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Occupational Gender Composition and Wages in Romania: From Planned Equality to Market Inequality?

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November 2007

Forschungsinstitut
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Institute for the Study
of Labor

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ABSTRACT

Occupational Gender Composition and Wages in Romania: From Planned Equality to Market Inequality?*

In Romania, the communist regime promoted an official policy of gender equality for more than 40 years, providing equal access to education and employment, and restricting pay differentiation based on gender. After its fall in December 1989, the promotion of equal opportunities and treatment for women and men did not constitute a priority for any of the governments of the 1990s. Given that both the economic mechanisms and the institutional settings changed radically, the question is if this affected gender equality. This paper analyzes both gender and occupational wage gaps in Romania before and during the first years of transition from a planned to a market economy. The results suggest that the communist institutions did succeed in eliminating the gender wage differences in female- and male-dominated occupations, but not in gender-integrated occupations, for which the gender wage gap was about 32%. During the transitions years, this gap decreased to 20-24%, while the gender wag gap in male and female-dominated occupations increased to 15%.

JEL Classification: J24, J31, J71, J78, P26, P27

Keywords: occupational segregation, gender wage gap, occupational wage gap

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1 Introduction

In Romania, the communist regime proclaimed from its establishment in the middle of the 1940s that liberty, gender equality and the emancipation of women were some of the main targets in the development of the new socialist society. A nationwide campaign was launched in order to eliminate female illiteracy, to increase the enrollment of women in secondary schools and universities, and to increase female employment outside of the household. Although all "able-bodied" citizens of working-age had the right and duty to work and were guaranteed a job, labor markets in particular were subject to a number of constraints, including a strict regulation of mobility, central allocation of university graduates to jobs, and a centralized wage-setting process. Additionally, from 1966, women were required to have more children. Hence, it does not seem likely that the communist regime could have reached its targets. However, the statistics show that by its fall in December 1989, at least some of the communist regime's targets regarding in particular the emancipation of women and gender equality in general had indeed been achieved.[1]

Before December 1989, the institutional support for women rights was strong. Romania ratified the United Nations Convention on the Elimination of All Forms of Discrimination Against Women on January 7, 1982. The Constitution of the Socialist Republic of Romania, adopted in 1965, states that "*women and men have equal rights*",[2] and the new constitution, adopted in 1991 and modified in 2003, reinforces "*equal pay for equal work*" (or mot à mot, "on equal work with men, women shall get equal wages").[3] However, under central planning, wages were set according to industry-specific wage grids varying only with the difficulty of the job and with worker

[1] The most impressive achievement was that of the literacy rates. While in 1945, only 27% of the population were unable to read or write, in 1989, the literacy rates were 95.6% for women, and 98.6% for men (UNESCO, 2002; 2005). Another impressive achievement is the relatively high and gender neutral proportion of young people who were enrolled in high schools or universities in 1988/89: a) about 70% of males aged 15-19 years, and about 72% of females in the same age interval were enrolled in high school education; b) about 6% of both males and females aged 19-25 years were enrolled in some form of higher education (National Commission for Statistics, 1995). Nevertheless, the workforce participation rates were unusually high relative to Western standards for both women (about 90-95% during the 1970s and 1980s), and men (approached 100 percent) (Central Statistical Direction, Romanian Statistical Yearbook, various years, 1951-1989).

[2] "In Republica Socialista Romania, femeia are drepturi egale cu barbatul." (Art. 26).

[3] "La munca egala, femeile au salariu egal cu barbatii." (Art. 38, §4 from 1991, and Art. 41, § 4 from 2004).

education and experience, and not with gender. Given that the promotion of equal opportunities and treatment did not constitute a priority for any of the governments of the 1990s (United Nations, 2003),[4] the question is how much the communist setting of gender equality was affected by the economic and social downturns of the transition years.

Previous research on other transition economies found that the gender wage gap generally decreases in the transition process.[5] Given the similarities between the Romanian economy and the other transition economies from Central and Eastern Europe, especially in terms of issues related to gender equality, it was not unexpected that the gender wage gap in Romania reached similar levels in the first years of transition (Paternostro and Sahn, 1999; Skoufias, 1999). Unfortunately, the literature offers these figures only for 1994/95, and there is no analysis of the gender wage gap during the communist regime. The contribution of this study is to analyze the wage gap during the communist regime and during the first ten years of transition using a structural approach that controls for occupational attainment. This approach is meant to take into account aspects related to the institutional settings presented previously. The main hypothesis is that the process of labor reallocation caused by the economic transition had an impact on the occupational distribution of women and men, and implicitly on the gender wage gap. Therefore, we analyze not only the gender wage gap, as previous studies on Romanian data have, but also the occupational wage gap separately for men and women. The results from different regimes characterized by different settings and interventions suggest that public policy measures should focus more on redistributing labor (or redirecting potential labor market entrants) across occupations.

The study is organized in the following way. Section 2 presents some aspects related to gender equality in Romania during the communist regime and the transition period, and Section 3 presents some findings reported in earlier literature on gender wage gap. Section 4 describes the data and the samples used in this study. The empirical

[4] In 2000, the last year of the available data, a special Commission for Equal Opportunities was established. The new Romanian Constitution, modified in 2003, states that "everyone has the free choice of profession and workplace", and reinforces the guarantee for equal opportunities for women and men in gaining access to a public office or dignity, civil or military. However, in 2003, there was a major gap between policy and practice, with women earning less, being concentrated in low-paid sectors and under-represented in management (Vasile, 2004).

[5] See Section 3.1 of this paper.

specification is presented in Section 5, while the results are presented in Section 6. Section 7 is a short discussion, and the final section contains a summary of the paper with some policy implications.

2 The gender issues and the institutions: before and after

The gender equality actions in Romania were developed during the communism era when "liberty", gender equality, and the emancipation of women were emphasized in the constitution as well as in other official documents (e.g., the Communist Party's decisions, laws and decrees). During the second half of the 1940s when communism was imposed in Romania, the society was predominantly rural with a strong mentality towards the woman as the crucial "factor" of the family. Therefore, it was impossible to imagine that Romanian women could engage in work outside the household in general, and especially in work considered to be suitable for men only. However, in the 1950s, this aspect of gender equality in the economy was evoked in party speeches by the presence of "women heroes" working in areas which had typically been male-dominated: from working in mines underground, or in industrial, chemical and metallurgical operations, to professions in areas such as surgery and experimental sciences (Vese, 2001). Furthermore, the state launched a nationwide campaign to virtually eliminate female illiteracy and to increase the enrollment of women in secondary schools and universities. At the same time that these changes were being put into place, the state was demanding that women have more children. This was done through different regulations, such as a fertility policy that banned abortion and limited contraception; the introduction of a tax on adults older than twenty-five years, single or married, who were childless; and the offering of a number of positive incentives to increase births, e.g., parents of large families were given additional subsidies for each new birth, families with children were given preference in housing assignments, the number of child care facilities were increased, and maternal leave policies were put into place (Keil and Andreescu, 1999).

Beginning in 1951, Romania set into practice the Soviet system of central planning based on five-year development cycles. The development program assigned top priority to the industrial sector (the machinery, metallurgical, petroleum refining, electric power, and chemical industries), necessitating a major movement of labor from

the agriculture occupations in the countryside to industrial jobs in newly created urban centers.

The labor market was characterized by a centralized wage-setting process with a standard set of rules based on industry, occupation, and length of service (Earle and Sapatoru 1993). Wages were set according to industry-specific wage grids varying only with the difficulty of the job and with the worker's education and experience, not with gender. After the fall of communism, in December 1989, the new wage law of February 1991 formally decentralized wage determination in Romania. All state and privately owned commercial companies were granted the right to determine their wage structure autonomously through collective or individual negotiations between employees and employer. Pay was no longer tied to performance as it has been during the years of socialism, and all restrictions on eligibility for promotion, bonuses, and internal and external migration were lifted. Also, hours of work per week were reduced from 46 to 40 without any decrease in monthly wages (Skoufias, 1999).

The structural starting point of the economic transformation was an oversized state-owned industry characterized by low competition and weak interaction with the world market. Despite still being the majority owner, the state did not intervene with any policy regarding wage differentials. Instead, its interventions have been limited to periodic indexations. Nevertheless, the state allowed sometime specific indexations only for the state institutions in order to diminish an increasing gap caused by the more rapid wage increases in the some industries because of negotiations of the collective and individual contracts. This system was supplemented by price liberalization and privatization, financial crises and a lack of (rule of) laws. All these factors have an effect on the labor market participation, occupational attainment and, nonetheless, on people's opinion about their opportunities and their place on the labor market. The 2000 Gender Barometer indicates that about half of those interviewed answered that it does not exist real equality of rights between women and men.[6] A majority (about 75-88%) considered gender not to be important in some occupations with respect to who should be employed (e.g., media, non governmental organizations, public administration, health, agriculture and banking), but that men should be employed in mining and

[6] The Gender Barometer of the Open Society Foundation covers a representative sample of 1,839 persons aged 18 and over, and it is the first documented attempt to examine the Romanian society in terms of the roles of women and men, their relationships, and their everyday life.

metallurgy (87%) and construction (83%), and women should be employed in the textile industry (74%). See Table A1 in the Appendix.

3 Earlier findings and some theoretical background

3.1 Labor market segregation and gender wage gap

Joshi and Paci (1998) summarize several economic reasons for why labor market segregation may lead to a gender pay gap. If women were segregated into a relatively small number of occupations and/or firms, then the abundant supply of labor in these jobs would push down wages and the employers would acquire some degree of monopsony power. The lower wages of women are due to their more abundant supply in some occupations, assuming that the workers are equally productive, so the labor demand curve is the same. Alternatively, the sorting of men and women into two sectors may reflect supply-side conditions such as systematic gender differences in preferences (Killingsworth, 1990) and in the elasticity of labor supply (Manning, 1996). Even though it is difficult to test empirically economic theories of the reasons for occupational gender segregation, there is some empirical literature on the subject. For most countries, it has been found that the wage gap falls (considerably or not) after accounting for occupational attributes and unmeasured worker skills and occupational preferences.[7] Furthermore, it has been found that not only women's but also men's wages are lower in predominantly female occupations.[8]

Until recently, the measurement of both residential and occupational segregation revolved around the Index of Dissimilarity (ID), popularized by Duncan and Duncan (1955). However, there have been numerous attempts to remedy deficiencies in the ID, most notably its sensitivity to the marginal distribution of occupational categories. In economics, several papers analyze the occupational segregation and wages by

[7] Blau and Kahn (2003) use cross-country differences in labor-market institutions and wage structures to study the sources of the gender wage gap. Dolado et al. (2002) analyze patterns of occupational segregation by gender in the EU countries vis-á-vis the U.S., and find that there is some evidence, albeit weak, that the gender wage gap and occupational segregation are positively correlated, particularly when the Scandinavian countries are excluded from the sample.

[8] In the U.S. and Canada, controlling for occupational segregation reduces the wage penalty to female-dominated occupations (Macpherson and Hirsh, 1995; Baker and Fortin, 2001).

estimating the effect of women's density in different occupations on individual wages.[9] A potential problem in these studies is the endogeneity of occupational choice. Except for a few studies that do take this problem into account,[10] most of the literature is based on the assumption that occupational attainment is exogenous. According to Macpherson and Hirsch (1995), there are at least two reasons why this assumption may be false: 1) men and women with higher unmeasured skills (captured by the error term in the wage equation) are more likely to be sorted into male-dominated jobs and those with lower skills into female-dominated jobs; 2) the error term may also capture unobserved taste differences (e.g. future work interruptions, work fewer and/or more flexible hours) and therefore some people may prefer jobs where the wage penalty for absence from work is low.

3.2 The gender wage gap in transition

There is relatively rich literature on labor market and gender issues in transition economies,[11] which typically compares relative wages and employment of men and women before and after the early market reforms.[12] Some theorists predicted that liberalizing the centrally determined wages would increase inequality between men and women, and that women would bear the burden of this transition.[13] In contrast to these expectations, evidence from early stages of transition suggests that women in some transition economies actually improved their economic position relative to men.[14] Despite the difficulties of establishing the reasons for occupational gender segregation, it is still important to assess the impact of this labor market phenomenon on wages and wage gaps. A relatively new branch of empirical research that takes occupational

[9] Hansen and Wahlberg (forthcoming) using Swedish data; Bayard et al. (2003), Macpherson and Hirsch (1995), Sorensen (1989, 1990), Gabriel et al. (1990), England et al. (1988), Johnson and Solon (1986), and Brown et al. (1980) for applications on U.S. data; Baker and Fortin (2001), and Kidd and Shannon (1996) using Canadian data; and Miller (1987) using data from the U.K.;

[10] e.g., Hansen and Wahlberg (forthcoming), Macpherson and Hirsch (1995), Sorensen (1989), and England et al. (1988).

[11] See Jones and Ilayperuma (1994), Krueger and Pischke (1995), Orazem and Vodopivec (1995), Vecernik (1995), Newel and Reily (1996), Flanagan (1998), Ogloblin (1999), Svejnar (1999), Brainerd (1998, 2000), Boeri and Terrell (2002), Hunt (2002), Jolliffe (2002), and Jurajda (2003).

[12] See Ogloblin (1999) and Brainerd (2000) for an analysis of the institutional background to gender under communism.

[13] Einhorn (1993) and Fong and Paull (1993).

[14] Brainerd (2000) finds a consistent increase in female relative wages across Eastern Europe (Bulgaria, Hungary, Poland, and the Czech and Slovak Republics), and a substantial decline in female relative wages in Russia and Ukraine. Newell and Reilly (2000), relying on mid-transition data, suggest that the gender wage gap has been relatively stable through the 1990s in a number of transition economies.

segregation into consideration has shown to be able to explain a great deal of the gender wage gap.[15] The few studies with data from transition countries suggest that the occupational segregation explains a part of the gender wage gap in all countries, but there are differences across countries. Job segregation by gender accounts for a big part (75-80%) of the gender wage gap in Russia (Ogloblin 1999, 2005), but only for about 35% in Czech and Slovak medium and large firms (Jurajda, 2003); the rest of the total gap reaming attributable to the individual's gender. These results are different from those reported by Bayard et al. (2003) for the U.S. using matched employer-employee data for 1990, where approximately one-half of the gender gap in wages is attributable to the individual's gender. Differences in employment rates of low-wage women driven by initial transition policies may be responsible for different wage penalties to predominantly female occupations, and the introduction of Western-type anti-discrimination policies has had little immediate effect on the structure of female-male wage differences (Jurajda, 2005).

4 Data

The data used in the empirical analysis is drawn from the Romanian Integrated Household Survey (RIHS). For the socialist years, 1960-1989, we use retrospective information in the 1994 survey, and for the analyzed transition years, we use the annual household survey (1994, 1996, 1998, and 2000).[16] The number of observations that include information about the wages and explanatory variables relevant for analysis vary across the cross-sections, starting at 25,565 in 1994, increasing to 21,518 in 1998, and decreasing to 17,480 in 2000. The labor force history data contains about 12,000 individuals.

The net monthly wage is computed as earnings on the primary job in the previous month minus taxes and other mandatory contributions. The wage variable refers to the previous month from 1994 to 2000 and to the starting wage from 1950 to 1989. Our concern is wage differentials rather than the overall level of real wages, so that our approach of estimating repeated cross-sections involves no deflation of the

[15] Ogloblin (1999, 2005), Adamchik and Bedi (2003), Jurajda (2003, 2005), and Jurajda and Harmgart (2004).

[16] We analyzed all cross-sections (1994-2000), but we report results for every second year. Unfortunately, although originally designed as a panel, the data do not permit linking of individual observations across all years.

dependent variable. Nevertheless, the significant inflation during the 1990s requires some within survey period adjustments, for which we use monthly dummies.

The next important variable in our analysis is occupation. Using a conventional approach that splits occupations into three groups based on the proportion of female workers in the occupation,[17] we define occupations with less than 33% women as being male-dominated occupations and occupations with more than 67% women as being female-dominated category. The remaining occupations form the gender-integrated occupations category. [18] Figure 1 shows the evolution of women's net monthly wages relative to men's for all occupations and by the occupational groups during the communist regime and transition period. The wage ratio for all occupation is relatively high, varying between 84% (in 1971-75 and 1995) and 91% (during 1986-89). Compared to the female-male wage ratio reported by Brainerd (2000), the Romanian values are near to those in Columbia (85% in 1988) and Sweden (84% in 1992), but much higher than those in USA (70% in 1987) and the Russian republic (69% in 1989). It seems that the observed differences were smallest for female-dominated occupations for some years during both periods. Additionally, the difference seems to be almost unchanged for the gender-integrated occupations, and higher during the transition period. However, at the end of the communist regime the difference seems to be the smallest, being almost at the same level (about 90%) for all occupational groups.

Figure 2 presents wage differences between occupational groups for men and women. These differences represent occupational wage differences that can not be attributed to gender since men are compared with men and women are compared with other women. A general picture that coincides for both men and women is that during the period before 1989, there was a moving trend towards equalization of occupational wage differences. This trend switched direction after 1994 when occupational differences started to increase. There seems to be some market mechanisms that generate occupational differences when there are few regulations on the labor market.

[17] See Jacobs (1995) for details about occupational groups.

[18] The distribution of individuals across these three groups was almost the same when we chose another cutting point (e.g., 25%, 30%, 35%). Figure A1 shows the evolution of these groups during 1951-2000. We divide the period before 1990's into 5-year periods that overlap five-year development plans. Table A2 shows the proportion of women working in occupations with more than 50%, 60%, 70%, 80% and 90% women, and the same figures for men. Tables A3(a and b)-A5(a and b) in the Appendix present basic descriptive statistics of some variables used in the empirical analysis.

Furthermore, it is the male-dominated occupations that increase in importance in terms of earnings, and that is true for both men and women.

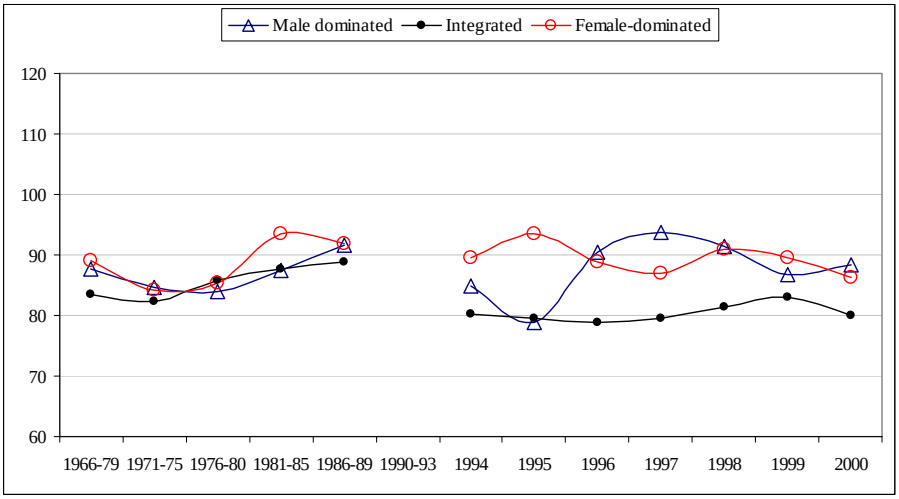
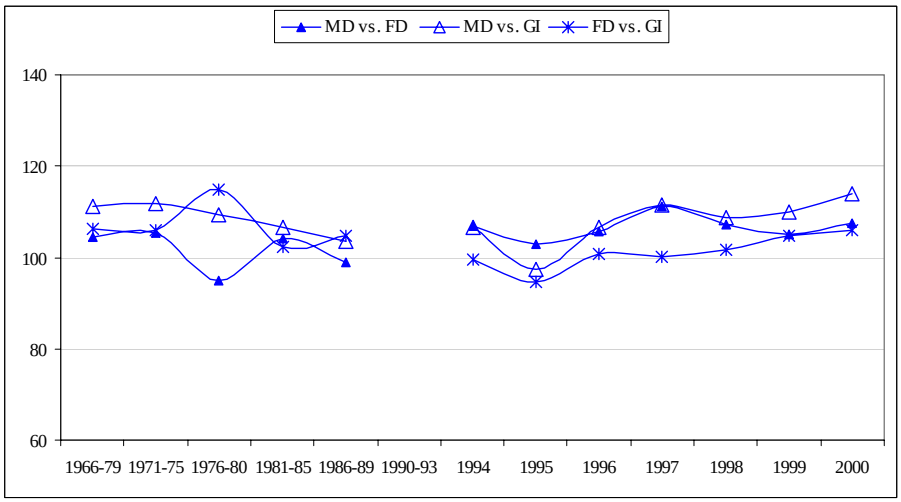
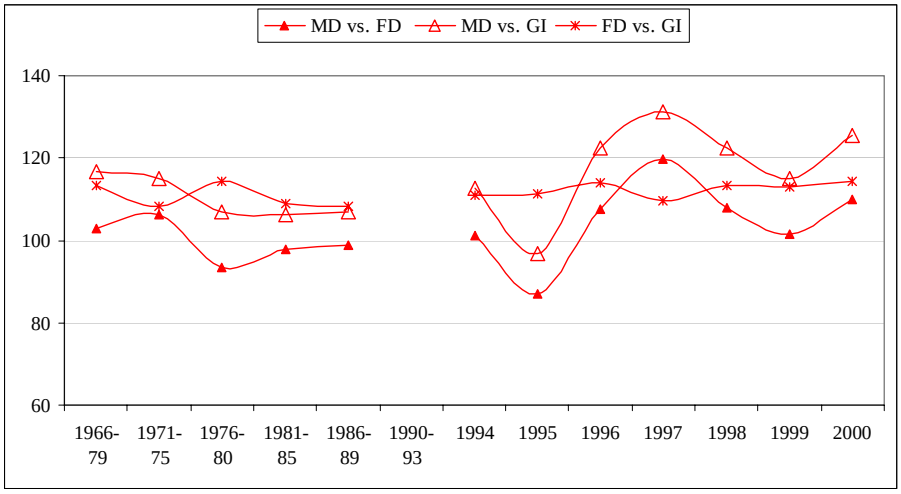


Figure 1 The women/men relative monthly net wages (%) by occupational groups



a) Men



b) Women

Figure 2 The relative monthly net wages (%) by occupational groups and gender

The occupational differences are larger for women than for men after 1994. For men there is basically no difference between gender-integrated and female-dominated occupations, while women in female-dominated occupations earn less than women in gender-integrated occupations and so forth. These are of course overall relative differences that say little about gender differences in wages, which is something that the empirical analysis will look further into.

5 Empirical framework

5.1 Econometric specification

Earlier literature on wage differentials suggests that occupational differences enhance and distort the overall wage differentials between groups of people, since occupations differ in average wage rate. Controlling for individual characteristics and observed occupational choice is not enough to hedge this distortion. In this study we address this problem by formulating a selection model with an endogenous switch among three broad types of occupational groups defined by their gender composition, namely, male-dominated (sector 1), gender-integrated (sector 2), and female-dominated (sector 3) occupations. Within this framework, a given individual could be in any of these three sectors, and each sector has its own earnings-generating function that will depend on the observed and unobserved characteristics of the individual, everything else equal. To

analyze the earnings differences among the sectors for a given individual, we therefore need to formulate an earnings equation for each sector:

$$Y_1 = X\beta_1 + U_1 \qquad \text{male-dominated (MD) occupation,} \qquad (1)$$

$$Y_2 = X\beta_2 + U_2 \qquad \text{gender-integrated (GI) occupation,} \qquad (2)$$

$$Y_3 = X\beta_3 + U_3 \qquad \text{female-dominated (FD) occupation,} \qquad (3)$$

where Y_j is the market wage for sector j, $j = 1, 2, 3$, X is a matrix of explanatory factors for the market wage, and β_j is the associated parameter vector, which is unique for each sector.

It is reasonable to believe that the occupational choice is non-random and that the propensity for a given individual to be in any of the sectors differs among individuals. It is therefore necessary to specify how the individual makes the occupational choice, and then incorporate this structure into the model. The occupational choice is based on taste or propensity for a specific occupation. The choice mechanism is specified as a linear latent variable model where the dependent latent variable (D^*) represents the propensity to choose a female-dominated occupation:

$$D^* = Z\gamma + \varepsilon . \qquad (4)$$

A high value of D^* corresponds to a high propensity to choose a female-dominated occupation, and a low value represents a low propensity to do so, which should be seen as equivalent to a high propensity to choose a male-dominated occupation. If the latent variable takes a value between a high and a low value, the individual will choose the gender-integrated sector. Z is a matrix containing observed factors that determine the size of the occupational propensity score, and γ is the associated parameter vector of these factors. The observed counterpart of the latent variable is defined as:

$$D=\begin{cases}1 & \text{if} \quad D^{*}<\mathrm{c}_1\ (MD)\\ 2 & \text{if} \quad \mathrm{c}_1\le D^{*}\le \mathrm{c}_2\ (GI)\\ 3 & \text{if} \quad D^{*}>\mathrm{c}_2\ (FD)\end{cases} \quad <=> \quad D=\begin{cases}1 & \text{if} \quad \varepsilon < c_1 - Z\gamma\\ 2 & \text{if} \quad c_1 - Z\gamma \le \varepsilon \le c_2 - Z\gamma\\ 3 & \text{if} \quad \varepsilon > c_2 - Z\gamma\end{cases}, \qquad (5)$$

with c_1 and c_2 being two unknown break points that will be estimated. They may be interpreted as intercepts since Z in itself does not include any constant.

The model, as defined by equations (1)-(5), contains four stochastic components which presumably are related to each other if the occupational choice is endogenous. We assume that these components are *i.i.d.* drawings from a multivariate normal distribution: $(U_1, U_2, U_3, \varepsilon) \sim N(0, \Sigma)$. In principal, one can allow for any potential correlation among the stochastic components. However, since not all components are observed simultaneously, it is clear that we have a partial observability problem to deal with. This implies that not all parameters in the assumed covariance matrix (Σ) are identified. The observability is partial because we only observe the actual wage and the indicated occupational choice in pairs, and not simultaneously with wages in other sectors for a given individual. That is, we only observe $(Y_1, D=1)$, $(Y_2, D=2)$, and $(Y_3, D=3)$, which means that we have to make inference on the population based on the marginal distributions corresponding to these pairs. In particular, we allow three covariances, $Cov(U_1, \varepsilon), Cov(U_2, \varepsilon)$, and $Cov(U_3, \varepsilon)$, to be non-zero, while the covariances among the three earnings residuals are left unspecified. The variances of the earnings equations are identified, while we choose to normalize the variance of the selection equation to 1.

The free covariances that will be estimated are important when analyzing the potential effect of the endogenous selection on the earnings of the individual. The conditional expectation of the earnings residuals from each of the three sectors tells us whether we have a positive or a negative selection into the sector. They are given by the following expressions:

$$E[U_1 \mid X, D=1] = Cov(U_1, \varepsilon) \times \underbrace{E[\varepsilon \mid \varepsilon < c_1 - Z\gamma]}_{Negative}, \quad (6)$$

$$E[U_2 \mid X, D=2] = Cov(U_2, \varepsilon) \times \underbrace{E[\varepsilon \mid c_1 - Z\gamma < \varepsilon < c_2 - Z\gamma]}_{Positive\ /\ negative}, \quad (7)$$

$$E[U_3 \mid X, D=3] = Cov(U_3, \varepsilon) \times \underbrace{E[\varepsilon \mid \varepsilon > c_2 - Z\gamma]}_{Positive}. \quad (8)$$

Equations (6) and (8) show that for people working in male- or female-dominated occupations, it is the sign of the covariance that determines whether the occupational sector has a positive or negative selection effect on the earnings. This means that in order to have a positive selection effect, the covariance needs to be negative in sector 1 and positive in sector 3. In equation (7), on the other hand, the covariance is just one of several factors determining the direction of the selection.

Even though the covariances among the earnings residuals are unidentified, we can still say something about the sorting structure with respect to the occupational gender segregation (see Roy, 1951) by calculating the implied signs of the covariances among the corresponding earnings residuals, using the estimated covariances. An interesting case is when $Cov(U_1, U_3) < 0$, which corresponds to the case when $Cov(U_1, \varepsilon) < 0$ and $Cov(U_3, \varepsilon) > 0$, and the sector specific skills (unobservables) are negatively correlated. This is known as a *comparative advantage structure*, and suggests that those who perform relatively well in sector 1 will perform relatively less well in sector 3. Hence, people with a high propensity to choose a male-dominated occupation, are that way because of comparative advantages arising from sector specific skills.

A second interesting case is when $Cov(U_1, U_3) > 0$, which corresponds to the case when $Cov(U_1, \varepsilon)$ and $Cov(U_3, \varepsilon)$ have the same sign. This is known as a *hierarchical sorting structure*, and suggests that the sector specific skills are positively correlated. This sorting structure implies that there is a positive selection into one sector and a negative selection into the other. If both covariances are positive, there will be a negative selection effect for those who chose male-dominated occupations and a positive selection effect for those in female-dominated occupations, and vice versa when both covariances are negative.

In order to form the likelihood function for the problem, we make use of the observed marginal distributions and assume them to have a bivariate normal shape, and define the following indicator variables:

$$\delta_1 = \begin{cases} 1 & \text{if } D = 1 \\ 0 & \text{elsewhere} \end{cases}, \ \delta_2 = \begin{cases} 1 & \text{if } D = 2 \\ 0 & \text{elsewhere} \end{cases}, \ \delta_3 = \begin{cases} 1 & \text{if } D = 3 \\ 0 & \text{elsewhere} \end{cases}.$$

Using this information, we construct the following likelihood function:

$$L = \prod_{i=1}^{N} \left[\int_{-\infty}^{c_1 - Z_i\gamma} f(U_{1i}, \varepsilon_i) d\varepsilon_1 \right]^{\delta_1} \left[\int_{c_1 - Z_i\gamma}^{c_2 - Z_i\gamma} f(U_{2i}, \varepsilon_i) d\varepsilon_i \right]^{\delta_2} \left[\int_{c_2 - Z_i\gamma}^{\infty} f(U_{3i}, \varepsilon_i) d\varepsilon_i \right]^{\delta_3}.$$

The advantage with this approach is that it allows us not only to estimate the earnings effect of female density in any given occupation; it also enables us to estimate the unexplained gender wage gap within a given occupation and how this gap varies across occupational groups. In addition, we can also test whether the returns to endowments differ across both gender and occupations. However, there are at least two problems with this approach: 1) finding valid instruments for occupational choices and 2) the accuracy of aggregation. Concerning the first problem, it is in general difficult to obtain observable characteristics that influence occupational choice but not wages. Concerning the second problem, it is necessary to test how sensitive the results are towards the degree of aggregation that we pursue.

5.2 Decomposing the gender wage gap

Weichselbaumer and Winter-Ebmer's (2005) meta-analysis of international gender wage gap shows that data restrictions (i.e., the limitation of the analysis to new entrants, never-married persons, or one narrow occupation only) have the biggest impact on the resulting gender wage gap. Since the early 1970s, a majority of the empirical literature on gender wage gap has used Blinder-Oaxaca (BO) decomposition, a formal statistical technique first introduced by Oaxaca (1973) and Blinder (1973) that builds on Becker's (1957) theory of labor discrimination. It separates the portion of the gap resulting from

differing characteristics of men and women from the portion that is not explained by these personal characteristics. We decompose both the gender gap and the occupational wage gap, i.e., the wage differential between men (and women) working in two different occupational groups.

In order to form the gender wage differentials, we compute the mean differences in log wages between men and women, taking into account both the individual effects that drive the occupational choice (the Mills' ratios) and the effects from the selection terms. Hence, the decomposed gender wage differential may be formed as a transformed difference between the expected wages of males and females (for the entire group and by occupational sector). For all sectors together, the expected wages are:

$$E[Y_m \mid X_m, Z_m] = X_m\beta_m + E[U_m \mid X_m, Z_m] = X_m\beta_m + \theta_m\lambda_m$$
$$E[Y_f \mid X_f, Z_f] = X_f\beta_f + E[U_f \mid X_f, Z_f] = X_f\beta_f + \theta_f\lambda_f,$$

and therefore the difference in expected wages between men and women is

$$E[Y_m \mid X_m, Z_m] - E[Y_f \mid X_f, Z_f] = (X_m\beta_m + \theta_m\lambda_m) - (X_f\beta_f + \theta_f\lambda_f), \quad (9)$$

where Y_m and Y_f represent the log monthly wages of men and women, respectively. X_m and X_f are the observables (endowments) of men and women, and in the empirical analysis they will be represented by sample means. The vectors β_m and β_f represent the estimated parameters from the wage equations, and λ_m and λ_f are the estimated Mills' ratio that account for the unobserved individual effects that drive the selection. θ_m and θ_f represent the effects from the selection terms, and are defined as the ratio $Cov(U_j, \varepsilon)/Var(\varepsilon)$. However, in this analysis we choose to normalize the variance of the selection equation, so θ is simply equal to the covariance given in the ratio.

Equation (9) would have been a simple wage differential if we had estimated just one equation for men and one for women. However, due to the nature of our model we have three wage equations for men and three for women; that is, one for each occupational sector [(equation (1)-(3)]. Following Brown et al. (1980), we rewrite (9) as a weighted average in the following way:

$$E[Y_m \mid X_m, Z_m] - E[Y_f \mid X_f, Z_f] = \sum_j^3 P_{jm}\left(X_{jm}\beta_{jm} + \theta_{jm}\lambda_{jm}\right) - \sum_j^3 P_{jf}\left(X_{jf}\beta_{jf} + \theta_{jf}\lambda_{jf}\right),$$

which can be rearranged as

$$\begin{aligned} &E[Y_m \mid X_m, Z_m] - E[Y_f \mid X_f, Z_f] \\ &= \underbrace{\sum_{j=1}^3 P_{jf}\left(X_{jm} - X_{jf}\right)\beta_{jm}}_{\text{Endowments}} + \underbrace{\sum_{j=1}^3 \left(P_{jm} - P_{jf}\right)X_{jm}\beta_{jm}}_{\text{Occupational}} \\ &+ \underbrace{\sum_{j=1}^3 \left(P_{jm}\theta_{jm}\lambda_{jm} - P_{jf}\theta_{jf}\lambda_{jf}\right)}_{\text{Selectivity}} + \underbrace{\sum_{j=1}^3 P_{jf}X_{jf}\left(\beta_{jm} - \beta_{jf}\right)}_{\text{Discrimination}}, \end{aligned} \tag{10}$$

where P_{jm} and P_{jf} represent shares or the probabilities to be in occupation *j* for men and women, respectively. When the decomposition is made on the full sample, it is possible to decompose the total earnings difference into four parts. The first component is related to endowments and comes from differences in observables such as age, education, and other socioeconomic factors important for the earnings generation. The second component (addressed as the occupational effect) is related to differences between men and women in both the structure of occupational attainment and their qualifications for the chosen occupation. The third effect (addressed as the selectivity effect) is related to self selection into occupations that is driven by the unobservables. Since the occupational choice is made on the basis of the individuals preferences, skills, or abilities related to different work tasks, this self selected choice could potentially affect the wages positively under the assumption that strong preferences and productivity have a positive association. If the mean selection effect for men is stronger than for women, then the total effect will be positive. However, if the sorting into different sectors is random, then the corresponding effect will be zero. The last component comes from differences in return to observables between men and women. Under the case of no discrimination, this component would be zero. However, a non-zero effect could also be due to lack of controlling for relevant variables, and is for that reason called unexplained.

The net gain of working in a given sector includes also non-pecuniary aspects of the job, and therefore occupational wage differentials may exist to compensate workers for pleasantness, safety, fringe benefits, and job stability. The decomposition within each occupational group can for obvious reasons not include any occupational effect other then the effect that comes from self selection. It is and is therefore given by:

$$E[Y_m \mid X_m, Z_m] - E[Y_f \mid X_f, Z_f] = (X_m\beta_m + \theta_m\lambda_m) - (X_f\beta_f + \theta_f\lambda_f),$$

which can be rearranged as

$$E[Y_m \mid X_m, Z_m] - E[Y_f \mid X_f, Z_f] = \underbrace{(X_m - X_f)\beta_m}_{\text{Endowments}} + \underbrace{(\theta_m\lambda_m - \theta_f\lambda_f)}_{\text{Selectivity}} + \underbrace{X_f(\beta_m - \beta_f)}_{\text{Discrimination}}. \qquad (11)$$

This is the so-called standard Blinder-Oaxaca decomposition.

5.3 Decomposing the occupational wage gap

The decomposition within each gender group for different occupational groups requires information about the average earnings for each gender and each occupational group. For example, the expression for average earnings for men working in sector *i* is defined as:

$$\begin{aligned} E[Y_i \mid X_i, Z, D = i] &= X_i\beta_i + E[U_i \mid X_i, Z, D = i] \\ &= X_i\beta_i + \theta_i\lambda_i, \; i = 1,\; 2, 3. \end{aligned}$$

Using this expectation and Blinder-Oaxaca decomposition, we may define the occupational wage gap as:

$$\begin{aligned} &E[Y_i \mid X_i, Z, D = i] - E[Y_j \mid X_j, Z, D = j] \\ &= \underbrace{(X_i - X_j)\beta_i}_{\text{Endowments}} + \underbrace{X_j(\beta_i - \beta_j)}_{\text{Occupational}} + \underbrace{(\theta_i\lambda_i - \theta_j\lambda_j)}_{\text{Selectivity}}, \end{aligned} \qquad (12)$$

where $i = 1,\; 2, 3;\;\; j = 1,\; 2, 3;$ and $i \neq j.$

The first component on the right hand side represents the wage difference between men working in sector *i* and men working in sector *j* that is due to observed and explained factors. The second component represents the differences in return to different characteristics in different occupations, and should be seen as an occupational factor that affects wages in different sectors since different factors are rewarded differently in different occupations. The third component represents the selection factor and contains wage effects from unobserved individual characteristics that influence the earnings of the individual.

6 Results

We estimate a selection model with an endogenous switch among three broad types of occupational groups defined by their gender composition: male-dominated, gender-integrated, and female-dominated occupations. The parameters for the occupational selection equation and the domain-specific earnings equations were estimated simultaneously. Critical in this process was to find valid instruments for occupational choices. Concerning this, it is generally difficult to obtain observable characteristics that influence occupational choice but not wages. Analyzing data for several years of structural changes in the economy makes it even harder to find instruments that work well for both women and men for all years. According to the institutional setting during the analyzed period, the wage differentiation based on gender was restricted under central planning, and even in the beginning of the transition period. Wages were set according to industry-specific wage grids varying only with the difficulty of the job and with worker education and experience, and not with gender. Additionally, under the central plan, given their last completed level of schooling and their ranking (based on academic grades and political, cultural and sportive involvement), people could choose from a given and very limited list of jobs, sometimes restricted only to the municipality or county area. Therefore, we argue that last completed level of schooling is an exogenous source of variation in occupational attainment that allows us to identify the causal effect of occupation. More exactly, after finishing compulsory education (i.e., 8 years of schooling), people had to pass a test in order to continue their education at the high school level. A majority of those who did not pass the test instead continued into vocational schools (most of time, being vocational programs of 1-2 years at the working

place). Those who passed the test were admitted to high school (lyceums), which could be general (mathematics-physics; natural sciences; philosophy-history), specialized (economic; pedagogical; health; art) or industrial or agro-industrial. After two years of high school, students had to pass a new test in order to continue the last two years of high school. Only those who had high school diploma could then take the university admission test (university is 3-6 years). High school graduates who were not admitted at university usually have no occupational choices; only few (usually those who graduated from a specialized high school) had a certain situation regarding their occupation (nurses, teachers in the pre-school and primary education). Graduates from general high schools usually faced uncertainty regarding their future occupation. Even though their academic merits and their human capital were better off on average than their peers who had graduated from other high schools, there were no clear rules for who would get the most attractive job. Sometimes they had to compete even with their peers who graduated a shorter vocational program (from vocational schools) and worked for a while. Therefore, until the end of the 1990s, we expect that the wages were related to the occupation, as a combination of factors such as education, job, and task-specific requirements. Due to this combination, it happened that people in different occupations with different level of education had almost the same salary. Hence, in order to control for the effect of the education on wages and occupational attainment, respectively, we use two different groups of educational dummies: (1) lower, medium, higher (in the wage equations); and (2) compulsory, vocational, high school, post-high school, university (in the selection equation). The "lower" category in (1) covers the "compulsory" (which can be 4/8 years) and "vocational" (1-4 years after compulsory education), while "medium" covers "high school" and "post-high school". "Higher" is the same as university. Due to these differences, we use as instruments the "vocational", "2/4 years high school", and "post high school".

In addition to these instruments, we use three dummies that should control for occupational "specialization" within ethnic groups [(Borjas (1992; 1995), Lehrer (2004)]. Following the same strategy as for education, we control for the effect of the geographical regions on wages and occupational attainment, respectively: (1) four dummies for the richest geographical regions (R4-R8) in the wage equations, and (2) five dummies for regions with a big majority of ethnic Romanians (R1-R4 and R8) in

comparisons with the regions with a relatively higher proportion of other ethnicities, mainly ethnic Hungarians,[19] in the selection equation.

6.1 Selection into occupational groups

The parameters for the occupational selection equation and the domain-specific earnings equations were estimated simultaneously. Tables 1 and 2 present the estimates of the selection equations for women and men, respectively.[20] Additionally, we present the variances and some covariances of error terms of the wage and selection equations, which provide useful information regarding the sorting behavior of individuals across sectors. For instance, hierarchical sorting suggests that workers tend to perform similarly in all sectors, leading to the same sign of $Cov(U_1, \varepsilon), Cov(U_2, \varepsilon),$ and $Cov(U_3, \varepsilon)$. This was the case for Romanian women; the correlations were negative for all the analyzed samples, suggesting the same behavior during the communist regimes and transition years. However, his was not the case for men; while the correlations were also all negative for three transition years (1994, 1996, 1998), they were all positive during the last (analyzed) year of the transition. Additionally, the covariances have different signs for the communist period, which suggests that men's behavior in sorting into occupational sectors during this regime was consistent with the theory of comparative advantage (Roy, 1951). More exactly, a given man selected the sector that paid him better than the average worker with the same characteristics and under the same working circumstances. These correlations were statistically significant for both women and men.

[19] See Andrén (2007) for a detailed description and analysis of wage differences between ethnic Romanians and ethnic Hungarians.

[20] Tables A6 and A7 in the Appendix present the estimates of domain-specific (i.e., MD, GI and FD) earnings equations for women and men respectively.

Table 1 Selection equation estimates, women, 1960-2000

	1960-89	1994	1996	1998	2000
c_1	-0.894***	-0.510**	-1.072***	-1.345***	-0.682**
c_2	2.138***	2.112***	1.658***	1.547***	2.149***
Age	0.425***	0.365***	0.004	0.000	0.274*
$Age^2/10$	-0.049**	-0.034**	0.014	0.005	-0.024
Educational Level[1)]					
Vocational	*0.113**	*0.222****	*0.219****	*0.253****	*0.182****
High school 2 years#	*0.766****	*0.802****	*0.173****	*0.226****	*0.273****
High school 4 years			*0.934****	*0.975****	*0.932****
After high school	*0.922****	*0.718****	*0.805****	*1.066****	*1.033****
University	0.163	0.159***	0.296***	0.347***	0.343***
Region					
R1: North-East	*-0.101**	*-0.174****	*-0.185****	*-0.240****	*-0.173****
R2: South-East	*-0.067*	*-0.008*	*-0.087***	*-0.151****	*-0.101***
R3:South	*0.057*	*-0.114****	*-0.072**	*-0.122****	*-0.094***
R4: South-West	-0.017	-0.075*	-0.162***	-0.200***	-0.215***
R8: Bucharest	0.154*	-0.090**	-0.050	-0.055	-0.089*
Hungarians*Center	-0.225	-0.403	-0.150	0.242	-0.434
Married	-0.046	-0.013	0.031	-0.030	0.004
Urban	-0.109**	0.072**	-0.020	-0. 056	-0.014
Ethnicity[2)]					
Romanian	-0.234*	-0.083	-0.025	-0.003	-0.015
Hungarian	0.048	0.330	0.067	-0.201	0.404
Sector [3)]					
Agriculture		-0.538***	-0.563***	-0.327***	-0.208**
Industry		-0.565***	-0.477***	-0.428***	-0.433***
Private ownership	0.406***	0.046	0.034	-0.040	-0.135***
Children aged< 18	-0.072***	-0.048***	-0.042***	-0.041***	-0.006
Multi-generation household	-0.086	0.058	0.014	-0.097**	0.062
Variance-covariances					
$Var(U_1)$	0.158**	0.230***	0.231***	0.276***	0.274***
$Var(U_2)$	0.362***	0.196***	0.196***	0.180***	0.201***
$Var(U_3)$	0.275***	0.236***	0.209***	0.159***	0.188***
$Cov(U_1, \varepsilon)$	-0.241	-0.284***	-0.332***	-0.380***	-0.381***
$Cov(U_2, \varepsilon)$	-0.300***	-0.245***	-0.279***	-0.292***	-0.319***
$Cov(U_3, \varepsilon)$	-0.461***	-0.374***	-0.271***	-0.162**	-0.243***
Likelihood	-6266.7	-12476.5	-11197.5	-9426.8	-8267.2

Notes: The estimate is significant at the 10% level (*), at the 5% level (**), and at the 1% level (***). These notes hold for all tables of estimates. Dummies for 5-year plan periods and three dummies for ownership were also included. [1)] the comparison group is compulsory; [2)] the comparison group is all other ethnicities; [3)] the comparison group is services. All these notes hold for Table 2.

Table 2 Selection equation estimates, men, 1960-2000

	1960-89	1994	1996	1998	2000
c_1	-1.285***	-0.938***	-0.544***	-0.610***	-0.754***
c_2	1.595***	1.698***	2.174***	2.214***	1.931***
Age	-0.119	-0.303***	-0.008	0.029	-0.009
$Age^2/10$	0.026	0.048***	0.007	0.003	0.012
Educational Level[1)]					
Vocational	*-0.128***	*0.155***	*0.105***	*0.097***	*-0.255***
High school 2 years[#]	*0.208***	*0.372***	*0.034*	*0.139***	*-0.172***
High school 4 years			*0.403***	*0.421***	*-0.017*
After high school	*0.719***	*0.689***	*0.634***	*0.652***	*-0.546***
University	0.076	0.470***	0.381***	0.466***	0.065
Region					
R1: North-East	*-0.010*	*-0.107***	*-0.182***	*-0.151***	*0.033*
R2: South-East	*-0.277***	*0.047*	*-0.047*	*-0.110***	*-0.183***
R3:South	*-0.145***	*-0.064***	*-0.140***	*-0.128***	*-0.089***
R4: South-West	0.007	-0.050	-0.086**	-0.076*	0.019
R8: Bucharest	-0.023	0.096**	0.043	-0.025	-0.099**
Hungarians*Center	-0.761	-0.287	-0.185	0.101	-0.428
Married	-0.046	-0.127***	-0.105***	-0.225***	-0.071*
Urban	0.034	0.032	-0.009	0.026	0.082***
Ethnicity[2)]					
Romanian	-0.212*	-0.042	-0.053	-0.154*	-0.009
Hungarian	0.635	0.255	0.060	-0.196	0.575
Sector [3)]					
Agriculture		-0.523***	-0.457***	-0.352***	-0.437***
Industry		0.127***	0.217***	0.227***	0.116***
Private ownership	-0.179**	0.138***	0.099***	0.065**	0.107***
Children aged< 18	-0.020	0.010	0.010	0.020	-0.022*
Multi-generation household	0.034	0.010	0.065*	0.033	0.109***
Variance-covariances					
Var(U_1)	0.143***	0.233***	0.266***	0.259***	0.363***
Var(U_2)	0.246***	0.203***	0.203***	0.186***	0.210***
Var(U_3)	0.148***	0.177***	0.129***	0.156**	0.464***
Cov(U_1, ε)	0.010	-0.329***	-0.402***	-0.391***	0.516***
Cov(U_2, ε)	0.142***	-0.264***	-0.293***	-0.271***	0.292***
Cov(U_3, ε)	-0.103	-0.255**	-0.085	0.139	0.619***
Likelihood	-6923.4	-17877.1	-15364.5	-13023.9	-10944

The estimated coefficients of the occupational selection (or attainment) equation indicate that the probability to work in a given occupational group (i.e., MD, GI or FD) differs between women and men. Even though it is not possible to pinpoint a clear trend, it seems that men's preferences for a given occupation were more stable than women's. Women's correlations between observables and occupational choice are less stable over time. However, when these correlations are statistically significant, they suggest that women changed preferences during transition years. The differences between women and men during the communist era might be due to the big changes in

the economy during that time (such as industrialization, mass privatization of the agriculture, prohibition of abortion, etc.), while the differences during the transition years might indicate the collapse of the socialist support for women but also the changes in the economy and society, which might have changed women's work preferences and/or opportunities.

We use age as a proxy for the different regulation and structural changes that people born in different cohorts were facing. We use the continuous variable instead of age intervals in order to avoid the multicoliniarity with the educational dummies. The estimated parameters are significant for women during the communist period and in 1994 and 2000, while for men only in 1994, and they show that the probability of choosing a female-dominated occupation increased with age during these years.

The highest educational level attained is strongly correlated with the occupational choice for both women and men. However, the women's parameters are much higher than the men's, and are always positive. This indicates that women are more oriented towards female-dominated occupations when they have more schooling than what is compulsory. This was not always true for men in 2000, or even in the communist period for those with a vocational education. The higher education parameter is not statistically significant for women or men during the communist regime, and it is not significant for women in 2000. The fact that this parameter is positive and significant for men during all transition years may indicate the collapse of the socialist support for women in male-dominated occupations but also the freedom of the market economy, which may restructure jobs and occupations.

The geographical region where people live is also correlated with the occupational choice for both women and men; people living in some regions with a big majority of ethnic Romanians (R1 and R2, which are also relatively poorer regions) have a lower probability to choose to work in a female-dominated occupation than those living in a region with an ethnic overrepresentation (R5-R7). However, being an ethnic Hungarian living in a region with a relatively high concentration of ethnic Hungarians does not have a statistically significant impact on occupational choice. This might suggest that the policy of territorial development during the communist years makes this region more heterogeneous than the others. Almost the same explanation might be used for the relationship between people living in urban areas and occupational choices. This

is statistically significant for men in 2000 and for women during the communist regime and in 1994. Women who lived in an urban area had a lower probability to choose a female-dominated occupation during the communist regime, but a higher probability in 1994. Men who lived in an urban area had a higher probability to work in a female-dominated occupation in 2000. These findings might be explained by the structural changes that made it more attractive for men to work in occupations within banking and insurance industries, or as estate agents, accountants, etc. The results for the communist period might be explained by the concentration of big industries in the urban area, while the results for the transition might indicate that the changes in that era (such as restructuring of the big industrial firms and of the whole agricultural system, as well as the private initiative, or start-ups, oriented mainly towards commerce and services) re-allocated male labor towards female-dominated occupations.

The effect of the number of children younger than 18 in the household on occupational choice is significant (and negative) for women in all years except in 2000, while for men only in 2000. The reason for including this variable is the assumption that occupational segregation may be more pronounced among those who have a higher preference for children and/or a family structure that implies more support (child and/or adult) within the family. The significant parameters indicate that those with more children are more likely to work in male-dominated or gender-integrated occupations, which suggests that family structure might influence the occupational choice.

6.2 Decomposing the gender wage gap

6.2.1 The overall gender wage gap

Table 3 presents the evolution of the observed gender wage gap and its components for all occupations together, as defined by expression (10).

Table 3 Overall gender wage gap decomposition, all occupations 1960-2000

	1960-1989	1994	1996	1998	2000
Observed	0.280	0.205	0.221	0.189	0.214
Endowments*	0.048	-0.016	-0.009	-0.016	-0.015
Discrimination (I)	0.172	0.302	0.286	0.223	0.036
Selectivity (II)	0.050	0.040	0.035	0.022	-0.061
Occupational	0.001	-0.125	-0.091	-0.041	0.252

Note: *we refer often to endowments as the component of the wage gap explained by the observables, or the explained part of the wage gap.

The overall gender wage gap, measured as the difference between mean log wages of male and female workers, stands at 0.28 during the communist era. In other words, the average female worker earned about 72% of the mean male wage. While the observed gender wage gap has remained almost constant over time, the relative importance of the individual components of the decomposition varies across years, with much higher variations in both female-dominated and male-dominated sectors during the transition period. These results support our earlier hypotheses and explanations about the effects of the structural changes in the economy during the transition period on both labor reallocation and the wage setting across occupations. The communist direction of gender equality spotlighted examples of "women heroes" working in typically masculine areas: from working in mines underground, or in industrial, chemical and metallurgical operations, to areas such as surgery and experimental sciences. Our results show that on average, women were better off during the transition. However, this holds only for the formal market. Given that the informal market was growing substantially during the analyzed years of transition, it might be that on average women are much more discriminated now.

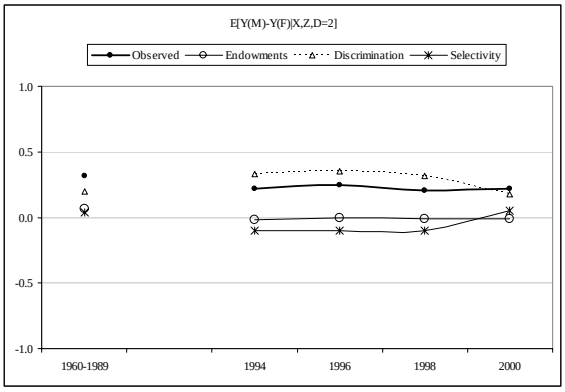
Our results suggest that some of the traditional motivations for the existence of the gender wage gap as in Becker's (1957) model are not supported by the institutional settings of a planned economy (education, experience, the discriminatory tastes of employers, co-workers, or customers). Even though women were expected to deliver more and more children (due to the 1966 abortion ban and almost no information about or supply of birth control), and the Romanian society is characterized by strong cultural traditions that hold women responsible for the well-functioning of the household, women (from our samples) invested in education and worked almost in the same way as men did. The fact that women tend to work the same amount of work hours as men (in the same occupation), but due to the cultural norms, women continued to spend longer hours doing housework, might be expected to decrease labor productivity in the workplace, it could not decrease their fixed wages, as Becker (1985) suggested (for a market economy). However, this could not be the case in the later years of transition. Nevertheless, the wage structure is a factor not directly related to gender, which may nonetheless influence the size of the gender pay gap.

6.2.2 The gender wage gap by occupational sector

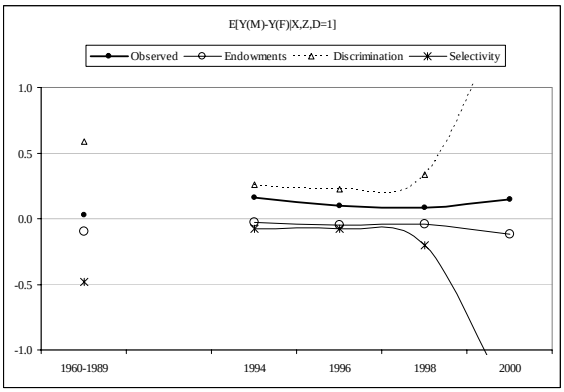
Table 4 presents the decomposed results by the three occupational groups, as defined by equation (11), while Figure 4 presents the visual decomposition. The wage differential between male and female was different across sectors, with the highest observed differences in the gender-integrated occupations during all analyzed years. In this sector, the observed gender wage gap was highest during the communist regime, while the observed wage gaps for the other two sectors were almost zero: 2.7% in the male-dominated occupations, and 0.1% in the female-dominated occupations. These numbers are in accordance with the official policy of gender equality during the communist regime, when wages were set according to industry-specific wage grids varying only with the difficulty of the job and with worker education and experience, and not with gender. The female-dominated occupations were less affected by the difficulty of the jobs, and more homogenous with respect to education requirements for (for example, the nurses and the teachers for the first four grades had graduated from specialized high schools). On the contrary, almost all male-dominated occupations were characterized by some degree of difficulty, and it may have happened that women who worked in that sector chose occupations with lower degree of difficulty. The gender-integrated occupations may have included a diversity of occupations that could be rewarded differently because of the different degrees of difficulty. The selection into these occupations may explain the gender wage gap. However, the endowments, or the part of the gender wage gap explained by the observables, offer another picture of the gender gap. The explained part is negative and much higher in magnitude than the observed gender wage gap in both male-dominated and female-dominated occupations. This indicates women's returns to endowments were higher than those of their male peers. This was not the case for the gender-integrated occupations, where the observables explain about 26% of the gender wage gap.

Table 4 Gender wage gap decomposition by sector, 1960-2000

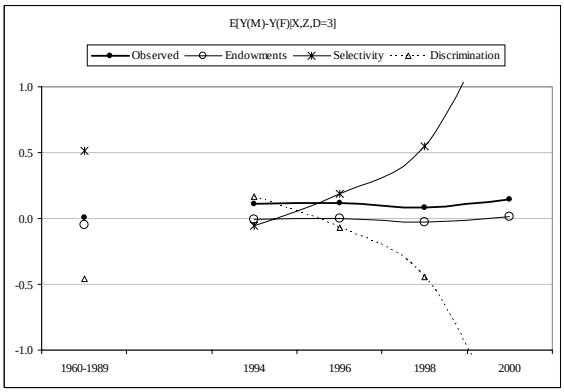
	1960-1989	1994	1996	1998	2000
MD occupations					
Observed	0.027	0.164	0.099	0.081	0.146
Explained	-0.096	-0.026	-0.049	-0.043	-0.116
Discrimination (I)	0.585	0.257	0.226	0.333	1.649
Selection (II)	-0.481	-0.073	-0.077	-0.204	-1.394
Unexplained (I+II)	0.104	0.183	0.150	0.128	0.256
GI occupations					
Observed	0.316	0.217	0.245	0.202	0.219
Explained	0.070	-0.016	-0.006	-0.013	-0.011
Discrimination (I)	0.198	0.332	0.352	0.315	0.177
Selection (II)	0.040	-0.104	-0.103	-0.102	0.054
Unexplained (I+II)	0.238	0.228	0.250	0.213	0.231
FD occupations					
Observed	0.009	0.110	0.115	0.081	0.145
Explained	-0.051	-0.009	0.002	-0.025	0.015
Discrimination (I)	-0.458	0.168	-0.068	-0.446	-1.590
Selection (II)	0.516	-0.053	0.186	0.551	1.723
Unexplained (I+II)	0.057	0.115	0.117	0.105	0.133



a) Gender-integrated occupations



b) Male-dominated occupations



c) Female-dominated occupations

Figure 3 Gender wage gap by sector, 1960-2000

During the analyzed transition years, the observed gender wage gap increased in male-dominated and female-dominated occupations, and decreased in gender-integrated occupations, although the magnitude was still the highest in this sector. The observed gaps were the same in the male and female-dominated occupations in 1998 (about 8%) and 2000 (about 14.5%). Except the female-dominated occupations in 1996 and 2000, the component of the gap explained by the observables is negative for all other analyzed years and sectors. In the gender-integrated and female-dominated occupations, the magnitude of this component is (about 0.01) much smaller than during the communist period. In the male-dominated occupations, the magnitude is relatively higher than in the other sectors (0.04), and even higher in 2000 (0.116) than during the communist period. It is interesting that when controlling for selection into occupation, the unexplained component of the gender wage gap varies greatly across years in the male-dominated occupations, which is almost the mirror image of the evolution of this component for the female-dominated occupations. This suggests once more that the transition changes had a direct impact on the labor reallocation of women and men, but also on the pay in various female-dominated occupations (much higher wages in banking and accounting) and male-dominated occupations. This would suggest that the market economy played its role by bringing the wages to different levels, and policies such as affirmative action would have only limited effect on the level of the unexplained wage gap. Nevertheless, the discrimination component of the wage gap is negative for female-dominated occupations during communist era and the last transition years (1996, 1998, and 2000), while positive and relatively high in all other sectors during all analyzed years. This might suggest that women working in female-dominated occupations were rewarded better than their peers men in 1996, 1998 and 2000, everything else being the same.

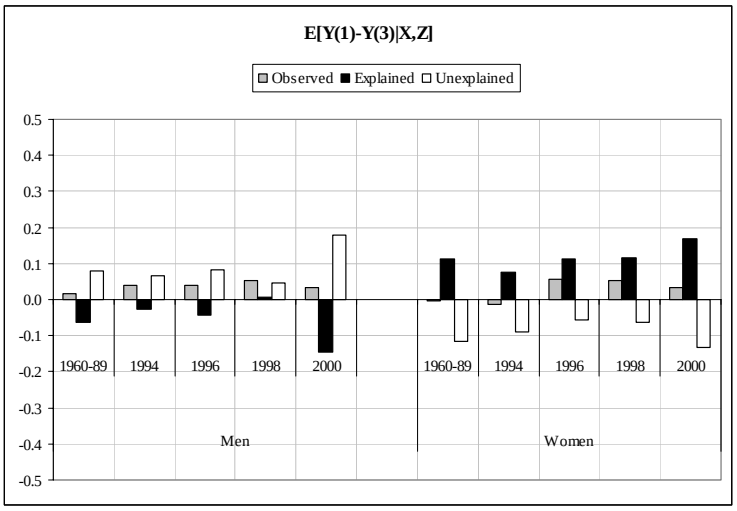
6.3 Decomposing the occupational wage gap

Table 5 presents the components of the decomposition of the occupational wage (MD-FD; MD-GI; and FD-GI) for women and men respectively, as defined by equation (12). Figure 5 presents a visual decomposition that shows, for “readability” reasons, only the observed, the explained (or the endowments), and the unexplained components. The results show that there is a large heterogeneity in the occupational wage differentials of women and men during both regimes. The three components were all positive for four

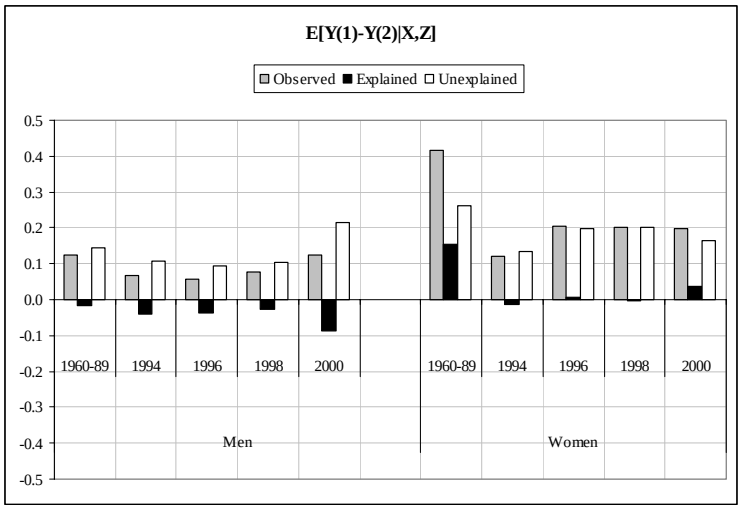
cases only (out of 30): the MD-GI wage difference for women during the communist period and in 2000, and the FD-GI difference for men during the communist period and in 2000. If we exclude the alternative of a data problem, then this should be interpreted as a reflection of the changes in the economy.

Table 5 Occupational wage gap decomposition by gender

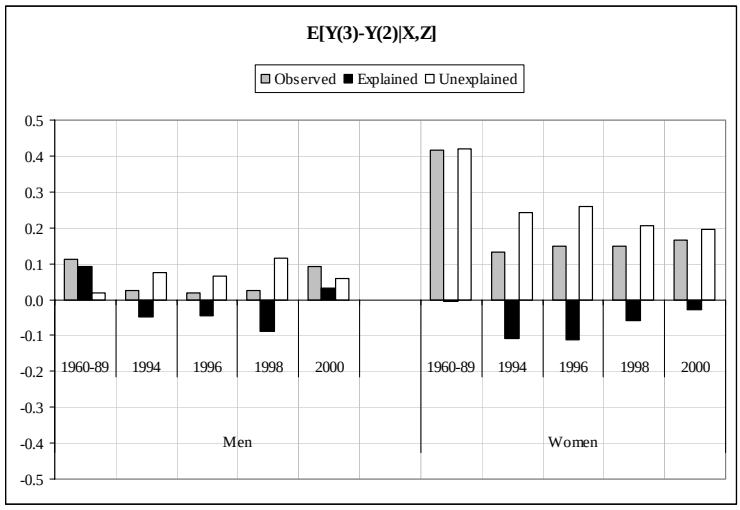
		1960-89	**1994**	**1996**	**1998**	**2000**
Women						
E[Y(1)-Y(3)|X,Z]	Observed	-0.003	-0.013	0.055	0.052	0.034
	Endowments	0.113	0.077	0.112	0.116	0.168
	Occupational (I)	-1.302	-1.075	-1.018	-1.005	-1.185
	Selectivity (II)	1.186	0.985	0.961	0.941	1.051
	Unexplained (I+II)	-0.116	-0.091	-0.057	-0.064	-0.134
E[Y(1)-Y(2)|X,Z]	Observed	0.415	0.120	0.203	0.200	0.199
	Endowments	0.154	-0.015	0.006	-0.002	0.036
	Occupational (I)	-0.199	-0.316	-0.378	-0.490	-0.523
	Selectivity (II)	0.460	0.451	0.575	0.692	0.687
	Unexplained (I+II)	0.261	0.135	0.197	0.202	0.164
E[Y(3)-Y(2)|X,Z]	Observed	0.417	0.133	0.148	0.148	0.165
	Endowments	-0.004	-0.110	-0.112	-0.057	-0.029
	Occupational (I)	1.147	0.778	0.646	0.453	0.560
	Selectivity (II)	-0.726	-0.534	-0.385	-0.248	-0.365
	Unexplained (I+II)	0.421	0.244	0.260	0.205	0.195
Men						
E[Y(1)-Y(3)|X,Z]	Observed	0.015	0.040	0.039	0.053	0.034
	Endowments	-0.064	-0.026	-0.045	0.006	-0.085
	Occupational (I)	-0.128	-0.901	-0.617	-0.134	0.789
	Selectivity (II)	0.207	0.967	0.700	0.181	-0.669
	Unexplained (I+II)	0.079	0.067	0.083	0.046	0.180
E[Y(1)-Y(2)|X,Z]	Observed	0.126	0.067	0.057	0.079	0.126
	Endowments	-0.018	-0.040	-0.036	-0.025	-0.045
	Occupational (I)	0.194	-0.377	-0.505	-0.481	0.163
	Selectivity (II)	-0.050	0.483	0.598	0.584	0.007
	Unexplained (I+II)	0.144	0.106	0.093	0.104	0.214
E[Y(3)-Y(2)|X,Z]	Observed	0.110	0.026	0.019	0.026	0.091
	Endowments	0.094	-0.050	-0.045	-0.089	-0.005
	Occupational (I)	0.273	0.560	0.166	-0.288	-0.580
	Selectivity (II)	-0.257	-0.484	-0.102	0.404	0.676
	Unexplained (I+II)	0.017	0.076	0.064	0.115	0.059



a) MD-FD sectors differences



b) MD-GI sectors differences



c) FD-GI sectors differences

Figure 4 Occupational wage gap by gender, 1960-2000

All observed occupational wage gaps were positive for men, while for women the observed MD-FD differences were negative, but almost zero during the transition period and in 1994. Except for these two periods, the occupational wage gaps were relatively lower for men than for women. Most of the years, the men's values were lower than 0.1 (or 10%), while the women's values were more often 0.1-0.2. This might suggest that men's wages across sectors were on average more homogenous. In other words, they were getting on average almost the same wages in all three sectors. Moreover, the part of the men's occupational wage gap explained by endowments is positive only for the FD-GI gap during the communist period and in 2000, and for the MD-FD gap in 1998. All other twelve values are negative, which might suggest that the wages of "the average observables" for men were lower in the first sector (MD or FD) than in the second (FD or GI); here first and second refer to the order of comparison. Nevertheless, the women's MD-FD gap explained by their endowments is positive and much higher than the observed gap during all years of transition. This suggests that "the average observables" for women is much higher in MD-occupations than in FD-occupations.

The unexplained portion of the wage gap is often interpreted as a result of discrimination. Under this view, once differences among women in the relevant determinants of wages are taken into account, any remaining difference in pay must be due to discrimination. This cannot be gender discrimination, but something else that we cannot observe. However, except for women's MD-FD samples, for all other samples, the unexplained part of the gap was positive and with a few exceptions, higher in magnitude than the observed gaps. During the communist era, this might be a direct reflection of the institutional settings of the labor market and the social security system, which gave privileges (such as access to day care, health care subsidized lunches, etc.) only to workers from given companies, while the variation in the unexplained part of the occupational wage gap during the transition period could be due to a relative improvement in unmeasured labor market skills. Nevertheless, the choice of occupation is related to the institutional and democratic settings, and therefore the results are a reflection of the multitude of changes accrued during the transition years. An individual who prefers characteristics associated with a typical female occupation will be more

likely to enter an FD occupation than someone who prefers characteristics associated with a typical male occupation.

7 Discussion and conclusions

After the communist regime's fall in December 1989, Romania has experienced profound political, democratic, and economic transformation. The labor market is one arena that experienced most of the market economy shocks: the official birth of unemployment and its social implications, the restructuring process of almost all big industrial companies and the whole agricultural sector, the expansion of the private sector, the growth of a decentralized system of wage setting, and the effect of these factors on the composition of employment (who works and where). Ignoring the relatively large percentage of those who did not work (many of them retired very early), our results show that the gender wage differentials remained stable during the period, which may suggest that the structural changes that occurred in 1994-2000 played a limited role in determining the gender wage gap for those who worked. However, the reallocation of labor from the public to the private sector (due mainly to the mass privatization of the state enterprises) was expected to increase wage inequality and to result in a wider gender wage gap.

The very low values of the gender wage gap in female- and male-dominated occupations support the hypothesis that if solidarity wage bargaining were effective in promoting equal pay for equal job types, then controlling for job characteristics should generate an adjusted pay gap of zero. In other words, this suggests some effects of the wage bargaining in securing equal treatment of men and women in the Romanian labor market during the communist regime.

The decomposition of the gender wage gap shows that the endowments (or the observables) have a negative contribution to the overall difference. Moreover, during the last three transition years, the discrimination and the selection components of the wage gap developed in opposite directions for male-dominated and female dominate occupations. The discrimination component was negative only for the female-dominated occupations, which might suggest that women working in the female-dominated occupations were getting a "gender bonus". Never the less, the "unadjusted" gender gap might be explained (largely) by nondiscriminatory factors, such as family

responsibilities and especially the involvement of women and men in housework. However, given that the economy and society in general and the labor market in particular experienced a multitude of complex changes during the analyzed period, it is possible that much of the wage gap is due to institutional norms, employer practices, and labor market policies. These three elements changed continuously, and reflect the structural conditions of the labor market and the societal restrictions, which may not only create different labor market opportunities for different groups of people, but also relative values of different occupations in society. The fact that women were less aggressive than men in the new free market economy created an advantage for men, who become over-represented as managers and politicians at all levels. There is also some anecdotal evidence that men use sexual harassment as a way to reduce female competition in some segments of the labor market. Therefore, it is not surprising that occupational differences explain a big part of the overall gender wage gap. However, the macro statistics show that in the first year of the transition men were more affected than women by the restructuring and closing of the big factories, and therefore it could be that those who did not find job contributed to reducing the weight of the men situated at the low end of the distribution of the offered wages. Even though the labor participation of women and men was high during the communist era (exceeding 90%) and even in the first years of transition (about 75%), the selection biases due to the fact that we observe only the wages of persons who work might be a relatively high source of errors in the assessment of wage differentials between groups and in the evaluation of the components of these differentials.

Nevertheless, our results indicate that the wage differences were in general much higher among workers of the same gender working in different occupations than between women and men working in the same occupational group. These results seem to be in line with earlier literature that support the belief that gender differences in preferences play some role in gender differences in occupations (Gunderson, 1989).The role of occupational upgrading in narrowing the gender pay gap raises the question of why occupational differences between men and women have declined. The rise in women's acquisition of career-oriented formal education may reflect not only changes in women's preferences and their response to greater market opportunities, but also changes in the admission practices of educational institutions and responses of other

institutions that support the promotion of women in a male-dominated world. In Romania, these factors were strong during the communist period, but light, almost absent (in a broad perspective) during the first years of transition, and this might contributed to the fact that the gender wage gap was low during the communist regime, and higher during the transition years. This implies that if policy makers are concerned with these issues, they should help more women in gaining a career-oriented formal education. Additionally, women should be giving assistance in motivating them to participate in the labor market in general, but also to choose occupations that match their education.

Romania has no sustained debate about "making work pay", instead in the preparation for a European Union (EU) membership the focus has been on preparing the legal and institutional processes and developing economic and social policy in line with EU guidelines and requirements. However, the EU has an explicit commitment to raising the employment rate for women and to advance gender mainstreaming and gender equality in both employment and social inclusion policies. Moreover, even the measure of the gender pay gap is part of the EU list of "structural indicators" (designed, after the Lisbon Special European Council in March 2000, to follow up on progress regarding employment and other issues). It seems that Romania would once more benefit from written and spoken policies about women's rights and their involvement in the labor market. We hope that more would be invested in motivating Romanian women to get involved in well-paid occupations, and girls and young women to acquire career-oriented formal education. Additionally, more support should be given to all organizations that support women's promotion in the Romanian male-dominated society.

References

Adamchik, Vera A. and Arjun S. Bedi (2003). "Gender pay differentials during the transition in Poland", *The Economics of Transition* 11(4), 697-726.

Andrén, D. (2007). "Ethnic Romanians and ethnic Hungarians, and their wages, in transition", manuscript.

Andrén, D., John Earle and Dana Sapatoru (2005). "The Wage Effects of Schooling under Socialism and in Transition: Evidence from Romania, 1950-2000", *Journal of Comparative Economics* 31(2). 300-23.

Baker, M., and N.M. Fortin (2001). "Occupational Gender Composition and Wages in Canada: 1987-1988," *Canadian Journal of Economics*, 34(2), 345-76.

Bayard, L., J. Hellerstein, D. Neumark, and K. Troske (2003). "New Evidence on Sex Segregation and Sex Differences in Wages from Matched Employee-Employer Data," *Journal of Labor Economics* 21, 887-922.

Becker, G. 1957 (2d ed., 1971). *The Economics of Discrimination*. Chicago: University of Chicago Press.

Becker, G. (1985). "Human capital, effort, and the sexual division of labor", *Journal of Labor Economics* 3, 553-58.

Blinder, Allan (1973). "Wage Discrimination: Reduced Form and Structural Estimates", *Journal of Human Resources* 7(4), 436-55.

Blau F.D. and L.M. Kahn (2003). "Understanding international differences in the gender pay gap," *Journal of Labor Economics* 21 (1), 106-44.

Boeri, Tito and Terrell, Katherine (2002). "Institutional Determinants of Labor Reallocation in Transition," *Journal of Economic Perspectives* 16 (1): 51-76.

Borjas, George J. (1992). "Ethnic Capital and Intergenerational Mobility", *Quarterly Journal of Economics* 107 (1), 123-50.

Borjas George J. (1995). "Ethnicity, neighborhoods, and human-capital externalities", *American Economic Review* 85(3), 365-90.

Brainerd, E. (1998). "Winners and Losers in Russia's Economic Transition", *American Economic Review* 88(5), 1094-115.

Brainerd, Elizabeth (2000). "Women in Transition: Changes in Gender Wage Differentials in Eastern Europe and the Former Soviet Union", *Industrial and Labor Relations Review* 54(1), 138-62.

Brown, R.S., M. Moon, and B.S. Zoloth (1980). "Incorporating Occupational Attainment in Studies of Male-Female Earnings Differentials", *Journal of Human Resources* 15(1). 3-28.

Chandra, Amitabh (2000). "Labor-Market Dropouts and the Racial Wage Gap: 1940-1990", *American Economic Review* 90(2): 333-38.

Constitution of Romania (on line), http://domino.kappa.ro/guvern/constitutia-e.html (January 7, 2007).

Dolado, Juan J., Florentino Felgueroso and Juan F. Jimeno (2002). "Recent Trends in Occupational Segregation by Gender: A Look across the Atlantic", CEPR Discussion Paper No 3421.

Duncan, Otis D. and Beverly Duncan (1955). "A Methodological Analysis of Segregation Indices", American Sociological Review 20:210-17.

Einhorn, B. (1993). *Cinderella Goes to Market: Gender, Citizenship, and Women's Movements in East Central Europe*, New York.

England, P., G. Farkas, B.S. Kilbourne and T. Dou (1988). "Explaining Occupational Sex Segregation and Wages: Findings from a Model with Fixed Effects," *American Sociological Review* 53, 544-58.

Flanagan, Robert, (1998). "Were Communists Good Human Capitalists? The Case of the Czech Republic." *Labour Economics* 5 (2), 295-312.

Fong, Monica S. and G. Paull (1993). *Women's economic status in the restructuring of Eastern Europe, in Democratic Reform and the Position of Women in Transitional Economies*, edited by V. Moghadam. Oxford: Clarendon Press, 217-47.

Gabriel, P.E., D.R. Williams, and S. Schmitz (1990). "The Relative Occupational Attainment of Young Blacks, Whites, and Hispanics," *Southern Economic Journal* 57, 35-46.

Gunderson, Morley (1989). "Male-Female Wage Differentials and Policy Responses", *Journal of Economic Literature* 27(1), 46-72.

Hansen, Jorgen and Roger Wahlberg (2007). "Occupational Gender Composition and the Gender Wage Gap in Sweden", manuscript, forthcoming in *Research in Labor Economics*.

Heckman, James J., Thomas M. Lyons and Petra E. Todd (2000). "Understanding Black-White Wage Differentials, 1960-1990." *American Review of Economics* 90, 334-49.

Hunt, J. (2002). "The Transition in East Germany: When is a Ten Point Fall in the Gender Wage Gap Bad News?", *Journal of Labor Economics* 20, 148-69.
Jacobs, S.C. (1995). "Changing Patterns of Sex Segregated Occupations throughout the Life-Course", *European Sociological Review*, 11(2), 157-71.
Joshi, H. and Paci, P. (1998). *Unequal Pay for Women and Men: Evidence from the British Birth Cohort Studies*, Cambridge, MA: The MIT Press.
Johnson, G., and G. Solon (1986). "Estimates of the Direct Effects of Comparable Worth Policy," *American Economic Review* 76(5). 1117-25.
Jolliffe, Dean (2002). "The Gender Wage Gap in Bulgaria: A Semiparametric Estimation of Discrimination", *Journal of Comparative Economics* 30(2): 276-295.
Jones, Derek C. and K. Ilayperuma (1994), "Wage Determination under Plan and Early Transition: Evidence from Bulgaria", Working Paper No. 94/7, Department of Economics, Hamilton College.
Jurajda, Stepan (2003). "Gender Wage Gap and Segregation in Enterprises and the Public Sector in Late Transition Countries", *Journal of Comparative Economics* 31, 199-222.
Jurajda, Stepan (2005). "Gender Segregation and Wage Gap: An East-West Comparison", *Journal of the European Economic Association* 3(2-3). pages 598-607.
Jurajda, Stepan and H. Harmgart (2004). "When Do 'Female' Occupations Pay More?", CEPR Discussion Paper No. 4270.
Keil Thomas J. and Viviana Andreescu (1999). "Fertility Policy in Ceausescu's Romania", *Journal of Family History* 24(4), 478-92.
Kidd, M.P., and M. Shannon (1996). "Does the Level of Occupational Aggregation Affect Estimates of the Gender Wage Gap?," *Industrial and Labor Relations Review* 49(2), 317-29.
Killingsworth, M. (1990). *The Economics of Comparable Worth*, Kalamazoo, Mich.: W. E. Upjohn Institute for Employment Research.
Krueger, A.B. and J.S. Pischke (1995). "A Comparative Analysis of East and West German Labour Markets: Before and After Unification" in Freeman, R.B. and F.Katz, eds., *Differences and Changes in Wage Structures*, Chicago: The University of Chicago Press.
Lehrer E.L. (2004). "The Role of Religion in Union Formation: An Economic Perspective", *Population Research and Policy Review* 23, 161-85.
Macpherson, D. A., and B. T. Hirsch (1995). "Wages and Gender Composition: Why Do Women's Jobs Pay Less?," *Journal of Labor Economics* 13, 426-71.
Meng, X., and P. Miller (1995). "Occupational Segregation and Its Impact on Gender Wage Discrimination in China's Rural Industrial Sector," *Oxford Economic Papers*, 47, 136-155.
Miller, P. (1987). "The Wage Effect of the Occupational Segregation of Women in Britain", *Economic Journal* 97, 885-96.
Munich, Daniel, Jan Svejnar and Katherine Terrell (2005). "Is Women's Human Capital Valued more by Markets than by Planners?", *Journal of Comparative Economics* 33(2), 278-99.
National Commission for Statistics (1995), Romanian Statistical Yearbook 1994, p. 272-3.
Newell, Andrew and Barry Reilly (1996). "The Gender Wage Gap in Russia: Some Empirical Evidence", *Labor Economics* 3(3), 337-56.
Newell, Andrew and Barry Reilly (2000). The gender wage gap in the transition from Communism: some empirical evidence. Working paper No. 305. William Davidson Institute, Ann Arbor, MI.
Neuman, S., and R. Oaxaca (2004). "Wage decomposition with selectivity-corrected wage equations: A methodological note", *Journal of Economic Inequality* 2, 3-10.
Oaxaca, R. (1973). "Male-Female Wage Differentials in Urban Labor Markets", *International Economic Review*, 14(3). 693-709.
Ogloblin, Constantin (1999). "The Gender Earnings Differential in the Russian Transition Economy", *Industrial and Labor Relations Review* 52(4). 602-27.
Ogloblin, Constantin (2005). "The Gender Earnings Differential in Russia After a Decade of Economic Transition", *Applied Econometrics and International Development*, 5(3), 5-26.
Orazem, Peter, and Milan Vodopivec (1995). "Winners and Losers in Transition: Returns to Education, Experience, and Gender in Slovenia". *World Bank Economic Review* 9(May):201-230.
Paternostro, Stefano and Sahn, David (1999). Wage Determination and Gender Discrimination in a Transition Economy: The Case of Romania, World Bank Policy Research Working Paper No. 2113.
Riphahn, R.T., Snower, D. J., and K. F. Zimmermann, eds. (2001). *Employment Policy in Transition: The Lessons of German Integration for the Labour Market*, Springer-Verlag, Heidelberg.
Roy, A. (1951). "Some thoughts on the distribution of earnings", *Oxford Economic Papers* 3, 135-46.

Rutkowski, Jan (1996) “High Skills Pay Off: The Changing Wage Structure During the Economic Transition in Poland”, *Economics of Transition* 4, 89-112.
Sorensen, E. (1989). “Measuring the Pay Disparity Between Typically Female Occupations and Other Jobs: A Bivariate Selectivity Approach”, *Industrial and Labor Relations Review*, 42(4). 624-639.
Sorensen, E. (1990). “The Crowding Hypothesis and Comparable Worth Issue: A Survey and New Results”, *Journal of Human Resources* 25, 55-89.
Svejnar, Jan (1999). “Labor Markets in Transitional Central and Eastern European Economies”, in *Handbook of Labor Economics, Vol 3b*, Orley Ashenfelter and David Card, eds. Amsterdam: Elsevier, 2810-57.
UNESCO (2002). Literacy and Non Formal Education Section, Estimated illiteracy rate and illiterate population aged 15 and older by country, 1970-2015, UESCO Institute for Statistics, July 2002 Assessment.
UNESCO (2005). Statistics in brief, Romania, UESCO Institute for Statistics.
United Nations (2003). “Consideration of reports submitted by States parties under article 18 of the Convention on the Elimination of All Forms of Discrimination against Women. Sixth periodic report of States parties. Romania”, Committee on the Elimination of Discrimination against Women, CEDAW/C/ROM/6.
Vasile, Valentina (2004), “Gender equality issues examined”, European industrial relations observatory on-line, http://www.eurofound.europa.eu/eiro/2003/12/feature/ro0312102f.html.
Vecernik, Jiri (1995). “Changing earnings distribution in the Czech Republic: survey evidence from 1988-1994”, Economics of Transition 3(3): 355–71.
Vese, Vasile (2001). ”The condition of women in Romania during the communist period”, in Ann Katherine Isaacs, ed., *Political Systems and Definitions of Gender Roles*, Edizioni Plus, Università di Pisa, 268.
Weichselbaumer, Doris and Rudolf Winter-Ebmer (2005). “A Meta-Analysis on the International Gender Wage Gap”, *Journal of Economic Surveys* 19 (3), 479-511.

Appendix

Table A1 The public opinion about *Who should be employed in the following domains*

Domain	Men	Women	Gender is not important
Agriculture	0.22	0.02	0.76
Mining and metallurgy	0.87	0	0.13
Textile industry	0.03	0.74	0.23
Construction	0.83	0	0.17
Transportation	0.64	0	0.37
Education	0.03	0.25	0.72
Health	0.03	0.21	0.76
Public administration	0.17	0.07	0.76
Non-Governmental organizations	0.12	0.10	0.77
Media	0.06	0.06	0.88
Food Industry/Commerce	0.03	0.25	0.72
Banking System	0.16	0.09	0.75
Justice	0.28	0.04	0.69
Government	0.42	0.02	0.56

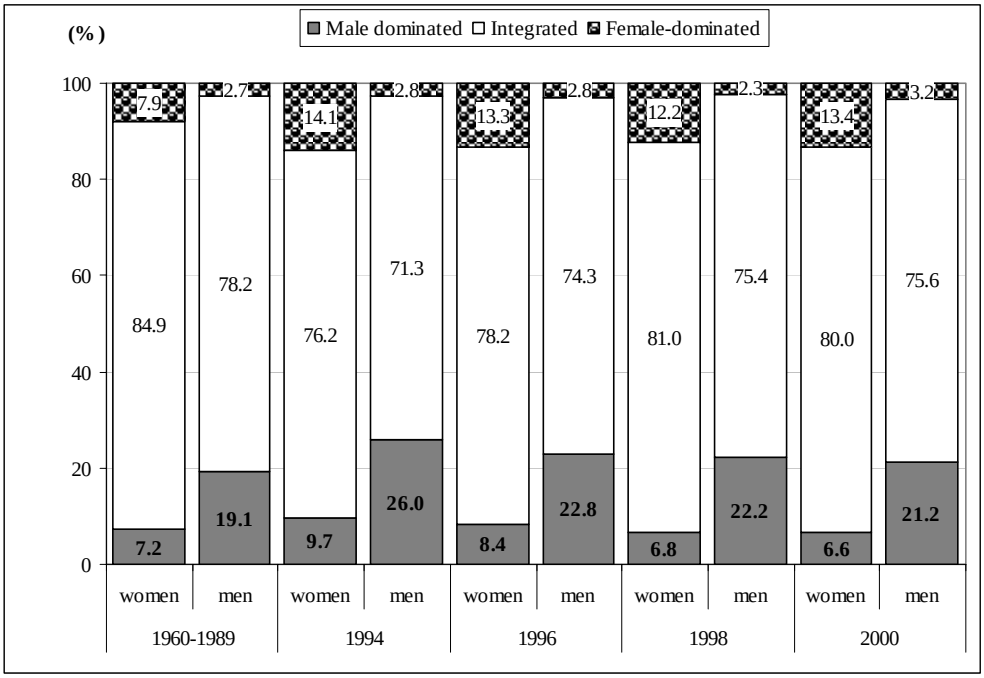


Figure A1 The distribution of the occupational groups, 1960-2000, selected years

Table A2 Occupational concentration, 1966-2000

		Proportion (%) of women working in occupation with						Proportion (%) of men working in occupation with					
		50% + women workers	55% +	60% +	65% +	70% +	75% +	50% + men workers	55% +	60% +	65% +	70% +	75% +
1966-70	1231	25.8	25.8	25.8	5.0	0.0	0.0	74.2	55.6	55.6	47.4	14.5	14.5
1971-75	1312	43.2	21.8	15.0	15.0	9.2	9.2	56.8	56.8	56.8	14.8	11.8	11.8
1976-80	1683	37.1	21.1	14.3	14.3	14.3	4.9	62.9	57.2	16.0	16.0	1.8	0.3
1981-85	1740	32.9	15.6	15.6	6.0	6.0	0.0	67.1	67.1	20.2	14.2	14.2	2.1
1986-89	2361	14.7	14.6	14.6	14.6	5.3	5.3	85.4	54.4	12.2	12.2	12.2	1.5
1994	25549	27.0	16.3	16.3	16.3	7.5	7.5	73.0	54.1	54.1	54.1	19.2	17.4
1995	23644	28.3	28.3	17.2	17.2	7.7	7.7	71.7	53.3	53.3	53.3	53.3	17.8
1996	23910	37.9	28.2	17.1	17.1	7.3	7.3	62.1	53.7	53.7	53.7	16.7	14.0
1997	15502	37.8	28.6	16.7	16.7	7.0	7.0	62.2	53.2	53.2	53.2	16.3	14.8
1998	21515	49.0	29.7	17.3	17.3	6.7	6.7	51.0	51.0	51.0	51.0	15.4	13.2
1999	18961	50.8	31.3	18.8	18.8	7.5	7.5	49.2	49.2	49.2	49.2	14.9	13.6
2000	17480	40.8	31.9	19.5	19.5	7.8	7.8	59.2	48.9	48.9	48.9	14.6	13.4

Table A3a Descriptive statistics, male-dominated occupations, 1951-2000, men

	1960-89	1994	1996	1998	2000
Wage[#]	1.472	151.78	328.86	992.60	2348.77
Age	27.69	39.27	39.11	39.68	39.60
Education					
Lower education	0.76	0.67	0.66	0.65	0.61
Medium education	0.17	0.26	0.26	0.26	0.30
Higher education	0.06	0.07	0.08	0.08	0.09
Region					
R1: North-East	0.20	0.14	0.14	0.13	0.13
R2: South-East	0.17	0.15	0.16	0.16	0.15
R3: South	0.18	0.18	0.17	0.18	0.17
R4: South-West	0.09	0.12	0.11	0.11	0.11
R5: West	0.09	0.11	0.11	0.10	0.10
R6: North-West	0.12	0.12	0.13	0.11	0.14
R7: Center	0.09	0.11	0.10	0.12	0.11
R9: Bucharest	0.06	0.08	0.08	0.09	0.10
Married	0.84	0.83	0.82	0.84	0.82
Urban	0.51	0.55	0.54	0.57	0.63
Ethnicity					
Romanian	0.92	0.94	0.94	0.94	0.94
Hungarian	0.06	0.05	0.05	0.05	0.05
Other	0.02	0.01	0.01	0.01	0.01
Sector					
Agriculture		0.21	0.19	0.15	0.12
Industry		0.36	0.32	0.32	0.32
Services		0.42	0.49	0.53	0.55
Ownership					
State	0.83	0.89	0.80	0.67	0.48
Private	0.09	0.08	0.14	0.23	0.37
Other	0.06	0.01	0.00	0.00	0.00
Household members	3.56	3.95	3.84	3.76	3.64
Multi-generation household	0.12	0.21	0.21	0.21	0.20
Children <18	0.88	1.20	1.10	0.99	0.95
n	1190	3887	3137	2680	2025

Note: [#] monthly wage in thousands of Romanian lei, and it is the starting wage for 1951-1989. This holds for all tables.

Table A3b Descriptive statistics, male-dominated occupations, 1951-2000, women

	1960-89	1994	1996	1998	2000
Wage[#]	1463.18	128.89	297.55	907.56	2073.20
Age	25.0	37.60	37.97	38.80	39.06
Education					
Lower education	0.66	0.56	0.53	0.49	0.48
Medium education	0.29	0.38	0.39	0.42	0.43
Higher education	0.04	0.06	0.08	0.08	0.09
Region					
R1: North-East	0.18	0.14	0.13	0.13	0.16
R2: South-East	0.15	0.13	0.14	0.16	0.15
R3: South	0.16	0.20	0.16	0.20	0.15
R4: South-West	0.09	0.10	0.10	0.11	0.10
R5: West	0.12	0.08	0.08	0.07	0.09
R6: North-West	0.13	0.12	0.15	0.10	0.12
R7: Center	0.10	0.11	0.11	0.12	0.10
R8: Bucharest	0.08	0.12	0.12	0.12	0.13
Married	0.78	0.80	0.79	0.80	0.79
Urban	0.72	0.74	0.74	0.78	0.82
Ethnicity					
Romanian	0.93	0.95	0.94	0.95	0.94
Hungarian	0.06	0.04	0.05	0.04	0.05
Other	0.01	0.01	0.01	0.00	0.01
Sector					
Agriculture		0.12	0.11	0.10	0.06
Industry		0.74	0.67	0.68	0.69
Services		0.14	0.22	0.22	0.25
Ownership					
State	0.88	0.92	0.80	0.65	0.36
Private	0.05	0.05	0.13	0.20	0.47
Other	0.04	0.02	0.02	0.01	0.01
Household members	3.57	3.74	3.68	3.62	3.42
Multi-generation household	0.12	0.14	0.15	0.15	0.13
Children <18	1.04	1.14	1.07	0.99	0.88
n	351	1025	860	643	521

Table A4a Descriptive statistics, gender-integrated occupations, 1951-2000, men

	1960-89	1994	1996	1998	2000
Wage[#]	1371.11	142.55	308.72	911.77	2062.32
Age	28.20	38.89	38.83	39.37	39.62
Education					
Lower education	0.77	0.59	0.64	0.62	0.58
Medium education	0.17	0.28	0.25	0.25	0.28
Higher education	0.06	0.13	0.11	0.13	0.15
Region					
R1: North-East	0.22	0.13	0.13	0.13	0.13
R2: South-East	0.11	0.12	0.11	0.12	0.11
R3: South	0.15	0.15	0.16	0.16	0.15
R4: South-West	0.10	0.10	0.11	0.11	0.12
R5: West	0.09	0.09	0.09	0.09	0.09
R6: North-West	0.13	0.14	0.14	0.15	0.15
R7: Center	0.14	0.14	0.15	0.14	0.13
R8: Bucharest	0.07	0.13	0.11	0.10	0.11
Married	0.82	0.80	0.79	0.78	0.77
Urban	0.52	0.65	0.62	0.66	0.68
Ethnicity					
Romanian	0.87	0.91	0.91	0.91	0.91
Hungarian	0.10	0.07	0.07	0.07	0.08
Other	0.03	0.02	0.02	0.02	0.02
Sector					
Agriculture		0.08	0.07	0.07	0.05
Industry		0.51	0.52	0.49	0.48
Services		0.42	0.41	0.44	0.47
Ownership					
State	0.81	0.88	0.77	0.62	0.40
Private	0.08	0.10	0.17	0.26	0.43
Other	0.10	0.01	0.01	0.01	0.01
Household members	3.49	3.81	3.78	3.71	3.63
Multi-generation household	0.13	0.22	0.24	0.24	0.24
Children <18	0.84	1.13	1.05	0.96	0.87
n	4934	10671	10202	9097	7224

Table A4b Descriptive statistics, gender-integrated occupations, 1951-2000, women

	1960-89	1994	1996	1998	2000
Wage[#]	1166.76	114.49	243.06	742.17	1651.01
Age	26.90	38.07	38.00	38.70	38.62
Education					
Lower education	0.72	0.50	0.52	0.49	0.47
Medium education	0.23	0.35	0.35	0.36	0.37
Higher education	0.05	0.15	0.13	0.15	0.16
Region					
R1: North-East	0.22	0.13	0.14	0.14	0.14
R2: South-East	0.11	0.11	0.11	0.12	0.11
R3: South	0.15	0.13	0.14	0.13	0.13
R4: South-West	0.11	0.10	0.10	0.10	0.11
R5: West	0.10	0.09	0.09	0.10	0.10
R6: North-West	0.11	0.14	0.14	0.15	0.16
R7: Center	0.13	0.14	0.15	0.15	0.14
R8: Bucharest	0.07	0.15	0.12	0.12	0.12
Married	0.76	0.76	0.74	0.74	0.72
Urban	0.57	0.79	0.74	0.77	0.77
Ethnicity					
Romanian	0.89	0.92	0.91	0.91	0.91
Hungarian	0.09	0.07	0.08	0.07	0.08
Other	0.02	0.01	0.01	0.02	0.01
Sector					
Agriculture		0.04	0.04	0.03	0.02
Industry		0.41	0.40	0.38	0.38
Services		0.55	0.56	0.59	0.60
Ownership					
State	0.69	0.83	0.71	0.59	0.37
Private	0.07	0.12	0.23	0.30	0.45
Other	0.23	0.03	0.02	0.02	0.02
Household members	3.35	3.62	3.60	3.53	3.48
Multi-generation household	0.08	0.16	0.19	0.19	0.20
Children <18	0.87	1.06	0.98	0.87	0.81
n	4371	8057	7963	7655	6338

Table A5a Descriptive statistics, female-dominated occupations, 1951-2000, men

	1960-89	1994	1996	1998	2000
Wage[#]	1462.96	141.99	311.25	926.18	2186.27
Age	29.80	40.82	39.90	39.94	40.27
Education					
Lower education	0.43	0.37	0.21	0.20	0.19
Medium education	0.49	0.56	0.71	0.74	0.68
Higher education	0.09	0.07	0.08	0.06	0.14
Region					
R1: North-East	0.17	0.16	0.14	0.15	0.13
R2: South-East	0.12	0.12	0.13	0.12	0.12
R3: South	0.15	0.19	0.12	0.12	0.14
R4: South-West	0.12	0.12	0.13	0.13	0.10
R5: West	0.13	0.08	0.10	0.12	0.15
R6: North-West	0.11	0.12	0.14	0.17	0.14
R7: Center	0.10	0.08	0.12	0.11	0.13
R8: Bucharest	0.09	0.13	0.12	0.09	0.09
Married	0.83	0.80	0.81	0.81	0.80
Urban	0.65	0.65	0.63	0.63	0.70
Ethnicity					
Romanian	0.91	0.94	0.94	0.93	0.94
Hungarian	0.07	0.04	0.04	0.04	0.06
Other	0.02	0.02	0.02	0.03	0.01
Sector					
Agriculture		0.10	0.08	0.05	0.06
Industry		0.21	0.19	0.19	0.16
Services		0.69	0.73	0.76	0.79
Ownership					
State	0.83	0.87	0.81	0.69	0.50
Private	0.10	0.09	0.14	0.23	0.32
Other	0.06	0.02	0.02	0.02	0.01
Household members	3.25	3.56	3.46	3.35	3.46
Multi-generation household	0.12	0.20	0.20	0.20	0.20
Children <18	0.63	0.90	0.87	0.75	0.78
n	162	418	391	283	309

Table A5b Descriptive statistics, female-dominated occupations, 1951-2000, women

	1960-89	1994	1996	1998	2000
Wage[#]	1388.34	127.22	276.84	841.49	1885.40
Age	25.90	38.37	38.64	38.86	39.86
Education					
Lower education	0.27	0.19	0.13	0.13	0.15
Medium education	0.69	0.78	0.82	0.83	0.79
Higher education	0.04	0.03	0.05	0.04	0.06
Region					
R1: North-East	0.13	0.12	0.11	0.11	0.12
R2: South-East	0.12	0.13	0.13	0.14	0.12
R3: South	0.14	0.15	0.14	0.14	0.15
R4: South-West	0.09	0.10	0.09	0.09	0.09
R5: West	0.11	0.11	0.12	0.12	0.11
R6: North-West	0.11	0.13	0.14	0.15	0.15
R7: Center	0.15	0.12	0.13	0.13	0.14
R8: Bucharest	0.14	0.14	0.14	0.12	0.11
Married	0.74	0.77	0.77	0.76	0.77
Urban	0.79	0.80	0.77	0.77	0.80
Ethnicity					
Romanian	0.90	0.93	0.93	0.92	0.91
Hungarian	0.09	0.06	0.06	0.07	0.08
Other	0.02	0.01	0.01	0.01	0.01
Sector					
Agriculture		0.05	0.04	0.06	0.04
Industry		0.27	0.25	0.24	0.22
Services		0.68	0.71	0.70	0.73
Ownership					
State	0.81	0.86	0.77	0.68	0.47
Private	0.11	0.10	0.17	0.23	0.33
Other	0.06	0.02	0.02	0.02	0.01
Household members	3.13	3.37	3.35	3.33	3.31
Multi-generation household	0.12	0.16	0.18	0.17	0.16
Children <18	0.67	0.83	0.78	0.75	0.72
n	439	1491	1357	1157	1063

Table A6 Earnings equation estimates by occupation, women, 1960-2000

	1960-89	1994	1996	1998	2000
Male-dominated					
Intercept	5.783***	3.685***	3.925***	4.541***	5.102***
Age	0.034	0.114	0.593***	0.480***	0.419*
$Age^2/10$	-0.009	-0.013	-0.080***	-0.054**	-0.044
Medium education	-0.144	-0.068	-0.114**	-0.133**	-0.093
Higher education	0.318***	0.522***	0.527***	0.511***	0.762***
Married	0.049	0.015	-0.014	-0.027	-0.131**
Urban	0.095**	0.069**	0.155***	0.048	0.036
Agriculture	0.265***	-0.049	-0.024	-0.112	-0.142
Industry	-0.032	0.085	0.146***	0.070	0.219***
State ownership	-0.032	0.046	0.064*	-0.007	-0.029
Long-term contract	-0.001	0.275***	0.038	0.175	0.447***
Multi-generation household	0.040	-0.107**	-0.121**	-0.121**	-0.198***
Household members		0.008	-0.017	-0.003	0.006
Integrated					
Intercept	5.213***	3.946***	4.451***	5.118***	6.134***
Age	0.090	0.189***	0.255***	0.268***	0.179***
$Age^2/10$	-0.022*	-0.019***	-0.026***	-0.024***	-0.012*
Medium education	0.001	0.024*	0.029**	0.045***	0.021
Higher education	0.363***	0.479***	0.522***	0.522***	0.532***
Married	0.019	0.001	0.010	0.007	-0.007
Urban	0.267***	0.107***	0.130***	0.117***	0.095***
Agriculture	-0.056	0.103**	0.088**	0.078**	0.106**
Industry	-0.116*	0.067	0.036	0.100***	0.084*
State ownership		0.000	0.043	-0.057*	-0.024
Long-term contract		0.064**	0.221***	0.169***	0.164***
Multi-generation household					
Household members	-0.005	-0.015***	-0.018***	-0.016***	-0.032***
Female-dominated					
Intercept	6.911***	4.947***	5.359***	6.038***	6.577***
Age	0.211	0.151	0.285***	0.285**	0.300**
$Age^2/10$	-0.026	-0.016	-0.030**	-0.029*	-0.029*
Medium education	-0.216***	-0.135***	-0.145***	-0.070*	-0.020
Higher education	0.319***	0.207***	0.278***	0.212***	0.255***
Married	-0.069	-0.033	-0.069**	-0.038	0.000
Urban	0.054	0.119***	0.114***	0.062**	0.076**
Agriculture	0.121**	0.191***	0.262***	0.055	0.020
Industry	0.113***	0.246***	0.198***	0.127***	0.119***
State ownership	0.001	0.005	-0.052**	-0.008	-0.008
Long-term contract	0.025	0.082	0.092	-0.013	0.234**
Multi-generation household	0.081	-0.089**	-0.124***	-0.074*	-0.044
Household members		0.013	0.003	-0.024**	-0.015

Note: we also control for region (5 dummies), ownership (3 dummies), and "time" (5 dummies controlling for the five-year periods for the communist period, and 11 monthly dummies for the transition years). This note holds also for the next table.

Table A7 Earnings equation estimates by occupation, men, 1960-2000

	1960-89	1994	1996	1998	2000
Male-dominated					
Intercept	6.264***	3.887***	4.126***	5.560***	7.054***
Age	0.146	0.283***	0.404***	0.068	0.315***
$Age^2/10$	-0.016	-0.035***	-0.049***	-0.006	-0.033***
Medium education	0.026	0.001	0.008	0.006	0.198***
Higher education	0.357***	0.409***	0.409***	0.438***	0.829***
Married	-0.031	0.076***	0.116***	0.166***	0.048
Urban	0.072***	0.094***	0.141***	0.091***	0.127***
Agriculture	0.060*	-0.118***	-0.100***	-0.104***	-0.428***
Industry	0.054	0.003	0.036**	0.050***	0.138***
State ownership	-0.058	0.028	0.078***	0.127***	0.107***
Long-term contract	0.002	0.144***	0.128***	0.074	0.082
Multi-generation household	-0.011	-0.073***	-0.073***	-0.091***	-0.029
Household members		-0.003	-0.010*	-0.015**	-0.008
Integrated					
Intercept	5.702***	4.231***	4.762***	5.451***	5.993***
Age	0.038	0.281***	0.310***	0.326***	0.314***
$Age^2/10$	-0.003	-0.034***	-0.036***	-0.037***	-0.031***
Medium education	0.059***	-0.002	-0.004	0.025**	0.116***
Higher education	0.285***	0.309***	0.347***	0.373***	0.466***
Married	0.020	0.079***	0.083***	0.122***	0.088***
Urban	0.165***	0.099***	0.120***	0.123***	0.117***
Agriculture	0.376***	-0.005	-0.007	-0.088***	-0.199***
Industry	0.081***	0.081***	0.130***	0.124***	0.134***
State ownership	-0.014	0.050***	0.069***	0.076***	0.062***
Long-term contract	0.006	0.070***	0.159***	0.154***	0.157***
Multi-generation household	0.002	-0.085***	-0.096***	-0.077***	-0.109***
Household members		-0.011***	-0.006*	-0.010***	-0.002
Female-dominated					
Intercept	5.417***	4.374***	4.731***	5.501***	5.909***
Age	0.596**	0.462***	0.553***	0.387	-0.166
$Age^2/10$	-0.068*	-0.055***	-0.060***	-0.044	0.027
Medium education	0.131*	-0.114***	-0.119**	-0.102	0.111*
Higher education	0.269**	0.121	0.087	0.282**	0.337***
Married	-0.111	0.080	0.156**	0.014	0.161**
Urban	0.256***	0.187***	0.176***	0.043	0.083
Agriculture	0.043	0.184**	-0.001	-0.096	-0.280***
Industry	-0.120	0.072	0.104	0.046	0.073
State ownership	-0.159	0.050	-0.030	-0.026	0.099**
Long-term contract	0.065**	0.170	-0.022	-0.013	-0.094
Multi-generation household	-0.254*	-0.070	0.028	-0.170**	0.004
Household members		-0.020	-0.039**	-0.016	0.009