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An Application to Belarus

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When Does Transition Increase the Gender Wage Gap?

An Application to Belarus[#]

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Abstract: Underneath stable female participation rates, the unconditional gender wage gap in the log of monthly wages has more than doubled in Belarus from 1996 to 2006. In this respect, the country represents a variant of the former Soviet Union transition, where relative female wages have reduced more than female participation did. Analysis of the Machado and Mata (2005) gender gap decomposition reveals that the effect of coefficients in rising the gap was increasing over time, especially at the lower and middle deciles of the wage distribution, while the effect of characteristics in reducing the gap was shrinking. The Juhn, Murphy and Pierce (1991) decomposition of changes in the gap over time confirms that the contraction of women's relative wages has been caused by deterioration of observed characteristics and of their remuneration. Instead, changes in the residual wage distribution tend to slightly reduce, rather than to increase the gender gap, as is the case elsewhere. Neuman and Oaxaca (2004) type of analysis suggests that sample selection was not behind the increased gap. Instead, two of observed factors are found to be mainly responsible for the results: the hours of work which have increased more for men than for women and the segregation of women in low-wage industries.

Keywords: Evolution of the Gender Wage Gap, Sample Selection Bias, Decomposition Analysis, Wage Inequality, Economic Transition, Central and Eastern European Counties, Commonwealth of Independent States, Belarus

JEL Classification: J16, J22, J31, P20

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Introduction

This is the first paper to study the evolution of the gender wage gap in the Republic of Belarus. The economic transition in Belarus led to a dramatic fall in output of the order of 35 percent until the mid-1990s when GDP growth began to rise again and inflation slowly began to fall. Privatization, in turn, has been slow moving, with the vast majority of firms remaining in State hands and the State controlling wages even in the private sector through the so-called tariff system.[1] Studying the evolution of the wage gap in Belarus is particularly interesting because of the slowness of the transition process there when compared to neighboring countries such as Poland, Russia, and Ukraine. In fact, such a comparison raises a puzzling question. Despite the fact that female employment and participation in the labor market have remained very stable at the level experienced in Soviet times (about 80 percent of the total female labor force), the gender wage gap in terms of monthly wages has more than doubled in Belarus during the period considered. Then, the question arises: Why are Belarusian women experiencing such a reduction in their relative wages if the main sources responsible for the deterioration of female pay, for example, privatization and market liberalization, that are typically found in transition countries have been virtually absent? This paper suggests that some of the forces that typically affect female participation in the labor market and that have been set into motion by the reforms in other transition countries have also operated in Belarus.

For a number of reasons that we discuss in the next section, the transition reduced the relative demand for female labor. In the case of the Central and Eastern European Countries (CEECs) where firms have been constrained by tighter wage-setting mechanisms, female wages have remained stable, and the reduced labor demand mainly resulted in lower female participation. In the case of the former Soviet Union (FSU) republics, widespread labor

[1] A tariff system is a centrally determined wage grid, inherited from the pre-transition period.

hoarding has pushed firms to reduce female wages rather than employment. Belarus is a specific variant of the FSU transition, where firms have obeyed the so-called model of "market socialism" by practically keeping the entire workforce. The consequence of this has predominantly been a wage reduction.

The peculiarities of the Belarusian case are interesting because they allow us to broaden our understanding of the way gender differences emerged in the early 1990s and evolved during the entire process of the economic transition from a planned to a market economy.

We base our econometric analysis on the Belarusian Household Survey of Income and Expenditure (BHSIE hereafter), the most comprehensive source of statistical information at an individual level in the country. The study covers almost the entire transition period, from 1996 to 2006, but not the tumultuous early 1990s when the Ministry of Statistics did not conduct the survey.

Our results for the Juhn, Murphy, and Pierce's (1991, 1993) decomposition analysis for Belarus (the first of its kind to our knowledge) show two main factors that caused the deterioration of female wages. The first was a silent but massive segregation of women out of the highly valued so-called "material production" into low-wage and female-dominated public service jobs in sectors like education and health. The second was a reduction in the average working hours of women relative to those of men. These two factors largely offset the positive impact that increasing educational levels had on female wages.

Changes in the overall degree of wage inequality that were found to reduce female wages in several transition countries (Reilly, 1999; Brainerd, 2000; Orazem and Vodopivec, 2000; Giddings, 2002; Hunt, 2002; Anderson and Pomfret, 2003), in the case of Belarus tended to slightly reduce and not increase the gap. This should come as no surprise considering the remarkable stability of wage inequality in Belarus.

The structure of the paper is as follows. Section one provides a brief overview of the existing literature on the evolution of the gender wage gap during transition. Section two presents evidence on the evolution of the wage gap in Belarus over the decade from 1996 to 2006. Section three discusses the data set and methodology used. Section four presents the results of the econometric analysis. Some concluding remarks and policy implications are drawn in the concluding section.

1. An overview of the literature

An interesting research question is whether the liberalization of the labor market increases or decreases the gender wage gap (GWG). Becker (1957) suggested that market forces could punish discriminatory wage-setting behavior and thus reduce such gap. In a meta-study of the cross-country determinants of the GWG, Weichselbaumer and Winter-Ebner (2007) concluded that both increased competition and the adoption of international conventions concerning equal treatment laws reduced the gap, although legislation that prevented women from performing strenuous or dangerous jobs tended to increase it.

The experience of transition countries might suggest the opposite, namely, that labor market liberalization also causes the wage gap to increase. This is simply because of the specific nature of the transition that, among other things, has led to the abolishment of centrally determined wage grids causing a shift from a predetermined and unnaturally compressed wage distribution to one featured by greater dispersion. Moreover, in all transition countries, increasingly tight budget constraints for the State, firms, and households have augmented the opportunity cost of childrearing, thus increasing the overall effort of women in market and nonmarket work, and forcing a share of them to substitute the former with the latter (Pascal and Kwak, 2005). As Malysheva and Verashchagina (2008, Fig. 10.4) note, in transition countries, including the new EU member states, women spend a large

amount of time - more than in any other mature market economy - working not only for pay but also without pay in the household. Unpaid housework (and care work) is found to be two to three times higher in CEE and FSU countries than in mature market economies, reaching an outstanding 28.2 hours per week in the case of Hungary and 25.6 in the case of Russia.

Belarus occupies the third position in this special ranking. According to Tereshchenko (2005), in 2005, women spent, on average, 23.6 hours per week performing unpaid work in the household, compared to 11.4 hours for men. Given that the time spent on paid work is respectively 53.7 for men and 48.5 for women, overall hours of work for women exceed that of men by 6 hours, 72 versus 65.[2]

Overall, these processes are also a consequence of monetary stabilization: in fact, the State has progressively reduced its presence in the economy and its expenditures for income support schemes for maternity and social policies for the provision of childcare facilities. As documented in Plantenga and Remery (2009), by the mid-1990s, there was a significant drop in the share of children aged 3–6 years that attended kindergartens in Bulgaria, the Czech Republic, Poland, Romania, and Slovakia.[3]

In the case of Belarus, since 1995, the number of preschool institutions dropped by about 10 percent. At the same time, the number of children attending these institutions shrank by about 20 percent. Initially this trend was driven by a sharp decrease in fertility during the 1990s. Once the demographic situation started to slowly improve in the early 2000s[4] other factors were responsible for not being able to catch up with pre-transition levels. One of them

[2] The figures mentioned in the text come from a survey of 3000 households that were interviewed with the aim to study the time use patterns in Belarus, under the joint project of the UNDP and the Belarusian government "The National Strategy to Prevent Poverty in Belarus". These figures are larger than those drawn from the BHSIE because the former also include travel time and other activities related to the main job.

[3] In the Czech Republic, the number of kindergartens declined between 1989 and 2005 by approximately 33 percent. Partly because of this development, the number of children attending a kindergarten dropped from a high of 96 percent in 1989 to 78.3 percent in 2005. There has also been a significant decrease in the number of all preschool facilities in Poland. Fewer facilities mean that accessibility has decreased for some families because of the increased distances they have to travel, especially in rural areas (Plantenga and Remery, 2009).

[4] That is when the positive trend in fertility rates was set, for the first time since the start of transition. This mainly happened via the contribution of the 1980s baby boom cohorts.

is the low status and low pay of preschool teachers that turned as one of the lowest paid professions. That caused a huge outflow of qualified personnel out of the sector. Moreover, the contraction of the number of preschool institutions that continued throughout the 2000s [5], despite fertility being slowly on the rise, led to their crowding out: in 2007, about 46.9 percent of kindergartens had up to 131 children for every 100 places available. Given that crowding and staff qualification are the main criteria for assessing the quality of childcare services, the above developments could explain why an increasing number of women prefer to look after their children on their own or to rely on grandparents.[6] This is reinforced by a cash-for-care scheme that in 2007 allowed for a fixed monthly allowance of about US$50 (65 percent of the minimum living budget) per child for a period of up to three years.

Privatization and market competition has also had an impact on firms, especially the private or privatized ones. According to Stefanova Lauerovà and Terrell (2007), these firms prefer firing women as opposed to men and, largely, hiring men instead of women.[7] Finally, having to pay for services that they used to receive for free, households have started to adapt their labor-market participation and, in most cases, also their fertility decisions by reducing both (United Nations, 2006).

The literature suggests that many factors are at work that need to be taken into consideration and that their overall impact on the relative pay of women might differ depending on the mix of labor-market institutions in the country and the national trends in employment. Factors that might increase the wage gap include: a) female segregation in low

[5] During the period 2000-2008 the number of preschool institutions in Belarus decreased by 7.1%, and the number of children attending them also dropped by 6.5%.

[6] The coverage of children by preschool institutions in Belarus in 2008 was 81.2 percent, 90.7 percent in urban areas and 53.4 percent in rural areas. See, for reference, the following websites: Interfax of Belarus, (29th July 2008), http://www.interfax.by/article/26390; BelTA (Belarusian Telegraphic Agency, 27th of August 2008), http://www.belta.by/ru/actual/comments?id=262777.

[7] Firms generally give preference to male workers, because they tend to believe that women have greater commitment to family duties and, as a consequence, lower commitment to work. Moreover, they believe that women have a greater risk of drop-out because of maternity.

paid jobs (Jurajda, 2005; Ogloblin, 1999); b) labor-hoarding practices, common in FSU countries, that by preventing quantity adjustments might cause wage adjustments instead (Koumakhov and Najman 2000; Namazie 2003); and c) the increased dispersion of the overall wage distribution (Brainerd, 2000). Conversely, factors that are able to potentially reduce the wage gap include: a) a drop in employment rates especially when it affects low-wage female earners (Hunt, 2002); b) the expansion of the high-pay service sector, which is typically female dominated (Giddings, 2002); c) rigid labor-market institutions (Brainerd, 2000); and d) the introduction of Western-type antidiscrimination policies (Jurajda, 2005).

The factors listed have produced two different outcomes. On the one hand, in CEECs, female participation has decreased more than the wage gap has increased. Conversely, in FSU countries, female participation has decreased less than the wage gap has increased.

In fact, the literature documents a remarkable reduction in female employment and participation rates in CEECs where the adjustment has been through quantity instead of price changes (Brainerd, 2000; Giddings, 2002; Hunt, 2002; Paci and Reilly, 2004). In addition, the reduction in the female labor supply has caused female wages to increase slightly through a mechanism of selection of the most motivated and educated women, which might help explain the substantial stability of the gender wage gap (see, for a survey, Paci and Reilly, 2004). In fact, many authors note a reduction in the wage gap in East Germany (Hunt, 2002), Hungary (Brainerd, 2000; Jolliffe and Campos, 2005), Poland, the Czech and Slovak Republics (Brainerd, 2000), Estonia, Slovenia (Orazem and Vodopivec , 2000), and Bulgaria (Giddings, 2002).

According to Brainerd (2000), however, in FSU republics, the evolution of the wage distribution was against women mostly because wages were easier to adjust than quantities due to widespread labor-hoarding practices. Allegedly, labor-market institutions, such as unions, employment-protection legislation, and other national arrangements like wage policy,

minimum wage, and so on, were less binding, therefore favouring dispersion of the wage structure and allowing for differences in women's wages to emerge. Brainerd provides support for this hypothesis based on evidence for Russia and Ukraine. In the same vein, Anderson and Pomfret (2003) document a notable increase in the wage gap in the Kyrgyz Republic.

2. The evolution of the gender wage gap in Belarus

As Figure 1 shows, Belarus can be seen as a special example of an FSU country where female participation rates have changed very little since the collapse of the Soviet Union. According to calculations based on the BHSIE, the participation rate of working age (16–55) women in Belarus was constantly around 80 percent from 1996 to 2006. This was due to the particular process of transition that the country experienced. State-owned enterprises, representing almost a totality of firms in the country, still enjoy soft budget constraints and tend to keep low-productivity workers on the job rather than firing them.

[Figure 1 about here]

Over the 1990s, the gender wage gap was smaller in Belarus than in other transition countries, but it has been increasing at a fast pace. Figure 2 provides measures of the unconditional and the conditional (sometimes also called adjusted or *ceteris paribus*) gender wage gap for three points in time. We use three different measures of wages, all in natural logarithms. Net (of taxes) monthly wages from the main job are defined in the questionnaire as "payment for work in cash from the main job including subsidies, benefits and dividends after deducting payroll and other taxes and alimony (in case it is withheld from wages)." In addition to wages from a main job, total monthly wages also include various forms of monetary and in-kind payments related to the main job. In Belarus, holding a job is important

not only for the wage but also for the benefits afforded by that job. The proposed measure of earnings should allow for other forms of payments related to the main job.

The unconditional wage gap is based on an OLS estimate including only the constant term and a gender dummy. The conditional wage gap is obtained from Mincerian OLS estimates including controls for educational levels, work experience, marital status, disability, industry, firm's ownership, and regions. Monthly hours of work are also included as an explanatory variable in the estimates relative to monthly wages.

The wage gap in terms of monthly wages has more than doubled during the period, from a low of 8 percent in 1996 to a high of 22 percent in 2006. Total (net of taxes) monthly wages also have experienced a doubling of the gap, witnessing the reduced ability of women to attract job-related benefits. The gap in terms of hourly wages has also increased but to a lesser extent.

Another interesting finding that Figure 2 shows is the dramatic, progressive reduction in the difference between the unconditional and the conditional wage gap whatever measure of pay is adopted. The initial difference is a consequence of the greater skills women possessed. The reduction in this difference over time is a sign of a progressive erosion of the female productivity characteristics. Explaining this will be one of the values added of this paper.

[Figure 2 about here]

Figure 3 investigates the wage gap at different quantiles of the hourly wage distribution. In the literature wage gap analysis by deciles has been used to assess the existence of a sticky floor or a glass ceiling effect. The former stands for a situation where the gender gap is larger at the very bottom of the wage distribution, while the latter refers to the increase in the gender wage gap as one goes up the personal distribution of incomes (see, e.g., Dolado and Llorens, 2004). If one assumes that the youngest segments are at the lower end of the personal distribution of incomes, it then appears from Figure 3 that young women obtain similar or

even higher wages than their coeval men, which does not support the hypothesis of a sticky floor effect. As one goes up the personal distribution of incomes, the gender gap increases, although not consistently so in 2006. Therefore, different from what Ganguli and Terrell (2005) found in the case of Ukraine,[8] there is no strong evidence of a glass ceiling effect either.

It is evident from the figure below that the increase of the total gender gap in Belarus went mainly to the detriment of the low- and middle-income groups. Moreover, the decomposition of the gap into coefficient and price effects using Machado and Mata (2005) type of decomposition[9] reveals that the effect of coefficients in rising the gap was increasing over time, while the effect of characteristics in reducing the gap was shrinking over time. In other words, the unexplained or discriminatory component of the gap was increasing, while the explained component was reducing.

[Figure 3 about here]

In short, this section reveals three main stylized facts that the rest of the paper attempts to explain. First, the unconditional wage gap has increased in relative terms by about two times in the case of monthly wages. Second, there has been increasing distance, especially in the last half decade, between the unconditional wage gap in terms of net monthly and hourly wages. The latter has increased only by about one-half. Third, the difference between the unconditional and the *ceteris paribus* wage gap has progressively narrowed and almost disappeared in 2006.

3. Data and methodology

[8] Ukraine records a very persistent glass ceiling effect with the gender pay gap being in the range of 40–50 percent for the 90th decile of the wage distribution from the mid-1980s until 2003. Moreover, the glass ceiling was found to be higher in the public rather than in the private sector—50 and 30 percent, respectively, in 2003 (see Ganguli and Terrell, 2005). We cannot verify the possible difference with our data because they lack consistent information on the private sector.

[9] We used the Stata module by Melly (2006).

To find an explanation of the above stylized facts, the following analysis will first of all estimate wage equations by gender and then implement several decomposition techniques to assess the role of different determinants of wages. The econometric analysis is based on the BHSIE. With about 5,000 households interviewed every year, this survey represents the most comprehensive source of microdata in the country. We use the waves relative to 1996, 2001, and 2006. The available release of the survey includes important information, which was not accessible before, namely, working hours, firm's ownership, sectors, and branches of employment. The sample we have selected for the purpose of this paper includes only wage employees of working age (16–55 for women and 16–60 for men). Pensioners, students, and the self-employed have also been excluded from the sample.[10]

In some estimates, we use the hourly wage as a dependent variable in order to control for the smaller number of hours worked by women as compared to men. However, there are two caveats that must be taken into account when using this measure. First, hourly wage rates are not widely used in Belarus. Second, the calculation procedure may introduce some distortions, for example, by excluding around 200 observations that do not report hours of work. Additionally, the variable is truncated to exclude outliers given that in some cases people declare unusually low wages and extraordinarily high working hours. To control for these measurement errors, the analysis is also carried out using monthly wages. Table A1 in the Appendix contains a detailed definition of each variable used in the estimates, while Table A2 provides descriptive statistics for the sample of men and women in wage work.

Finally, this paper uses a nontraditional definition of work experience, as in Munich, Svejnar, and Terrell (2005). This is obtained by deducting from a standard potential work experience (age – years of education – six) the number of children multiplied by three. This

[10] The number of self-employed is very small in all years considered: 36 persons in 1996, 145 in 2001, and 133 in 2006 (not more than 1 percent of the sample). There are two reasons why we think it is better to exclude them: first, self-employed incomes are defined and depend on a different set of factors; second, there are reasons to believe that the self-employed may not disclose the true information about their earnings.

definition aims to account for the "child leave" as defined in the Labor Code of the Republic of Belarus, which is provided until a child is three-years old.[11] Nonetheless, this measure can understate the real work experience in the case of overlapping three-year periods taken for two children born one after another (rare cases) or not using the parental leave in full.

Note that the specification of the Mincerian equation is slightly different in 2006 due to some small changes in the design of the questionnaire, especially the composition of employment by type of employer. In particular, few observations related to people working in joint and foreign enterprises, leasing enterprises, and joint stock enterprises are pooled together in "other types of employers." Therefore, the coefficients used when implementing pair wise Juhn, Murphy, and Pierce's decomposition for the changes between 1996–2001 and 2001–2006 are slightly different for the same year 2001.[12]

The Juhn, Murphy, and Pierce (1991) methodology has been adopted to disentangle the components of the increased wage gap, as documented in the previous section.[13] Consider the usual log wage regression:

$$w_{it} = X_{it}\beta_t + u_{it} = X_{it}\beta_t + \sigma_t\theta_{it}, \qquad (1)$$

where *t* stands for time, X_{it} is a vector of the observable characteristics of individual *i*, β_t gives the coefficients on these characteristics, σ_t is the within-group standard deviation of wages in year *t*, and θ_{it} is the standardized residual (with mean 0 and variance 1). Taking the male wage equation as reference , the wage gap between men (m) and women (f) at point t, can be written as:

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[11] According to article 184–185 of the Belarusian Labor Code, "fully paid maternity leave cannot be for less than 146 (160) calendar days." However, under special conditions, women can still apply for an extension of maternity leave for up to three years and still be eligible for a State allowance. This refers to women who do not work or work part-time at their main job, not to exceed half of the monthly time norm.

[12] In other words, the 2001 data have been made homogeneous to the 1996 data for the decomposition relative to the first period and homogeneous to the 2006 data for the decomposition relative to the second period. The obvious reason is that the decomposition requires the same specification to be held for two years.

[13] See also Blau and Kahn (2006) for an application of this methodology.

$$\Delta w_t = w_{mt} - w_{ft} = (\Delta \overline{X}_t)\beta_{mt} + \sigma_t \Delta \overline{\theta}_t \,. \qquad (2)$$

The change of the gender wage gap over time can be further decomposed as follows:

$$\Delta w_1 - \Delta w_0 = (\Delta \overline{X}_1 - \Delta \overline{X}_0)\beta_{m0} + \Delta \overline{X}_1(\beta_{m1} - \beta_{m0}) + \sigma_0(\Delta \overline{\theta}_1 - \Delta \overline{\theta}_0) + \Delta \overline{\theta}_1(\sigma_1 - \sigma_0) \,. \quad (3)$$

1. $(\Delta \overline{X}_1 - \Delta \overline{X}_0)\beta_{m0}$ represents changes in the wage gap due to changes in the observed characteristics of men and women evaluated at fixed male prices ("quantity effect of the predicted part of the wage gap").
2. $\Delta \overline{X}_1(\beta_{m1} - \beta_{m0})$ represents changes in the gap due to changes in the returns for men to those observed characteristics ("price effect of the predicted part of the wage gap").
3. $\sigma_0(\Delta \overline{\theta}_1 - \Delta \overline{\theta}_0)$ represents the change in the gap due to changes in the relative position of men and women in the residual wage distribution. If this term is positive, then the average position of women is worse in a later year ("unobserved quantity effect of the residual part of the wage gap").
4. $\Delta \overline{\theta}_1(\sigma_1 - \sigma_0)$ represents the change in the gap due to changes in the degree of dispersion in the residual wage distribution. Provided that $\Delta \overline{\theta}_1$ is negative (as women earn less than men on average), an increase in residual inequality would expand the wage gap even if women maintained the same relative position in the male residual wage distribution ("unobserved price effect of the residual part of the wage gap").

Note that components 1 and 3 are gender-specific factors, and components 2 and 4 depend on the structure of the labor market.[14]

The Juhn, Murphy, and Pierce (1991) methodology has been used in a number of studies on transition economies. As Table 1 shows, findings are different according to the period,

[14] According to Suen's (1997) critique, when wage inequality is increasing, the JMP decomposition would tend to render rising returns to skills and increasing differences in the levels of skills even if there is no change in either prices or quantities. This is unlikely to be the case of Belarus considering the stability of wage inequality over the period considered.

country, and data used. Anderson and Pomfret (2003) found a large increase in the wage gap for the Kyrgyz Republic, but very small changes in observed prices and quantities as compared to those in the residual wage distribution. The main factor was identified in an unobserved quantity effect rather than in an unobserved price effect.

Brainerd (2000) used a specific survey covering several countries and two years in the early 1990s, when the economic transition had already started but before there was any substantial GDP recovery. Most of the dramatic changes in the wage gap in Russia and Ukraine were due to the extreme widening of the wage distribution (unobserved prices), which more than offset the positive effects of changes in returns to observed skills (observed prices) and small relative gains in the mean female rank in the male residual distribution (unobserved quantities). Brainerd found that changes in female characteristics were almost irrelevant.

[Table 1 about here]

In the case of CEECs (Hungary, Poland, the Czech and the Slovak Republics), Brainerd found that the wage gap decreased and changes in the predicted gap were almost immaterial. Changes in the residual wage distribution tended to increase the gap, suggesting that women were negatively affected by the widening of the distribution during the transition (unobserved prices). Nonetheless, important gains in the mean female rank in the male residual distribution (unobserved quantities) outweighed this effect. Overall, changes in the residual wage distribution reduced the wage differential. Hunt (2002), Orazem and Vodopivec (2000), and Giddings (2002) found very similar results for East Germany, Estonia, Slovenia, and Hungary as those of Brainerd (2000).

Using the Longitudinal Monitoring Survey, Reilly (1999) instead found that the wage gap slightly decreased in Russia in the mid-1990s. Moreover, he found that the changes in unobserved quantities and unobserved prices were almost irrelevant. Changes in the residual

distribution were much more sizeable than, for instance, changes in observed quantities and prices. However, as they moved in an opposite direction, they offset each other. Reilly maintained, therefore, that the widening wage structure that occurred during the transition was also gender neutral in Russia.

Finally, Dohmen et al. (2008) document a decrease in the GWG by looking at personal data of one Russian firm. Both predicted and residual gap were found to work in the direction of reducing the gap over 1997-2002. This study was the first to use personnel data and thus warrants attention, but may not be representative for the whole Russian economy-wide trends.

4. Results

Table 2 presents the wage equations. The returns to education are slightly higher, and the profile of work experience is steeper for women. This is a well-known fact in the literature on returns to education. Being married brings a wage premium for men only. In addition, there are industry wage differentials that more or less go in the same direction for both sexes, though with some differences in coefficients.

[Table 2 about here]

Table 3 reports the results of Juhn, Murphy, and Pierce's (1991) decomposition as based on standard Mincerian wage equations presented in Table 2. For every year, the table reports the total unconditional wage differential by gender (Column 1) and the decomposition between the predicted gap (Column 2) and the residual gap (Column 3), which in turn is the component of the gap due to the residual wage distribution. For changes over time, the table reports not only changes in the predicted and the residual gap but also decomposes this change in the part that is due to observed quantity and price effects (under Column 2) and the

part that is due to unobserved quantity and price effects (under Column 3). Negative (positive) values of the reported figures indicate factors that reduce (increase) the wage gap.

The residual component tends to increase the gap in 1996 and 2001, whereas the predicted component tends to decrease it. In 2006, instead, these two forces go in the same direction; that is, they increase the gap. This change over time is the consequence of a continuous reduction of the impact of the residual component and of a continuous increase of the impact of the predicted component.

In addition, it is important to note that in contrast to comparable studies on other FSU republics (Brainerd, 2000; Anderson and Pomfret, 2003), in Belarus, the residual wage distribution has tended to decrease (not to increase) the wage gap. In fact, women have benefited from both changes in the degree of wage inequality and gains in the mean female rank in the male residual distribution. This is hardly surprising if one considers the remarkable stability of the Gini coefficient.[15]

Disentangling changes in the predicted gap in quantity and price effects, denoted by Q and P, respectively, in Table 3, it appears that they are both positive. Overall, the trends observed in the case of hourly wages also hold true when one looks at the monthly measures of pay.

[Table 3 about here]

To sum up the previous discussion, changes in both the productive characteristics of women (observed quantities) and in the way such characteristics are priced in the market (observed prices) are behind the increase in the wage gap. This suggests not only that the productive potential of women is decreasing but also that it is causing a reduction in the remuneration that women receive for the same characteristics as men. This conclusion finds support in the way the transition has affected female labor market outcomes. As noted earlier, the opportunity cost for childrearing and household work for women increased during

[15] In unreported estimates based on the BHSIE, the Gini coefficient is very stable at about 0.32–0.36, whatever the measure of wages adopted.

transition. In turn, this has pushed women to reduce their commitment to market work. Since, however, this reduction has not occurred via lower participation (see above) we can surmise that, in order to accommodate their increasing hours in unpaid family work women resorted to either of the following alternatives: a) decreasing the relative number of hours spent in formal work or b) moving to jobs that require a lower work commitment. Both developments are likely to have negatively affected not only female productive characteristics but also their remuneration.

What evidence is available in favor of this hypothesis? Panel A of Figure 4 provides kernel density estimates of the distribution of weekly working hours and monthly wages by gender for the years under scrutiny. Apparently, the overall amount of working time of women has remained more or less stable as well as the share of part-time laborers.[16] However, women have reduced their commitment to market work *relative* to men. In fact, the male work effort in terms of average weekly hours has been higher than that of women, reaching 39.8 hours per week in 2006. This corresponds to a relatively bigger increase in the share of men doing the contractual working hours: the frequency of the modal value of the distribution is increasing in the case of men from about 25 in 1996 to 36 in 2006, whereas in the case of women only from 21 to 25.

[Figure 4 about here]

Interestingly, as shown in Table 4, the gender differences in working hours concentrate among individuals in the top quartile of the personal income distribution. For this group, the gap amounts to around two hours of work per week, equivalent to one full-time working day per month. Note, however, that the difference in hours between men and women in the top earnings quartile is small when compared to Western countries. In an environment where almost everyone works full time, even such small variation in work hours can affect wages.

[16] As Malysheva and Verashchagina (2008) note, part-time employment represents a very low share of total employment in almost all transition countries because of the low average level of part-time pay.

[Table 4 about here]

Gender differences in working hours might also explain the difference between the evolution of the wage gap in the log of hourly and monthly wages, as evidenced in Figure 2. Recall, the wage gap in hourly wages increased by only one-half when compared to that of monthly wages. The simple explanation is that the relative number of weekly hours of work has increased in favor of men. Panel B of Figure 4 confirms this by comparing the distribution of monthly wages of men and women over time: it shows that real wages increased relatively more for men than women.

In addition to decreasing their relative working hours, women may reduce their commitment to market work by reinforcing their choice in favor of feminized but flexible hour's jobs, where pay tends to be lower. Low wages for both men and women coupled with fringe benefits for public sector jobs, favor a two-breadwinner family model. This model induces women to work predominantly full time, despite the very high number of hours they spend doing unpaid family work.[17] Men often hold manufacturing jobs that are closely related to the production line, whereas women more frequently work in the personal service industry or hold white-collar jobs. In Belarus, the segregation of women away from the manufacturing sector and into the services sectors happens for the same reasons that it happens in any other part of the world. In the manufacturing sector, work hours are less flexible because the continuous flow of production without interruption is necessary, which is usually not essential in the services sectors.

Table 5 provides evidence in favor of increased segregation of women into low paid, service type jobs. It reports a breakdown of the composition of employment by sector and gender during the three years of the study. In addition to the female shares of employment in each sector (Columns 2, 6, and 10) and the change in the female share from one year to the

[17] Unreported estimates based on the BHSIE point to a relatively small fraction (about 10 percent) of women holding secondary jobs (for further details, see Haiduk et al., 2005; Sokolova, 2005).

next (ΔF, Columns 5 and 9), the table also gives sector specific wages in ratio to the national average (Columns 3, 7, and 11) and the share of each sector over total employment (Columns 4, 8, and 12).

The table clearly shows that a dramatic redistribution of employment by gender has occurred over time, especially in the first period from 1996 to 2001, as also UNDP documents.[18] In 1996, men and women were almost evenly distributed across sectors. In 2001, women appeared more frequently in traditional female-dominated sectors, especially the services sectors, whereas the number of women dramatically decreased in the so-called "material production" sector, which was the most prized sector in Soviet times and which remains so in modern Belarus, as Columns 3, 7, and 11 of the table show. In our view, this massive process of segregation partly explains why the effect of characteristics in reducing the gap has shrunk over time.

[Table 5 about here]

By contrast, the increasing importance of segregation for women's comparative wages is underscored by the dramatic rise in significance of the correlation between the female share and the average wage paid in each industry. The value of the Pearson coefficient was –0.23 (28 percent significance) in 1996, –0.08 (72 percent significance) in 2001, and –0.51 (1 percent significance) in 2006 (Figure 5).

[Figure 5 about here]

As we show below, in fact, the amount of reshuffling of women that occurred across sectors of employment, has outweighed the remarkable increase in the relative educational level of women. In Belarus, as in many other countries, women have overtaken men in tertiary education, which resulted in an almost equal composition of skilled labor force by

18 Note that the UNDP report relies on aggregated statistics. That is why some of the findings may slightly differ from those based on BHSIE and reported in this paper. See UN in Belarus, "Moving Gender Equality to the Center of Development Work," http://un.by/en/gender/, March 2006.

gender. According to the population census, 1.7 percent of men had some higher education in 1959, 7.8 percent in 1979, and 14.1 percent in 1999. The corresponding figures for women are 1.5, 6.3, and 13.9 percent (BelStat).

Table 6 provides evidence for 1996 and 2001 that the process of employment segregation by gender starts before the labor market entry.[19] In Belarus, women show a higher preference for university degrees in pedagogy and humanities which lead to typically female low-paid jobs. For example, in both years, the share of women holding a degree in economics, medicine, and natural sciences is higher than average, whereas it is lower than average in engineering, military school, and agriculture. However, there are marked changes in the distribution of men/women by field of study over the period considered, in at least two disciplines, humanities and pedagogy.

[Table 6 about here]

The comparative contribution to the wage gap of educational attainment and segregation is summarized in Figure 6. The figure presents a snapshot of the contribution of observed productive characteristics on the wage gap in terms of log of net monthly wages during the three years considered, as obtained by applying the Juhn, Murphy, and Pierce's (1993) methodology. This decomposition technique is similar to that of Juhn, Murphy, and Pierce (1991) but refers to a given point in time. Each bar represents the average contribution of a given group of characteristics: for instance, under the term "education" is the average contribution of all educational variables to the gender gap. The Figure shows that the increasingly higher educational level attained by women made them more able to "swim upstream" and to partly offset unfavorable changes in the structure of employment and the hours of work. Nevertheless, the overall change in the observed characteristics of women contributed to an increase and not a decrease in the wage gap over time.

[19] The presence of forms of market-entry segregation has also been noted in the case of other transition countries (see, among others, Orazem and Vodopivec, 2000; Giddings, 2002; Bettio and Verashchagina, 2009).

[Figure 6 about here]

The analysis implemented so far did not control for sample selection bias. As already noted, in the case of Belarus, the share of the non-employed individuals is low, which suggests that there is little room for sample-selection bias.[20] To test this hypothesis, we run a maximum likelihood estimation of the selectivity corrected wage equation for all the years considered. The instrumental variables used include age at the birth of the first child, the presence in the household of children under the age of five, the number of elderly over the age of 60, the number of individuals in poor health, and other family income. The results presented in Table 7 suggest rejecting the hypothesis of sample-selection bias in two out of the three years considered for women, while there is evidence of sample selection for men.

[Table 7 about here]

We further investigate the significance and implications of sample selection for the gender gap using the decomposition proposed by Neuman and Oaxaca (2004):

$$\overline{Y}_m - \overline{Y}_f = \underbrace{\overline{X}'_f(\hat{\beta}_m - \hat{\beta}_f)}_{coefficients} + \underbrace{(\overline{X}_m - \overline{X}_f)'\hat{\beta}_m}_{endowments} + \underbrace{(\hat{\varphi}_m\mu_m - \hat{\varphi}_f\mu_f)}_{selectivity}, \quad (4)$$

where indices *m/f* stand for *men/women,* $\overline{Y}$ is the predicted mean log hourly wage, $\overline{X}$ is the vector of means of personal characteristics entering the wage equation, $\hat{\beta}$ is the vector of estimated coefficients, $\hat{\varphi}$ is an estimate of $\rho\sigma_u$ and μ is an estimate of the mean Inverse Mills Ratio.

The results are presented in Figure 7, where the decomposition of the gap with a correction for sample selection bias as based on equation (4) (and Table 7) is compared with a standard Blinder (1973) and Oaxaca (1973) type of decomposition as based on Table 2. The figure shows that when accounting for sample selection bias, the overall wage gap diminishes by

[20] This conclusion does not change if one includes a small number of outliers (two in 1996, seven in 2001, and 11 in 2006) relative to the wage variable together with the non-employed in the estimates of wage equations corrected for sample selection bias.

about one per cent only. This reduction is due to the already mentioned greater negative selectivity bias in the case of men. In other words, unobserved differences between employed and non employed individuals are greater for men than for women. This reduces the overall GWG given that the average male wage figure diminishes once (hypothetical) wages for the non employed are included in the calculation.

In addition, the selectivity term affects the overall gap more in 1996 and 2006 when our estimates cannot detect selectivity bias in the case of women. As a result, the term $\hat{\varphi}_f \mu_f$ in equation (4) tends to zero, which magnifies the effect of selectivity for men. In 2001, when $\hat{\varphi}_f \mu_f > 0$, selectivity does not affect much the gender gap.

[Figure 7 about here]

The main effect of accounting for selectivity in the otherwise standard Oaxaca (1973) and Blinder (1973) decomposition is that of increasing the discriminatory component of the gap. However, this is easily explained considering that we have been forced to drop important determinants of wages in order to correctly implement the sample selection procedure. In fact, although allowing us to control for the overall impact of unobservable factors, the sample-selection-corrected estimates of Mincerian wage equations imply giving up the goal of assessing the impact of some important observables. In particular, sectors of employment seem to be of the utmost importance in the case under scrutiny, as the following discussion shows. Nevertheless, they should not be included in the selection equation as they are not defined for the jobless people (Wooldridge, 2003, p. 588).

While the evidence on selectivity is mixed, and is particularly weak for women, correcting for selectivity has the disadvantage of dropping the relevant variables and therefore worsening the quality of the predicted wage series.

Concluding remarks and policy implications

The apparent stability of employment and participation rates may induce the a priori expectation that the slow transition process was gender neutral in Belarus. However, the evidence provided in this paper suggests the existence of sizeable changes in the unconditional wage gap from 1996 to 2006, and the analysis of the components of this change unravels a possibly different interpretation, namely, that the transition negatively affected women more than men in Belarus. In other FSU Republics (Brainerd, 2000; Anderson and Pomfret, 2003), women experienced a reduction in wages more so than in employment and participation rates. Belarus can be seen as a particular case of the FSU, whereas the wage gap more than doubled, but employment and activity rates remained unchanged.

To explain the stability of activity rates *and* the sizeable reductions in unconditional average wages of females in Belarus, one should have in mind an analytical framework where female labor demand is decreasing, but the female labor supply is rigid. This case is different from some other CIS countries, where wages have adjusted, but the labor supply has decreased. It is even more different from the CEE countries where the labor supply has decreased somewhat more due to rigid wage-setting mechanisms.

The results of a Juhn, Murphy, and Pierce's (1991) decomposition of changes in the wage gap from 1996 to 2006 are consistent with the predictions. The analysis shows that unlike Russia and Ukraine (Brainerd, 2000) most of the increase in the wage gap was due to changes in observed prices for female skills. Observed characteristics reduced the gap until 2001. After that, they started to increase the gap. This is consistent with the hypothesis that the effort of women to increase their qualification level was progressively offset by a dramatic process of segregation into low-wage, typically female occupations in the public and social services sectors and out of the "material production sector." This hypothesis is confirmed by Juhn, Murphy, and Pierce's (1993) decomposition analysis. Also, and in contrast to

comparable studies on other FSU republics, the residual wage distribution tended to decrease not increase the wage gap. This is hardly surprising if one considers the remarkable stability of the Gini coefficient over the decade object of this study.

The analysis proposed in this paper has clear policy implications. Before the transition, the countries in Eastern Europe had a relatively well-functioning, free system of childcare services. This allowed a very high percentage of children to attend preschool institutions. The Barcelona targets, which for most old EU15 member states still seemed hard to reach, were already achieved by the new EU member states at the outset of the economic transition from plan to market. Recently, however, some countries in the area have fallen behind the Lisbon target. In all new EU member states, there has been a sharp decrease in the number of preschool institutions, a change in social norms as regards gender issues, and even more importantly a lack of state funds to support the high participation of women in the labor market.

As shown in this paper, the peculiarity of the Belarusian case is that most women remained at work but moved to service sector jobs, which remained low-paid jobs even after the transition. This massive process of segregation was the way women responded to the increasing cost of childrearing which followed the reduction in the quantity and quality of State services and forced upon them an increase in the number of hours spent in unpaid family duties. The reason women did not quit their jobs altogether during transition in Belarus is that wages are sufficiently low that only two-breadwinner families can survive.

However, it is likely that, if the direction of changes remains the same, an increasing number of women will leave the labor market after giving birth. Indeed, the current financial and industrial crisis is likely to further reduce the State financial effort as well as the income opportunities of the Belarusian people, women in particular.

The Belarusian government tends to stress demographic targets, mainly the need to increase the fertility rate instead of gender equality. Apparently, this has had a positive effect on the fertility rate, but the evidence provided here suggests that it may happen at the cost of greater gender inequality. There is mounting evidence that, in an industrialized market setting there need not be a conflict between higher fertility and higher labor market participation, and it is therefore important to provide good assistance for childrearing in order to keep women in the work force and, at the same time, to encourage them to have children. Scandinavian countries are the clearest and best known example. This evidence suggests that the positive outcome of the government policy on fertility might not hold in the long run unless it is coupled with greater gender equality.

A number of additional issues are also worth reconsidering. For instance, it is worth asking whether a maternity leave of three years is appropriate. After such a long time away from the work force, women dramatically lose their competitiveness in the labor market. Such a delay might generate a long-lasting scarring effect. An alternative to long maternity leaves might be to offer flexible working arrangements, which would allow women to better reconcile work and family life. Incentives for the use of part-time work arrangements, especially on a temporary basis, might be an important instrument for the development of more effective reconciliation strategies. Ensuring effective training after long maternity leaves might also prevent excessive loss of skill on account of child-rearing. Finally, reconciliation strategies need to include men in order to ensure effective gender equality in the long run.

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TABLES

Table 1. Previous studies on CIS countries using the Juhn, Murphy, and Pierce (1991) decomposition

Author	Country	Period	Change in wage gap	Observed quantities	Observed prices	Unobserved quantities	Unobserved prices
Anderson and Pomfret (2003)	Kyrgyz Republic (KLSMS)	1993-97	0.304 (hw; no ind/occ) 0.285 (hw; with ind/occ)	-0.027 0.021	0.027 0.066	0.339 0.214	-0.055 -0.016
Brainerd (2000)	Ukraine (VTsIOM)	1991-94	0.274 (mw)	-0.011	-0.0113	-0.052	0.349
	Russia (General Social Survey)	1991-94	0.150 (mw)	0.003	-0.013	-0.041	0.198
	Hungary (Labor Force Survey, Tarki)	1986-91	-0.054 (mw)	-0.023	-0.004	-0.284	0.257
	Poland (Household Budget Survey)	1986-92	-0.124 (mw)	-0.015	-0.001	-0.153	0.045
	Czech Republic (Class and Social Structure Survey)	1984-92	-0.049 (mw)	-0.02	0.010	-0.256	0.217
	Slovak Republic	1984-92	-0.093 (mw)	-0.032	0.008	-0.250	0.182
Dohmen et al. (2008)	Russia	1997-02	-0.199 (mw)	-0.047	-0.010	-0/062	-0.080
Giddings (2002)	Bulgaria	1992-95	-0.087 (mw)	-0.014	-0.017	-0.122	0.066
Hunt (2002)	Eastern Germany (GSOEP)	1990-94	-0.112 (mw)	-0.035	0.009	-0.102	0.017
Orazem and Vodopivec (2000)	Estonia (Retrosp. LFS)	1989-94	-0.140 (hw)	-0.020	-0.060	-0.146	0.046
	Slovenia (Social security data)	1987-91	-0.030 (hw)	-0.012	-0.014	-0.100	0.097
Reilly (1999)	Russia (RLMS)	1992-96	-0.014 (mw) -0.007 (hw)	-0.018 -0.007	-0.018 -0.043	-0.078 -0.011	0.100 0.054
This study	*Belarus (BHSIE)*	*1996-2001*	*0.031 (hw)* *0.044 (mw)*	*0.014* *0.022*	*0.045* *0.023*	*-0.023* *0.016*	*-0.005* *-0.017*
		2001-2006	*0.057 (hw)* *0.092 (mw)*	*0.019* *0.031*	*0.058* *0.072*	*-0.004* *0.016*	*-0.017* *-0.028*

Note:

[a] mw stands for monthly wages; hw stands for hourly wages.

[b] Anderson and Pomfret (2003) provide two types of results for the Kyrgyz Republic, one based on wage equations including industry and occupation variables, and the other without them.

[c] Note that a positive (negative) sign means an increase (a reduction) in the wage gap.

Table 2. Wage equations (1996, 2001 and 2006)

Variables	Male			Female		
	1996	2001	2006	1996	2001	2006
Dep. variable – *ln* of hourly wage						
University	0.436***	0.499***	0.541***	0.572***	0.631***	0.700***
	(0.045)	*(0.051)*	*(0.045)*	*(0.046)*	*(0.051)*	*(0.056)*
Technical school	0.254***	0.294***	0.27***	0.235***	0.27***	0.237***
	(0.042)	*(0.047)*	*(0.042)*	*(0.043)*	*(0.049)*	*(0.054)*
Vocational school	0.121***	0.202***	0.168***	0.042	0.048	0.001
	(0.038)	*(0.047)*	*(0.041)*	*(0.044)*	*(0.052)*	*(0.055)*
Gen.secondary school	0.11***	0.142**	0.148***	0.048	0.037	0.007
	(0.039)	*(0.046)*	*(0.042)*	*(0.043)*	*(0.049)*	*(0.055)*
Work experience	0.009*	0.022***	0.011**	0.022***	0.026***	0.030***
	(0.004)	*(0.004)*	*(0.004)*	*(0.004)*	*(0.004)*	*(0.004)*
Work experience2	-0.0001*	-0.0001***	-0.0001**	-0.001***	-0.001***	-0.001***
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Married	0.187***	-0.051	0.221***	0.001	-0.031	0.002
	(0.038)	*(0.027)*	*(0.034)*	*(0.034)*	*(0.025)*	*(0.030)*
Divorced/Widowed	0.031	-0.063	-0.173**	0.011	-0.043	-0.032
	(0.071)	*(0.036)*	*(0.057)*	*(0.041)*	*(0.032)*	*(0.035)*
Disabled	-0.369	-0.166	-	-0.224	-0.646***	-
	(0.202)	*(0.207)*		*(0.215)*	*(0.244)*	
Chernobyl	-0.013	-0.091	-	0.053	-0.065	-
	(0.044)	*(0.050)*		*(0.037)*	*(0.035)*	
Joint stock company	0.155**	0.131**	-	0.249***	0.091*	-
	(0.050)	*(0.041)*		*(0.041)*	*(0.037)*	
Private sector	0.167*	-0.018	-	0.256***	0.135**	-
	(0.075)	*(0.045)*		*(0.071)*	*(0.045)*	
Budget organisation	-0.037	-0.22***	0.116**	0.025	-0.207***	0.097***
	(0.058)	*(0.046)*	*(0.044)*	*(0.047)*	*(0.053)*	*(0.045)*
Collective farm	-0.36***	0.129	-0.116	-0.394***	0.126	-0.144
	(0.048)	*(0.077)*	*(0.066)*	*(0.065)*	*(0.086)*	*(0.083)*
Agriculture, forestry, fishing	-0.148**	-0.294***	-0.16**	0.045	-0.259***	0.082
	(0.049)	*(0.044)*	*(0.049)*	*(0.061)*	*(0.048)*	*(0.070)*
Transport, communications	0.049	-0.036	0.067	0.154***	0.115*	0.112*
	(0.039)	*(0.041)*	*(0.035)*	*(0.046)*	*(0.045)*	*(0.046)*
Construction	0.042	0.025	-0.01	0.148***	0.086	0.104
	(0.037)	*(0.038)*	*(0.031)*	*(0.056)*	*(0.059)*	*(0.057)*
Trade and Catering	-0.093	-0.154**	-0.246***	-0.081*	-0.133***	-0.143***
	(0.055)	*(0.055)*	*(0.044)*	*(0.034)*	*(0.032)*	*(0.031)*
Services	-0.029	-0.073	-0.005	-0.117	-0.076	-0.129
	(0.078)	*(0.076)*	*(0.062)*	*(0.081)*	*(0.085)*	*(0.077)*
Social and public services	-0.032	-0.009	-0.116**	-0.148**	-0.118*	-0.086*
	(0.053)	*(0.050)*	*(0.043)*	*(0.051)*	*(0.051)*	*(0.042)*
Health, social security	0.106	-0.294***	-0.211**	0.018	-0.155***	-0.068*
	(0.090)	*(0.073)*	*(0.064)*	*(0.056)*	*(0.035)*	*(0.033)*
Education	0.027	-0.114*	-0.22***	0.058	-0.116***	-0.037
	(0.078)	*(0.058)*	*(0.051)*	*(0.055)*	*(0.033)*	*(0.030)*
Management	0.345***	0.186***	0.15***	0.193***	-0.011	0.069
	(0.068)	*(0.052)*	*(0.044)*	*(0.066)*	*(0.054)*	*(0.050)*
Finance	0.266	0.13	-0.233*	0.122	0.149*	0.214*
	(0.152)	*(0.131)*	*(0.114)*	*(0.074)*	*(0.075)*	*(0.071)*
Culture, arts and science	-0.084	-0.162	-0.199*	-0.128	-0.238***	-0.228***

	(0.098)	*(0.104)*	*(0.083)*	*(0.069)*	*(0.059)*	*(0.055)*
Constant	1.712***	6.404***	7.569***	1.43***	6.144***	7.339***
	(0.059)	*(0.064)*	*(0.069)*	*(0.060)*	*(0.064)*	*(0.079)*
N obs.	2668	2553	2711	2705	2830	2882
Adj. R^2	0.3782	0.3139	0.3428	0.2958	0.3022	0.3420

Note: *significant at 10%; **significant at5%; *** significant at 1%.
The specification also includes a set of regional dummies as defined in Table A1 in the Appendix.
Source: Own elaboration on the BHSIE.

Table 3. Decomposing the change in the GWP over time (between the years 1996-2001, and 2001-2006) (based on Juhn, Murphy, and Pierce, 1991 and 1993)

Reference wage	Reference year	Total difference (male-female) (1)	Predicted gap (2)	Residual gap (3)
		1996-2001		
Hourly	2001	0.1166	-0.0303	0.1469
	1996	0.0860	-0.0891	0.1751
	GWG (2001-1996)	***0.0306***	***0.0588***	***-0.0282***
			Q P	*Q P*
			0.0135 0.0453	*-0.0234 -0.0048*
Monthly	2001	0.1197	-0.0174	0.1370
	1996	0.0758	-0.0626	0.1383
	GWG (2001-1996)	***0.0439***	***0.0452***	***-0.0013***
			Q P	*Q P*
			0.0221 0.02310	*0.0160 -0.0173*
Total monthly	2001	0.1203	-0.0135	0.1338
	1996	0.0662	-0.0648	0.1311
	GWG (2001-1996)	***0.0541***	***0.0514***	***0.0027***
			Q P	*Q P*
			0.0278 0.0235	*0.0195 -0.0168*
		2001-2006		
Hourly	2006	0.1732	0.0489	0.1243
	2001	0.1166	-0.0303	0.1469
	GWG (2006-2001)	***0.0566***	***0.0771***	***-0.0205***
			Q P	*Q P*
			0.0191 0.0579	*-0.0036 -0.0169*
Monthly	2006	0.2113	0.0870	0.1243
	2001	0.1197	-0.0174	0.1370
	GWG (2006-2001)	***0.0916***	***0.1038***	***-.0127***
			Q P	*Q P*
			0.0314 0.0724	*0.0160 -0.0282*
Total monthly	2006	0.2110	0.0865	0.1246
	2001	0.1203	-0.0135	0.1338
	GWG (2006-2001)	***0.0907***	***0.0993***	***-0.0086***
			Q P	*Q P*
			0.0301 0.0692	*0.0208 -0.0294*

Note: Wages are expressed in natural logarithms. The log of hours of work at the main job is included as an explanatory variable. Different from the net monthly wage, the total (net) monthly wage includes also various forms of additional monetary as well as in-kind payments. "Q" stands for quantity effect and "P" stands for price effect.
Source: Own elaboration on the BHSIE.

Table 4. Average weekly hours of work by gender for the bottom, middle and top quartiles of the hourly wage distribution

	Men			Women		
Year	<25	25-75	>75	<25	25-75	>75
1996	39.82	39.57	39.68	39.29	38.93	36.70
2001	39.43	39.73	39.32	39.08	39.46	37.44
2006	39.72	40.18	39.29	38.92	39.28	36.91

Source: Own elaboration on the BHSIE.

Table 5. The gender composition of employment by sector of industry

	1996			2001				2006			
Sector	Share of female employees in the sector, %	% of the average wage in the sector to the average wage in the country	Share of the sector in the number of the total employed	*Change in the number of female employees, ΔF (2001-1996)*	Share of female employees in the sector, %	% of the average wage in the sector to the average wage in the country	Share of the sector in the number of the total employed	*Change in the number of female employees, ΔF (2006-2001)*	Share of female employees in the sector, %	% of the average wage in the sector to the average wage in the country	Share of the sector in the number of the total employed
1	2	3	4	5	6	7	8	9	10	11	12
Industry	51.0	108.6	25.3	*-75*	47.7	110.7	24.8	*17*	46.1	110.7	23.3
Agriculture	52.2	55.9	20.7	*-283*	38.7	64.1	16.0	*40*	43.6	70.9	14.0
Forestry	58.8	84.7	1.7	*-51*	13.6	91.0	1.1	*4*	14.9	93.3	1.3
Fishing	57.1	74.1	0.1	*-3*	20.0	101.5	0.1	*-1*	-	-	-
Transportation and communication	49.8	114.2	6.8	*-51*	36.9	111.7	7.0	*-6*	33.3	121.7	6.6
Construction	50.9	123.6	6.7	*-126*	19.7	125.7	6.8	*20*	18.7	122.8	8.0
Trade and public catering	55.1	99.6	8.3	*220*	78.2	88.7	10.6	*47*	73.3	83.5	11.0
Material and technical supply and sales activity	48.7	90.3	0.6	*-10*	25.8	117.0	0.5	*-2*	37.5	114.5	0.2
Procurement	25.0	97.3	0.1	*1*	28.6	62.8	0.1	*1*	42.9	93.9	0.1
Information and computer services	58.3	133.0	0.2	*-4*	60.0	174.2	0.1	*-1*	14.3	176.4	0.2
Real-estate activities	33.3	250.3	0.1	*-1*	-	-	-	*3*	50.0	134.7	0.1
Commercial and market activity	50.0	225.8	0.1	*0*	57.1	158.7	0.1	*2*	66.7	119.5	0.1
Geology and mineral wealth prospecting	54.6	159.8	0.2	*-2*	42.9	119.4	0.1	*-1*	11.8	156.6	0.3
Other types of activities in material production	45.8	110.0	0.4	*9*	42.6	88.4	0.8	*11*	51.7	108.6	0.9
Housing and communal services	57.6	97.0	2.7	*-6*	37.6	101.1	4.0	*43*	42.9	96.8	4.6
Non-production consumer services	54.2	81.0	1.2	*-4*	71.4	79.2	0.8	*23*	82.9	78.5	1.1
Health care, sports and social security	53.6	92.4	7.2	*157*	84.3	82.4	7.8	*30*	83.5	88.9	7.5
Education	54.6	92.7	9.9	*231*	80.9	85.1	11.6	*122*	82.2	90.1	12.4
Culture and art	48.6	86.6	1.2	*28*	72.9	87.8	1.4	*16*	76.5	77.9	1.5
Science and scientific activities	52.6	155.0	0.6	*3*	74.2	107.1	0.5	*-1*	59.5	136.5	0.6
Credit and finance, insurance, pensions security	51.5	113.7	1.1	*18*	73.2	122.4	1.2	*2*	71.1	130.1	1.1
Administration	48.9	144.1	4.6	*-37*	39.4	135.0	4.3	*35*	43.6	141.4	4.6
Public associations	35.7	76.6	0.2	*1*	66.7	72.5	0.2	*6*	48.0	75.0	0.4
Total			100 (6,038)	*14*			100 (5,947)	*410*			100 (6,693)

Note: [1] in 2006 Fishery is included into Industry or Agriculture, depending on the type of activity.
[2] Positive values for ΔF mean an increase in the number of female workers.
[3] We specify only the share of female employees in the sector. By subtracting it from 100, one can obtain the corresponding share of male employees.
Source: Own elaboration on the BHSIE.

Table 6. Field of higher education attained by gender

Field of study	Education attainment						Wage effect
	1996			2001			1996-'01[a]
	Men	Women	Total	Men	Women	Total	Total
Economics	39	108	147	48	134	182	0.73
in %	6.14	14.5	10.65	7.22	15.67	11.97	
Medicine	25	56	81	20	53	73	0.84
in %	3.94	7.52	5.87	3.01	6.2	4.8	
Engineering	248	142	390	262	197	459	0.70
in %	39.06	19.06	28.26	39.4	23.04	30.2	
Natural Sciences	23	40	63	23	33	56	0.65
in %	3.62	5.37	4.57	3.46	3.86	3.68	
Humanities	38	75	113	62	108	170	0.72
in %	5.98	10.07	8.19	9.32	12.63	11.18	
Pedagogic	82	264	346	79	269	348	0.53
in %	12.91	35.44	25.07	11.88	31.46	22.89	
Military school	96	2	98	75	0	75	0.47
in %	15.12	0.27	7.1	11.28	0	4.93	
Agriculture	84	58	142	96	61	157	0.55
in %	13.23	7.79	10.29	14.44	7.13	10.33	
Total	635	745	1,380	665	855	1,520	
in %	100	100	100	100	100	100	0.74

Note: [a] The last column reports wage effects by type of degree as an average between the 1996 and 2001 coefficients as based on wage equations of the type in Table 2. Note also that the wage effect of military school is low, because it is partly caught by a separate dummy for those employed in the military sector (45% higher wage than average). Unfortunately, the question on the type of degree has been dropped in the 2006 release of the data.

Source: Own elaboration on the BHSIE.

Table 7. Maximum likelihood estimation of the selectivity corrected wage equations

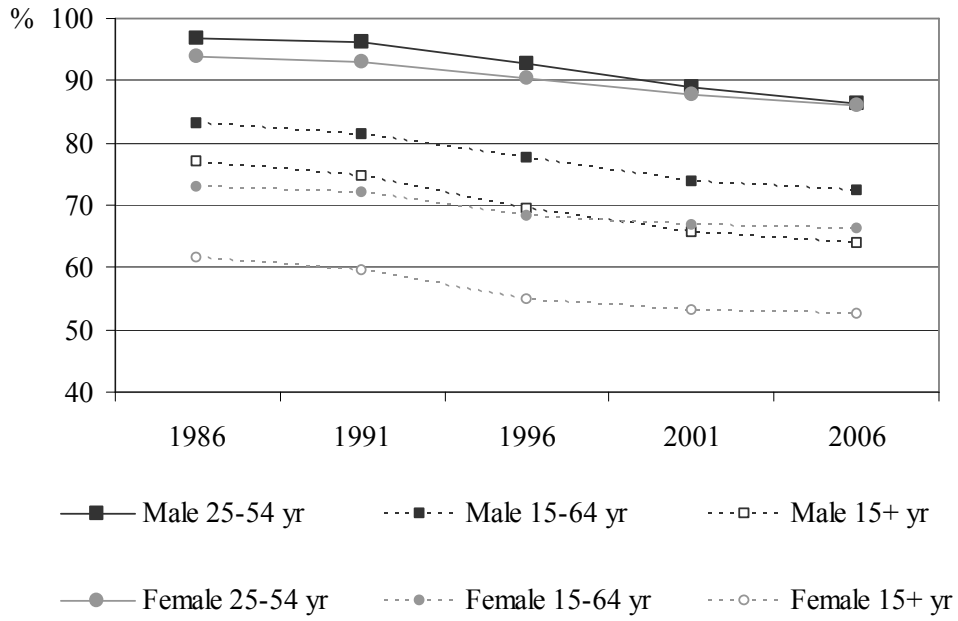
	Men			*Women*		
	1996	2001	2006	1996	2001	2006
Wage equation						
University	0.443***	0.251***	0.302***	0.593***	0.374***	0.735***
	(0.053)	*(0.057)*	*(0.051)*	*(0.066)*	*(0.061)*	*(0.067)*
Technical school	0.216***	0.057	0.066	0.239***	0.063	0.255***
	(0.051)	*(0.053)*	*(0.048)*	*(0.056)*	*(0.057)*	*(0.063)*
Vocational school	0.083	-0.01	-0.038	0.044	-0.095	0.016
	(0.044)	*(0.053)*	*(0.046)*	*(0.054)*	*(0.058)*	*(0.063)*
Gen. secondary school	0.073	-0.059	-0.061	0.065	-0.112*	0.011
	(0.045)	*(0.051)*	*(0.047)*	*(0.053)*	*(0.056)*	*(0.063)*
Work experience	-0.006	-0.003	-0.003	0.013	-0.008	0.027***
	(0.006)	*(0.005)*	*(0.004)*	*(0.007)*	*(0.005)*	*(0.005)*
Work experience2	0.000	-0.000	-0.000	-0.000	0.000	-0.001***
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Married	0.131**	-0.035	0.163***	-0.014	-0.016	0.037
	(0.045)	*(0.025)*	*(0.032)*	*(0.023)*	*(0.022)*	*(0.019)*
Constant	2.065***	7.021***	8.105***	1.575***	6.695***	7.355***
	(0.122)	*(0.073)*	*(0.063)*	*(0.122)*	*(0.086)*	*(0.088)*
Selection equation						
University	0.709***	1.043***	1.1***	1.319***	1.347***	1.845***
	(0.095)	*(0.097)*	*(0.113)*	*(0.105)*	*(0.102)*	*(0.115)*
Technical school	0.542***	0.880***	0.924***	0.794***	0.976***	1.493***
	(0.092)	*(0.088)*	*(0.094)*	*(0.091)*	*(0.091)*	*(0.105)*
Vocational school	0.351***	0.741***	0.859***	0.616***	0.821***	1.33***
	(0.074)	*(0.086)*	*(0.086)*	*(0.091)*	*(0.099)*	*(0.109)*
Gen. secondary school	0.406***	0.665***	0.9***	0.602***	0.857***	1.284***
	(0.077)	*(0.080)*	*(0.091)*	*(0.091)*	*(0.093)*	*(0.107)*
Work experience	0.088***	0.104***	0.055***	0.157***	0.166***	0.116***
	(0.009)	*(0.008)*	*(0.011)*	*(0.011)*	*(0.011)*	*(0.013)*
Work experience2	-0.002***	-0.002***	-0.001***	-0.004***	-0.004***	-0.003***
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Married	0.463***	0.032	0.659***	0.063	-0.03	0.081
	(0.072)	*(0.050)*	*(0.082)*	*(0.063)*	*(0.052)*	*(0.068)*
First child 15-17	-	-	-	-0.043	0.646**	0.867**
				(0.286)	*(0.234)*	*(0.284)*
First child 18-22	-	-	-	0.349***	0.394***	0.356***
				(0.084)	*(0.079)*	*(0.099)*
Children under 5 in HH	0.146*	0.422***	0.017	-0.381***	-0.453***	-0.876***
	(0.063)	*(0.062)*	*(0.074)*	*(0.060)*	*(0.059)*	*(0.069)*
Elderly over 60 in HH	-0.225***	-0.428***	-0.142	-0.138	-0.269***	-0.037
	(0.067)	*(0.060)*	*(0.074)*	*(0.076)*	*(0.066)*	*(0.086)*
Poor health	-0.167*	-0.429***	-0.456***	-0.13	-0.288***	-0.378**
	(0.069)	*(0.074)*	*(0.126)*	*(0.069)*	*(0.076)*	*(0.120)*
Other income	-0.032	0.084***	-0.029	-0.128***	0.026	-0.178***
	(0.029)	*(0.010)*	*(0.017)*	*(0.029)*	*(0.014)*	*(0.031)*
Constant	-0.606*	-2.055***	-0.126	-0.267	-1.663***	1.254**
	(0.244)	*(0.161)*	*(0.263)*	*(0.251)*	*(0.208)*	*(0.454)*
Rho	-0.442**	-0.786***	-0.787***	-0.154	-0.743***	-0.035
	(0.139)	*(0.030)*	*(0.037)*	*(0.153)*	*(0.047)*	*(0.091)*
Sigma	0.577***	0.639***	0.557***	0.499***	0.551***	0.470***
	(0.018)	*(0.013)*	*(0.011)*	*(0.008)*	*(0.012)*	*(0.006)*
Lambda	-0.255**	-0.502***	-0.438***	-0.077	-0.410***	-0.016

	(0.087)	*(0.027)*	*(0.027)*	*(0.077)*	*(0.033)*	*(0.043)*
Mean Inverse Mills Ratio	0.480***	0.486***	0.362***	0.506***	0.474***	0.408***
	(0.006)	*(0.007)*	*(0.006)*	*(0.007)*	*(0.007)*	*(0.007)*
Sample size	3700	3534	3398	3681	3773	3723
Log likelihood	-4030.16	-3739.513	-3218.6	-3633.12	-3605.96	-3278.8
LR test of indep eq.: chi2(1)	3.82	60.94	28.21	1.02	14.01	0.15
Prob>chi2	0.05	0.00	0.00	0.31	0.00	0.70

Note: *significant at 10%; **significant at5%; *** significant at 1%.
The list of variables incorporated into both wage and selection equation includes also regional dummies as defined in Table A1 of the Appendix.
Source: Own elaboration on the BHSIE.

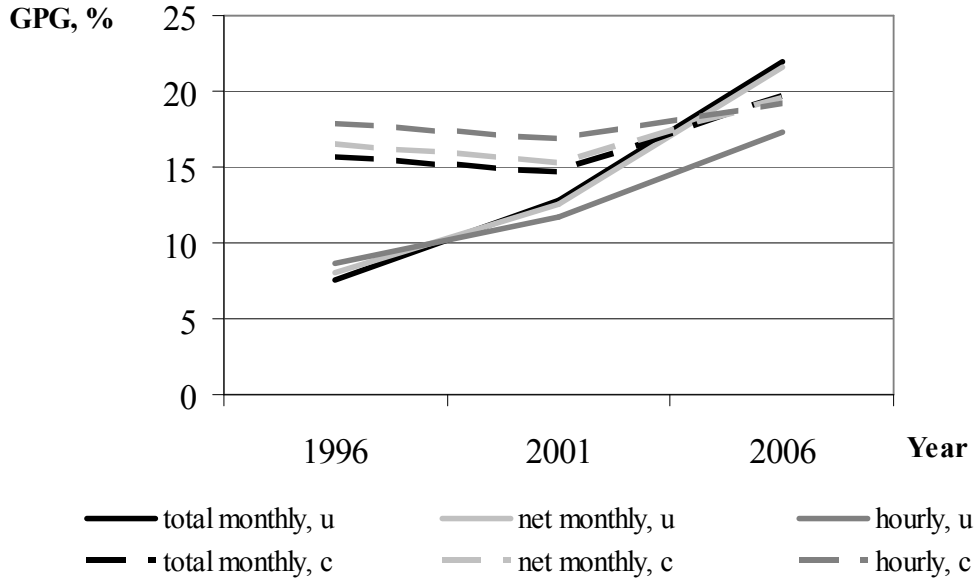
FIGURES

Figure 1. Labor Force Participation rate by gender and age in Belarus, 1986-2006



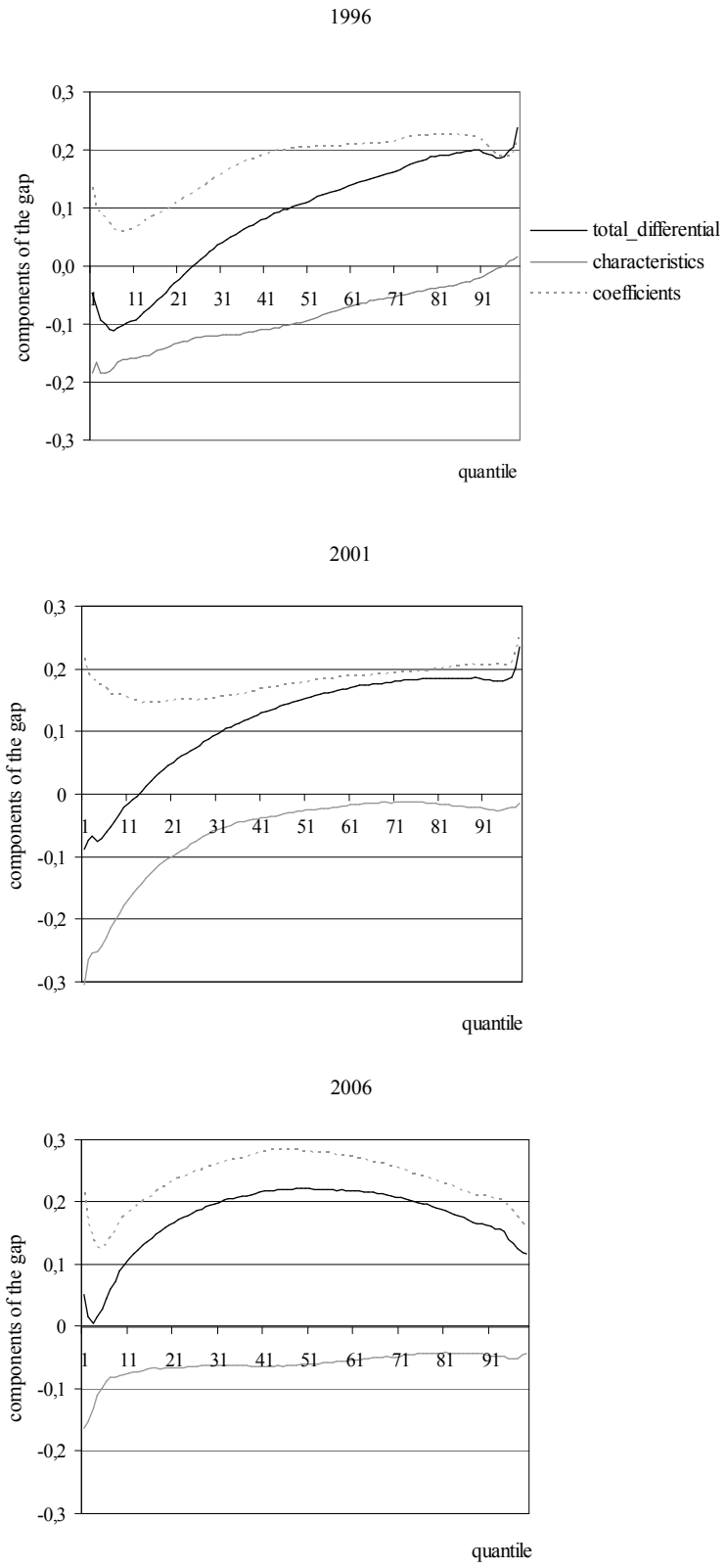
Source: United Nations Statistics (http://data.un.org/).

Figure 2. The conditional versus unconditional wage gap over time (1996-2006)



Note: All wages are in natural logs. Total monthly wage includes the wage from the main job as well as various forms of monetary and in-kind payments related to the main job. The unconditional wage gap (denoted as "u") is based on an OLS estimate including only the constant term and a gender dummy. The conditional wage gap (denoted as "c") is obtained from Mincerian OLS estimates including controls for educational levels, work experience, marital status, disability, industry, firm's ownership and regions. Monthly hours of work are also included as explanatory variable in the estimates relative to monthly wages.
Source: Own elaboration on the BHSIE.

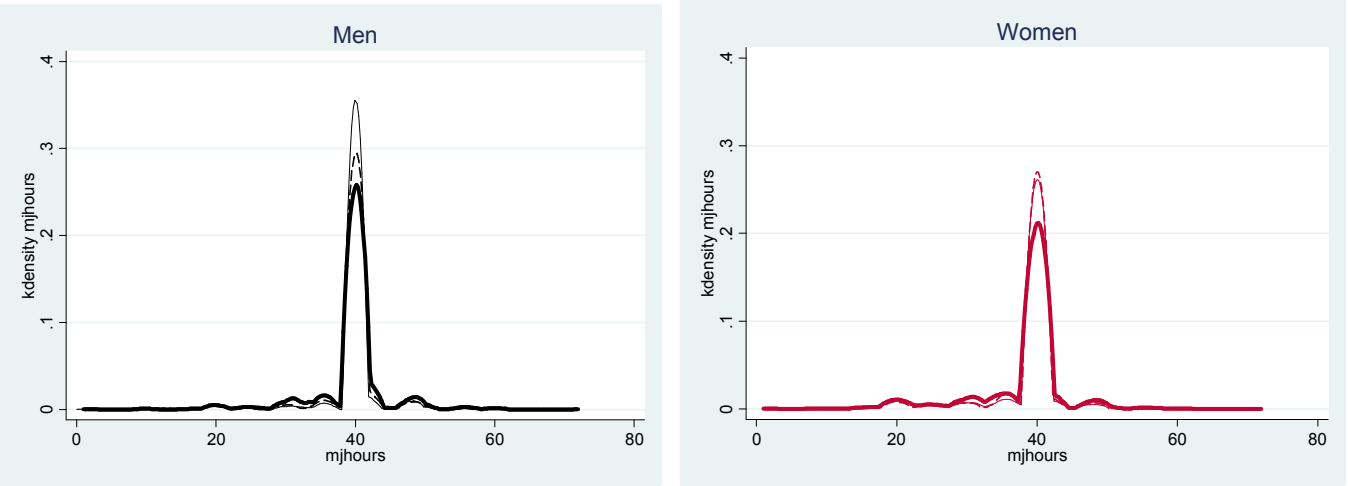
Figure 3. Gender wage gap across hourly wage distribution



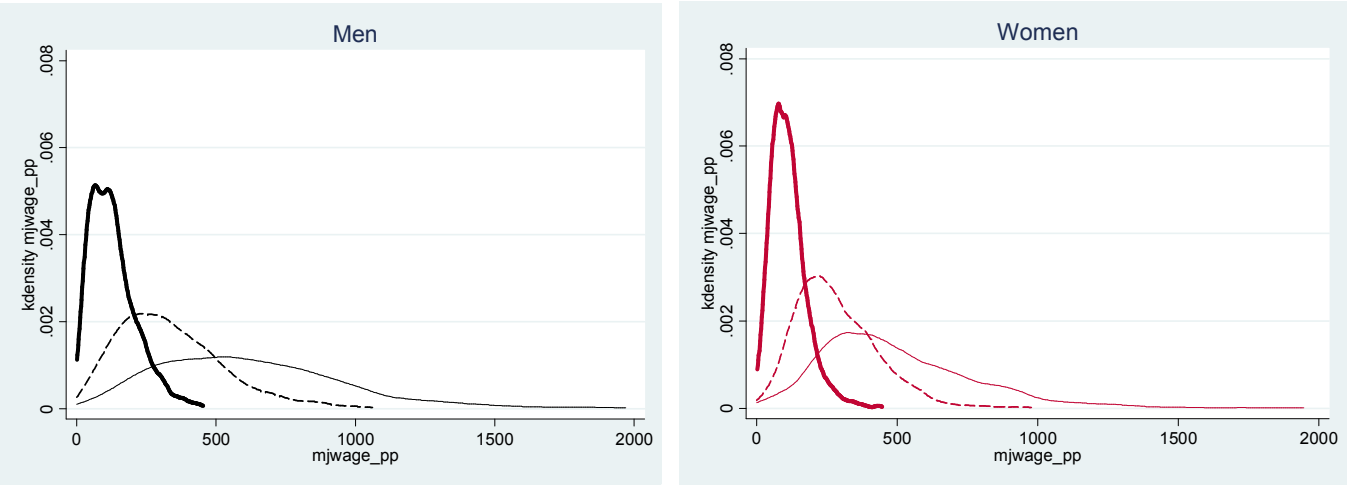
Note: The components of the gap in terms of differences in coefficients and characteristics were obtained using the Machado and Mata (2005) type of decomposition. See the Stata module by Blaise Melly (2006).
Source: Own elaboration on the BHSIE.

Figure 4. Kernel Density Estimates of Distribution of Work Hours and Monthly Wages by gender*

Panel (A): Hours worked at the main job

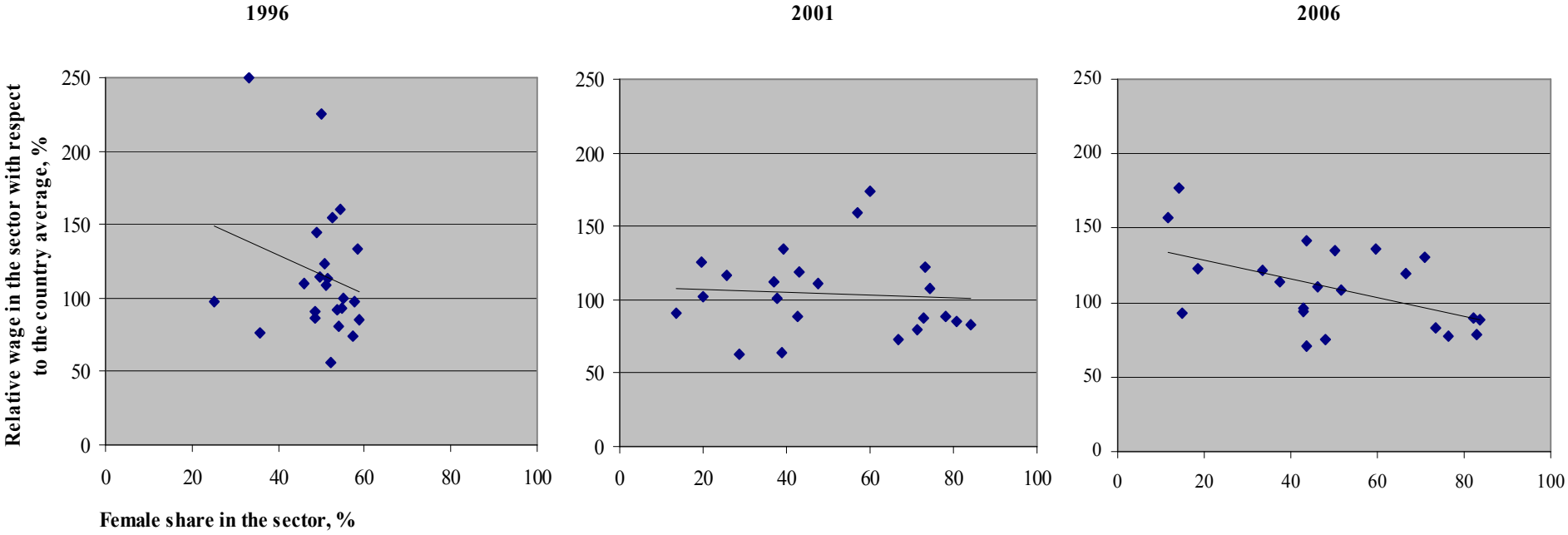


Panel (B): Net monthly wages by gender



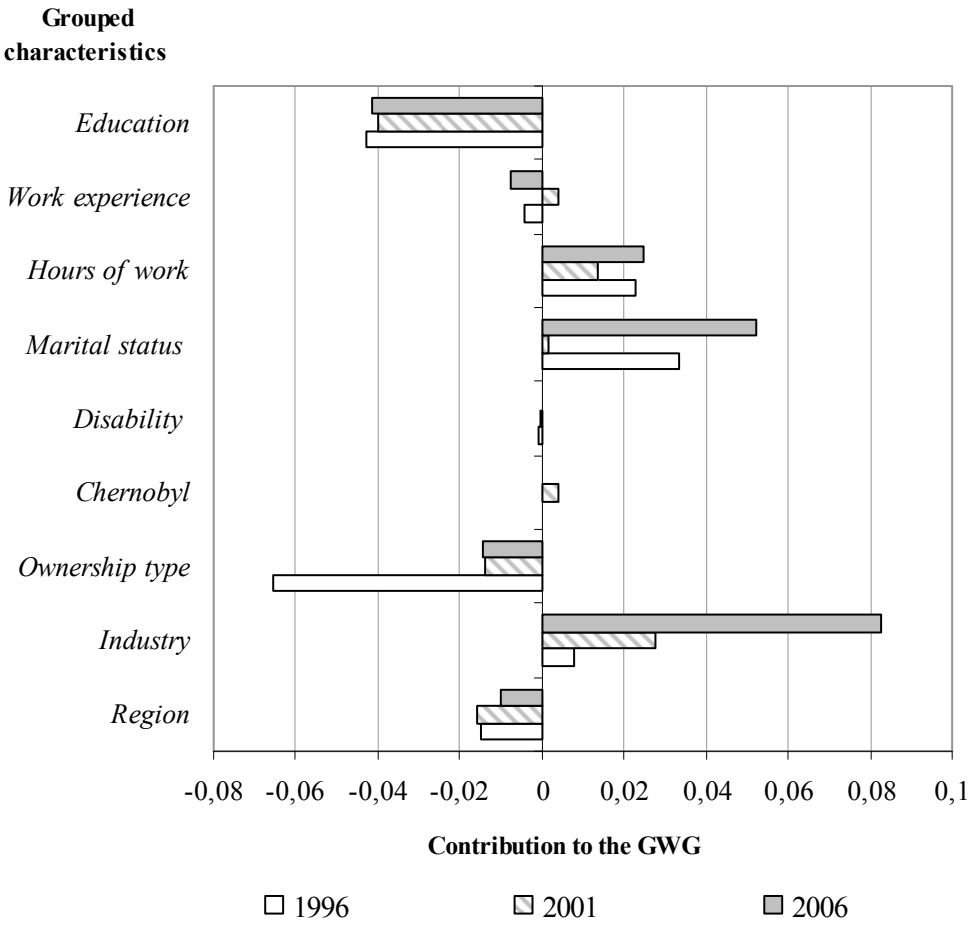
Note: 1996 is marked by a thick solid line, 2001 by a dash line and 2006 by a thin solid line.
† Net monthly wages at the main job were adjusted using PPP conversion factor (http://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=699)
Source: Own elaboration on the basis of the BHSIE.

Figure 5. Scatter plot of relative wage and female occupational intensity by sector of industry



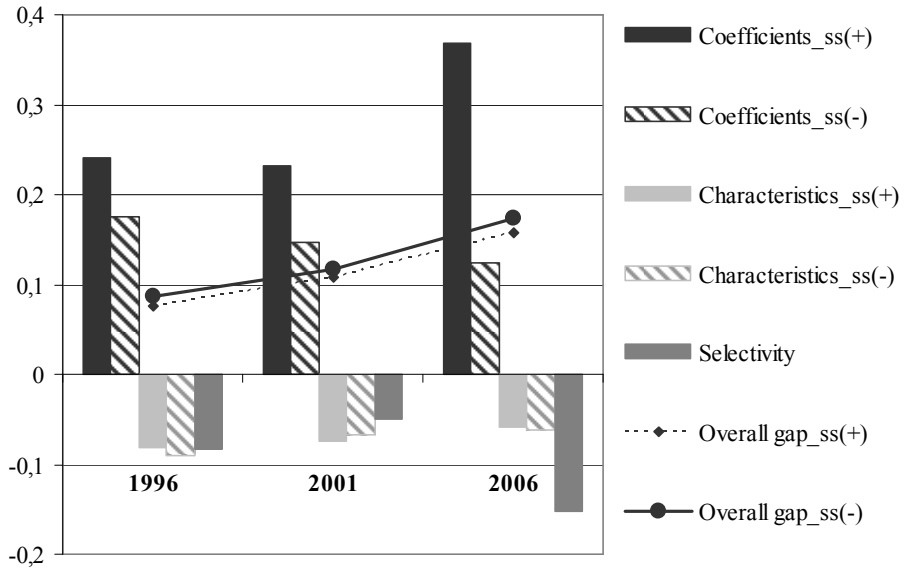
Source: own elaboration based on Table 6 above.

Figure 6. Contribution of observed characteristics to the gender wage gap, Juhn, Murphy, and Pierce (1993) decomposition



Note: The results are based on log of net monthly wages as dependent and log of monthly hours at the main job as explanatory variable as based on the estimated equation presented in Table 2.
Source: Own elaboration on the BHSIE.

Figure 7. Neuman-Oaxaca (2004) decomposition of the GWG, with sample selection.



Note: The "ss(+)" and "ss(-)" after underscore means with and without sample selection correction, respectively. The decomposition without sample selection is a standard Blinder (1973) and Oxaca (1973) type decomposition.
Source: own elaboration on the BHSIE.

Appendix

Table A1. Variables' definition

Variable name	Definition
Lmwage	natural log of monthly wage (with/without additional monetary and in-kind payments)
Lhwage	natural log of hourly wage from the main job
Lmmjhours	natural log of monthly hours of work at the main job=weekly hours*4.3
University	= 1, if university degree; = 0, otherwise
Technical school	= 1, if diploma of technical secondary school; = 0, otherwise
Vocational school	= 1, if diploma of vocational secondary school; = 0, otherwise
General secondary school	= 1, if diploma of general secondary school; = 0, otherwise
Compulsory education (low secondary school, baseline)	= 1, if diploma of basic school; = 0, otherwise
Work experience	potential work experience =(age – education – 6) – no.children*3
Work experience2	potential work experience squared
Marital	marital status is represented by three dummy variables: married, single and divorced/widowed
Joint stock company†	=1 for person working at joint stock company
Private sector†	=1 for person employed in the private sector
Budget organization	=1 for person employed in a budget organization
Collective farm	=1 for person employed in a collective farm
Industry (baseline)	=1 for person employed in industry
Disabled	dummy for disabled persons
Chernobyl	dummy for persons who report to be Chernobyl influenced
Student	dummy for persons involved into education process
Pensioner	dummy for persons who retired
Self-employed	dummy for self-employed persons
Agriculture, Forestry and Fishing; Transport, communication; Construction; Trade and Catering; Services; Social and public services; Health, social security; Education; Management; Finance; Culture, arts and science	eleven sectoral dummies (some are obtained by aggregating information on smaller sectors due to the lack of observations that does not allow to keep them separate)
Brest_ru, Brest_sm, Brest_lar, Gomel_ru, Gomel_sm, Gomel_lar, Grodno_ru, Grodno_sm, Grodno_lar, Minsk_ru, Minsk_sm, Minsk_lar, Minsk_city, Vitebsk_ru, Vitebsk_sm, Vitebsk_lar, Mogilev_ru, Mogilev_sm, Mogilev_lar	nineteen regional dummies are constructed by dividing each of the six existing oblasts/regions (Brest, Gomel, Grodno, Minsk, Vitebsk, Mogilev) into three sub-regions, relative to areas with large cities, small cities and rural areas. Minsk city is kept separately and represents a baseline
Instruments	
Age first child 15-17	Dummy for the age when the first child was born, two groups are considered: 15-17, 18-22
Age first child 18-22	
Children under 5 in the household	=1, if in the household there are children under 5 y.o.
Elderly over 60 in the household	=1, if in the household there are elderly people over 60 y.o.
Poor health	=1, if the person reports to have poor health
lother_income	difference between the total household income and the respondent's total monthly income, in natural log terms

Note: † not available in 2006

Table A2. Descriptive statistics (2006)

Variable	*Men*					*Women*				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Log hourly wage	2711	7.842	0.599	5.068	9.611	2882	7.669	0.572	5.169	9.949
University	3398	0.147	0.354	0	1	3723	0.204	0.403	0	1
Technical secondary	3398	0.204	0.403	0	1	3723	0.305	0.460	0	1
Vocational Secondary	3398	0.273	0.446	0	1	3723	0.199	0.400	0	1
General secondary	3398	0.226	0.419	0	1	3723	0.189	0.391	0	1
Work experience	3398	19.625	11.732	0	44	3723	14.457	9.051	0	38
Work experience2	3398	522.734	480.198	0	1936	3723	290.910	283.506	0	1444
Age	3398	37.372	11.970	16	60	3723	36.890	10.651	16	55
Married	3398	0.701	0.458	0	1	3723	0.653	0.476	0	1
Divorced or widowed	3398	0.048	0.214	0	1	3723	0.167	0.373	0	1
Enterprise, budgetary organization	3398	0.634	0.482	0	1	3723	0.713	0.452	0	1
Collective farm	3398	0.127	0.334	0	1	3723	0.086	0.281	0	1
Industry	3398	0.215	0.411	0	1	3723	0.167	0.373	0	1
Agriculture, forestry, fishing	3398	0.163	0.370	0	1	3723	0.100	0.300	0	1
Transport, communication	3398	0.079	0.270	0	1	3723	0.036	0.186	0	1
Construction	3398	0.115	0.319	0	1	3723	0.023	0.149	0	1
Trade or catering	3398	0.048	0.214	0	1	3723	0.131	0.337	0	1
Services	3398	0.020	0.140	0	1	3723	0.011	0.104	0	1
Social, public services	3398	0.049	0.216	0	1	3723	0.045	0.206	0	1
Health, social security	3398	0.019	0.136	0	1	3723	0.097	0.296	0	1
Education	3398	0.033	0.179	0	1	3723	0.158	0.365	0	1
Management	3398	0.047	0.212	0	1	3723	0.033	0.178	0	1
Finance	3398	0.006	0.075	0	1	3723	0.013	0.115	0	1
Culture, Arts, Science	3398	0.011	0.104	0	1	3723	0.026	0.158	0	1

Source: Own elaboration on the BHSIE.