11 to 49 employees	0.061***	0.061***	0.073***	0.074***
	(0.013)	(0.013)	(0.013)	(0.013)
50 employees or more	0.118***	0.118***	0.120***	0.120***
	(0.013)	(0.013)	(0.011)	(0.011)
Belgrade (omitted)				
Vojvodina	–0.090***	–0.090***	–0.112***	–0.112***
	(0.012)	(0.012)	(0.013)	(0.013)
Šumadija and Western Serbia	–0.140***	–0.140***	–0.179***	–0.179***
	(0.012)	(0.012)	(0.013)	(0.013)
Eastern and Southern Serbia	–0.170***	–0.171***	–0.192***	–0.192***
	(0.012)	(0.012)	(0.013)	(0.013)
Year 2014 (omitted)				
Year 2015	0.003	0.002	-0.001	-0.001
	(0.016)	(0.016)	(0.016)	(0.016)
Year 2016	0.021	0.021	0.020	0.020
	(0.015)	(0.015)	(0.015)	(0.015)
Year 2017	0.021	0.021	0.031**	0.031**
	(0.015)	(0.015)	(0.015)	(0.015)
Year 2018	0.064***	0.064***	0.088***	0.088***
	(0.014)	(0.014)	(0.014)	(0.014)
Constant	5.102***	5.106***	5.041***	5.038***
	(0.103)	(0.103)	(0.063)	(0.063)
Observations	6,401	6,401	8,123	8,123
R-squared	0.475	0.475	0.343	0.344