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Occupational segregation and gender differentials in earnings in Macedonia

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Abstract

This paper examines gender differentials in earnings in Macedonia, with special emphasis on the role of occupational segregation. The lower earnings of women in Macedonia cannot be explained by gender differences in measured human capital endowments. There is a high degree of segregation of jobs along gender lines, the end product of which is lower earnings for women relative to men. Women are over-represented in female-dominated occupations, and feminization of occupations has a negative impact on earnings. Even after controlling for numerous individual and job characteristics and gender composition of occupations, a huge amount of the gender wage gap remains unexplained.

JEL codes: J31, P2

Keywords: Occupational segregation; Occupational feminization; Gender wage gap; Decomposition of earnings differentials

1 Introduction

Gender differentials in the labor market in industrial and transition countries have attracted much attention from researchers, policy makers and international institutions[1]. Despite long-standing legislation on equal pay and equal opportunities, a wage gap between women and men persists in the United States and Europe. In the United States, according to the Bureau of Labor Statistics, the women-to-men median earnings ratio was about 74 in 2000 and has risen to 81 percent in 2010. In the EU-25 countries, according to national data sources, the average gender pay gap among employees was fairly stable at around 15-17 percent during 1994-2006, but there was a large variability among member states. The pay gap in Italy and Portugal was in the single digits while the pay gap in Cyprus, Estonia, Germany, Slovakia, and the United Kingdom was in excess of 20 percent throughout[2]. A typical finding for all countries is that the gender pay gap is not fully explained by differences in individual human capital endowments and other conventional determinants of earnings such as job characteristics and firm characteristics. In fact, many studies find that the unexplained pay gap is considerably larger than the gap attributable to gender differences in individual, job, and firm characteristics.

One hypothesis receiving increasing attention is the effect of occupational segregation on earnings. Anker (1997) notes that the crowding of women in a smaller number of occupations than men is common in labor markets across the world and is an important source of gender-based inequalities. However, studies that examine the

relationship between occupational segregation and earnings in a multivariate context are still relatively small compared to the voluminous literature on the determinants of the gender pay gap. For example, only four out of the thirty five studies surveyed in the European Commission (2003) staff paper include a variable on gender segregation or gender share in occupation in the earnings function equations and decomposition of the gender pay gap. Also, country-specific earnings functions reported in European Commission (2005) do not include any gender share in occupation variable.

Notable econometric studies on the role and contribution of gender share in occupation on earnings include Bayard et al. (2003), Boraas and Rodgers III (2003), Johnson and Solon (1986), Kilbourne et al. (1994), Macpherson and Hirsch (1995), and Sorensen (1990) for the United States; Busch and Holst (2011) for Germany; Campos and Ropero (2011) for Spain; European Commission (2002) for a pooled sample of EU-12 countries; Jurajda (2003) for the Czech and Slovak Republics; Karamessini and Ioakimoglou (2007) for Greece; and Ogloblin (1999) for Russia. These studies confirm that earnings of both women and men are lower in female-dominated occupations. While a majority of the studies show that the negative effect of working in female-dominated occupations on earnings is much more pronounced for women, studies by Johnson and Salon (1986) and Sorensen (1990) for the United States and Busch and Holst (2011) for Germany found that the negative effect was stronger for men. In Macpherson and Hirsch's (1995) study for the United States, the effect of gender composition on earnings was of similar magnitude for women and men. The fraction of the observed gender pay gap explained by occupational segregation varies a lot across studies and countries. The gender share in occupation variable explained between 7 percent and 32 percent of the observed pay gap in the studies on the United States, about 25 percent in the cross-country study on EU-12 countries (European Commission 2002), as much as 50-56 percent in Greece (Karamessini and Ioakimoglu 2007), and as little as 3 percent in Germany (Busch and Holst 2011).

A variety of explanations have been offered in the literature for the prevalence of occupational segregation. Key factors include: choice of field of study which results in segregation in education and eventually in employment; preference of women for jobs that allow flexible hours or intermittent employment; differences in unmeasured worker skills or job characteristics that may be correlated with gender; stereotyping of occupations as appropriate for women owing to discriminatory hiring practices or social norms; and covert barriers to entry and bias in organizational practices (see European Commission 2009). Karamessini and Ioakimoglu (2007) emphasize that the extent to which gender-based occupational segregation occurs depends on prevailing institutions, culture, and history. They contend that gender relations are impacted by wage-setting and collective bargaining practices and that these practices reflect "not only current processes but also the weight of history" (p. 35). In a similar vein, Ogloblin (1999) and Jurajda (2003) conclude that occupational segregation by gender in labor markets of transition countries is more likely a legacy from communism under which central planners stereotyped women into particular jobs and consequently shaped social attitudes. Pailhé (2000) also argues that stereotyping is widely accepted as a part of life by Central European women.

In this paper we examine gender differentials in earnings in the Former Yugoslav Republic of Macedonia in 2000, with special emphasis on the role of occupational segregation. In particular, we estimate the importance of the degree of feminization of an

employee's occupation in explaining the earnings of each gender and the gender earnings gap. The choice of the reference period is dictated by data accessibility. Despite the vintage of the data, the findings should serve as a useful comparison point for future research. Macedonia is relatively under-researched on the gender pay gap issue. No official data exists on the gender pay gap. Earlier econometric analyses of the gender wage gap in Macedonia include Angel-Urdinola (2008) and Lehman (2010) for Macedonia based on data for 2006 and 2007, respectively. However, neither of these studies examines the role of occupational segregation and gender concentration in occupation in explaining earnings and the gender wage gap. Interest on gender equality issues in Macedonia is expected to rise following the recent launch of the "Equality Pays Off" initiative by the EU aimed at providing information and promoting awareness on gender equality, including the gender pay gap. The initiative covers the EU-27 member states and seven other countries, including Macedonia[3].

We approach the empirical analysis in two ways. First, we follow the traditional approach. We estimate gender-specific earnings functions for all wage and salaried workers corrected for sample selection bias. The explanatory variables include the traditional variables mentioned in the literature on gender pay gaps (e.g., individual characteristics such as education and work experience, and job characteristics such as occupation, industry, and ownership and size of the firm where the worker is employed, etc.) plus a set of dummy variables measuring the gender composition of occupations. Based on the earnings functions estimates, the observed gender wage gap is divided into the part "explained" by different personal and job characteristics, the "unexplained" part reflecting differences in the wage structure (i.e., in the constant terms and coefficients of the regression equations for men and women), and the part due to selectivity correction.

Although the inclusion of occupation and other job characteristics as explanatory variables in earnings functions is extremely common (recent examples are Christofides and Michael 2013, and Pastore *et al*. 2013), it has been noted by many researchers that this gives rise to endogeneity bias because job outcomes depend on the decisions of workers and employers (see, for example, Beblo *et al.* 2003a, b). Thus, in the second approach, we carry out an analysis of occupational attainment and estimate within-occupation earnings functions to partially address the concern about endogeneity. However, do not carry out a full decomposition of the observed overall gender pay gap into within-occupation and between-occupation earnings differentials, in line with Brown *et al.* (1980), because some occupation groups had a limited number of women.

The rest of the paper is organized as follows. Section 2 provides background information on the economy and labor market institutions. Section 3 describes the data on which this paper is based. Section 4 looks at the sample characteristics. Section 5 presents the findings of earnings function analysis for all wage earners. Based on these estimates, Section 6 decomposes the observed gender wage gap into explained, unexplained, and selectivity bias components. Section 7 examines the determinants of occupational attainment. Section 8 presents the results of within-occupation earnings functions. Section 9 concludes.

2 Economic and institutional background

Macedonia was buffeted by several shocks following independence: border closure and trade embargo during 1994-1995 owing to a political dispute with Greece over the name of the country; regional unrest in 1999 on account of the crisis in Kosovo; and

subsequent brewing of domestic ethnic tensions that erupted in open conflict in 2001. As a result, business prospects and investment activity were undermined, foreign investors stayed away, and growth was lackluster. Thus, per capita GDP in purchasing-power-parity dollars increased by only 16 percent during 1992-2000 to about 6,350 in 2000[4]. The structural transformation of the economy proceeded slowly, enterprise restructuring was limited, and corporate governance stayed weak. The enterprise sector as a whole continued to generate losses and there was little new job creation. The legacy of high unemployment from pre-independence remained intact at more than 30 percent for both women and men. The share of employment in agriculture and in the informal economy increased during the transition to a market economy.

Some institutional aspects contributed to the low demand for labor. In particular, the structure of the social insurance system discouraged the hiring of part-time workers. A floor for social contributions, set at 65 percent of the average sectoral wage for full-time work, increased the effective payroll tax for part-time workers. Generous maternity leave regulations and the right to return to the former work in the enterprise also inhibited women from early return to work on part-time basis (Cazes and Nesporova 2006).

However, a few features of the labor market were not particularly restrictive. Although the Employment Protection Legislation (EPL) index in 2000 was estimated at 3.3 (Micevska 2008), it appears that enterprise managers did not see labor regulations as a major constraint on firm growth. In the Business Environment and Economic Performance Survey conducted by the World Bank and the European Bank for Reconstruction and Development in 2002, the average rating of labor regulations as a constraint on firm growth was 1.68 in Macedonia (i.e. between "no obstacle" and "minor obstacle)[5]. According to the World Bank's assessment on doing business, the rigidity of the labor regulation index in Macedonia with respect to hiring, firing, and working conditions was below the average for the region. The unionization rate and the bargaining power of trade unions had fallen during the transition process. Around the reference period of this paper (2000), wages in the public sector and large private enterprises were determined through collective bargaining at the sectoral level, while wages in small and micro-firms were unilaterally fixed by employers on the basis of the firm's ability to pay. Mojsoska-Blazevski (2011) argues that, because of the nature of the wage-setting mechanism and the preponderance of small and micro firms, legal coverage of wages in Macedonia was weak.

The Constitution of Macedonia proclaims gender equality and includes a general provision against discrimination on several grounds, including gender. Macedonia enacted a National Plan for Gender Equality in 1999 and introduced legislation on equal pay and equal opportunities in 2006 (Koteska 2011).

3 Data

This paper is based on data collected in the September 2000 national labor force survey in Macedonia. The labor force survey involved a stratified random sample of 7,200 households, representing about 1.5 percent of the total number of households in the country. Two questionnaires were used in the survey. The first questionnaire obtained information on the socio-demographic characteristics of all members of the household. The second questionnaire targeted household members between 15 and 80 years of age individually, and contained separate modules on employed person, those not currently

employed, and those seeking employment. In all, the second questionnaire obtained information from 20,904 persons, of whom 10,503 were men and 10,401 were women.

The survey data may be subject to bias. In the survey, only 59.4 percent of the persons were questioned personally. Another member of the household provided the answers for those who could not be questioned personally. A World Bank study (2003) argues that although the labor force surveys in Macedonia meet International Labor Office standards for design and conduct (including concepts and definitions), they tend to overstate unemployment and downplay informal sector activity. Still, these surveys remain the best source of labor market data.

4 Sample characteristics

Labor force participation in Macedonia follows the common cross-country pattern of being higher among men than women. The participation rate in 2000 was about 65 percent for men and about 41 percent for women. The incidence of open unemployment was very high—around 31 percent—and the gender differential was small. Wage employment was equally important among women and men. Among both sexes, 71 percent of those employed were employees. Paid self-employment was more prevalent among men, but women were more likely than men to be engaged as unpaid family workers.

The gender differential in earnings among wage employees in Macedonia in 2000 was smaller than that observed in most EU-15 and transition countries. The ratio of earnings of women to those of men was 0.85 for monthly earnings and 0.88 for hourly earnings. In the EU-15 countries, the gender earnings ratios in 2000 were in the range 0.79–0.94, and averaged 0.84. In transition countries, women-men earnings ratios were typically around 0.80 (Newell and Reilley 2000). The observed (or unadjusted) gender earnings gap can be partly attributed to differences between the two sexes in several characteristics that are associated with earnings. Data on some selected characteristics for wage employees only are reported below.

4.1 Personal characteristics

As Table 1 shows, women had an advantage with respect to educational attainment. A higher proportion of women than men had studied beyond the secondary level. Women employees were on average slightly younger and had less experience in the labor market than men. A lower proportion of women than men were unmarried. The proportion of ethnic Albanians among women employees was much smaller than that among men employees. This likely reflects the traditional views among ethnic Albanians that emphasize women's domestic responsibilities and discourage work outside the home.

4.2 Enterprise characteristics

The public sector was the largest employer in Macedonia, and women had a lower representation than men in this sector. In the private sector, the likelihood of working in enterprises with more than 25 workers was greater for women than for men.

4.3 Occupational segregation and gender concentration

Occupational segregation, measured at the one-digit ISCO classification level, among wage employees was small (Table 2). The Duncan segregation index, which measures

Table 1 Macedonia: Mean values of selected sample personal and job characteristics[a]

	Men	Women
Monthly earnings (denars)[b]	9183.61	7851.68
Hourly earnings (denars)[b]	54.87	48.36
Ln (hourly earnings)	8.9923	8.8567
Work hours per week	42.330	41.449
Education		
Below primary	0.050	0.025
Primary	0.205	0.179
Secondary, 3 years	0.171	0.107
Secondary, 4 years	0.403	0.448
Non-university post-secondary	0.061	0.097
University and above	0.110	0.145
Years of potential experience[c]	23.593	21.870
Experience-squared	673.877	577.900
Marital status		
Married	0.851	0.886
Unmarried	0.149	0.114
Ethnic affiliation		
Macedonians	0.833	0.936
Ethnic Albanians	0.101	0.024
Other minorities	0.067	0.040
Enterprise ownership/size		
Public sector	0.758	0.689
Private, with <10 employees	0.103	0.119
Private, with 10-25 employees	0.042	0.037
Private, with >25 employees	0.098	0.155
Pension fund registration		
Registered	0.866	0.865
Not registered	0.134	0.135
Region		
West Macedonia	0.185	0.157
East Macedonia	0.281	0.288
Central Macedonia	0.242	0.237
Skopje	0.293	0.318
Urban/Rural		
Urban	0.688	0.812
Rural	0.312	0.188

[a]For categorical variables, shows fraction of total in the category.
[b]In 2000, the period average exchange rate was 1 Euro = 60.7250 denars.
[c]Measured as (age-years of education-6).

the proportion of workers who would have to change occupations in order for gender equality to be attained in occupational distribution, was 0.214. A higher proportion of women than men worked in white-collar occupations such as professionals, technicians and associate professionals, and clerks. Whereas, men had a higher proportion working as managers and as plant and machine operators. The gender differences in the

Table 2 Macedonia: Occupation and industry distribution by gender, 2000

	Men	Women
Occupation	(in percent)	
Managers and senior officials	3.9	1.9
Professionals	9.3	16.8
Technicians and associate professionals	9.5	13.2
Clerks	8.2	15.0
Service and sales workers	16.3	17.6
Craft and related trade workers	24.5	21.0
Plant and machine operators and assemblers	18.1	4.0
Elementary (unskilled) occupations	10.3	10.5
Total	100	100
Duncan segregation index[a]	0.214	
Industry	(in percent)	
Agriculture	8.3	3.9
Manufacturing and mining	31.0	37.9
Electricity, gas, water supply	5.5	1.8
Construction	10.6	1.9
Wholesale and retail trade	9.6	11.7
Hotels and restaurants	2.6	2.9
Transport and communications	7.5	2.2
Financial intermediation	0.9	2.8
Real estate and business services	2.5	1.8
Public administration	6.7	5.7
Education	5.1	9.9
Health and social work	3.4	13.2
Other services	6.2	4.3
Total	100	100
Duncan segregation index[a]	0.257	

[a]Computed as follows: Segregation index = 0.5*Sum[Abs(P_m–P_f)], where P_m and P_f are the proportion of men and women, respectively, employed in a particular occupation or industry.
Source: Labor Force Survey, September 2000.

proportions engaged in services and sales occupations and in craft and related trade occupations were small.

However, there was considerable gender segregation within the one-digit occupation categories. Thus, another dimension of segregation is indicated by the degree of concentration in a limited number of occupations classified at the ISCO-88 three-digit level. Similar to that observed in other countries (European Commission 2009), women in Macedonia were crowded in a smaller number of occupations than men. However, the degree of concentration was higher than that observed in the European Union as a whole. In Macedonia, about 50 percent of women employees were found in a total of six three-digit level occupations, whereas the top six occupations for men accounted for only 32 percent of men employees (Table 3). In contrast, in the European Union, the top six occupations accounted for 36 percent of women and 25 percent of men in work in 2005 (European Commission 2009, p. 31).

Table 3 Macedonia: Occupation crowding by gender, 2000

	Men employees		
Top 10 occupations at 3 digit level	**ISCO-1988 code**	**Men employees engaged in specified occupation (percent frequency)**	**Percent of employees in occupation who were men**
Motor vehicle drivers	832	8.6	98.6
Protective services workers	516	6.4	96.4
Machinery mechanics and fitters	723	4.9	99.4
Building frame and related trade workers	712	4.5	99.3
Shop salespersons	522	4.4	40.2
Metal molders, sheet-metal workers and related trades	721	3.5	95.9
Administrative associate professionals	343	3.3	53.4
Material recording and transport clerks	413	3.1	86.6
Assemblers	828	2.7	95.7
Building finishers and related trade workers	713	2.6	98.9
Total: top 6 non-agricultural occupation groups		32.2	
Total: top 10 non-agricultural occupation groups		43.9	
	Women employees		
Top 10 occupations at 3 digit level	**ISCO-1988 code**	**Women employees engaged in specified occupation (percent frequency)**	**Percent of employees in occupation who were women**
Textile, garments and related trade workers	743	17.3	88.8
Shop salespersons	522	10.1	59.8
Numerical clerks	412	7.5	81.1
Cleaners and launderers	913	5.9	76.2
Nursing professionals	323	5.0	97.3
Administrative associate professionals	343	4.5	46.6
Personal care and related workers	513	3.5	67.9
Secondary education teaching professionals	232	3.2	58.8
Housekeeping and restaurant service workers	512	3.2	44.5
Cashiers, tellers and related clerks	421	2.8	52.1
Total: top 6 non-agricultural occupation groups		50.4	
Total: top 10 non-agricultural occupation groups		63.2	

Source: Author's calculations based on September 2000 Labor Force Survey data.

Another perspective of occupational segregation is obtained from an examination of the gender concentration within each three-digit occupation group and the distribution of occupation feminization among women and men. If wage employees in the sample were assigned randomly to occupations, the segregation-free distribution would collapse around the proportion of women employees in the whole sample—about 40 percent in the case of Macedonia. However, as Table 4 shows, men tended to be employed in men-dominated occupations while women tended to be employed in women-dominated occupations.

Table 4 Macedonia: Frequency distribution of occupation feminization of wage employees by gender (in percent)

Percent of occupation female[a]	Men	Women
≤ 10	46.1	1.8
> 10 – 20	9.5	2.8
> 20 – 30	8.3	4.4
> 30 – 40	10.5	8.0
> 40 – 50	7.7	10.2
> 50 – 60	11.0	22.7
> 60 – 70	2.1	6.4
> 70 – 80	2.0	9.9
> 80 – 90	2.9	28.0
> 90 – 100	0.1	5.7
Total	100	100

[a]Occupation classified at the ISCO-88 three-digit level.
Source: Authors' calculations based on September 2000.
Labor Force Survey data.

Slightly over four-fifths of women and only one-fourth of men were employed in occupations where more than 40 percent of the employees were women.

Contrary to expectations, the distribution of occupation feminization was more skewed for men than for women. The likelihood of men being found in overwhelmingly men-dominated occupations was greater than that of women being found in overwhelmingly women-dominated occupations. Slightly over one-half of men were employed in occupations where more than 80 percent of employees were men, whereas only one-third of women were employed in occupations where more than 80 percent of employees were women.

4.4 Industrial segregation

Industrial segregation was lower in Macedonia than in industrial countries and some transition countries. The Duncan segregation index for industry affiliation, measured at the one-digit level, was around 0.257 in Macedonia (Table 2), compared with 0.291–0.426 in industrial countries (Blau and Kahn 1996), 0.324 in Russia (Ogloblin 1999), and 0.33 in Poland (Adamchik and Bedi 2003). Men had a higher representation than women in construction and in transport and communications, while a higher proportion of women than men were employed in manufacturing, the education sector, and the health sector.

5 Earnings function analysis

Earnings functions are estimated for wage employees, for both sexes together and separately for men and women. Since participation in wage employment is not a random phenomenon, we first correct for potential sample selection bias by estimating an equation to determine who is a wage employee and then estimate an earnings function conditional on wage employment. Thus, we include in the earnings equation an additional regressor representing the selectivity variable (inverse of Mill's ratio) constructed from the estimates of a multinomial logit model for activity status. The choice groups for activity status are wage employment, non-wage employment (comprising employers, self-employed persons, and unpaid family workers), unemployment, and non-participation in the labor force. In the

estimation of earnings functions containing a selectivity term, the identification of this term requires having one or more variables that influence the choice of activity status but do not directly determine earnings. We achieve this identification by excluding household characteristics that appear in the model for activity status (viz., presence of small children, if head of household, number of other earners in the household, and total earnings of other household members) from the earnings equation. The results of the first stage exercise on the determinants of activity status are not reported in the paper, but are available from the author on request.

The dependent variable in the earnings equation is the natural logarithm of hourly earnings. Hourly earnings were calculated from the answers given by the respondents to questions on their usual monthly earnings and hours usually worked per week. The explanatory variables include education, proxy for experience, marital status, ethnic background, firm characteristics, if the individual was registered with the pension fund, region of employment, urban residence, industry of operation of enterprise, occupation of worker, and occupation feminization (measured as the ratio of women to total employment in the employee's occupation measured at the ISCO-88 three-digit level).

The estimated earnings functions are presented in Table 5. The estimated asymptotic covariance matrix for the two-step multinomial logit sample selection model corrects for heteroscedasticity induced by the selection. In the equation for both sexes, the coefficient on the dummy variable for women is negative and significant at the 1 percent level: being a woman reduces hourly earnings by 11.9 percent[6]. Earnings functions estimated separately for men and women indicate that the wage determination process is different between genders. We carried out the standard F tests of homogeneity of earnings equations for men and women. We tested for (i) the equality of the coefficients of the gender specific regressions; and (ii) the coefficients of the set of women interaction terms (i.e., the slope and intercept dummies) in the pooled equation for both sexes being equal to zero. In both cases the computed F value allows the rejection of the null hypothesis at the 99 percent confidence level. The results of the earnings equation with slope and intercept dummies are reported in Table 6.

The relationship between education and earnings is statistically significant and non-linear for both sexes. The returns to education at almost all levels are higher for women than for men: except for non-university post-secondary education, the coefficients on all the education dummies are significantly higher for women. Completing secondary education appears to be critical for men. Up to three years of secondary education, the incremental return from an additional year of schooling, though significant, is small. There is a jump in the incremental return upon completing four years of secondary education, and the earnings differentials between successive stages of education beyond this level imply a constant percentage increase in earnings from an additional year of education. In contrast, for women, the returns from completing primary education and from obtaining a university degree are substantial. In the interim education levels, the incremental return from an additional year of education is steady.

The coefficients on experience are significant for both men and women, and the regression equation for the pooled sample containing slope and intercept dummies indicates that there is no significant difference between men and women with regard to returns to experience. The experience-earnings profile is concave, peaking at between 23 and 29 years of experience. Münich *et al.* (2005) found an experience-earnings profile

Table 5 Macedonia: Determinants of hourly earnings with selectivity correction

	Both sexes		Men		Women	
	Coefficient	Standard error[a]	Coefficient	Standard error[a]	Coefficient	Standard error[a]
Constant	3.2636	0.1105***	3.2741	0.1213***	2.5948	0.2255***
Education dummies[b]						
Primary	0.1251	0.0348***	0.0737	0.0398*	0.3123	0.0697***
Secondary, 3 years	0.2044	0.0408***	0.1352	0.0444***	0.4681	0.0856***
Secondary, 4 years	0.2976	0.0418***	0.2414	0.0446***	0.5325	0.0892***
Non-university post-secondary	0.4314	0.0509***	0.4385	0.0572***	0.5961	0.1038***
University and above	0.6814	0.0558***	0.6568	0.0597***	0.9129	0.1165***
Years of potential experience	0.0123	0.0047***	0.0186	0.0056***	0.0173	0.0080**
Experience-squared	−0.0002	0.0001**	−0.0004	0.0001***	−0.0003	0.0002*
Unmarried person dummy	−0.0521	0.0209**	−0.1179	0.0280***	0.0359	0.0312
Enterprise dummies[c]						
Public sector	−0.1462	0.0196***	−0.1827	0.0278***	−0.1073	0.0267***
Private, with <10 employees	−0.2521	0.0258***	−0.2740	0.0353***	−0.2197	0.0371***
Private, with 10–25 employees	−0.0307	0.0332	−0.0320	0.0442	−0.0546	0.0492
Pension fund registration dummy	0.1316	0.0186***	0.1196	0.0250***	0.1509	0.0267***
Industry dummies[d]						
Manufacturing	0.1029	0.0276***	0.0944	0.0329***	0.1581	0.0530***
Electricity, gas, water supply	0.4279	0.0379***	0.4410	0.0438***	0.3189	0.0795***
Construction	0.1694	0.0334***	0.1446	0.0384***	0.0721	0.0785
Wholesale and retail trade	0.1679	0.0338***	0.1163	0.0421***	0.2629	0.0592***
Hotels and restaurants	0.2383	0.0454***	0.1111	0.0600*	0.4327	0.0719***
Transport and communications	0.2108	0.0357***	0.1712	0.0414***	0.3799	0.0757***
Financial intermediation	0.6299	0.0530***	0.6322	0.0882***	0.6328	0.0722***
Real estate and business services	0.1590	0.0459***	0.0743	0.0564	0.3092	0.0804***
Public administration	0.2543	0.0355***	0.2764	0.0444***	0.2177	0.0623***
Education	0.1262	0.0368***	0.0909	0.0499*	0.1794	0.0603***
Health and social work	0.2162	0.0353***	0.1858	0.0529***	0.2224	0.0581***
Other services	0.2519	0.0354***	0.2347	0.0430***	0.3101	0.0639***
Occupation dummies[e]						
Managers and senior officials	0.2627	0.0416***	0.2844	0.0513***	0.2222	0.0749***
Professionals	0.2341	0.0340***	0.1863	0.0466***	0.2921	0.0494***
Technicians and associate professionals	0.2181	0.0295***	0.1711	0.0393***	0.2788	0.0452***
Clerks	0.1519	0.0300***	0.1046	0.0408**	0.1997	0.0447***
Service and sales workers	0.0493	0.0273*	0.0642	0.0360*	0.0171	0.0413
Craft and related trade workers	0.0657	0.0268**	0.0970	0.0340***	0.0090	0.0444
Plant and machine operators and assemblers	0.0446	0.0283	0.0629	0.0351*	−0.0162	0.0536
Occupation feminization dummies[f]						
Feminization 21-40 percent	−0.0856	0.0203***	−0.0590	0.0245**	−0.0588	0.0477
Feminization 41–60 percent	−0.0933	0.0209***	−0.0586	0.0268**	−0.0622	0.0458
Feminization 61–80 percent	−0.1809	0.0263***	−0.1833	0.0419***	−0.1088	0.0482**
Feminization >80 percent	−0.1710	0.0239***	−0.2265	0.0475***	−0.0999	0.0460**

Table 5 Macedonia: Determinants of hourly earnings with selectivity correction *(Continued)*

Ethnic affiliation dummies[g]						
Ethnic Albanians	−0.0407	0.0333	−0.0698	0.0349**	−0.1745	0.0817**
Other minorities	−0.0254	0.0296	−0.0600	0.0351*	−0.0455	0.0539
Region dummies[h]						
West Macedonia	−0.0926	0.0182***	−0.1111	0.0243***	−0.0614	0.0284**
East Macedonia	−0.2123	0.0159***	−0.2502	0.0219***	−0.1647	0.0229***
Central Macedonia	−0.1329	0.0170***	−0.1476	0.0228***	−0.1199	0.0243***
Urban area dummy	0.0430	0.0157***	0.0237	0.0192	0.1112	0.0243***
Selection term (LAMBDA)	0.1165	0.0437***	0.2126	0.0519***	0.1583	0.0718**
Female dummy	−0.1265	0.0183***				
R-squared	0.3533			0.3078	0.4465	
Adjusted R-squared	0.3482			0.2989	0.4353	
F-ratio	68.51			34.54	40.10	
(N)	5436			3305	2131	

[a]Standard error corrected for heteroscedasticity induced by the selection. The two-step sample selection model was estimated using LIMDEP.

[b]The omitted category is below primary education.

[c]The omitted category is private enterprises with more than 25 workers.

[d]The omitted category is agriculture.

[e]The omitted category is elementary (unskilled) occupations.

[f]The omitted category is feminization of 20 percent or less.

[g]The omitted category is ethnic Macedonian.

[h]The omitted category is Skopje region.

***significant at the 1 percent level; **significant at the 5 percent level; *significant at the 10 percent level.

peaking at around 26 years of experience for the Czech Republic, while Ogloblin (2000) found a profile peaking at around 17 to 19 years for Russia. The finding of similar age-earnings profile for both sexes is contrary to expectations. Normally, it is expected that women will have a flatter age earnings profile because of the likelihood of women interrupting their work experience on account of child bearing or because they may prefer to be engaged in activities which give them flexibility to take time off to look after family matters.

Marital status has a significant effect on earnings of men but not of women. Unmarried men earn less than their married counterparts by 11.1 percent. Several other studies have found a similar result (e.g., Sorensen (1990) for the United States, and Adamchik and Bedi (2003) for Poland). The common explanations are that married men have greater attachment to the labor market because of their family obligations, and that marriage is a proxy for unmeasured attributes of productivity. The insignificant coefficient of marital status for women suggests that for women marriage is not associated with greater attachment to the labor market.

The effect of ethnicity on earnings is judged to be weak. On one hand, the coefficient on ethnic Albanians is negative and statistically significant in the separate equations for both men and women and the gender difference between the coefficients is seemingly large. On the other hand, the coefficients on ethnic affiliation are not significant in the pooled equation for both sexes, and the regression equation with interaction dummies suggests that there is no significant difference between men and women on the effect of ethnicity on earnings. These results along with the findings from the first-stage multinomial logit model

Table 6 Macedonia: Wage equation for pooled sample with intercept and slope dummies for women[a]

			Women interaction dummies	
	Coefficient	Standard error[b]	Coefficient	Standard error[b]
Constant	3.3824	0.1216***	−0.6705	0.1196***
Education dummies[c]				
Primary	0.0809	0.0394**	0.2024	0.0775***
Secondary, 3 years	0.1408	0.0454***	0.2796	0.0845***
Secondary, 4 years	0.2445	0.0462***	0.2352	0.0826***
Non-university post-secondary	0.4375	0.0583***	0.0975	0.0954
University and above	0.6477	0.0616***	0.1989	0.0974**
Years of potential experience	0.0123	0.0053**	0.0022	0.0049
Experience-squared	−0.0002	0.0001**	−0.0001	0.0001
Unmarried person dummy	−0.0994	0.0263***	0.1231	0.0428***
Enterprise dummies[d]				
Public sector	−0.1844	0.0266***	0.0760	0.0393*
Private, with <10 employees	−0.2751	0.0338***	0.0543	0.0526
Private, with 10–25 employees	−0.0313	0.0423	−0.0254	0.0681
Pension fund registration dummy	0.1172	0.0240***	0.0335	0.0375
Industry dummies[e]				
Manufacturing	0.0954	0.0315***	0.0614	0.0656
Electricity, gas, water supply	0.4430	0.0420***	−0.1224	0.0958
Construction	0.1463	0.0368***	−0.0747	0.0928
Wholesale and retail trade	0.1185	0.0403***	0.1432	0.0758*
Hotels and restaurants	0.1152	0.0575**	0.3167	0.0970***
Transport and communications	0.1716	0.0396***	0.2101	0.0912**
Financial intermediation	0.6345	0.0842***	−0.0023	0.1150
Real estate and business services	0.0771	0.0540	0.2313	0.1025**
Public administration	0.2801	0.0425***	−0.0613	0.0798
Education	0.0927	0.0478*	0.0857	0.0810
Health and social work	0.1867	0.0506***	0.0355	0.0808
Other services	0.2361	0.0412***	0.0747	0.0806
Occupation dummies[f]				
Managers and senior officials	0.2866	0.0490***	−0.0633	0.0947
Professionals	0.1892	0.0446***	0.1051	0.0697
Technicians and associate professionals	0.1716	0.0376***	0.1094	0.0618*
Clerks	0.1043	0.0391***	0.0968	0.0623
Service and sales workers	0.0629	0.0345*	−0.0430	0.0566
Craft and related trade workers	0.0971	0.0326***	−0.0866	0.0582
Plant and machine operators and assemblers	0.0628	0.0336*	−0.0784	0.0672
Occupation feminization dummies[g]				
Feminization 21-40 percent	−0.0580	0.0234**	0.0003	0.0568
Feminization 41-60 percent	−0.0572	0.0256**	−0.0060	0.0558
Feminization 61-80 percent	−0.1826	0.0402***	0.0740	0.0659
Feminization >80 percent	−0.2275	0.0455***	0.1269	0.0675*

Table 6 Macedonia: Wage equation for pooled sample with intercept and slope dummies for women[a] *(Continued)*

Ethnic affiliation dummies[h]				
Ethnic Albanians	−0.0586	0.0364	−0.0564	0.0662
Other minorities	−0.0402	0.0338	0.0141	0.0561
Region dummies[i]				
West Macedonia	−0.1020	0.0232***	0.0240	0.0374
East Macedonia	−0.2383	0.0206***	0.0673	0.0321**
Central Macedonia	−0.1413	0.0219***	0.0255	0.0332
Urban area dummy	0.0273	0.0193	0.0617	0.0309**
Selection term (LAMBDA)	0.1341	0.0457***		
R-squared			0.3673	
Adjusted R-squared			0.3574	
F-ratio			36.99	
(N)			5,436	

[a]The dependent variable is logarithm of hourly earnings. Wage equation corrected for sample selection.
[b]Standard error corrected for heteroscedasticity induced by the selection.
[c]The omitted category is below primary education.
[d]The omitted category is private enterprises with more than 25 workers.
[e]The omitted category is agriculture.
[f]The omitted category is elementary (unskilled) occupations.
[g]The omitted category is feminization of 20 percent or less.
[h]The omitted category is ethnic Macedonian.
[i]The omitted category is Skopje region.
***significant at the 1 percent level; **significant at the 5 percent level; *significant at the 10 percent level.

of activity status suggest that the negative effect of ethnicity for ethnic Albanians and other minorities is mainly in terms of access to wage employment rather than wage offers.

Employees of both sexes in government and public sector establishments and in small private enterprises earn less than those working in private enterprises with more than 10 workers. Though, the wage gaps between the three groups of enterprises are smaller for women compared with those for men. From the wages perspective, a workforce of 10 or more workers seems to be a relevant dividing line for separating small and large private sector establishments in Macedonia: the coefficient on the dummy variable representing employment in private establishments with 10 to 25 workers is not statistically significant. Higher wages in the large private enterprises likely reflect the influence of labor unions, the desire of employers to minimize labor turnover, and operation of internal labor markets. Whereas, lower wages in government and public sector establishments relative to the large private enterprises are mainly a manifestation of the government's restrictive wages policy.

The regression results indicate that it is important to make a distinction between workers who are registered with the pension fund and those who are not. Workers not registered with the pension fund are typically not protected by employment legislation and are likely to have less job security. Employers not only avoid payment of payroll taxes for unregistered workers but also reward them less than registered workers. Being registered with the pension fund increases hourly earnings by 12.7 percent for men and 16.3 percent for women.

There is considerable regional variation in hourly earnings for both sexes, though inter-regional inequality in earnings is lower for women than for men. Additionally, urban location adds significantly to earnings for women but not for men. The regional differences in hourly earnings may be related to spatial price variations and to differences in productivity.

However, since the coefficient on urban residence is positive and significant only for women, it cannot be claimed that the urban premium reflects cost-of-living differences between urban and rural areas. It perhaps suggests that typical "higher-paid" female jobs are more concentrated in urban centers compared to male jobs, or that men are more likely than women to commute from rural areas to their work in urban centers.

Occupation and industry affiliation have a significant impact on hourly earnings of both women and men, with the impact favoring women in many instances. Systematic earnings differences between occupations and industry likely reflect skill variations or compensating wage differentials resulting from differences in job characteristics, but may also be due to institutional factors. The gender-specific regressions show that the coefficients are significant on all the occupation dummy variables for men but on only white collar occupations for women. However, the equation for the pooled sample with slope and intercept dummies indicates that none of the coefficients on the occupation dummies are significantly different between men and women, except for that on technicians and associate professionals which is higher for women. The coefficients for nearly all the industry dummies are significant for both sexes. The coefficients on the dummies for trade, transport, hotel, and real estate are higher for women than for men. For the other industry groups, the differences between the coefficients for men and women are not statistically significant.

Occupation feminization (i.e., proportion of women in the employee's occupation at the three-digit level) is entered in the earnings equation as a set of four dummy variables to allow for a non-linear relationship. The feminization of occupation lowers earnings for both men and women, and the penalty is greater for men at higher degrees of feminization. In occupations with more than 80 percent feminization, wages are 20.3 percent lower for men and 9.5 percent lower for women compared with the base category (occupations with less than 20 percent feminization). Up to feminization of 80 percent, the differences between the coefficients on the feminization dummies for men and women are not statistically significant, signaling that the wage-feminization relationship is similar for both sexes. However, once feminization exceeds 80 percent, men experience a further drop in wages but women do not. For women, the coefficients on the dummy variables for feminization of 60–80 percent and more than 80 percent are similar in size.

The crowding hypothesis can explain the negative wage-feminization relationship for women but not for men. Common explanations for the negative effect of feminization on men's wages are that men engaged in predominantly female jobs are of lower quality or that they have a taste for these jobs and choose to accept lower wages. Macpherson and Hirsch (1995) have argued that feminization serves as a proxy for unmeasured skills, preferences, and job attributes. In their study on the United States, they found that in the presence of detailed controls for job characteristics the direct effect of feminization on wages becomes substantially smaller for both sexes and the stronger negative relationship for men disappears. However, we cannot assert unambiguously that this is the case in Macedonia. In the present study, occupation feminization has a significant direct effect on wages even after controlling for occupation and industry. In addition, the coefficients on feminization dummies become less negative by small amounts (between 0 and 0.03 log points) for men but, contrary to expectations, become more negative for women when occupation and industry are added to the regression equation. However, it cannot be ruled out that the estimated effect of feminization would be reduced if specific measures of occupation and industry characteristics (such as on-the-job training, indices of physical demands, work environment,

and strength) had been included in the earnings equation. Given the slow pace of structural change and low occupational mobility since Macedonia's independence, one can speculate that occupational feminization is attributable to institutional factors under the former socialist Yugoslavia. As European Commission (2010b, p. 18) notes, in Macedonia "Discriminatory customs, traditions and stereotypes are widespread and undermine women's basic rights." The nature of the data set does not allow us to examine in more detail competing hypotheses behind occupation feminization.

Selectivity bias is important for both men and women, but the bias is larger for men. For both sexes, the selectivity term is positive and significant, indicating that wage employees are positively selected in terms of their unmeasured characteristics, which consequently result in higher earnings. The finding of a higher positive sample selection bias for men seems to suggest that men are more likely than women to accept jobs with wages in the upper segment of their wage offer distribution. This perhaps partly explains the high incidence of unemployment among men. It may also be influenced by the fact that a higher proportion of men than women were in paid self-employment.

The common perception that sample selection bias is an issue only for women or that it is greater for women than for men is not universally valid. In their study on Poland, Adamchik and Bedi (2003) also obtained a positive and significant selectivity term for both men and women, and the selectivity term was higher for men in three of the five years under study. In Ashraf and Ashraf's (1993) study on Pakistan, the selectivity term was positive and significant for men but insignificant for women. For Georgia, Khitarishvili (2009) found no evidence of selection bias among women and, like in most studies on the former Soviet Republics, obtained a counterintuitive finding of a negative and significant selection term for men.

6 Decomposition of observed earnings differentials

Having estimated the earnings equations, we decompose the observed hourly earnings gap between men and women into three components: (i) that due to differences in selectivity bias; (ii) that due to gender differences in characteristics ("explained" difference); and (iii) that due to gender differences in the coefficients of the earnings equations ("unexplained" difference), caused by unobserved factors, including any discrimination. We also calculate how much of the "explained" difference can be ascribed to specific sets of characteristics. We do not undertake similar breakdown for the "unexplained" difference because, as Oaxaca and Ransom (1999) have shown, the separate contributions of sets of dummy variables to the "unexplained" difference are not invariant with respect to the choice of the left-out reference groups.

Following the standard practice, the decomposition is based on three alternative assumptions: first, that the earnings function for men also applies to women; second, that the earnings function for women also applies to men; and third, that a weighted average of the separately estimated wage structures for men and women represents the non-discriminatory wage structure. The decomposition predicated on the earnings function for men and women provide the upper and lower bounds of the estimates. A non-discriminatory wage structure should lie somewhere in between. In this paper, following Cotton (1988), we have used the proportion of men and women in wage employment as weights for calculating the non-discriminatory wage structure.

The results of the decomposition exercise are shown in Table 7. We focus on the decomposition based on the weighted wage structure (column 3). About 28 percent of the

Table 7 Macedonia: Decomposition of gender differences in hourly earnings[a]

	Assuming wage structure of men	Assuming wage structure of women	Assuming weighted wage structure
	(1)	(2)	(3)
Total observed log hourly earnings gap	0.1173	0.1173	0.1173
Difference due to selectivity bias	0.0333	0.0333	0.0333
Explained difference *due to:*	0.0213	−0.0768	−0.0171
Education	−0.0387	−0.0386	−0.0386
Experience	−0.0041	−0.0004	−0.0027
Unmarried person	−0.0042	0.0013	−0.0020
Ethnic affiliation	−0.0069	−0.0145	−0.0099
Enterprise type	−0.0082	−0.0040	−0.0065
Pension fund registration	0.0001	0.0001	0.0001
Industry	0.0020	−0.0111	−0.0031
Occupation	−0.0104	−0.0437	−0.0235
Feminization of occupation	0.0967	0.0492	0.0781
Region	−0.0021	−0.0012	−0.0017
Urban	−0.0029	−0.0138	−0.0072
Unexplained difference[b]	0.0627	0.1608	0.1011

[a]A positive number means earnings difference in favor of men.

[b]Total unexplained difference is the sum of the components attributable to the constant term and the coefficients. Also equal to total earnings gap minus explained difference minus difference due to selectivity bias.

observed gender earnings gap (i.e., 0.0333 out of 0.1173 log points) can be attributed to the net impact of the selectivity correction. Thus, in the absence of the selection correction term the observed earnings gap overstates the true offer wage differential. The contribution of the "unexplained" difference (due to difference in coefficients) to the observed gender earnings gap is substantial—86 percent of the observed earnings gap (0.1011 out of 0.1173 log points) is "unexplained"[7]. The "explained" difference is negative. That is, men would actually earn less than women by 0.0171 log points on the basis of the given differences in characteristics.

Although it is methodologically inappropriate in the presence of dummy variables to quantify the share of a specific set of coefficients in the total "unexplained" difference, it still seems that the major source of the "unexplained" wage gap is unobserved sex-related factors that determine earnings and alter the constant term in the wage equation. This is because, as already discussed above, the coefficients on the women-specific slope dummies in the wage equation with slope and intercept dummies show women to be at an advantage or, at least, not at a disadvantage vis-à-vis men. The constant term is lower for women than for men.

Most of the "explained" difference in the earnings gap can be attributed to gender differences in education, occupation, and occupation feminization. Women were in a rather disadvantaged position by virtue of having a higher proportion than men being employed in female-dominated occupations. In the decomposition based on the weighted wage structure, occupation feminization explains about 0.0769 log points of the observed gender earnings gap; i.e., about 65 percent of the observed earnings gap. However, this effect is mostly offset by women's advantage in educational and occupational attainment. Women's advantage in educational attainment results in an earnings differential of 0.0398 log points in favor of

women. In addition, a higher representation of women in professional, technical, and clerical occupations contributes to an earnings differential of 0.0233 log points in their favor.

7 Multinomial logit estimation of occupational attainment

The gender differences in occupational distribution can arise on account of several factors: differences in human capital characteristics, differences in "tastes" (e.g., in attitudes and aspirations), and prejudices of employers in hiring. We examine the role of these unexplained factors in occupational attainment in two ways. First, we estimate a model of occupational attainment for the sample of wage earners as a whole, using the method of multinomial logit. The explanatory variables include education, age, ethnic affiliation, family structure (represented by a set of two dummy variables identifying married persons with children up to five years in age and married persons with children in the age group 6 to 14 years), a dummy variable for head of household, and a female dummy. The coefficients on the female dummy indicate the importance of its direct influence (including differences in tastes and hiring practices) on a particular occupational outcome, controlling for the influences of the other explanatory variables. They also allow us to gauge the relative effects of gender on being engaged in different occupations. Second, we estimate a separate model of occupational attainment for men and then predict the occupational distribution of women assuming that it is determined in the same way as that of men. On this basis, the difference between the actual occupational distributions of women and men can be decomposed into difference that is "explained" by differences in characteristics and a residual "unexplained" difference that can be attributed to omitted factors, differences in taste, and employer prejudices.

In the multinomial logit model, if there are N occupation groups, the probability that an individual i characterized by the vector $x^i = \left(1, x^i_{2,\ldots,} x^i_h\right)$ of the independent variables will be found in the jth occupation group is given by

$$P^i_j = \exp\ \beta'_j x^i \quad / \quad \Sigma^N_{k=1} \exp\ \beta'_k x^i$$

where β_k is the vector of h coefficients corresponding to the kth occupation group. The total number of parameters to be estimated is $h(N-1)$, since coefficients for each element of x are determined only up to an arbitrary normalization. In our model, we set the coefficients for elementary (unskilled) workers to zero for the purpose of normalization. Thus, the estimated coefficients for each occupation group do not represent marginal probabilities, but indicate the change in the log of odds of being in that occupation instead of in unskilled occupations. By ranking the coefficients of a given variable by size, we can see the relative impact of that variable on the probabilities of being in specific occupations.

The estimates of the multinomial logit model indicate that there is differential access to occupations according to gender (see upper panel of Table 8). The coefficient on the female dummy is significantly different from zero in five occupation groups and the sign varies across occupations. *Ceteris paribus*, the likelihood of being a manager or plant and machine operator is lower (the coefficient on the female dummy is negative and significant) and the likelihood of being a professional, technician and associate professional or a clerical worker is higher (the coefficient on the female dummy is positive and significant) for women compared to men. There is no significant difference between men and women in the likelihood of being engaged as service and sales workers or being in craft and related trade.

Table 8 Macedonia: Coefficients and asymptotic standard errors for the multinomial logit model of occupational attainment

	Occupation						
	Managers	**Professionals**	**Technicians and associate professionals**	**Clerks**	**Service and sales workers**	**Craft and related trade**	**Plant and machine operators**
A. Entire sample							
Constant	−21.1246	−20.8515	−11.2797	−9.9732	−1.1533	−1.7064	−3.6846
	(1.9546)***	(1.2275)***	(0.9526)***	(0.9362)***	(0.6828)*	(0.6660)**	(0.8171)***
Education, in years	1.3177	1.6071	0.9571	0.7317	0.3465	0.1757	0.2689
	(0.0526)***	(0.0437)***	(0.0373)***	(0.0344)***	(0.0248)***	(0.0204)***	(0.0250)***
Age	0.1132	−0.0472	−0.0298	0.0397	−0.1076	0.0382	0.0661
	(0.0866)	(0.0565)	(0.0457)	(0.0451)	(0.0347)***	(0.0337)	(0.0412)
Age-squared	−0.0002	0.0014	0.0009	0.0002	0.0013	−0.0005	−0.0007
	(0.0010)	(0.0007)**	(0.0006)	(0.0006)	(0.0004)***	(0.0004)	(0.0005)
Ethnic affiliation dummies[a]							
Albanian	−0.2327	1.3643	−0.0988	0.2048	0.1619	−0.2814	−0.8034
	(0.4821)	(0.2936)***	(0.2983)	(0.2720)	(0.2022)	(0.1899)	(0.2393)***
Other minorities	0.5125	0.3807	−0.1400	−0.0777	−0.0568	−0.3334	−0.1627
	(0.3941)	(0.3468)	(0.2946)	(0.2820)	(0.2222)	(0.2024)*	(0.2283)
Family structure dummies[b]							
Married with child upto 5 years	0.4598	0.5224	0.3574	0.2481	0.3012	0.3683	0.4530
	(0.2566)*	(0.1959)***	(0.1683)**	(0.1689)	(0.1431)**	(0.1342)***	(0.1497)***
Married with child of 6–14 years	0.3711	0.0026	0.0379	−0.1324	0.1584	0.2109	0.1121
	(0.2140)*	(0.1694)	(0.1455)	(0.1435)	(0.1252)	(0.1152)*	(0.1321)
Head of household dummy	0.1207	0.1021	0.2075	−0.0131	0.1227	0.2188	0.1592
	(0.2616)	(0.2165)	(0.1851)	(0.1835)	(0.1608)	(0.1483)	(0.1635)
Female dummy	−0.5787	0.8703	0.3625	0.5412	0.0692	−0.1457	−1.5635
	(0.2611)**	(0.1920)***	(0.1634)**	(0.1612)***	(0.1408)	(0.1339)	(0.1713)***
Log likelihood = −8770.197; Chi-squared = 4012.852; N = 5436; d.f. = 63.							
B. Men							
Constant	−20.5173	−19.9835	−11.6217	−9.7774	−1.8815	−3.4966	−4.9669
	(2.2980)***	(1.6425)***	(1.2704)***	(1.2676)***	(0.8894)**	(0.8646)***	(0.9612)***
Education, in years	1.1404	1.4393	0.8962	0.5751	0.3390	0.1699	0.2437
	(0.0589)***	(0.0544)***	(0.0458)***	(0.0426)***	(0.0311)***	(0.0248)***	(0.0279)***
Age	0.1896	0.0239	0.0155	0.1346	−0.0700	0.1171	0.1391
	(0.1015)*	(0.0753)	(0.0615)	(0.0622)**	(0.0464)	(0.0443)***	(0.0490)***
Age-squared	−0.0010	0.0007	0.0005	−0.0009	0.0010	−0.0011	−0.0014
	(0.0011)	(0.0009)	(0.0007)	(0.0008)	(0.0006)*	(0.0005)**	(0.0006)**
Ethnic affiliation dummies[a]							
Albanian	−0.5827	1.0844	−0.6520	0.1014	0.1401	−0.1685	−0.7920
	(0.5230)	(0.3259)***	(0.3636)*	(0.2936)	(0.2177)	(0.2012)	(0.2458)***
Other minorities	0.1717	0.1772	−0.4237	−0.2166	−0.2220	−0.1423	−0.2601
	(0.4547)	(0.4238)	(0.3664)	(0.3440)	(0.2719)	(0.2360)	(0.2571)

Table 8 Macedonia: Coefficients and asymptotic standard errors for the multinomial logit model of occupational attainment *(Continued)*

Family structure dummies[b]							
Married with child upto 5 years	0.5094	0.3824	0.4541	0.0917	0.2716	0.3829	0.4372
	(0.2884)*	(0.2491)	(0.2079)**	(0.2167)	(0.1747)	(0.1614)**	(0.1709)**
Married with child of 6–14 years	0.1438	−0.1916	0.0017	−0.3954	−0.0152	−0.1287	−0.1219
	(0.2536)	(0.2277)	(0.1930)	(0.1956)**	(0.1642)	(0.1480)	(0.1574)
Head of household dummy	−0.1376	−0.1910	−0.0534	−0.3189	−0.0136	−0.0238	−0.0423
	(0.2905)	(0.2598)	(0.2222)	(0.2212)	(0.1922)	(0.1753)	(0.1847)
Log likelihood = −5504.404; Chi-squared = 1939.604; N = 3305; d.f. = 56.							

[a]The omitted category is ethnic Macedonian.

[b]The omitted category is married persons with no children and unmarried persons.

***Significant at the 1 percent level, using a two-tailed test; **significant at the 5 percent level; *significant at the 10 percent level.

To measure the impact of differences in "tastes", hiring prejudices, or other unobservable factors on the occupational distribution, we estimate a separate model of occupational attainment for men (see lower panel of Table 8). Employing these estimates, we obtain the predicted distribution for each sex as follows: substitute the sample data for each sex into the estimated model, producing for each individual a vector of predicted probabilities of belonging to each of the eight occupation groups, and calculate the mean of the predicted probabilities for each occupation after summing over observations. For men this estimation yields a predicted distribution which is identical to their actual sample distribution, i.e., $M_p = M_a$. The difference in the predicted distributions of men and women ($M_a - W_p$), is the 'explained' component due to difference in characteristics, and the residual difference, ($W_p - W_a$), is the 'unexplained' component due to differences in tastes, hiring prejudices, or other unobservable factors.

The results of the decomposition exercise are presented in upper panel of Table 9. We focus mainly on the decompositions for the large differences in the actual sample distributions. The exercise shows that if there was no differential access to occupation by gender, the proportion of women engaged as professionals, technicians and associate professionals, and clerks would be much smaller than observed, and the proportion of women engaged as managers and plant operators would be considerably higher than observed (column 5). The residual "unexplained" component accounts for around 73-78 percent of the observed difference between women and men in the proportions engaged in professional and clerical occupations, and 97 percent in the case of plant and machine operators (column 7). Given the nature of these occupations, this likely reflects "supply-side" differences in preferences of women for white-collar jobs. For managers and senior officials, the residual "unexplained" difference (0.0269) is actually greater than the observed difference (0.0198). If there was no differential access to occupation by gender, the proportion in managerial positions would be higher for women than for men. It is difficult to ascribe this finding to "supply-side" difference in tastes.

8 Within-occupation earnings functions and decomposition of earnings differentials

Brown *et al*. (1980) suggest the following decomposition of the wage gap: a part which is due to wage differences within occupations and another part which is due to differences

Table 9 Macedonia: Actual and predicted occupational distribution according to sex (based on coefficients for men) and wage gap due to differences

	Observed occupational distribution		Predicted occupational distribution		Observed difference	Explained difference	Unexplained difference
	Men	Women	Men	Women			
	M_a	W_a	M_p	W_p	M_a–W_a	M_a–W_p	W_p–W_a
Occupation	(1)	(2)	(3)	(4)	(5) = (1) – (2)	(6) = (1) – (4)	(7) = (4) – (2)
Managers and senior officials	0.0390	0.0192	0.0390	0.0462	0.0198	−0.0072	0.0269
Professionals	0.0929	0.1685	0.0929	0.1128	−0.0756	−0.0199	−0.0557
Technicians and associate professionals	0.0953	0.1319	0.0953	0.1086	−0.0366	−0.0133	−0.0232
Clerks	0.0817	0.1502	0.0817	0.0974	−0.0685	−0.0157	−0.0527
Service and sales workers	0.1628	0.1755	0.1628	0.1528	−0.0127	0.0100	−0.0227
Craft and related trade workers	0.2448	0.2098	0.2448	0.2206	0.0350	0.0242	0.0108
Plant and machine operators and assemblers	0.1809	0.0399	0.1809	0.1767	0.1411	0.0042	0.1368
Elementary (unskilled) occupations	0.1026	0.1051	0.1026	0.0849	−0.0025	0.0177	−0.0203

	Ln (hourly earnings)		Observed wage gap	Wage gap due to differences in occupational distribution	
	Men	Women		Explained	Unexplained
	$Ln\ Y_m$	$Ln\ Y_w$	$Ln\ Y_m - Ln\ Y_w$	$(M_a - W_p) \times Ln\ Y_m$	$(W_p - W_a) \times Ln\ Y_m$
	(8)	(9)	(10)	(11)	(12)
Managers and senior officials	4.2994	4.0965	0.2029	−0.0308	0.1158
Professionals	4.2382	4.1526	0.0856	−0.0844	−0.2359
Technicians and associate professionals	4.0715	3.9846	0.0869	−0.0542	−0.0946
Clerks	3.9127	3.9334	−0.0206	−0.0616	−0.2063
Service and sales workers	3.8152	3.6057	0.2095	0.0380	−0.0865
Craft and related trade workers	3.7926	3.4933	0.2993	0.0919	0.0410
Plant and machine operators and assemblers	3.8152	3.5106	0.3046	0.0161	0.5221
Elementary (unskilled) occupations	3.5462	3.3817	0.1645	0.0628	−0.0718
All	8.9923	8.8567	0.1356	−0.0221	−0.0164

in occupational distribution; both parts contain an "explained" and an "unexplained component.

$$\overline{LnY_M} - \overline{LnY_W} = \sum_{j=1}^{K} W_{aj}\left(\overline{X_{M_J}} - \overline{X_{W_J}}\right)\beta_{M_J} + \sum_{j=1}^{K} W_{aj}\left(\beta_{M_J} - \beta_{W_J}\right)\overline{X_{W_J}} + \sum_{j=1}^{K}\left(M_{aj} - W_{pj}\right)\overline{X_{M_J}}\beta_{M_J} + \sum_{j=1}^{K}\left(W_{pj} - W_{aj}\right)\overline{X_{M_J}}\beta_{M_J}$$

where M_{aj} and W_{aj} are the proportions of men and women, respectively, in occupation j; W_{pj} is the predicted proportion of women in occupation j assuming men's occupational outcomes; $\bar{X}_{M_j}$ and $\bar{X}_{W_j}$ are the mean values of the characteristics of men and women, respectively, in occupation j; β_{MJ} and β_{WJ} are the estimated wage equation coefficients for men and women, respectively, for occupation j. The first term on the right hand side of the equation is the "explained" component of the wage differences within occupations, the second term is the "unexplained" component of the wage differences within occupations, the third term is the "explained" component of the wage gap due to differences in occupational distribution, and the fourth term is the "unexplained" component of the wage gap due to differences in occupational distribution. If the within-earnings function is estimated with selection correction, then an additional term can be introduced in the above expression to measure the wage gap due to selectivity bias.

The estimates for the "explained" and "unexplained" components of the wage gap due to differences in occupational distribution are shown in the bottom panel of Table 9. In the aggregate, both the components favor women and make a combined negative contribution of 0.0385 log points to the observed wage gap. This is consistent with the findings of the simple decomposition exercise presented earlier in Table 7. The "unexplained" component is large and positive for managers and plant and machine operators, but is more than offset by the negative effect for the other occupation groups.

Although the decomposition exercise suggests that the observed gender wage gap in Macedonia mainly reflects earnings differences within occupations, it would be misleading to conclude that occupational segregation does not play a significant role. This is because there is job segregation within the broad occupational groups and it has a significant influence on the wage gap.

Occupation-specific earnings functions show that occupation feminization "explains" quite a high proportion of the observed wage gap for craft and related trade workers (82 percent), technicians and associate professionals (49 percent), service and sales workers (48 percent), and professionals (19 percent) (see Table 10). The total contribution of the "explained" component to the observed wage gap for these four occupation groups varies between 55 percent and 75 percent, based on the weighted wage structure. Occupation feminization is not important for unskilled workers and, unlike in other occupation groups, works toward reducing the observed wage gap for clerical workers. Significantly, for both clerical and unskilled occupations, the "explained" part of the within-occupation wage gap is negative; that is, men would earn less than women on the basis of the given differences in characteristics.

The decomposition exercise shows that the earnings difference due to selectivity bias is large for all occupation groups, except for unskilled occupations. The net impact of selectivity is negative for professionals and for technical and associate professionals, and positive for the other occupation groups. However, the "unexplained" component due to differences in the coefficients of the earnings function is also large and works in the opposite direction to that of selectivity bias. Still, the net residual effect accounts for a sizeable part of the observed wage gap. These findings suggest complex factors at work and are difficult to explain.

We did not estimate separate gender-specific earnings functions for managers and for plant and machine operators, because the number of women in these two occupation groups was too small for meaningful analysis. Hence we could not calculate the aggregate

Table 10 Macedonia: Decomposition of gender differences in hourly earnings by occupation[a]

	Professionals			Technicians and associate professionals			Clerks		
	Assuming wage structure of men	Assuming wage structure of women	Assuming weighted wage structure	Assuming wage structure of men	Assuming wage structure of women	Assuming weighted wage structure	Assuming wage structure of men	Assuming wage structure of women	Assuming weighted wage structure
Total observed log hourly earnings gap	0.0857	0.0857	0.0857	0.0869	0.0869	0.0869	−0.0206	−0.0206	−0.0206
Difference due to selectivity bias	−0.1724	−0.1724	−0.1724	−0.5751	−0.5751	−0.5751	0.1616	0.1616	0.1616
Explained difference *due to:*	0.0125	0.0776	0.0476	0.0736	0.0487	0.0619	−0.0441	−0.1282	−0.0898
Feminization of occupation	−0.0091	0.0376	0.0161	0.0573	0.0261	0.0426	0.0091	−0.0705	−0.0341
Unexplained difference[b]	0.2457	0.1805	0.2105	0.5884	0.6133	0.6001	−0.1381	−0.0540	−0.0925
	Service and sales workers			**Craft and related trade workers**			**Elementary (unskilled) workers**		
	Assuming wage structure of men	Assuming wage structure of women	Assuming weighted wage structure	Assuming wage structure of men	Assuming wage structure of women	Assuming weighted wage structure	Assuming wage structure of men	Assuming wage structure of women	Assuming weighted wage structure
Total observed log hourly earnings gap	0.2095	0.2095	0.2095	0.2993	0.2993	0.2993	0.1645	0.1645	0.1645
Difference due to selectivity bias	0.2817	0.2817	0.2817	0.6062	0.6062	0.6062	−0.0312	−0.0312	−0.0312
Explained difference *due to:*	0.1243	0.0975	0.1133	0.2082	0.2500	0.2231	−0.0924	−0.1525	−0.1163
Feminization of occupation	0.1002	0.1024	0.1011	0.2324	0.2732	0.2469	0.0124	0.0052	0.0095
Unexplained difference[b]	−0.1966	−0.1697	−0.1855	−0.5151	−0.5568	−0.5299	0.2881	0.3482	0.3120

[a]A positive number means earnings difference in favor of men.

[b]Total unexplained difference is the sum of the components attributable to the constant term and the coefficients. Also equal to total earnings gap minus explained difference minus difference due to selectivity bias.

contribution of the "explained' and "unexplained" components of the within-occupation wage differences, in line with the methodology of Brown *et al.* (1980). However, when wage equations are estimated for all managers and for all plant and machine operators with a dummy variable for women included in the list of independent variables, the coefficient on women is negative and significant: *ceteris paribus*, women in managerial jobs or working as plant and machine operators have between 30 percent and 33 percent lower hourly earnings than men (see Appendix, Additional file 1: Table S1).

9 Conclusions

This paper on gender differentials in earnings in Macedonia in 2000 has four principal findings. First, the lower earnings of women in Macedonia cannot be explained by gender differences in measured human capital endowments. The average educational attainment of women was above that of men. Furthermore, women were at an advantage vis-à-vis men with regard to the marginal return to education. This suggests that for promoting gender equality in earnings the focus should not be on expansion of education of women.

Second, there was differential access to occupation by gender. A higher proportion of women than men worked in white-collar occupations such as professionals, technicians and associate professionals, and clerks. Whereas, men had a higher proportion working as managers and as plant and machine operators. Differences in endowments explained only a small part of the observed difference in the occupational distribution. The bulk of the difference was attributable to "unexplained" factors. Significantly, if there was no differential access to occupation by gender, the proportion in managerial positions would be higher for women than for men. It is difficult to ascribe this finding to "supply-side" difference in tastes. Still, the aggregate impact of the differences in occupational distribution on earnings favored women and worked towards lowering the observed gender earnings gap.

Third, the occupational distribution measured at the one-digit ISCO classification level hides the high degree of employment segregation by sex that exists at more disaggregated levels of occupational classification. The degree of concentration in a limited number of occupations at the ISCO-88 three-digit level was much higher among women than among men, and women were over-represented in female-dominated occupations. Feminization of occupations had a sizeable negative effect on the earnings of women, but the negative effect was stronger for men at higher degrees of feminization. Occupation feminization accounted for a sizeable part of the overall gender wage gap as well as the one-digit level occupation-specific wage gaps. It is possible that cultural factors conditioned by the pre-Yugoslavia legacy were mainly responsible for stereotyping of women and their streamlining into low-paying jobs and for the persistence of discriminatory pay practices. In countries with a long tradition of desegregation policies (such as Denmark, Finland, Germany, and Sweden), an important element of equal opportunities policies has been to encourage young girls to consider a wider range of occupational options. Such efforts in Macedonia may help to change perceptions regarding appropriate female activities and reduce occupational segregation. Comparable worth policies are also a way to address the problem of undervaluation of female-dominated occupations. However, as Altonji and Blank (1999, p. 3248) note, there is considerable debate over the advantages and disadvantages of comparable worth policies. In particular, no matter how occupational categories and occupational characteristics are measured, it is hard to resolve without firm-level data whether important unobserved

differences exist in the types of jobs that women and men perform. Nevertheless, as Koteska (2011) points out, Macedonia will need to address the problems with the implementation and enforcement of the law on equal opportunities arising from weaknesses in the administrative machinery and poor gender data gathering and reporting.

Fourth, the role of "unexplained" factors in accounting for the observed differentials in earnings and occupational composition was substantial. The evidence suggests that complex factors were at work. It cannot be ruled out that some of the "unexplained" component of the gender pay gap represented legitimate compensating differentials for worker skills or job attributes not captured in this paper.

In Macedonia, in common with many other countries in eastern Europe, there has been little policy debate and strategy on the gender pay gap issue. In large part, this is because of low awareness and absence of feminism (European Commission 2009, p. 56). To address this problem in member states and candidate countries, a major thrust of the EU's "Equality Pays Off" initiative is to raise awareness of the gender pay gap among government organizations, trade unions, employers' organization, and the population at large (European Commission 2011). Subsequent empirical research on gender earnings differentials will demonstrate the effectiveness of this initiative across countries.

Endnotes

[1]Much of this literature is reviewed in Altonji and Blank (1999), European Commission (2003) (2006), (2009), (2010a), Newell and Reilley (2000), UNICEF (1999), and World Bank (2002).

[2]See http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=earn_gr_hgpg&lang=en

[3]For background, see http://www.msc.es/ssi/igualdadOportunidades/iEmpleo/Igualdad_salarial/Proyecto_Equality_Pays_Off_ingles.pdf .

[4]See International Monetary Fund, World Economic Outlook data base. http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/weorept.aspx?pr.x=59&pr.y=7&sy=1992&ey=2010&scsm=1&ssd=1&sort=country&ds=.&br=1&c=962%2C961&s=PPPGDP%2CPPPPC&grp=0&a=.

[5]See Lehmann (2010), Table III.5, page 21. Lehmann interprets this finding as evidence of lack of enforcement of labor regulations.

[6]The relative effect of a dummy variable on earnings in a semi-logarithmic specification is given by 100*{exp (d) − 1}, where d is the coefficient on the dummy variable.

[7]Angel-Urdinola (2008) also obtained similar very large "unexplained" component in his study on Macedonia.

Appendix

This appendix provides the results on the occupation-specific earnings functions for both sexes together and separately for men and women (Additional file 1: Table S1).

Additional file

Additional file 1: Table S1. Macedonia. Coefficient and standard errors of with-in occupation earnings functions with selectivity correction[a].

Competing interests
The IZA Journal of European Labor Studies is committed to the IZA Guiding Principles of Research Integrity. The author declares that he has observed these principles.

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References

Adamchik VA, Bedi AS (2003) Gender pay differentials during the transition in Poland. Econ Transition 11(4):697–726
Altonji JG, Blank RM (1999) Race and Gender in the Labor Market. In: Ashenfelter O, Card D (ed) Handbook of Labor Economics, Volume 3. Elsevier Science B.V, Amsterdam
Angel-Urdinola DF (2008) Can the Introduction of a Minimum Wage in FYR Macedonia Decrease the Gender Wage Gap? Policy Research Working Paper 4795. The World Bank, Washington DC. December. http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-4795
Anker R (1997) Theories of occupational segregation by sex: an overview. Int Labour Rev 136(3):315–339
Ashraf J, Ashraf B (1993) Estimating the gender wage gap in Rawalpindi City. J Dev Stud 29(2):365–376
Bayard K, Hellerstein J, Neumark D, Troske D (2003) New evidence on sex segregation and sex differences in wages from matched employee-employer data. J Labor Econ 21(4):887–922
Beblo M, Beninger D, Heinze A, Laisney F (2003a) Methodological Issues Related to the Analysis of Gender Gaps in Employment: Earnings and Career Progression. Final Report to the European Commission, Employment and Social Affairs DG, Brussels. October
Beblo M, Beninger D, Heinze A, Laisney F (2003b) Measuring Selectivity-Corrected Gender Wage Gaps in the EU. ZEW Discussion Paper No. 03-74, Center for European Economic Research. http://www.econstor.eu/bitstream/10419/24024/1/dp0374.pdf
Blau FD, Kahn LM (1996) Wage structure and gender earnings differentials: an international comparison. Economica (Supplement on Economic Policy and Income Distribution) 63:S29–S62
Boraas S, Rodgers WM, III (2003) How does gender play a role in the earnings gap? An update. Mon Labor Rev 126(3):9–15
Brown RS, Moon M, Zoloth BS (1980) Incorporating occupational attainment in studies of male–female earnings differentials. J Hum Resour 15(1):3–28
Busch A, Holst E (2011) Gender-specific occupational segregation, glass ceiling effects, and earnings in managerial positions: results of a fixed effects model: discussion paper 1101, DIW. Institute for Business Research, Berlin, German. January
Campos JA, Ropero MA (2011) Occupational segregation and the gender difference: a decomposition by occupational areas and responsibility levels. International Conference on Applied Economics-ICOAE, University of Malaga. 15-17 December. (http://kastoria.teikoz.gr/icoae2/wordpress/wp-content/uploads/2011/10/011.pdf)
Cazes S, Nesporova A (2006) Combining flexibility and security for employment and decent work in the western Balkans. South-East Eur Rev Labour Soc Affairs 2:7–23
Cotton J (1988) On the decomposition of wage differentials. Rev Econ Stat 70(2):236–243
Christofides LN, Michael M (2013) Exploring the public-private sector wage gap in European countries. IZA J Euro Labor Stud 2:15. http://www.izajoels.com/content/pdf/2193-9012-2-15.pdf
European Commission (2002) Employment in Europe 2002: Recent Trends and Prospects. Office for Official Publications of the European Communities, Luxembourg
European Commission (2003) Gender pay gaps in the European labour markets—Measurements, analysis and policy implications. Commission Staff Working Paper, SEC (2003) 937, Brussels. September. (http://www.ispesl.it/dsl/dsl_repository/Sch39PDF08Marzo06/Sch39PayDiffGensec_03_937_en.pdf)
European Commission (2005) Employment in Europe: Recent Trends and Prospects. Office for Official Publications of the European Communities, Luxembourg. http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1033&context=intl
European Commission (2006) The gender pay gap—origins and policy responses: a comparative review of 30 European countries. Office for Official Publications of the European Communities, Luxembourg
European Commission (2009) Gender segregation in the labour market: Root causes, implications and policy responses in the EU. Office for Official Publications of the European Communities, Luxembourg
European Commission (2010a) Report on equality between women and men 2010. Office for Official Publications of the European Communities, Luxembourg
European Commission (2010b) The Former Yugoslav Republic of Macedonia 2010 Progress Report. Commission Staff Working Document, SEC (2010) 1332, Brussels, November. (http://ec.europa.eu/enlargement/pdf/key_documents/2010/package/mk_rapport_2010_en.pdf)
European Commission (2011) Reducing the gender pay gap: exchange of good practices on gender equality: Summary report. , Germany. 5-6 December. (http://ec.europa.eu/justice/gender-equality/files/exchange_of_good_practice_de/summary_report_de_2011_en.pdf)
Johnson G, Solon G (1986) Estimates of the direct effects of comparable worth policy. Am Econ Rev 76(5):1117–1125
Jurajda S (2003) Gender wage gap and segregation in enterprises and the public sector in late transition countries. J Comp Econ 31(2):199–222
Karamessini M, Ioakimoglou E (2007) Wage determination and the gender pay gap: a feminist political economy analysis and decomposition. Fem Econ 13(1):31–66
Khitarishvili T (2009) Explaining the Gender Wage Gap in Georgia: working paper no. 577. The Levy Economics Institute of Bard College. September. http://ideas.repec.org/p/lev/wrkpap/wp_577.html
Kilbourne B, England P, Beron K (1994) Effects of individual, occupational, and industrial characteristics on earnings: intersection of race and gender. Soc Forces 72(4):1149–1176

Koteska J (2011) Gender mainstreaming in the Republic of Macedonia. Comments paper—Former Yugoslav Republic of Macedonia, Exchange of good practices on gender equality, Belgium. 17-18 May. (http://ec.europa.eu/justice/gender-equality/files/exchange_of_good_practice_be/mk_comments_paper_en.pdf)
Lehmann H (2010) Macedonia's Accession to the EU and the Labor Market: What Can Be Learned from the New Member States? IZA Policy Paper No. 14. Institute for the Study of Labor (IZA), Bonn
Macpherson DA, Hirsch BT (1995) Wages and gender composition: why do women's jobs pay less? J Labor Econ 13(3):426–471
Micevska M (2008) The labour market in Macedonia: a labour demand analysis. Labour 22(2):345–368
Mojsoska-Blazevski N (2011) The former Yugoslav Republic of Macedonia: is the present wage setting mechanism an effective policy tool? In: Schmidt V, Vaughan-Whitehead D (ed) The Impact of the Crisis on Wages in South-East Europe. International Labour Office, Budapest, pp 83–121
Münich D, Svejnar J, Terrell K (2005) Returns to human capital under the communist wage grid and during the transition to a market economy. Rev Econ Stat 87(1):100–123
Newell A, Reilley B (2000) The Gender Pay Gap in the Transition from Communism: Some Empirical Evidence. William Davidson Institute Working Paper No. 305, Ann Arbor, Michigan
Oaxaca RL, Ransom MR (1999) Identification in detailed wage decompositions. Rev Econ Stat 81(1):154–157
Ogloblin CG (1999) The gender earnings differential in the Russian transition economy. Ind Labor Relat Rev 52(4):602–627
Pailhé A (2000) Gender discrimination in central Europe during the systemic transition. Economics of Transition 8 (2):505–535
Pastore F, Sattar S, Tiongson ER (2013) Gender differences in earnings and labor supply in early career: evidence from Kosovo's school-to-work transition survey. IZA Journal of Labor & Development. 2:5. http://www.izajold.com/content/pdf/2193-9020-2-5.pdf
Sorensen E (1990) The crowding hypothesis and comparable worth. J Hum Resour 25(1):55–89
UNICEF (1999) Women in Transition. The MONEE Project, CEE/CIS/Baltics, Regional Monitoring Report No. 6, Florence, Italy
World Bank (2002) Gender in Transition. Washington, D.C
World Bank (2003) FYR Macedonia Country Economic Memorandum: Tackling Unemployment. Poverty Reduction and Economic Management Unit. Washington, D.C

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