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Does motherhood explain lower wages for women in Macedonia?

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ABSTRACT

The objective of the paper is to estimate the motherhood wage gap and its contribution to the gender wage gap in Macedonia, after considering workers' characteristics and selectivity bias into the labour market for the childbearing-age population. In particular, it aims to disentangle the extent to which the natural role of women to have and raise children affects the gender wage gap. Due to the large female inactivity in Macedonia, we employ a repeated imputation technique, which imputes the wages of those who are unemployed or inactive. Imputed samples are used to decompose the gaps by weighing and by using a re-centred influence function. The Survey of Income and Living Conditions (2010) is used in the analysis. The results suggest that the motherhood wage gap in Macedonia is fully explained by characteristics and, hence, it does not contribute to the potential reducing of the gender wage gap. The selection is also irrelevant, i.e., its consideration does not alter these conclusions.

1. Introduction

A recent study (Petreski, Mojsoska-Blazevski, & Petreski, 2014) has shown that the gender wage gap in Macedonia—when workers' characteristics and selectivity bias into employment have been taken into account—is ~ 7.5%. This suggests that 7.5% lower wage for women than men, on average, remains unexplained and could be understood as discrimination against women in the labour market. There are, however, several possible veins within which to think about this residual gap, a notable one being the natural difference between the two genders: the female's role as a mother. This could cause a lower wage for women due to several reasons: (i) the different productivity levels of mothers versus childless women or men due to losses of job experiences and career interruptions in the past; (ii) the different productivity level due to tasks related to childcare, the potential reduction of devotion to work, the limited or even lack of options to travel or stay overtime, and the change in overall working attitude after giving birth; (iii) different employers' expectations of the mother's

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productivity compared to other workers; (iv) different perceptions of employers of the work of mothers; and others.

The objectives of the paper are three-fold: first, to calculate the differences in wages between mothers and childless women (the motherhood wage gap); second, to estimate the motherhood wage gap's contribution to the gender wage gap in Macedonia; after considering workers' characteristics and selectivity bias into the labour market for the childbearing-age population; and, third, to decompose the selection-adjusted gaps into deciles by referring to semi- and non-parametric approaches.

The paper relies on a relatively novel method of estimating gender gaps in wages, imputing missing wages for those who are not in employment and, hence, have an unobserved wage. This is especially important for cases where the inactivity of women is prevalent. In Macedonia, the gender inactivity gap is above 30%, while the motherhood inactivity gap is 23%, suggesting that women in general and mothers in particular experience large detachment from the labour market. Their exclusion from the calculation of the wage gaps potentially hides important information. Hence, we rely on the repeated imputations technique, which is based on median regressions (Rubin, 1987) and does not require assumptions on the actual level of missing wages, as usually required in the matching approach, nor does it require arbitrary exclusion restrictions and lack of robustness (Manski, 1989), as raised in the Heckman (1979) models. To assign a person with a missing wage below or above the medium, we rely on a human capital specification whereby indicators as education, age and experience play a prominent role. Finally, we pursue decomposition of the gaps by deciles: by utilising weights that equalise the empirical distributions of the explanatory variable (Barsky, Bound, Charles, & Lupton, 2002); and by replacing the log wages with the re-centred influence function (Firpo, Fortin, & Lemieux, 2007).

The main finding is that, once workers' characteristics and selectivity into employment are accounted for, employers in Macedonia commit discrimination against women, penalising them by lowering wages by ~ 7–8% as compared to men. The selection has been found to explain about 60% of the existing gender wage gap. On the other hand, mothers are not penalised in terms of their wage, i.e., the motherhood wage gap does not exist and, hence, it does not contribute to explaining the gender wage gap. Selection does not alter this conclusion, thus there is no motherhood-based selection in Macedonia. The analysis by deciles suggests that the gender wage gap exists along the entire wage distribution, with potentially declining size in the right half of it and vanishing for the highest-paid jobs. On the other hand, the existent difference in the wages between mothers and childless women could be entirely, if not overly, explained by characteristics, at any point of the wage distribution.

Defined this way, the paper adds several novelties to the current knowledge. First, the paper is the first examining the motherhood wage gap, and its interference with the gender wage gap, in Macedonia and transition countries in general. Understanding both phenomena and their association should open public discussion on the topic and provide evidence and assistance to policymakers in designing credible policies that tackle these problems, as well in softening the discussions pertinent to female discrimination in the labour market. Second, the paper provides novelty for the theoretical and empirical literature, in the sense that it applies—likely for the first time—a novel method for correcting selectivity in the labour market. While a comparison with the usually-used approach—the Heckman method—is provided, the utilisation of the repeated imputation technique should spark researchers to investigate deeply—both theoretically and empirically—the extent to which

different methods for addressing selectivity may yield different results. Finally, the paper provides several ways to decompose the motherhood wage gap, accentuating their advantages and disadvantages, especially compared to the standard Oaxaca-Blinder approach, which has dominated the literature for many years.

The rest of the paper is structured as follows. Section 2 offers stylised facts about the issue at hand. Section 3 presents the economics of the motherhood wage gap. Section 4 presents the methodology and the data we use. Section 5 presents the results and offers a discussion. Section 6 concludes.

2. Some stylised facts

To start the discussion about the motherhood wage gap and its interference in the gender wage gap, we portray some stylised facts for the gaps in Macedonia. We use the age span 24–45, which reflects the usual childbearing period for women, as in Harkness and Waldfogel (2003), Gash (2009) and Pal and Waldfogel (2014). Other spans were used throughout the literature (e.g., Felfe, 2012; Zhang, 2010), but excluding mothers with grown up children (above the age of 18) who had already separated from parents (i.e., had become independent).

That mothers could have lower wages than childless women can be observed in Table 1: this contrasts the labour-market status of childbearing-age men and women and of childbearing-age childless women and mothers.

There are notable differences. First, both the employment and unemployment rates of women of childbearing age are lower than those of men, due to the pervasive inactivity of women of that age group. Reasons for inactivity may be manifold: the increased investment in postgraduate education in the last several years against the low creation of higher-paying jobs; women heading or living in female-headed households receiving remittances; women engaged as unpaid family workers in agriculture; and others—all raising the reservation wage. The final but still significant reason, aside from those affecting reservation wage, is the childbearing and housewife role of women. Hence, second, when childless women are compared with mothers, it is evident that the last reason for inactivity—women as mothers—may be prevalent: the inactivity rate of mothers is almost triple that of childless women.

Table 2 also supports our discussion: having a child likely makes a difference—mothers are lower paid than childless women and also compared to men (both with or without children). If looking at the unadjusted gaps pattern may suggest a role for motherhood in explaining (part of) the gender wage gap in Macedonia, then we may be able to further explain the adjusted gap seen in Petreski et al. (2014).

Figures 1 and 2 cross-analyse the gender and motherhood wage gaps, respectively, with the gender/motherhood employment and participation gaps for childbearing-age persons at different levels of education. Figure 1 analyses the gender gaps and suggests that the

Table 1. Labour-market status of persons of childbearing age (24–45 years).

Labour market status	3	Women	Childless women	Mothers
Employed	59.4	40.1	49.9	36.9
Unemployed	40.4	29.3	36.8	26.7
Inactive	0.3	30.6	13.4	36.4

Source: Author's calculation based on S.I.L.C.

Table 2. Unadjusted wage gap.

	Gender/Motherhood pay gap
All women compared to all men	−12.5
Childbearing-age women compared to childbearing-age men (gender wage gap)	−14.1
Mothers compared to childless women (motherhood wage gap)	−8.7
Mothers compared to fathers	−21.9
Mothers compared to all men	−16.8

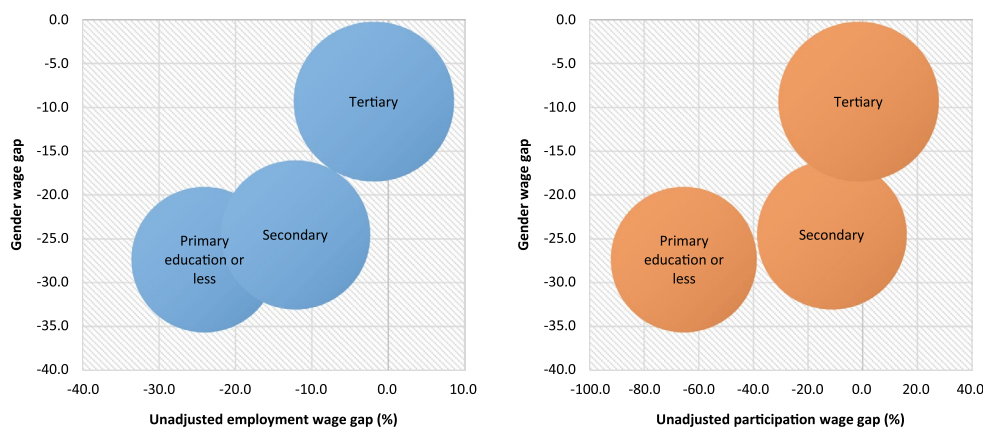Source: Author's calculation based on S.I.L.C.

Figure 1. Gender wage gap against (i) gender employment gap (left) and (ii) gender participation gap (right), at different levels of education for childbearing-age individuals (24–45 years). Source: Authors' calculations based on S.I.L.C. 2010.
Note: The size of the circles represents the size of the females' wage.

employment and participation gaps are wider for less-educated youth. In addition, Figure 1 reveals a positive correlation between the gender wage gap, on the one hand, and the gender employment and participation gaps on the other: with growing education both gaps are closed. Such a positive correlation between the gaps may suggest that childbearing-age women tend, on average, to be more negatively selected into employment than men (i.e., that women who work have worse characteristics than those who do not), which is likely explained by the high reservation wage.

However, what about the childbearing role and education? Figure 2 analyses the motherhood wage gap and suggests several interesting insights: the motherhood wage gap is large for childbearing-age women with secondary education and almost non-existent for those with primary education; on the other hand, it is positive for those with tertiary education. Conversely, the employment and participation gaps are considerably larger at the primary-education level and small at the secondary-education level. Hence, for these two education groups, the correlation is actually negative: higher education improves the position of mothers in the labour market, but worsens the wage. This may suggest a positive selection of mothers in the labour market. However, the picture reverses when the tertiary education is added. So, overall, selection may not actually play a role for mothers.

Given the discussion above, several features of the labour market for childbearing-age women in Macedonia emerge:
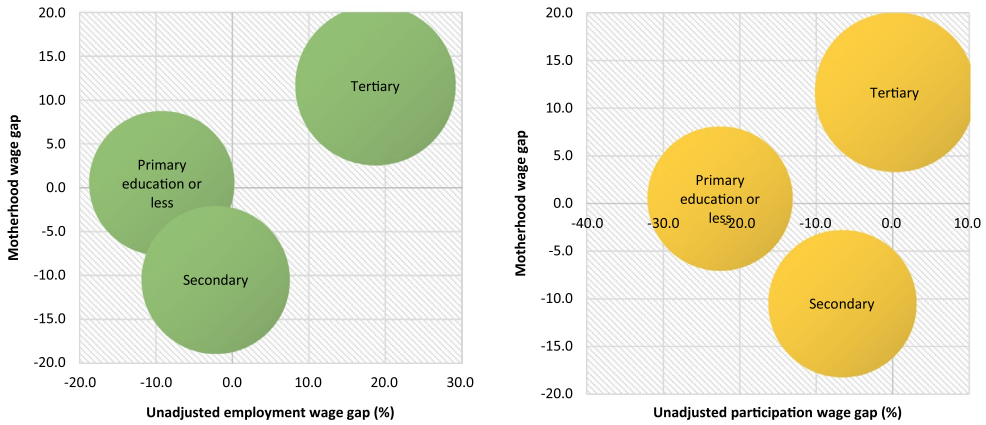
Figure 2. Motherhood wage gap against (i) motherhood employment gap (left) and (ii) motherhood participation gap (right), at different levels of education for childbearing-age women (24–45 years). Source: Authors' calculations based on S.I.L.C. 2010.
Note: The size of the circles represents the size of the mothers' wage.

(1) The unadjusted motherhood wage gap is likely lower than the gender wage gap, but is mainly driven by women in the secondary-education group, who are most prone to having too high reservation wages and putting more than usual value for childbearing;

(2) Childbearing-age women outside the labour market are likely not those with the worst labour-market characteristics (negative selection), reflecting the high reservation wages;

(3) Conversely, childbearing-age mothers outside the labour market are likely to have worse labour-market characteristics (positive selection), but the result is likely driven by the secondary-education group and not the entire cohort;

(4) Hence, motherhood may explain a part of the gender wage gap, potentially correcting it downwards.

3. Theoretical foundations and literature overview

The literature underpinning this paper is two-stranded. The first relevant strand of literature is the one on gender wage gaps and their interferences with the gender employment and participation gaps. Some of the representative papers include: Gronau (1974); Beblo, Beninger, Heinze, and Laisney (2003); Blau and Kahn (2003); Albrecht, van Vuuren, and Vroman (2004); Azmat, Güell, and Manning (2006); Neal (2004); Fortin (2005); Petrongolo and Olivetti (2008), and others. In general, many studies document the role of selection into employment or into the labour market; in the majority of cases the selection is positive, i.e., women outside the labour market are those with worse labour-market characteristics, but in some cases selection is found to be negative, i.e., women outside the labour market are not those with the worst characteristics, since they set a high reservation wage and value leisure more than employment not commensurate to their human characteristics. However, a widespread aspect of studies correcting for selection is that they mainly rely

on the Heckman (1979) method of correction, with few exceptions (e.g., Machado, 2012; Petrongolo & Olivetti, 2008).

The other strand of literature pertinent to this paper is the one on the motherhood wage gap. In particular, the motherhood gap could be an important component of the gender wage gap (Waldfogel, 1998). This strand of the literature is actually fairly wide and touches upon a variety of wage differentials: (i) between full- and part-time workers (Blank, 1990; Corcoran, Duncan, & Ponza, 1983; Ermisch & Wright, 1993; Jones & Long, 1979; Joshi & Newell, 1989; Joshi & Paci, 1998), given the propensity of childless women to work full-time and to be more career-minded than mothers; (ii) between married and single women (Dolton & Makepeace, 1987; Greenhalgh, 1980; Hill, 1979; Joshi & Newell, 1989; Neumark & Korenman, 1994), reflecting the fact that spouse's income may play a role in labour market status and outcome; and (iii) between mothers and childless women (Amuedo-Dorantes & Kimmel, 2005; Correll, Benard, & Paik, 2007; Daniel, Lacuesta, & Rodríguez-Planas, 2013; Felfe, 2012; Fuchs, 1988; Gangl & Ziefle, 2009; Harkness & Waldfogel, 2003; Hill, 1979; Joshi, 1991; Joshi & Newell, 1989; Joshi, Paci, & Waldfogel, 1999; Korenman & Neumark, 1992; Lundberg & Rose, 2000; Neumark & Korenman, 1994; Waldfogel, 1995, 1997a, 1997b), reflecting the notion that motherhood may impact labour-market status and outcome. The latter is what we focus on in this paper.

The literature offers a variety of explanations why mothers may have lower wages than childless women (for an extensive review of the literature about these explanations, see Budig and England, 2001). First, many women spend time at home caring for children, interrupting their job experience completely, or at least interrupting full-time employment. This explanation draws on Becker's (1964) human capital theory. If the market wage reflects individual productivity, which is determined by formal skills (education), experience and routine, any period of non-market activity (i.e., birth-giving and childcare) is likely to generate wage losses due to processes of human capital depreciation and lack of further human capital investment (Becker, 1985; Mincer & Ofek, 1982). Hence, mothers accumulate smaller human capital stock, which then predicts a lower wage for them than women who continuously stay in human-capital investment.

Second, mothers may make a trade-off of higher wages for 'mother-friendly' jobs, which are easier to combine with parenting. This explanation suggests that motherhood may shape post-partum mothers' labour-market choices, i.e., that childbirth may stir the traditional division of labour between spouses (e.g., Becker, 1985). In a traditional view, childbirth may even lead to females' withdrawal from the labour market, i.e., encourage inactivity, although nowadays the return of mothers to work occurs faster than it did previously (Goldin, 2006). Still, if mothers have observed or unobserved characteristics that make them different than childless women, their absence from the wage distribution may impose significant selection bias in the estimation of the motherhood wage gap. In understanding this process, the role of the husband's income may play a role: depending on the level, it may actually influence the mother's decision to stay detached from the labour market for a longer period and/or to insist that she return to the labour market in a position that is more mother-friendly and likely less well-paid. In addition, if such job changes result in loss of firm-, occupation- or industry-specific human capital, then a wage loss is implied (Budig & England 2001; Waldfogel 1998).

Third, mothers may earn less, because the needs of their children leave them exhausted or distracted at work, making them less productive, or simply limit their options to travel,

to stay overtime and the like (Gangl & Ziefle, 2009). In addition, wage losses or wage growth stagnation after childbirth may be assumed due to mothers' geographical/mobility restriction, limiting the set of available job opportunities. In such a case, as Manning (2003) argues, mothers' bargaining power is decreased, in relation to both current and prospective employers.

Fourth, employers may discriminate against mothers, even though these women may have the same productivity as the childless women in the same workplace and position. This is pure statistical discrimination against mothers, as the status of a mother may easily infer unobservable worker productivity for employers, when they recruit, train, promote or remunerate mothers (Correll et al. 2007; Petersen & Saporta, 2004; Spence, 1973).

> As with many other traits and behaviours, motherhood or taking time off for childcare may have little real productivity effects in itself, but may nevertheless generate significant wage effects whenever employers believe more family-oriented behaviours to be correlated with mothers' lower productivity on the job and consequently decide to stigmatise working mothers. (Gangl and Ziefle, 2009, p. 343)

Fifth, still more unobserved factors may inflate the motherhood gap, like the career-mindness of some women, which deters them from marriage and/or having children; as well as career ambition or ability at the workplace. We should also note that men's wages are not usually affected by fatherhood (Loh, 1996), and in some cases they even increase after having a child (Lundberg & Rose, 2000).

To our knowledge, there is no literature merging the selectivity effects of the motherhood wage gap on the gender wage gap. Hence, this study will be the first that examines the contribution of the motherhood wage gap to the gender wage gap in Macedonia, through its explicit consideration of selectivity bias into employment and participation.

4. Model, methodology and data

To estimate the gender and motherhood wage gaps, we rely on Mincer's (1974) human capital earnings function, which relates the log of individual wage to human capital characteristics:

$$ln(y_t) \ = \ \alpha + \beta_1 gender_i + \beta_2 mother_i + \Sigma \gamma_j * X'_t + \ \varepsilon_i \tag{1}$$

Where $ln(y_t)$ is the log of the hourly wage; $gender_i$ is a dummy variable taking a value of 1 for women and 0 for men; and $mother_i$ is a dummy variable taking a value of 1 for women with at least one child below the age of 18. The coefficient β_1 measures the gender wage gap, while the coefficient β_2 measures the motherhood wage gap. X'_t is the s vector of labour-market characteristics, including, but not limited to, those which are usually found in the referent literature: education, age and its square, experience, marriage and the like (Agüero & Marks, 2011; Budig & England, 2001). In the regression, we do not include variables related to occupation and economic sector, since these are not observed for those who are unemployed or inactive and, hence, would not fit into our methodological framework, as described below. The contract type is also dropped from our imputation-based estimates.

Given the presence of selection into the labour market (Section 2), the non-completeness of the wage distribution will make inferences about the estimated wage gaps false. While this has been addressed in previous studies by employing the Heckman (1976, 1979) sample-selection method, we hereby propose an alternative empirical approach: repeated

imputations. This technique is based on median regressions (Rubin, 1987) and does not require assumptions on the actual level of missing wages, as usually required in the matching approach, nor does it require arbitrary exclusion restrictions and lack of robustness (Manski, 1989), as raised in the Heckman (1979) models.

One plausible characteristic of the median regressions is that, if missing wage observations fall completely on one side or the other of the median regression line, the results are only affected by the position of wage observations with respect to the median, and not by the precise values of imputed wages. Hence, we can make an assumption referring to the economic theory on whether an individual who is not employed should have a wage observation below or above the median wage for their gender and for whether she is a mother or not; and we extend the framework of Johnson, Kitamura, and Neal (2000) and Neal (2004) by using probability models (probit) to assign individuals to one side or the other of the median of the wage distribution. This assumption relates to the individual's observable characteristics, in the following manner:

$$Pr\left(m_t\right) \ = \ \alpha + \Sigma\gamma_j * Z_t' + u_i \tag{2}$$

Where the Z_t vector includes: education, experience, age, its square, marital status, number of children below the age of 3, and between the ages of 3 and 6, and spouse's income (but not gender and motherhood). In particular, we include the last three variables to control for some of the reasons articulated by the literature for the potential presence of the motherhood wage gap (e.g., Budig & England, 2001): experience—to control for career breaks and their potentially negative influence on human capital and, hence, wages; the presence of children and, in particular, small children—to control for the potentially lower productivity and devotion given the need to raise children; and spousal income—to control for the possibility that mothers' labour-market choices depend, *inter alia*, on the labour-market status of their husbands. What we cannot control within this specification is the type of workplace, given that we do not observe this variable for the non-working mothers—to account for the fact that mothers may choose more flexible job places; and other unobservable factors, like ability and career-mindness.

Hence, by using the repeated imputation technique, we allow for so-called *selection on observables*. In doing so, we estimate the probability of each individual belonging above or below their gender-specific/motherhood-specific median. Then, the missing wage values are replaced by simulated versions and independent simulated datasets are obtained. Despite early suggestions (e.g., Schafer, 1999; Schafer & Olsen, 1998) that three-to-five imputations are sufficient to obtain good results, some more recent contributions (Graham, Olchowski, & Gilreath, 2007) document that increasing the number of imputations increases the efficiency of the estimations. Hence, we have used 100 imputations. This method has the advantage of using all available information on the characteristics of the non-employed and of taking into account uncertainty about the reason for missing wage information (Petrongolo & Olivetti, 2008; Rubin, 1987).

The repeated imputation technique is not without its criticisms, though. One apparent critique is the work of unobservables in determining participation (or missingness from the wage distribution) and wages simultaneously. One obvious example is individual values and attitudes towards family orientation: a person may be family-oriented and has a partner but not children and, hence, does not want to work (or does not want to work long

hours). Then, this inclination to devoting time to family values affects both non-participation (and, hence, the motherhood wage gap) and wages. Hence, while repeated imputation has the advantage over the Heckman (1979) selection method in that it does not require (arbitrary) exclusion restrictions, this advantage could equally be considered as its main weakness: it is weak on the selection on unobservables. Hence, in the Appendix we will compare our results with the results of a Heckman model. However, the main challenge with the Heckman (1979) procedure is to find exogenous instrument(s) affecting participation, but not wages directly. Some studies (e.g., Aguero & Marks, 2011; Budig & England, 2001; Davies & Pierre, 2005; Grimshaw & Rubery, 2015) suggest that the number of children, their age and (mostly in less developed countries) their gender may affect the motherhood wage penalty, i.e., determine the decision of the mother to participate in the labour market or not, but not the wage *per se*.

After we have estimated the gender and motherhood wage gaps of the childbearing-age cohort, we will conduct several decompositions. The decomposition literature has seen an evolution: Fortin, Lemieux, and Firpo (2011) review the decomposition methods that have been developed since the seminal work of Oaxaca and Blinder (Blinder, 1973; Oaxaca, 1973)[1]. In that regard, we propose two advancements of the decomposition in this work, which could, *inter alia*, serve as a robustness exercise. First, the research moved to estimating the gender and motherhood wage gaps at different percentiles of the wage distribution. Some important contributions include: Machado and Mata (2005), Firpo et al. (2007), Firpo, Fortin, and Lemieux (2009), and Chernozhukov, Fernandez-Val, and Melly (2013). Second, semi- and non-parametric methods, such as matching or weighting, have been proposed, against the inherently parametric character of the Oaxaca-Blinder decomposition. Representative papers in this field include: Barsky et al. (2002), Frölich (2007), Black, Haviland, Sanders, and Taylor (2008) and Ñopo (2008). Hence, we finally opt to decompose the gaps by deciles, by referring to the weighting approach (Barsky et al., 2002); and the re-centred influence function (R.I.F.) approach (Firpo et al., 2007).

The analysis is based on the Survey of Income and Living Conditions (S.I.L.C.). This is a longitudinal survey of a representative sample of Macedonian individuals and their households, performed in accordance with the Eurostat S.I.L.C. It was performed in Macedonia for the first time in 2010. The survey has a representative sample of about 13,800 individuals, out of which about 3,000 belong to the childbearing-age cohort of between 24 and 45 years of age. As mentioned, similarly to other studies, we choose a span of 20 years, for two reasons: on the one hand, to allow more observations in the analysis (as compared to analysis based on one particular year of age) and, on the other, to capture the entire childbearing age. This, *inter alia*, suggests that we exclude potential outliers: i.e., women with dependents becoming mothers too early or too late, as we believe motherhood in these ages is fairly unrelated to labour-market status or outcome.[2]

5. Results and discussion

5.1. *Does motherhood explain part of the gender wage gap*

We start our analysis by estimating the gender and motherhood wage gaps in a simple Ordinary Least Squares (O.L.S.) framework (Table 3). Columns 1–4 use the entire childbearing-age cohort to estimate the gender and motherhood wage gaps; while columns 5

and 6 use only the female childbearing-age population to calculate the motherhood wage gap. Column 1 estimates the unadjusted (raw) gender wage gap, suggesting that childbearing-age women in Macedonia have on average 14.1% lower wage than men in the same age cohort. Recall that Petreski et al. (2014) found a gap of 12.5% for the entire working-age population in Macedonia. Column 2 adds the indicator of 'mother', in order to separate the motherhood wage gap from the gender wage gap. The results suggest that childbearing-age mothers have an 8.7% lower wage than childless women. The result is confirmed in column 5, whereby we drop all men in the sample. Importantly, the consideration of motherhood in the regression dwindles the gender wage gap to 8.1%, potentially suggesting that motherhood is a powerful explanatory variable for a significant portion of the gender wage gap in Macedonia. Certainly, this is only a raw gap and such simple conclusions cannot easily be drawn.

Columns 3 and 4 adjust the estimates regarding the workers' characteristics. Several interesting conclusions can be drawn from here. First, the gender wage gap inflates to 20.4% when characteristics are controlled for. This suggests that an average employed woman in Macedonia has better labour-market characteristics than an average employed man (see Figure 1). This occurs because a significant portion of low-skilled women stay out of the labour market, meaning that they self-select out of employment due to the low opportunity

Table 3. Gender and motherhood wage gaps in an O.L.S. regression.

	Entire sample				Females' sample	
	Raw gaps		Adjusted gaps		Raw gap	Adjusted gap
Gender	−0.141***	−0.0811*	−0.204***	−0.145***		
	(0.030)	(0.044)	(0.026)	(0.042)		
Mother		−0.0870*		−0.0862*	−0.0870*	−0.00089
		(0.050)		(0.048)	(0.050)	(0.059)
Secondary education			0.185***	0.186***		0.203***
			(0.035)	(0.035)		(0.056)
Tertiary education			0.728***	0.727***		0.790***
			(0.041)	(0.041)		(0.061)
Age			0.00513	0.0122		0.031
			(0.029)	(0.029)		(0.048)
Age squared			−0.00022	−0.00033		−0.00056
			(0.000)	(0.000)		(0.001)
Experience			0.0185***	0.0184***		0.0187***
			(0.003)	(0.003)		(0.005)
Marital status (1 = married)			0.0475	0.0671*		−0.124*
			(0.033)	(0.036)		(0.067)
Contract (1 = fulltime)			0.219***	0.220***		0.257***
			(0.038)	(0.037)		(0.057)
Constant	4.220***	4.220***	3.662***	3.535***	4.139***	3.046***
	(0.018)	(0.018)	(0.494)	(0.501)	(0.040)	(0.816)
Observations	1,488	1,488	1,445	1,445	634	627
R-squared	0.015	0.017	0.257	0.259	0.004	0.305

*, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively. Estimates are robust to heteroskedasticity. Standard errors given in parentheses.
Source: Authors' calculations.

cost of not working (higher female reservation wage at low-skill level), as we discussed in Figure 1. Note that the gender wage gap inflates when controlling for motherhood (columns 3 vs 1 and 4 vs 2). Avlijaš, Ivanović, Vladisavljević, and Vujić (2013) label this as the 'Balkan' phenomenon, against the Western evidence of a reducing gender wage gap when controlling for workers' characteristics. Second, motherhood's significance and magnitude are maintained, potentially suggesting that the average employed mothers have no different characteristics than the average employed men and childless women observed together.

We now turn to the cohort of women only. Column 5 replicates the conclusions for the motherhood wage gap obtained in column 2. However, when adding characteristics for women only, the motherhood gap loses significance, suggesting that, indeed, mothers who are employed in Macedonia have, on average, worse labour-market characteristics than the employed childless women (see Figure 2).

Table 4 considers the adjusted-for-characteristics of the gender and motherhood wage gaps at different levels of skills. Expectedly, the gender wage gap is reduced with education and vanishes at the tertiary education level—similarly as in Petreski et al. (2014). Motherhood continues to be irrelevant for the wages, except for the secondary-education level, but the finding is not robust.

However, all these estimates are exposed to selection bias, as we discussed extensively in the sections above. Selection correction is needed, which we conduct through the repeated imputations technique. Namely, we assign each person whose wage is not observed a random wage below or above the median in a repeated fashion. We classify the person to be above the gender/motherhood-specific median, according to equation (2), whose marginal effects are presented in Table 5. The results suggest that education is a strong predictor of the position of the wage with respect to the median, as well experience and the spouse's income. Their increase increases the probability that a person whose wage is not observed is classified above the median.

Table 6 presents the results after imputations based on the probit predictions. We first work with the entire childbearing-age cohort (columns 1–3) and then reduce it to women

Table 4. Gender and motherhood wage gaps in O.L.S. regression—by education.

	Dependent variable: Log of the net hourly wage		
	Entire childbearing-age cohort		Only childbearing-age women
Primary			
Woman	−0.317***	−0.267***	
	(0.065)	(0.097)	
Mother		−0.0654	−0.0718
		(0.107)	(0.133)
Secondary			
Woman	−0.235***	−0.153***	
	(0.034)	(0.053)	
Mother		−0.119*	−0.0106
		(0.063)	(0.074)
Tertiary			
Woman	−0.0753	−0.0278	
	(0.052)	(0.084)	
Mother		−0.0759	0.0109
		(0.099)	(0.129)

*, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively. Estimates are robust to heteroskedasticity. Standard errors given in parentheses. Labour-market characteristics are not shown due to space.
Source: Authors' calculations.

only (columns 4–9). Note that, for robustness checks, in columns 5–9 we add additional explanatory variables which may be related to the mother's wage: spouse's income, number of children, having at least one child below the age of 3 and at least one child between the ages of 3 and 6. There is discussion of whether these determine a mother's wage *per se* or a mother's labour-market choice (decision to participate in the labour market or not), but presently we abstract from such discussion.

Several robust conclusions could be made from Table 6:

(i) The gender wage gap exists, but, after considering selection into employment, the gap more than halves: from ~ 20% to ~ 8.2%. The finding suggests that selection could explain ~ 12% of the gender wage gap in Macedonia. The finding is strongly consistent with Petreski et al. (2014), who found that the gap for the entire working-age population dwindles from 14% to 7.5%, after the selectivity bias has been accounted for. This finding suggests that indeed there is negative selection of women into employment: those with not-the-worst characteristics are outside the labour market;

(ii) After considering selection issues, the results suggest that characteristics do not explain the portion of the gender wage gap further explained by selection, including motherhood. Namely, motherhood is not powerful enough to explain the gender wage gap either;

(iii) The selection-adjusted motherhood wage gap remains significant (column 4 in Table 6) and with a similar magnitude as when selection is not considered (column 5 in Table 3), suggesting that selection does not play any role for the difference in wages between mothers and childless women;

Table 5. Probit regression for assigning an individual without observed wage below or above the median.

	Dependent: Dummy 1 = if wage above median	
	Entire childbearing-age cohort	Only childbearing-age women
Age	0.0105	−0.324
	(0.071)	(0.226)
Age squared	−0.00062	0.00453
	(0.001)	(0.003)
Secondary education	0.558***	0.797**
	(0.117)	(0.401)
Tertiary education	1.793***	1.968***
	(0.137)	(0.442)
Experience	0.0582***	0.0595***
	(0.008)	(0.020)
Marital status (1 = married)	0.068	
	(0.101)	
Spouse's income	0.00199***	0.00868***
	(0.001)	(0.003)
Number of children below the age of 3	0.146	0.282
	(0.091)	(0.233)
Number of children between the ages of 3 and 6	−0.0128	0.0248
	(0.069)	(0.191)
Constant	−1.047	3.38
	(1.207)	(3.870)
Observations	1,488	242

*, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively. Marginal effects reported. Standard errors are given in parentheses.
Source: Authors' calculations.

Table 6. Gender and motherhood wage gap with repeated imputations (100).

	Dependent variable: Log of the net hourly wage							
	Entire childbearing-age cohort			Only childbearing-age women				
Woman	−0.0820*** (0.025)	−0.0823*** (0.025)	−0.069* (0.041)					
Mother			−0.0761** (0.038)	0.0332 (0.050)	0.0418 (0.051)	0.00456 (0.068)	0.0008 (0.068)	0.00232 (0.067)
Secondary education		0.0158 (0.030)	−0.00906 (0.042)	−0.0479 (0.048)	−0.0282 (0.047)	−0.0209 (0.047)	−0.0203 (0.047)	−0.0216 (0.047)
Tertiary education		0.501*** (0.039)	0.500*** (0.040)	0.404*** (0.061)	0.425*** (0.058)	0.434*** (0.058)	0.434*** (0.058)	0.433*** (0.058)
Age		0.0179 (0.024)	0.0187 (0.024)	0.0117 (0.039)	0.0265 (0.040)	0.0203 (0.040)	0.0235 (0.041)	0.0195 (0.041)
Age^2		−0.0003 (0.000)	−0.0003 (0.000)	−0.0001 (0.001)	−0.00037 (0.001)	−0.00028 (0.001)	−0.00031 (0.001)	−0.00027 (0.001)
Experience		0.009*** (0.002)	0.009*** (0.002)	0.00431 (0.004)	0.00439 (0.004)	0.00479 (0.004)	0.00477 (0.004)	0.00489 (0.004)
Marital status (1 = married)		0.0491 (0.031)	0.0511 (0.032)	−0.0688 (0.061)	−0.0401 (0.061)	−0.0446 (0.061)	−0.0472 (0.062)	−0.0425 (0.061)
Log of spouse's income					−0.0191 (0.013)	−0.0185 (0.013)	−0.0186 (0.013)	−0.0184 (0.013)
Number of children						0.0219 (0.025)	0.02 (0.026)	0.0263 (0.027)
Children below the age of 3							0.026 (0.051)	0.026 (0.051)
Children between the ages of 3 and 6								−0.0161 (0.037)
Constant	4.143*** (0.019)	3.705*** (0.406)	3.693*** (0.409)	3.783*** (0.663)	3.531*** (0.673)	3.626*** (0.679)	3.562*** (0.699)	3.647*** (0.682)
Observations	3,018	3,018	3,018	1,579	1,579	1,579	1,579	1,579

*, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively. Estimates are robust to heteroskedasticity. Standard errors are given in parentheses.
Source: Authors' calculations.

(iv) However, the addition of explanatory variables suggests that the motherhood gap identified in column 4 in Table 6 is actually entirely due to characteristics. Hence, the motherhood wage gap becomes insignificant, a conclusion which is consistent, irrespective of whether it is calculated within the entire childbearing-age cohort or only for the childbearing-age women; and

(v) The addition of some variables which may be important for the motherhood wage gap does not alter the conclusion that the motherhood wage gap is insignificant. Spouse's income, number of children and the existence of child below the age of 3 and between the ages of 3 and 6 are insignificant, which, *inter alia*, may suggest that they indeed could be considered exclusion restrictions, i.e., they may affect the labour-market choice of the mother, but not the wage directly.

Table 7 examines the same estimates as in Table 6, but at skills level. The coefficients are both adjusted for characteristics (not shown due to space restrictions, but available on request) and selection. The table suggests that what we concluded for the overall sample is valid for each educational cohort.

Overall, the analysis shows that, once workers' characteristics and selectivity into employment are accounted for, employers in Macedonia commit discrimination against childbearing-age women in general, penalising their wage by ~ 7–8% compared to men. A motherhood wage gap does not exist and, hence, does not contribute to explaining the gender wage gap, while any differences in wages between mothers and childless women can be entirely explained by observable characteristics.[3]

5.2. Decompositions of the gaps

This section presents the gender and motherhood wage gap decompositions. We go beyond the standard Blinder-Oaxaca decompositions, based on the medians, and focus our attention on decomposition by deciles. The reasons for doing this are two-fold: first, the literature

Table 7. Gender and motherhood wage gap with 100 repeated imputations, by education.

	Dependent variable: Log of the net hourly wage		
	Entire childbearing-age cohort		Only childbearing-age women
Primary			
Woman	−0.0503	−0.064	
	(0.052)	(0.088)	
Mother		0.0166	−0.0123
		(0.085)	(0.099)
Secondary			
Woman	−0.123***	−0.0773	
	(0.033)	(0.050)	
Mother		−0.0678	−0.00809
		(0.057)	(0.072)
Tertiary			
Woman	−0.0694	−0.0448	
	(0.053)	(0.075)	
Mother		−0.0453	0.0402
		(0.090)	(0.118)

*, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively. Estimates are robust to heteroskedasticity. Standard errors are given in parentheses. Labour-market characteristics not shown due to space.
Source: Authors' calculations.

has generally abandoned decompositions at the mean and, second, we proved the overall motherhood wage gap to be statistically insignificant in explaining wage differentials as well for affecting the gender wage gap in Macedonia. However, we draw on the recognition that the wage gaps may be different at different points of the wage distribution.

Figure 3 visualises the selection-corrected wage gaps—respectively for gender and motherhood—and gives some support to our claim: the left graph suggests that women/mothers are more prevalent than man/childless women in the left part of the wage distribution, while men/childless women score better in the middle and to its immediate right. The right figure gives the gap by deciles and finds that, for the left-middle deciles, it hovers within the confidence interval of the average wage gap.

Our decomposition exercise starts by utilising weights that equalise the empirical distributions of the explanatory variable. This weighting technique involves estimating a model for the probability of being male/a childless woman rather than woman/a mother using a set of explanatory variables. We use a probit model to predict man/childless woman and use the predictions to compute weights given by the ratio of the probability of being male/a childless woman and the probability of being woman/a mother. Then, we operate with the weighted mean and deciles of log wages for women/mothers. These weighted statistics are the counterfactual mean and deciles of log wages for women/mothers as if they had the same distribution of characteristics of men/childless women. In our case, we may ask what the distribution of wages of women and mothers would look like if they had the same characteristics as men and childless women, respectively.
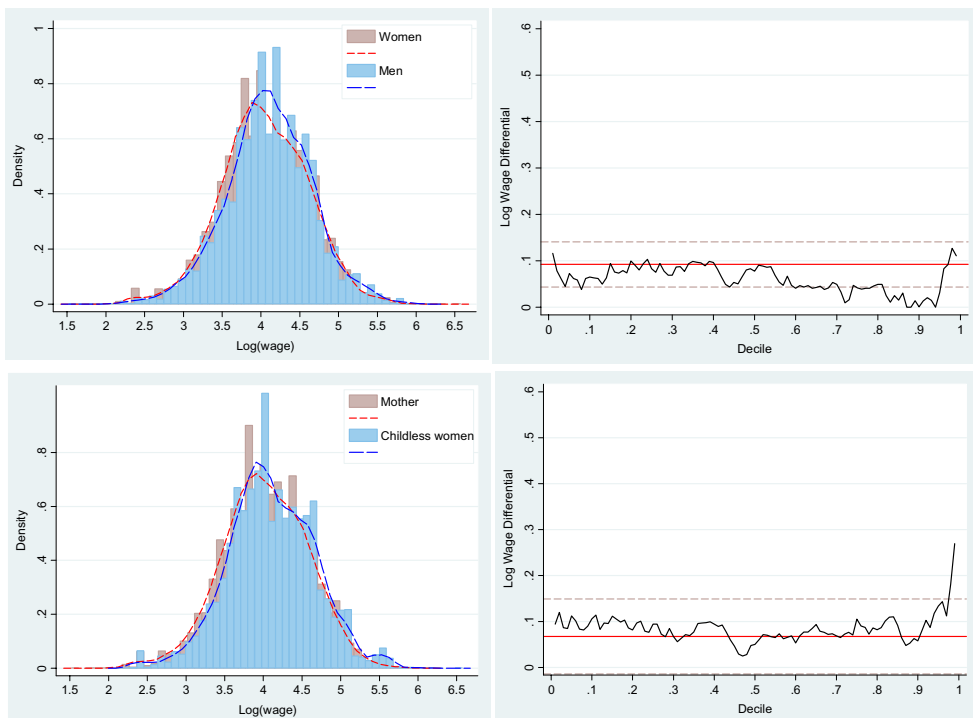

Figure 3. Densities of wages by gender/motherhood (left) and gender/motherhood differential by decile (right). Source: Author's calculation.
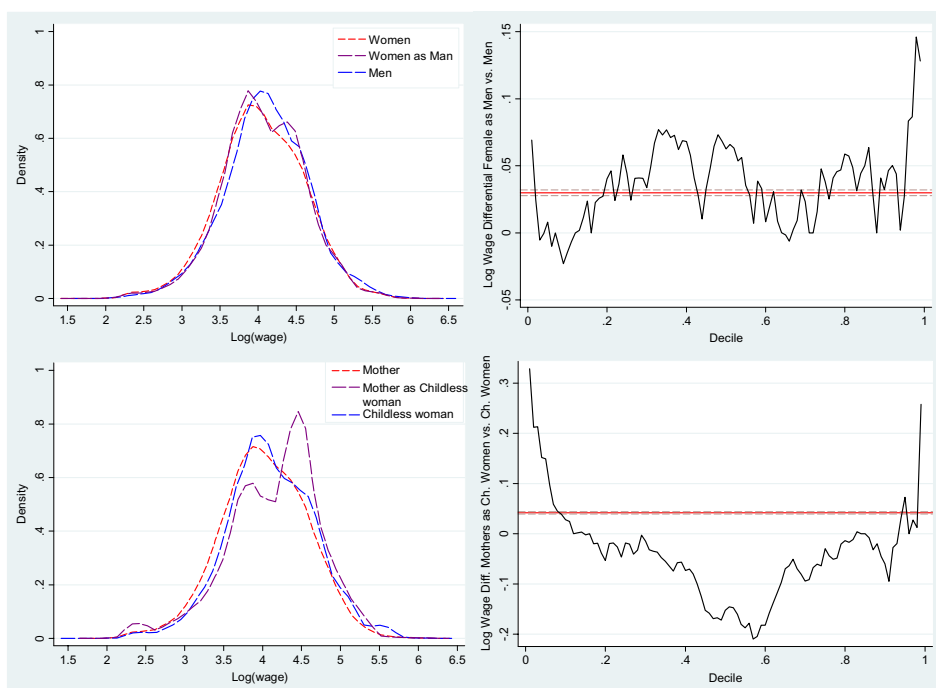
Figure 4. Densities of wages by gender/motherhood (left) and gender/motherhood differential by decile (right), after weighting. Source: Author's calculation.

Figure 4 provides the answers. On the left panel, besides the distributions for men and women and mothers and childless women, a wage distribution is shown representing women/mothers had they had the same observable characteristics as men/childless women, respectively (purple dashed line). The right panel presents the gender and motherhood wage gaps, respectively, once weighting has been pursued, i.e., once males' characteristics have been attached to women and childless women's characteristics attached to mothers. Hence, Figure 4 is a replica of Figure 3, but weighting has been imposed. The right graphs suggest that, after weighting, both wage gaps decline, as well as their standard error. The gender wage gap is persistent along the entire wage distribution, with possibly declining magnitude in the right half; and with a likely exception of the highest wages (above the 95th percentile) where it jumps as high as 15%, being a sign of a glass-ceiling effect for women in Macedonia. On the other hand, mothers likely face both phenomena of sticky floor and glass ceiling, as the motherhood wage gap may actually go up to 30% on both ends of the wage distribution. In other words, had mothers had the same observable characteristics as childless women, it is likely that they would have faced lower wages for the lowest and the highest paid jobs than childless women, simply because they are mothers. In Macedonia, the lowest paid jobs belong to the textile and fur industry, while the highest paid jobs are managerial positions, usually in the financial industry. There, mothers are penalised because of their natural role. On the other hand, for jobs with wages around the middle, the motherhood wage gap is the opposite, suggesting that mothers with the same characteristics of childless women would have had a higher wage. In Macedonia, middle-paid jobs belong mainly to the public sector, as well as for non-managerial position in manufacturing and

Table 8. Gender wage gap— a R.I.F. approach without weighting.

					Dependent variable: Log of hourly wages				
					Deciles				
	10	20	30	40	50	60	70	80	90
Mean R.I.F. gender wage gap	−0.0660***	−0.0827***	−0.0662***	−0.101***	−0.0765***	−0.0533***	−0.0536***	−0.0466***	0.00314
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Composition effects attributable to									
Education	−0.0722***	−0.0252***	−0.00449	−0.0283***	−0.0371***	−0.0486***	−0.0783***	−0.0693***	−0.0289***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Age	2.029***	0.807***	0.509***	0.627***	0.397***	0.169*	0.241**	−0.644***	−0.326***
	(0.129)	(0.099)	(0.086)	(0.083)	(0.085)	(0.092)	(0.095)	(0.094)	(0.106)
Experience	−0.0245***	−0.0418***	−0.0447***	−0.0676***	−0.0627***	−0.0524***	−0.0363***	−0.0267***	−0.0213***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Marriage	−0.0862***	−0.0910***	−0.0845***	−0.0816***	−0.106***	−0.138***	−0.150***	−0.103***	−0.0286***
	(0.008)	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)
Motherhood	−0.0196***	−0.00785**	0.0130***	−6.49E-05	0.0564***	0.0606***	0.0800***	0.0512***	0.0314***
	(0.005)	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Total explained by characteristics	−0.0130***	−0.0312***	−0.0260***	−0.0600***	−0.0425***	−0.0168***	−0.0197***	−0.0350***	−0.00592
	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Wage structure effects attributable to									
Education	−0.0178***	−0.0123***	−0.00676***	−0.0103***	−0.0119***	−0.0147***	−0.0225***	−0.0159***	−0.00576***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age	−0.0176***	−0.0149***	−0.0100***	−0.0114***	−0.00916***	−0.0110***	−0.00640***	−0.000752	0.00706***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience	−0.0400***	−0.0440***	−0.0376***	−0.0393***	−0.0340***	−0.0362***	−0.0321***	−0.0188***	−0.00508***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Marriage	0.0224***	0.0197***	0.0141***	0.0203***	0.0210***	0.0254***	0.0271***	0.0238***	0.0128***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Motherhood	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000	−0.0000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total wage structure	−0.0530***	−0.0515***	−0.0403***	−0.0406***	−0.0340***	−0.0365***	−0.0338***	−0.0116***	0.00906***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	1.840***	0.673***	0.414***	0.510***	0.290***	0.00726	0.0762	−0.757***	−0.367***
	(0.129)	(0.098)	(0.086)	(0.083)	(0.085)	(0.092)	(0.095)	(0.093)	(0.106)

*, **, and *** denote statistical significance at the 10, 5 and 1% level, respectively. Estimates are robust to heteroskedasticity. Standard errors are given in parentheses.
Source: Authors' calculations.

Table 9. Motherhood wage gap—a R.I.F. approach without weighting.

	Dependent variable: Log of hourly wages								
					Deciles				
	10	20	30	40	50	60	70	80	90
Mean R.I.F. motherhood wage gap	-0.112***	-0.0788***	-0.0794***	-0.0912***	-0.0499***	-0.0691***	-0.0749***	-0.0854***	-0.0580***
	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Composition effects attributable to									
Education	-0.0633***	-0.105***	-0.0914***	-0.0821***	-0.110***	-0.124***	-0.131***	-0.113***	-0.0852***
	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Age	0.00701**	0.0199***	0.00938***	0.0146***	0.0140***	0.0226***	0.0185***	0.0003	0.0205***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
Experience	-0.0372***	-0.00445***	-0.0115***	-0.00340***	0.0111***	0.00171	0.00093	0.00330**	0.00568***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Marriage	-0.0105*	-0.0291***	-0.0160***	-0.0128***	-0.0284***	-0.0431***	-0.0282***	-0.0177***	-0.00351
	(0.006)	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)
Total explained by characteristics	-0.104***	-0.119***	-0.110***	-0.0837***	-0.113***	-0.143***	-0.140***	-0.127***	-0.0626***
	(0.007)	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)
Wage structure effects attributable to									
Education	-0.0521***	-0.0728***	-0.0371***	0.00749	-0.0290***	-0.0233***	-0.00757	0.0026	0.0183***
	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)
Age	-0.0626	-0.842***	-0.476***	-0.568***	-0.560***	-1.287***	-1.060***	-0.453***	-1.317***
	(0.187)	(0.142)	(0.126)	(0.125)	(0.132)	(0.152)	(0.147)	(0.144)	(0.172)
Experience	-0.0277***	0.00894***	-0.00470**	-0.0196***	0.0130***	0.00833***	0.0150***	0.00851***	-5.43E-05
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Marriage	0.0263*	0.0365***	0.0207**	0.0162*	0.0319***	0.0451***	-0.00741	0.0141	0.0475***
	(0.015)	(0.011)	(0.010)	(0.010)	(0.010)	(0.012)	(0.012)	(0.011)	(0.014)
Total wage structure	-0.00834	0.0404***	0.0301***	-0.00751	0.0630***	0.0734***	0.0653***	0.0420***	0.00458
	(0.009)	(0.007)	(0.006)	(0.006)	(0.007)	(0.008)	(0.007)	(0.007)	(0.009)
Constant	0.108	0.910***	0.527***	0.556***	0.607***	1.330***	1.125***	0.470***	1.256***
	(0.185)	(0.140)	(0.126)	(0.124)	(0.131)	(0.150)	(0.146)	(0.143)	(0.171)

*, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively. Estimates are robust to heteroskedasticity. Standard errors are given in parentheses.
Source: Authors' calculations.

finance. It is likely that there mothers are perceived as more stable and suitable for such 'quiet' workplaces and hence, they have a reward.

Closely connected to the weighting approach, Firpo et al. (2007) proposed a concept whereby the dependent variable is replaced by the R.I.F. of the statistic of interest. However, the estimation of the counterfactual in this approach is still based on a linearity assumption and possibly on out-of-the-sample predictions (on the R.I.F. approach, see further details in Firpo et al., 2009). The approach allows us to decompose the mean (or deciles') wage gap into an 'explained' part attributable to differences in characteristics between the two groups and an 'unexplained' part, as well as to decompose the contribution of the specific characteristics to the wage gap. Tables 8 and 9 provide the decile estimates of the gender and motherhood wage gaps, respectively, decomposed by the explained and the unexplained part. Several conclusions can be made from here:

- The gender wage gap, after workers' characteristics and selectivity have been considered, exists along the entire wage distribution, potentially declining in size in the right half of it and vanishing for the highest-paid jobs.
- At each decile, a generally small portion of the gender wag gap can be attributed to education, age, experience, and marriage, which is in line with the conclusions for the mean distribution (Table 6).
- On the other hand, Table 9 suggests that the existent difference in the wages between mothers and childless women could be entirely, if not overly, explained by characteristics, at any point of the wage distribution. The conclusion is similar to the one in Table 6.

6. Conclusions

The objective of this paper is to estimate the motherhood wage gap, as well as its contribution to the gender wage gap in Macedonia, after considering workers' characteristics and selectivity bias into the labour market, for the childbearing-age population. We estimate the gap by employing a repeated imputation technique, which imputes the wages of those who are unemployed or inactive by making an assumption about their position with respect to the median wage. The latter is obtained through the predictions of a human-capital specification function, whereby we add the spouse's income and the existence of small children to account for the possibility that these factors affect the positioning of the mother's wage below or above the median. Then, imputed samples are used to calculate the gaps adjusted for selectivity. Imputed samples are further used to decompose the gaps by weighing, whereby men's and childless women's characteristics are attached to women and mothers, respectively, and the gaps are obtained (Barsky et al., 2002); and by using the R.I.F., which swaps the log wage (Firpo et al., 2007). The Survey of Income and Living Conditions 2010 is used.

The main finding is that, once workers' characteristics and selectivity into employment are accounted for, employers in Macedonia commit discrimination against women in general, penalising their wage by ~ 7–8% compared to men. Selection has been found to explain ~ 60% of the existing gender wage gap. This finding suggests that, indeed, there is negative selection of women into employment: those with not-the-worst characteristics are outside the labour market. On the other hand, mothers' wage is not penalised, i.e., the motherhood wage gap does not exist and, hence, does not contribute to explaining the gender wage gap.

Any wage differential between mothers and childless women could be entirely explained by observable characteristics. There is no motherhood-based selection bias in Macedonia.

The analysis by deciles suggests that the gender wage gap, after workers' characteristics and selectivity has been considered, exists along the entire wage distribution, potentially declining size in the right half of it and vanishing for the highest-paid jobs. At each decile, a generally small portion of the gender wage gap can be attributed to education, age, experience, and marriage. On the other hand, the results suggest that the existent difference in the wages between mothers and childless women could be entirely, if not overly, explained by characteristics at any point of the wage distribution.

The study and its findings do have several theoretical and practical implications. The main theoretical implication is that the understanding of the selection into the labour market—of women and mothers—may have a dominant role in determining the real gender wage gap, a major part of which could be considered gender/motherhood discrimination. Theoretical work, in particular models for dealing with the issue, should pay special attention to the selectivity bias, as well as explicitly incorporate it in the modelling work. Hence, a re-assessment of the gender gaps, highlighting the selectivity in a variety of ways, may provide further insights into the value of the theoretical work in the field. More importantly, however, the implications of this paper and its findings are practical. The general practical value lies in the domain of the implications of selectivity for any policy-making move: strategies and action plans for gender and motherhood inequalities should be based on empirical estimations of the gaps, considering selectivity, which is core for patriarchic-minded societies such as Macedonia, against the approach where solutions are only copied from the developed world without prior examination of the local specifics. The local practical value is related to the specific case of Macedonia (and potentially to the other transition economies), where it is widely believed that mothers are paid less and more discriminated against in the labour market than are childless women and men. This study shows that this is not the case. Hence, for policy-making, this would imply that any policies brought about based on such a belief should be rethought and possibly further examined in the light of the wide inactivity of women in the labour market in these economies.

Notes

1. We decide here to go beyond the usual Oaxaca-Blinder decomposition, for two reasons: first, decomposition at the mean may actually hide a lot of information about gaps, in particular about the glass ceiling effect; and, second, the Oaxaca-Blinder decomposition could not be technically combined with the repeated imputation technique
2. i.e. it is usually related to unwanted pregnancies in early age, or motherhood after a period of sterility in the late age
3. As the Heckman selection correction approach has been more standard across the respective literature, we present the results of the Heckman correction in the Appendix.

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Appendix. Heckman selection correction

As the Heckman selection correction approach has been more standard across the respective literature, herein we present the results of the Heckman correction. While the intuition behind this procedure is the same as with the repeated imputation, in a technical sense they are distinctive: Heckman relies on exclusion restrictions, i.e., variables entering the selection equation and, hence, the decision to participate in the labour market, but not the outcome variable, i.e., wages, except through the decision to participate. In this way, the selection due to unobservables is addressed. The Heckman selection correction method has been, though, criticised for the arbitrariness in the choice of exclusion restrictions, as well as for its incapability to actually correct the selection bias when missingness is pervasive. This has been extensively discussed in Petreski et al. (2014), so that here we only present the results. For the exclusion restrictions, we choose two variables: the number of children and the (log of) spouse wage. It could be argued that both do not affect the wage directly, but do affect participation and have some roots in the literature (e.g. Aguero & Marks, 2011; Budig & England, 2001; Davies & Pierre, 2005; Grimshaw & Rubery, 2015), as well as in our estimates in columns 4–7 in Table 6. The other explanatory variables enter both the outcome and selection equations, but the coefficients are not reported due to space.

Table A1 presents the results. It suggests that indeed Heckman fails to provide any guidance on the potential presence of selectivity: it actually produces coefficients which are very similar to the O.L.S. ones (Tables 3 and 4), leading one to conclude that selection is not present in the data or, if it is, it does not affect the wage gaps. However, due to Heckman's method, weaknesses against the argumentation and finding above that selection is actually a pervasive problem in our data; the findings with the Heckman method should be approached with caution.

Table A1. Heckman selection correction.

	Entire sample	Education cohorts		
		Primary	Secondary	Tertiary
Regression 1				
Woman	−0.197***	−0.268***	−0.230***	−0.0717
	(0.027)	(0.071)	(0.034)	(0.054)
Regression 2				
Woman	−0.165***	−0.262**	−0.155***	−0.0746
	(0.041)	(0.119)	(0.054)	(0.071)
Mother	−0.0473	−0.008	−0.107*	0.0046
	(0.044)	(0.127)	(0.060)	(0.077)
Regression 3				
Woman	−0.101**	−0.104	−0.0543	−0.0778
	(0.046)	(0.239)	(0.064)	(0.072)
Wife	−0.129***	−0.173	−0.225***	0.01
	(0.050)	(0.242)	(0.070)	(0.080)

*, ** and *** denote statistical significance at the 10, 5 and 1% level, respectively. Estimates are robust to heteroskedasticity. Standard errors are reported in parentheses.
Source: Authors' calculations.