

On the Evolution of Gender Wage Gaps Throughout the Distribution in Ukraine

Ina Ganguli

John F. Kennedy School of Government
Harvard University, Cambridge, MA

and

Katherine Terrell

Stephen M. Ross School of Business
Gerald R. Ford School of Public Policy
University of Michigan, Ann Arbor, MI
terrell@umich.edu

revised January 20, 2008

ABSTRACT:

This paper uses micro data from the Ukrainian Longitudinal Monitoring Survey (ULMS) to examine the gender wage gap across the distribution of wages in Ukraine during communism (1986), at the start of transition (1991), and after Ukraine started to be considered a market economy (2003). We find that the mean gap is large (40%) and constant in the first two years but it falls in 2003 (to 34%). The decline in the mean is explained by a shrinking of the gap in the bottom half of the distribution and not in the top half, where the gaps are large and persistent across the three points in time. We then ask if the 2003 distribution of the gaps is being driven by different behavior in the private and public (state) sectors: the striking finding is that the gaps at the bottom are similar but the gaps at the top are larger in the public sector than in the private sector. Using the Machado and Mata (2004) method, we create counterfactuals to determine to what extent differences in men's and women's rewards (β s) rather than differences in their productive characteristics (Xs) are driving the changes in the gaps over time and within the public and private sectors. We find that the gender gaps at the top, for all and for those within each sector, are due primarily and doggedly to differences in men's and women's β s rather than differences in their Xs. The decline in the gaps in the lower part of the distribution arises in part from the fact that women were more productive in 2003 compared to 1986 and in part because men's β s fell, lowering their wages in the bottom. However, probably the most important reason for the decline in the gap at the bottom, not explained by the decomposition, is the higher value of the minimum wage in 2003, which raised the wage floor for more women than men.

JEL: C14 I2, J16

Key Words: gender gap, quantile regression, transition, Ukraine

Acknowledgements: The authors would like to thank Kathryn Anderson, Olivier Deschenes, John DiNardo, Yuriy Gorodnichenko, Jennifer Hunt, David Margolis, Andrew Newell, and Jan Svejnar for their comments as well as participants of the ACES session at the ASSA meetings in Philadelphia, Jan. 6-9, 2005, the EBRD/IZA Conference in Bologna, May 5-6, 2005 and the SOLE-EALE meetings in San Francisco, June 2-5, 2005. Katherine Terrell is grateful to the NSF (Research Grant SES 0111783) for its generous support. Ina Ganguli appreciates the support of the U.S. Fulbright Program and the EERC-EROC at the National University "Kyiv-Mohyla Academy." We also thank Joseph Green, Olga Kupets, and Bogdan Prokopovych for their assistance.

1. Introduction

As Ukraine considers the process of seeking entry into the European Union, discussions have begun on how to create policies for gender equality in line with those of Western Europe. Deliberations have focused on creating a new agency or ministry focused on gender rights and on drafting a new law on equal opportunity.¹ The countries of western Europe have exhibited a commitment to gender equality in the labor market; yet, recent studies have shown that ‘glass ceilings’ and ‘sticky’ or ‘glass’ floors persist (e.g., Arulampalam et al., 2005; de la Rica et al., 2005; Albrecht et al., 2003).² How far off is Ukraine from the European benchmarks of gender equality in the labor market? In other words, how large are the gender gaps at the top and bottom of the wage distribution? How much has the situation changed since Soviet times, with the USSR’s egalitarian ideals?

In this paper we examine the gender wage gap across the distribution of wages in Ukraine in three time periods -- a year during communism (1986), the start of the transition to a market economy (1991) and 12 years later (2003). We hypothesize that the gap would be smaller during communism, when egalitarian principles were espoused, than in 2003, when markets were in play in a new economy and no explicit policies on gender equality were in effect. However, we recognize that many factor come into play in determining the changes in these gaps over time; they can be summarized in two large categories: a) changes in the composition of the labor force that we observe (e.g., education structure or distribution of private v. public jobs) and do not observe (e.g., if the more able are the ones to remain in the labor force or move to the private sector jobs); b) changes in institutions, including formal policies which are observable (such as a new law on equal opportunity, or changes in the level and enforcement of a wage floor through a minimum wage) as well as informal institutions

¹ For example, the law on “Equal Rights for Women and Men and Realization of Equal Opportunities,” which passed its first Parliamentary hearing in January 2005, aims to ensure the equal rights and opportunities of both genders, particularly in the areas of education, professional training, employment, entrepreneurship, and the social sector.

² The terms ‘sticky floor’ as discussed in Arulampalam et al. (2005) and ‘glass floor’ as discussed in de la Rica et al. (2005) refer to the gender gap at the bottom of the distribution and how persistent it is. They define a glass ceiling as occurring when the 90th percentile wage gap is higher than the gap in other parts by at least 2 points; a sticky floor is when the 10th percentile gap is higher than the 25th gap by two points.

(such as societal views on discrimination) which are not usually observable in standard labor force surveys.

We examine these various determinants by estimating counterfactual kernel density functions with the Machado and Mata (2004) method with household data from the 2003 Ukrainian Longitudinal Monitoring Survey (ULMS). We not only examine wages for male and female workers as a whole, but take a closer inspection of the gap within the public and private sectors in 2003. We recognize that relatively fewer women than men shifted to the private sector in Ukraine (and in most of the transition economies) and if wage setting practices differ in the two, it might also be an important factor in explaining changes in the gap over time. I.e., we might expect the gap to be smaller in the public sector than in the private sector, if the government applies more egalitarian principles to its wage setting than the competitive market forces which drive wages in the private sector. Finally, we ask to what extent institutions, such as the minimum wage, have played a role in the gender gap.

We find that the mean gap is large and constant (around 40%) in the first two years but it falls in 2003 (to 34%). The decline in the mean is explained by a shrinking of the gap in the bottom half of the distribution and not in the top half, where the gaps are large and persistent across the three points in time. We show that the decline in the gap at the bottom is not being driven by the privatization process, because the gaps in the public and private sector are very similar at the bottom of the distribution. An important reason the gap at the bottom of the overall distribution fell in 2003 compared to 1986 and 1991 is government intervention: Unlike the previous two years, in 2003 the minimum wage was set at a level that raised the floor for women's wages but not for most men. In addition, the counterfactual analysis indicates that the reduction in the wage gap at the bottom of the distribution is also driven by the better composition of women's characteristics relative to men's in 2003, compared to 1986 and 1991.

With respect to the private and public sectors, we find similar gaps at the bottom of the distribution, but the striking finding is that in the top half of the distribution the gaps in the private sector are smaller than the gaps public sector. Our counterfactual results indicate that this latter finding is explained by differences in the composition of men and women. In the

public sector difference in men's and women's characteristics favor men whereas in the private sector women have more favorable characteristics compared to men. Nevertheless, there is substantial evidence in each year and in each sector that the most important force driving the gender gaps throughout the distribution are differential rewards, often interpreted as discrimination.

The paper is structured as follows: A brief review of the literature is presented in Section 2; Ukraine's transition experience is described in Section 3; an explanation of the data source is found in Sections 4; the observed wage gaps are described in Section 5 and analyzed with counterfactuals in Section 6; the impact of the minimum wage is discussed in Section 7; conclusions follow in Section 8.

2. Literature Review

There is a large body of research dealing with the extent to which the gap between men's and women's wages has grown in the transition countries as the market-based economies replaced the planned economies (see for example, Anderson and Pomfret, 2003; Brainerd, 2000; Joliffe and Campos, 2005; Joliffe, 2002; Jurajda, 2003; Newell and Reilly, 1996 and 2001; and Ogloblin, 1999).³ Some argued that the market-based system would create wider gender differentials due to the egalitarian philosophy of socialism and others argued that a smaller difference might be expected if competition from markets was effective. The evidence from this research has been mixed. For example, Brainerd (2000) found the gender gap grew in Russia and Ukraine whereas it decreased in the CEE countries.⁴ On the other hand, Newell and Reilly (2001), conclude that, in general, the gender gap has not exhibited an upward tendency over the 1990s in sixteen transition economies. Orazem and Vodopivec (1995) find that the gender gap fell (three log points) in Slovenia from 1987 to 1991, but it is not clear if the difference is statistically significant.

Various factors may be accounting for the changes in the gender wage gap and in the relative distribution of wages of men and women over time. One focus has been to look for

³ For important papers analyzing the gap in a number of industrialized countries, see Blau and Kahn (1996; 2003).

⁴ She finds the gender gap grew by 0.27 log points in Ukraine and by 0.15 log points in Russia, whereas it declined between 0.03 and 0.14 points in the Czech Republic, Hungary, Poland, Slovakia and Slovenia.

changes in the level of discrimination (see for e.g., Joliffe's 2002 analysis of Bulgaria, or Joliffe and Campos' 2004 analysis of Hungary). Another factor may be changes in occupational segmentation (see for e.g., Jurajda's 2003 study of the Czech Republic and Ogloblin's 1999 study of Russia). One might also examine the role of the relative changes in returns to human capital for men and women (see for e.g., Münich, Svejnar and Terrell, 2005 and Liu et al., 2000). With the enormous structural changes in these economies, it is natural to focus on changes in the composition of the labor force. For example, Hunt (2002) shows that in East Germany, the 10-point decrease in the gender wage gap was driven largely by decreases in employment among low-skilled women relative to men. Orazem and Vodopivec (1995) indicate that the improvement in women's relative wages was due in part from the fact that women were in sectors that benefited from transition. Others have examined the impact of specific factors of the transition process, such as privatization (Brainerd, 2002 and Munich, Svejnar and Terrell, 2005).

Although none of the authors analyzing the gender gap in transition economies have examined the role of wage setting institutions and policies, Blau and Kahn (2003) test for the impact of the relative level of the minimum wage on the gender gap using several years of micro data from 22 countries, including seven transition economies. They find a negative correlation between the gender gap and the "bite" of minimum wages, measured as the minimum wage as a share of the average wage.⁵ Two studies for the U.S. (Blau and Kahn, 1997 and DiNardo, Fortin and Lemieux, 1996) have also shown how the falling real minimum wage over the 1980s increased the pay gap between low-skilled women and men. Hence we contribute to the literature by asking to what extent does the minimum wage, and its changing value over time, affect the gender gap in Ukraine?

⁵ They also find that the effect of collective bargaining agreements is significantly negative and that the effect of minimum wages become smaller and not significant when controlling for collective bargaining coverage. They recognize that it may be difficult to disentangle the effects of minimum wages and collective bargaining since the level of the minimum may be influenced by the strength of unions in influencing the political process. In Ukraine, the strength of unions in this period has been relatively weak. During Soviet times, trade unions existed under the leadership of Central Party of the Communist Party. After 1991, trade unions became independent from the state, and have increasingly played a greater role in collective bargaining. However, their influence on the political process, and the setting of the minimum wage, appears to have been minimal.

Finally, all of the studies using data from transition economies have only examined the average gender gap; none has measure and explained gender wage gaps across the distribution and how these have changed over time. Several recent empirical studies using west European data have plotted the actual and counterfactual distributions of the wage gap using the Machado and Mata, (2004) methodology as we do (see e.g., Albrecht et al., 2003; Arulampalam et al., 2005; and de la Rica, 2005). They show the existence of large gaps in the top of the distribution (glass ceilings) in many of these countries and the fact that a ceilings exists in the public as well as the private sector. Moreover, Arulampalam et al. (2005) and de la Rica (2005) find that there are large gaps at the bottom of the distribution for some countries, calling these phenomenon ‘sticky’ or ‘glass’ floors. Arulampalam et al. (2005) also find that the distribution of the gaps has not changed over time in the eleven European Union countries they examine, but these economies have undergone less structural change than the transition economies over this period.

3. Ukraine’s Transition and Labor Market Policies

The three points in time selected for the analysis – 1986, 1991 and 2003 – were chosen to be able to capture the evolution of gender gaps as Ukraine transitioned from a socialist (1986) to a market economy (2003). In August 1991 Ukraine became independent from the USSR and this year marks the beginning of the transition to markets and the start of reforms.

In Table 1 we present some of the key policy changes that took place over this period to show the extent and timing of reforms. Although Gorbachev took the first steps in liberalizing the centrally planned economy with *perestroika* in 1985, true transformation only began after Ukraine’s independence in 1991. Many reforms were gradual, e.g., price liberalization began in 1992 but was not completed until 1995. The privatization process was initiated in 1992 with medium and large enterprises privatized through buyouts by managers and employees and by 2003, the privatization process was nearly complete with only the largest enterprises remaining to be privatized (Elborgh-Woytek and Lewis, 2002).

Ukraine, as most of the countries of the Commonwealth of Independent States (CIS), suffered a severe recession. GDP declined almost every year between 1986 and 1999. In 1991,

Ukraine's economy was shrinking at a rate of 10 percent and inflation was over 390 percent. The trough was hit in 1994 when GDP growth was -20 percent; positive rates of growth began only in 2000. Inflation rose to 2,000 percent in 1992 and over 10,000 percent in 1993, before it fell to 500 percent in 1994.⁶ By 2003 the economy had been stabilized for several years, with inflation below 5 percent and GDP growth of about 10 percent. There were three currencies used during our period of study: *Roubles* were used at the time of our first two observations (December 1986 and December 1991); in January of 1992, *karbovanets* were introduced, and then in 1996 the currency used to this day – *hryvnia* – was introduced.

Policies to liberalize the labor market lagged behind other reforms. Wage setting was only liberalized in 2003, after several reforms that did not always tend to move forward. Nevertheless, the Ukrainian government required compliance with a minimum wage, which was relatively low in 1986 and 1991 compared to 2003. Based on our data, the minimum wage was about 47 (and 45) percent of the average wage in 1986 (1991), but in 2003 it was raised to 57 percent.⁷ We note that 57 percent in 2003 averages two very different shares for men and for women: 49 percent of the average wage for men and 71 percent of the average wage for women.

While the system of wage determination was reformed, Ukraine's Labor Code was not reformed during the period we analyze; it still contained a significant amount of legislation meant to protect women can also be seen as discriminatory. For example, Chapter XII (on women's labor) included provisions prohibiting employment of women in certain occupations and in night work.⁸ Generous leaves of absence were given to women for pregnancy, childbirth and child-caring, e.g., 70 days prior to giving birth and 56 days after (in the case of twins or labor complications this is extended to 70 days). Women were also given the option of taking a leave-of-absence from work for child-caring until the child is three years old. During this

⁶ This is taken from the National Bank of Ukraine.

⁷ The government continued to raise the wage after this year. On March 25, 2005, the Parliament of Ukraine passed increases in the minimum monthly salary to be implemented in three steps: UAH290 as of April 1, 2005; UAH310 as of July 1, 2005; and UAH332 as of September 1, 2005.

⁸ Prohibitions include strenuous occupations, occupations with harmful or dangerous conditions, and underground work. Women are also not allowed to lift or carry objects with a weight exceeding a certain limit. A list of dangerous and harmful occupations, as well as the weight limits for objects, is provided by the Ministry of Health. The list of the sectors of economy and occupations where night work is allowed is provided by the Cabinet of Ministers of Ukraine.

period women were eligible for receiving state pension benefits and can work part-time or at home. The labor code also forbade pregnant women and women with children under the age of three from night work, over-time work, and work on weekends. There are also constraints on imposing over-time work and out-of-town business trips on women who had children between the ages of 3 and 14 or children with disabilities. Pregnant women were also subject to lower productivity and service requirements, and could be transferred to positions with less heavy work and less harmful conditions, while maintaining their average salary from the previous occupation (ILO, 2004).

A new Labor Code, under consideration in 2004, includes an article (Article 4) on the “prohibition of discrimination in the area of labor,” which among other forms of discrimination, prohibits discrimination based on sex. Gender discrimination is also specifically prohibited in Ukraine’s Constitution under Article 24, which guarantees freedom from all forms of discrimination, including on the basis of sex. (Minnesota Advocates for Human Rights, 2005).

However, gender discrimination appears to be a problem for women in the worker place. Human Rights Watch (2003) documents several channels of discrimination against women that they observed in 2002-2003. Primarily drawing upon information from job posting and advertisements, they find evidence of discrimination in hiring. For example, vacancy announcements, especially for high-level and high-paid positions, often specified male candidates. They point out that even the State Employment Centers have gender-specific listings among their posted vacancies. Such discriminatory practices would suggest that there may be discrimination in wage setting as well.

4. Data

We use data from the first wave of the Ukrainian Longitudinal Monitoring Survey (ULMS), the first nationally representative longitudinal survey of households, administered from April 11 until June 30, 2003. It contains demographic information on 4,056 households and 8,621 individuals as well as retrospective data on the characteristics of the jobs held by each member of the household in 1986, 1991, and during 1997-2003. We use the information

on both the workers' demographic characteristics and the characteristics of their main job in the reference week and in the retrospective sections.

For this analysis, we created three cross sections (1986, 1991 and 2003) of individuals ages 15-56 who reported a monthly salary and were working full time (between 30 and 80 hours per week). We restrict the sample to full-time work (40 hours/week) in the 1991 and 2003 samples to be comparable with the 1986 sample since there was virtually no part-time work in 1986.⁹

Since the 1986 and 1991 data are obtained retrospectively, we must consider how representative these cross-sections are, especially in terms of the demographic structure given the problem of survival bias. Survival bias means we are unlikely to see older people in the earlier year, e.g., since the oldest individuals surveyed in 2003 are 72 years old, they would have been 56 years old in 1986. Hence we take two measures: 1) We trim the 2003 data to individuals 56 years of age; and 2) We follow Gorodnichenko and Sabirianova Peter (2004) and weight the 1986 and 1991 samples using weights created from the sample weights for 2003 and the information on the age and gender structure from the 1987 and 1991 Statistical Yearbooks of the USSR, since weights are not available in the ULMS for the earlier periods.¹⁰

Wage Data

For our analyses, we use wage data from a ULMS question on the “net contractual monthly salary” for a main job in 1986, 1991 and 2003.¹¹ Since we limit our analysis to changes in the wage gap, which is calculated within each year, we avoid conversion problems arising from the three currencies. The first question that arises with these data is the degree to which there is recall error; it can be argued that people may have had difficulty remembering their wages and employment status 16 and 11 years earlier. However, we expect the recall error to be relatively small since 1986 was the year of the Chernobyl nuclear explosion and

⁹ We also include individuals working 30 hours/week if they report that this is considered full-time at their job since this is the case for several professional occupations. We do not include individuals who reported working more than 80 hours per week, due to potential misreporting.

¹⁰ The regional distribution of the 2003 sample-weighted 1986 and 1991 data is representative when compared to the Statistical Yearbook, hence we re-weight only on the demographic structure and not on the regional dimension.

¹¹ Net contractual salary does not include taxes and it also does not include in-kind payments, arrears, etc. We are not excluding much information by concentrating on the main job since only approximately 2 percent of the 1986 and 2003 samples reported having a second job.

1991 was the year of Independence, events which most Ukrainians remember vividly. Studies have shown that respondents are less likely to have recall lapse when they have an important event as a reference point. Moreover, since wages set in the communist grid were clearly defined and did not change much over time, we expect them to be more easily remembered.¹² However we suspect that the wage data in 1991 may be a bit noisier than in the other two data points since Ukraine gained independence from the Soviet Union in August and quite a few changes were made in its institutions, and inflation was high at this time (although not as high as in 1992 and 1993).

We must also consider some other potential limitations of the salary data in an environment of wage arrears. As in Russia, Ukraine had significant wage arrears in the mid to late 1990s, however in 1991 this phenomenon was not widespread and by 2003, lack of payment of wages was less frequent than it had been earlier. In our sample, 10.4 percent of the workers reported having wage arrears in the previous year. This share was higher for men (12.1) than for women (8.8). Nevertheless, the problem of wage arrears is not captured in our analysis since we use data from the “net contractual monthly salary,” which does not include arrears.

Sample Selection

To get a sense of the characteristics of individuals included and excluded from the sample, we compiled the summary statistics in appendix Table A1. We show in the columns in panel (a) the characteristics of the entire sample of men and women aged 15-56 in 1986, 1991 and 2003 and in columns in panel (b) the characteristics of the analytical sample of full-time workers with no missing data. Columns in panels (c) and (d) report the characteristics of the individuals with missing wage data and who were working less than full-time in each year. As can be seen from the comparison of columns in panel (b) with columns in panels (c) and (d), the individuals excluded from the sample have fairly similar characteristics to those of the full-time workers with no missing data, hence discarding them does not bias our sample on the basis of observable characteristics of age, education, etc.. As we mentioned previously, due to

¹² We also note that since we use the self-reported wage as a dependent variable rather than as a regressor, we avoid the usual problem of “errors in variables” with respect to the right hand side variables.

many events taking place in 1991, there is a higher percentage of individuals with missing data in this year.

Appendix Table A1 also shows large shifts in the labor force status of the working age population. In columns (e) and (f) we report the share of men (women) ages 15-56 that were unemployed or out of the labor force, respectively. The unemployment rates rose from 1 percent to 14 percent for men and from 0.5 percent to 11 percent for women over the period.¹³ The share of the working age population out of the labor force, which was similar for men and women in 1986 (16-18 percent), grew substantially in 2003 and was much higher for women (37 percent) than for men (23 percent). The characteristics of the men and women who are unemployed or out of the labor force in each year are very different from the characteristics of both the working men and women and total population of men and women in the 15-56 year old age group. In general, the non-employed tend to be younger (15-19), less educated, and more likely to be unmarried.

In explaining changes in the gaps over time, we will look at differences in the composition of the men's and women's labor force as an explanatory factor. We report in Table 2 the percentage point difference in the demographic and job characteristics of men and women working full time within each of the three years. We also present the differences in men's and women's characteristics in the public and private sectors. First, among all men and women, we see that more working women are in older age groups as compared to men in all three years. There are relatively more women with higher education – secondary professional and higher – but especially in 2003. In 1986 and 1991, there were more working women with less than high school education, but in 2003 there were fewer of them. As for the economic activity of their job, women are more likely to be working in the education, health and social services sector, and the difference was even larger in 2003. There are relatively fewer women in manufacturing and utilities, but especially so in 2003. In 2003 many more women are working in the public sector than men (12.5 percentage points), and more men are working in privatized firms.

¹³ Our 2003 unemployment rates are very similar to the ILO estimates of overall unemployment in Ukraine.

Turning to the differences in the public and private sectors, we find similar results. The notable differences are: in the private sector, there are more 30-39 year old women than men, while this age group of men is more represented than women in the public sector; there are even more women with secondary professional degrees working in the public sector than in the private; the percentage women working in the education, health and social services sector is much greater in the public sector (40 percentage points); in the private sector, more women than men also work in education, health and social services, as well as in areas such as transportation, financial sector, communication, hotels and restaurants.

5. The Observed (Raw) Gender Gaps

To begin our analysis, we first run OLS and quantile regressions on our pooled male and female data separately for 1986, 1991, and 2003 with no controls to estimate the raw gender gap at different points in the distribution. Using quantile regression, we can estimate the θ th quantile of a random variable y (in our case, the log wage) conditional on covariates, where the θ th quantile of the distribution of y_i given X_i is:¹⁴

$$Q_{\theta}(y_i | X_i) = X_i\beta_{\theta}(\theta) \tag{1}$$

In this instance, to estimate the raw gender gap at different points in the distribution using equation (1) with no controls on our pooled male-female data, X_i is only the male dummy variable.

There are three notable findings on the raw mean gender wage gaps for these three years. First, the gap is relatively high in each year (ranging from 0.34 to 0.41) compared to Blau and Kahn's (2003) estimates of mean raw gaps in 21 countries, where they range from 0.14 (for Slovenia) to 0.48 (for Switzerland) and average at 0.28.¹⁵ Second, the observed mean gap did not change from 1986 to 1991 (when it was 0.40 and 0.41, respectively), which is not surprising since there had not been much reform with *perestroika*, as also witnessed in the lack of change in the structure of the labor force in appendix Table A1. Third, counter to our expectations, the log wage gap declined by 2003, to 0.34. This falling trend is similar to Jolliffe

¹⁴ See Koenker and Bassett (1978) and Buchinsky (1998) for a discussion of the quantile regression technique.

¹⁵ Blau and Kahn (2003) corrected the raw gaps for differences in hours worked. In calculating the average, we excluded the log wage gap for Japan because it was such an outlier at 0.895.

and Campos' (2005) results for Hungary during the first years of its transition; although they found a greater decline in the observed gap over a shorter period and smaller gaps in each year: 0.31 in 1996 and 0.19 in 1998.

In Figure 1 we plot the gender log wage gaps at each percentile for each of the three years.¹⁶ We see that the fall in the mean gap in 2003 relative to 1986 and 1991 is the result of a decline in the gaps in the lower half of the distribution in 2003. However, there is not as steep of an increase in the gaps at the top quarter or ten percent, as found by Albrecht et al. (2003) in Sweden in 1992 and 1998. The slopes in the distribution of gaps are considerably flatter in 1986 and 1991 than in 2003. In 1986 and 1991, they rise from about 0.25 in the 10th percentile to 0.4 in the 40th percentile; then rise to 0.5 in the 80th percentile. In 2003, the gap in the 10th percentile is much lower, at 0.1, and it reaches a peak of nearly 0.5 already in the 50th percentile. The slopes of the two earlier years resemble the slopes for the U.S. in 1999 and for Sweden in 19981 and 1991 shown in Albrecht et al. (2003).

Next, we analyze the gender gap in the public and private sectors, where each is defined by the employer in the workplace. "Public" includes budgetary organizations, state enterprises, local municipal enterprises, and state or collective farms, whereas "private" includes cooperatives, newly established private enterprises, privatized enterprises, and freelance work/self-employed. The analysis was restricted to 2003 because there was insufficient employment in the private sector to be able to analyze gender gaps in the earlier periods. We hypothesized that the gender gap might be smaller in the state sector, where more principles of equity in pay were more likely to apply than in the private sector. However, we find that the mean gender gap is larger in the public sector than in the private sector: 0.39 vs. 0.26. In Figure 2 we show the remarkable finding that the difference in the mean gaps in these two sectors is driven by large gaps (of 0.4-0.5) in the top half of the distribution in the public sector than in the private sector (where the gaps in the top half are between 0.2 and 0.3). Moreover, the gaps at the bottom half of the distribution are quite similar in the two sectors, i.e., between 0.1 and 0.3. Closer examination of the public sector, by separating it into 'public administration, education and health' and 'other', reveals that it is indeed in public

¹⁶ The graph actually represents a three percentage point moving average in order to smooth the plots.

administration, education and health where the large gaps at the top of the distribution are most notable.

This larger mean and higher end gaps in the public sector is surprising as this is counter to the findings in studies using data from both the US and EU economies; yet it is consistent with the findings from one study using data from a transition economy. For example, Arulampalam et al. (2005) find smaller gaps at the mean and in the upper deciles in the public sector than in the private sector in each of the eleven countries in the EU they analyzed, using 1995 to 2001 data. Moreover, Tansel (2004), using 1994 data for Turkey, subdivides the public sector and finds the mean log wage gap is lower in public administration (0.003) than in state-owned enterprises (0.22) and both are lower than the gap in the private sector (0.27), which is counter to our finding. We also find that the mean raw gap in Ukraine's private sector is similar to the gaps in most of the European countries, which range from 0.13 to 0.31, in the study by Arulampalam et al. (2005). Yet, Ukraine's average public sector gender gap of 0.39 is much larger than the gap in any of these eleven countries, where they range from 0.01 to 0.26. The study of Hungary by Jolliffe and Campos (2005) is the only other one we are aware of that finds the gender wage gap is larger in public enterprises than in private firms in 1992-1998, but that the difference is declining over time.¹⁷ This also raises a question as to whether the forces of competition are actually reducing gender wage in Hungary and Ukraine.

6. Counterfactual Analysis of the Gaps

We encounter several puzzles in the observed gaps which we want to explore: (1) why did the gap at the bottom fall from the Communist period, when there were expressed goals of gender equity and protection of the vulnerable, to the market period, when one may expect less protection of vulnerable groups, the government is weaker and gender equity is not yet an expressed policy goal? (2) What explains the persistence of gender gaps in the upper half of the distribution from communism to markets? (3) Why is there a larger gap in the upper half of the distribution in the public sector than in the private sector in 2003?

¹⁷ Jolliffe and Campos (2005) found that in 1992 the public gap was 0.32 while the private gap was 0.16. In 1998 they were 0.20 and 0.14, respectively.

One explanation for the first puzzle may lie in differences in the composition of men's and women's labor force over time. For example, if a relatively larger number of low-skilled women left such that the composition of the remaining women was more skilled, then women's wages would be higher relative to men's at the end of the period, reducing the gap in the lower part of the distribution. There is some evidence of this pattern in appendix Table A1, where we find that more women than men left the labor force, and in Table 2, where we see that the composition of the remaining employed women is comprised of relatively smaller shares with less education in 2003 compared to 1986. A second explanation may be that the returns to (prices of) the productive characteristics changed over time, favoring women. This may be interpreted as a decline in discrimination with the advent of markets, a conjecture that others are testing as well (e.g., Jolliffe and Campos, 2005).

These factors can also apply in explaining the second and third puzzles. That is, the persistence of the gaps in the upper end of the distribution could be due to women being persistently less productive (compared to men) over time or it could be driven by continuous discrimination (i.e., lower returns to their characteristics) over time. This higher end gap in the private sector may be due to men and women having very similar characteristics or to less discrimination against women in the private sector.

Hence we construct several counterfactuals at the means and at each percentile along the density of wages following the decomposition methodology developed by Machado and Mata (2004), henceforth MM. First we create counterfactual densities for each of the three years and the public and private sectors where women are given men's characteristics (X_s) in one scenario, and women are given men's "rewards" (β_s) in another to learn the extent to which it is differences in productive characteristics or differences in rewards that explain the gaps within each year and sector. Second, we also create counterfactuals where the women in 2003 are given characteristics of women in 1986 to see to what extent the change in women's characteristics over time explain the change in the gaps. We repeat this 'experiment' for men in 2003.

We apply the MM method of decomposition to create these counterfactual densities, using both quantile regression and bootstrapping techniques. First, we estimate quantile

regressions separately for men and women for each year as in equation (1), where X_i now is a vector of covariates, to estimate the returns to labor market characteristics (β s) at different points in the wage distribution.¹⁸ Secondly, we draw on the inverse probability integral transformation theorem, which states that if x is a random variable with a cumulative distribution function $F(x)$, then $F^{-1}(x) \sim U(0,1)$, and so for a given X_i and a random $\theta \sim U(0,1)$, $X_i\beta_\theta$ has the same distribution as y . In other words, using MM, we can create a random sample from our 1986, 1991, and 2003 samples while maintaining the conditional relationship between the log wages and the covariates. We create several counterfactual distributions with the following steps:

1. We randomly draw 5000 numbers from a standard uniform distribution, $U(0,1)$ as the quantiles we will estimate.
2. Using the male and female data for each year and sector, we estimate 5000 quantile regression coefficients $\beta(\theta_i)$ for $i= 1, \dots, 5000$, for men and women ($\beta^M(\theta)$ and $\beta^F(\theta)$).
3. We generate random samples of the male and female 1986, 1991 and 2003 (public and private) covariates (X s) by making 5000 draws of men and women with replacement from each year.
4. With our X s and β s generated for men and women in each year, we can compute the predicted counterfactual wages (i.e. $y_i = X_i\beta(\theta)$) and construct counterfactual gaps (e.g., $\beta^M X^M - \beta^M X^F$, $\beta^M X^M - \beta^F X^M$, etc.)

We compare the observed gap to the counterfactual gap to learn whether the ‘experiment’ would lower or raise the gap. We do not explicitly decompose the changes in the wage gaps as in the Blinder-Oaxaca (1979) method.¹⁹

¹⁸ The covariates in the quantile regression are: age, nationality, education, location of enterprise (Kyiv and other), activity of the enterprise (ISIC at the one digit level), and ownership type (state or private). As in most data sets, we do not have actual experience in the workplace and hence use age groups as a proxy instead. The education variable is coded as the highest level completed, since using the highest degree completed allows returns to vary by the type of attainment. The education levels are defined as: less than High School, High School (through grade 11), Vocational (Technical Education), Secondary Professional (two additional years after High School), University and higher (Bachelor/Specialist/Masters/PhD). See appendix Tables A1 and A2 for the coefficients from quantile regressions for men and women, respectively.

¹⁹The Oaxaca-Blinder decomposition is of the form: $\beta^M X^M - \beta^F X^F = \beta^F (X^M - X^F) + (\beta^M - \beta^F) X^M$, where the first term on the right-hand side is the part due to different observed characteristics, and the second term is the part due to differences in rewards and unobservables. (In the MM method there is no error term – it disappears as the

Some Explanations for Persistent Gaps at the Top and Falling Gaps at the Bottom

In Table 3 we present the observed gender gap and two counterfactual gaps for each of the three years 1986, 1991 and 2003 and for six points in the wage distribution. The counterfactuals in rows numbered (2) assume that women have men's β s in that year, and the counterfactuals in rows numbered (4) assume that women have men's X s in that year. In each of the three years we find that the gaps are positive with either of these counterfactuals, but that they would have been much smaller throughout the distribution if women had been "paid as men" and only a little smaller if women had had the same characteristics as men at each quantile.²⁰

The size of the counterfactual gaps in rows numbered (2) and (4) relative to the observed gap can also be interpreted as a term in separate decompositions.²¹ The ratios in rows numbered (3) indicate the importance of the differences in men's and women's X s in explaining the observed gap, while the ratios in rows 5 indicate the importance of the differences in men's and women's β s in explaining the observed gap. We find that the difference in men's and women's pay structure (β s) is far more important than the differences in their characteristics (X s) in explaining each of the gaps. This finding is consistent over time.

On average, the differences in the β s is not as great in 2003 as in 1986 and 1991 and hence the 2003 gap does not drop as much as the 1986 or 1991 gaps when women have men's β s. The differences in the β s are important throughout the distribution: they explain more than three quarters of the gap at each point in all three years. The differences in the β s are not more important at the top or the bottom of the distribution, except in 2003. In that year the gap would have fallen more at top (50, 75, 90) than at bottom (10, 25) if women had men's β s. This means that discrimination is higher at the top of the distribution in 2003 but at the bottom

sample size increases.) The two counterfactuals in Table 3, for example, represent terms in separate decompositions and do not hence add up to the observed gap. Note the gap with counterfactual 1 = $\beta^M X^M - \beta^M X^F = (X^M - X^W)\beta^M$; the gap in counterfactual 2 = $\beta^M X^M - \beta^F X^M = (\beta^M - \beta^F) X^M$. The difference in the X s in counterfactual 1 would need to be weighted by women's β s in order for the two counterfactuals to add up to the observed gap.

²⁰ The exception is the gap at the bottom 10 percent of the distribution for 1991 and 2003, where the gap grows when women have men's X s.

²¹ These two terms do not add up to the observed gap for reasons noted earlier.

of the distribution, women had relatively better rewards than men. This latter finding may help explain the fall in the gap at the bottom in 2003 compared to 1986 and 2001 (Puzzle 1).

In Table 4 we present the counterfactuals that throw light on changes in Xs and β s over time, from 1986 to 2003. We ask whether the observed gap fell at the bottom (10 and 25 percentile) in 2003 relative to 1986 because women's Xs or women's β s changed in a way that would reduce the gap there (which is our Puzzle 1). In addition, can we explain the persistence of gaps at the 50, 75, 90 percentiles because there was no change over time in the roles played by β s or Xs at top of distribution? (Puzzle 2)

First we ask what would have happened to the gap if the distribution of women's Xs had not changed from 1986, *ceteris paribus*. We learn from this counterfactual (row number 4) that the mean (OLS) gap would not have changed at all: the counterfactual gap is 98 percent of the actual gap (see row number 6).²² However, the gap would have widened in the bottom of the distribution (at the 10th and 25th percentiles) while not changing in the percentiles at the median and above. This implies that women's Xs in the bottom of the distribution were not as good in 1986 as in 2003, but the Xs in the upper half of the distribution were similar in 1986 and in 2003. This is consistent with hypothesis that changes in women's Xs contributed to the fall of gap at bottom and no change at top, and this helps us explain both Puzzles 1 and 2.²³

We also see in Table 4 that if women in 2003 had the same β s as in 1986, the gap would have fallen on average, by about 12 percent (row 9). However the impact across the distribution is quite mixed: the gap would have risen at the very top (90th percentile) and fallen at the very bottom (10th percentile) and at the median, but it would not have changed in the other percentiles. Hence the change in the β s from 1986 to 2003 contributed to a reduction in gap at top and an increase at the bottom, and do not help explain our puzzles.

We turn to the counterfactuals for men in the second panel of Table 4. If in 2003 men had 1986 Xs, the gap would have been somewhat smaller on average (0.28 when the actual gap was 0.34). This is driven by a large decline at the 10th percentile since there is not as much of a

²² Note that this counterfactual is not a component of a Oaxaca-Blinder style decomposition.

²³ The one exception is at the 50th percentile where we find that Xs in 1986 were better than Xs in 2003 so that change in Xs increased the gap there.

difference in the 25-90 percentiles. This means that at very bottom, men's Xs in 1986 were worse than their 2003 Xs; hence the change in men's Xs over time contributed to an increase in the gender gap there. This implies that men with worse characteristics left the bottom of the distribution.

Finally, if men in 2003 had 1986 β s, the gap would have been about 31 percent higher on average (row 15). However, the impact changes throughout distribution: it would have widened the gap in the bottom half (10, 25, and 50) but reduced it at the 75th and 90th percentiles. This means men's 1986 β s were better than 2003 β s on average and in the bottom half of the distribution, but worse at the top. This finding is consistent with a great deal of evidence that the transition process rewards people at top of the skill distribution, but penalizes the less-skilled. Hence, changes in the β s from 1986 to 2003 contributed to increasing the gap at top (75, 90) and reducing it at the bottom (10, 25). The latter helps explain Puzzle 1.

In sum, if women were paid like men in each of the three years, the gaps would have fallen tremendously throughout the distribution. For example, men would have earned only 6 - 10 percent more than women on average, as opposed to 34 - 41 percent. If women had the same characteristics as men in each year, the gaps would have also fallen but not by as much and not everywhere in the distribution. Hence, the differences in men's and women's rewards accounts for the lion's share of the gap in each year. What explains the fall in the gap at the bottom of the distribution from 1986 to 2003 (Puzzle 1) and the persistence of the wage gaps at the top (Puzzle 2)? Women's productive characteristics (Xs) improved in the bottom half from 1986 to 2003 but stayed the same in the top of the distribution. The worsening of men's pay structure (β s) at the bottom half of the distribution also contributed to reducing the gaps there, as it improved women's relative position.

Public-Private Sectors: what explains the different gaps at the tops of their distributions?

We now turn to possible explanations for the third puzzle, why the gap is larger in the public sector at the top of the distribution. This may result from bigger compositional differences between men and women within each sector or it could also be due to a higher degree of discrimination within one sector compared to the other (i.e., relative differences in men's and women's β s in the two sectors).

In Table 5 we present the standard Blinder-Oaxaca type decompositions at different points of the distribution of wages. In rows number (1) we show the raw gender gaps in the public and private sectors: 0.30 and 0.26, respectively. The counterfactuals in rows numbered (2) show the gap that would exist if women were rewarded with men's pay structure in the same sector, *ceteris paribus*; the counterfactuals in rows (4) show the gaps that would exist if women had men's characteristics in their same sector. Rows numbered (3) and (5) show both the relative importance of the differences in men's and women's Xs and β s, respectively, in explaining the gap and the relative effect of the counterfactual to the observed gap.²⁴

In both the public and the private sector, the gender gap is mainly to be due to differences in rewards. If women had men's β s in the private sectors, the mean gap would have fallen to nearly zero and it would have fallen more in the top half than in the bottom half of the distribution. In the public sector, the mean gap would have also fallen, but not by as much: from 0.39 to 0.21. It would have fallen more in the top than in the bottom of the distribution, like in the private sector. But in the private sector, the differences in rewards explain the entire gender pay gap at the top: Note women would be paid more than men in the top half of the distribution in the private sector if they were rewarded as men are in that sector.

There is not much difference between men's and women's characteristics on average, and the size of the mean counterfactual and observed gaps in each sector are very similar for each sector. However, at the bottom of the distribution (10 percentile), we see that women have better characteristics than men, as the part of the gap explained by the β s is more than 100 percent. This is even more pronounced in the public sector, suggesting that women in the bottom of the state pay scale have superior demographic characteristics that compensate them for lower rewards (potentially discrimination). On the other hand, the composition effect is different for the public and private sectors in the upper part of the distribution and it helps explain why the gap at the top is higher in the public than in the private sector (Puzzle 3). In the private sector men's Xs are worse than women's at the 75th and 90th percentiles, whereas in

²⁴ As noted above with the similar exercise in Table 3, these two components do not add up exactly to the observed gap because we are looking at $B^M(X^M - X^F)$ and $(B^M - B^F)X^M$, when the second term should be $(B^M - B^F)X^F$ in order for the two components to add up to the observed gap. We are more interested in seeing the gap with the women's β s and Xs changed as they are in these counterfactuals, than in getting the decomposition to add up.

the public sector men's Xs are somewhat better than women's at the 75th and 90th percentiles. Hence the larger gap in the top of the distribution in the public sector compared to the private sector is partially explained by the differences in men's and women's Xs in each sector, since women have relatively poorer characteristics in the public as compared to the private sector.

7. Another explanation for the decline in the gap at the bottom from 1986/91 to 2003

We discussed some changes in the institutions in Ukraine with the transition, and it is difficult to assess their impact on the change in the gender gap with the counterfactual analysis above. However, we know from our analysis of wage inequality in Ukraine (Ganguli and Terrell, 2005) that kernel density estimates for men's and women's wages in 1986 and 2003 show that the minimum wage was binding for women in both years, but became especially important in 2003. Figure 3 presents kernel density estimates of the distribution of men's and women's wages in 1986, 1991 and 2003; and in Figure 4 we present kernel density estimates for men's and women's wages in the private and public sectors in 2003. These figures clearly show the importance of the minimum wage for women in each of these three years. There is a clear spike in the women's distribution of wages at a point that represents the minimum wage in that year.²⁵ The density at the spike around the minimum wage rises from about 0.8 in 1986 to about 0.9 in 1991 to 1.3 in 2003. It appears the women's wage distribution collapses around the minimum wage in 2003 and from Figure 4 it seems this is due to public sector wages for women. Whereas the minimum wage is important in both the public and private sector, the density at the minimum wage is much higher in the public sector than in the private sector. Hence, the decline in the gap at the bottom half of the distribution from 1986/1991 to 2003 may have to do with better compliance with and/or the higher level of the minimum wage which is affecting women more than men over time.

8. Conclusion

In this paper, we set out to analyze the gender wage gap across the distribution in Ukraine's transition from communism to a market economy, as the country moves toward Europe. We uncover several patterns that are puzzling to those who expect socialism to lead to

²⁵ The minimum wages in 1986, 1991 and 2003 are taken from Minimum Wage decrees.

smaller gender gaps especially for those at the bottom of the distribution. We find the raw mean gender gap remained about the same from 1986 to 1991 (0.40 and 0.41, respectively) but declined in 2003 to 0.34. The decline in the mean gap is driven by a decline in the gaps in the lower part of the distribution as we find the gaps in the upper part of the distribution are persistent in all three years. We show that the gaps in the upper half of the distribution are persistently larger than the gaps in the lower half of the distribution. Most notably, both the mean gap and the gaps in the upper half of the distribution are larger in the public sector than in the private sector, which is counter to other studies. A comparison with estimates for eleven European countries indicates that the mean gender gap in the public sector is much higher in Ukraine, while the gap in the private sector is at similar levels to these European countries.

What could be explaining these patterns? As we noted in the outset, changes in the wage gaps over time are driven by changes in either: a) composition of the labor force (observed and unobserved) and b) formal institutions such as the minimum wage or informal institutions such as discrimination (which back out of the changing ‘reward structure.’) We find that a difference in rewards is the most important factor explaining the gender gap, at the mean and throughout the distribution in each year. We attribute the persistence of the gender gap at the top of the distribution from Soviet times to continued discrimination and relatively little change in the characteristics of men and women at the top. However, we note that over this period there was a significant change in the composition of jobs from the public to private sector jobs. Women were less likely than men to move into the private sector and those that did tended to have better productive characteristics, which partially explain the smaller gap in the upper end of the distribution in the private sector.

The fall in the gap at the bottom of the distribution in 2003 arises from two factors: a) Institutions: the rise of the minimum wage, which raised the wage floor for women more than for men over time; and b) Composition effects: women with poorer characteristics left the labor force during the transition and hence the women at the bottom of the wage distribution had better characteristics in 2003 compared with 1987.

It is clear that the gender wage gap will be an important measure of gender equality in Ukraine in the coming years as it begins its bid to join the EU. Our findings suggest that the

Ukrainian government should take note of the persistence of discrimination in the rewards to women's work and the impact of policies and institutions, like the minimum wage, can have on women's wages at the bottom of the distribution. Nevertheless, its should also recognize that changes in the gap are also being driven by changes in the composition of the labor force across different jobs or due to movements in and out of the labor force, which are more complex and further out of reach of policy levers.

References

- Albrecht, James, Anders Bjoekland, and Susan Vroman, 2003. "Is There a Glass Ceiling in Sweden?" *Journal of Labor Economics*, 21(1): 145 – 177.
- Anderson, Kathryn and Richard Pomfret, 2003. "Women in the Labour Market in the Kyrgyz Republic, 1993 and 1997," in Anderson, K. and R. Pomfret, eds. *Consequences of Creating a Market Economy: Evidence from Household Surveys in Central Asia*. Edward Elgar, Cheltenham, UK.
- Arulampalam, Wiji, Alison Booth, and Mark Bryan, 2005. "Is there a glass ceiling over Europe? Exploring the Gender Pay Gap across the Wage Distribution," unpublished paper University of Warwick, April 30.
- Blau, Francine and Lawrence Kahn, 2003. "Understanding International Differences in the Gender Pay Gap," *Journal of Labor Economics*, 21(1): 106-144.
- _____, 1996. "Wage Structure and Gender Earnings Differentials: An International Comparison," *Economica*, Supplement: Economic Policy and Income Distribution, 63(250): S29-S62.
- Blinder, Alan S., 1973. "Wage Discrimination: Reduced Form and Structural Variables," *Journal of Human Resources*, Vol. 8: 436-455.
- Brainerd, Elizabeth, 2002. "Five Years After: The Impact of Mass Privatization on Wages in Russia, 1993-1998," *Journal of Comparative Economics*, Vol. 30, No. 1, March: 160-190.
- _____, 2000. "Women in Transition: Changes in Gender Wage Differentials in Eastern Europe and the Former Soviet Union," *Industrial and Labor Relations Review*, Vol. 54, No. 1, October: 138-162.
- Buchinsky, Moshe, 1998. "Recent Advances in Quantile Regression Models: A Practical Guideline for Empirical Research," *The Journal of Human Resources*, No. 33: 88-126.
- De la Rica, Sara, Juan J. Dolado, Vanesa Llorens, 2005 "Ceiling and Floors: Gender Wage Gaps by Education in Spain," IZA Discussion Paper No. 1483.
- DiNardo, John, Nicole Fortin, and Thomas Lemieux, 1996. "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach," *Econometrica*, Vol. 64, No. 5: 1001-1044.
- Elborgh-Woytek, Katrin and Mark Lewis, 2002. "Privatization in Ukraine: Challenges of Assessment and Coverage in Fund Conditionality," IMF Policy Discussion Paper PDP/02/7, May.

- Ganguli, Ina and Katherine Terrell, 2005. "Institutions, Markets and Men's and Women's Wage Inequality: Evidence from Ukraine," IZA Discussion Paper 1724.
- Gorodnichenko Yuriy and Klara Sabirianova Peter, 2004. "Returns to schooling in Russia and Ukraine: A Semiparametric Approach to Cross-Country Comparative Analysis," *Journal of Comparative Economics*, Vol. 33: 324-350.
- Human Rights Watch, 2003. "Women's Work: Discrimination Against Women in the Ukrainian Labor Force." Human Rights Watch, Vol. 15, No. 5(D), August 2003.
- Hunt, Jennifer, 2002. "The Transition in East Germany: When is a Ten-Point Fall in the Gender Wage Gap Bad News?" *Journal of Labor Economics*, Vol. 20, No. 1: 148-169.
- Jolliffe, Dean, 2002. "The Gender Wage Gap in Bulgaria: A Semiparametric Estimation of Discrimination," *Journal of Comparative Economics*, Vol. 30, No. 2: 276-295.
- Jolliffe, Dean and Nauro F. Campos, 2005. "Does market liberalization reduce gender discrimination? Econometric evidence from Hungary, 1986-1998," *Labour Economics*, Vol. 12, No. 1: 1-22.
- Jurajda, Stepan, 2003. "Gender Wage Gap and Segregation in Enterprises and the Public Sector in Late Transition Countries," *Journal of Comparative Economics*, Vol. 31, No. 2: 199-222.
- Koenker, Roger and Gilbert Bassett, 1978. "Regression Quantiles," *Econometrica*, No. 46: 33-50.
- Liu, Amy P., W. Meng et al. 2000. "Sectoral Wage Differentials and Discrimination in Transitional China," *Journal of Population Economics*, Vol. 13, No. 2: 331-352.
- Machado, José A. F. and José Mata, 2004. "Counterfactual Decomposition of Changes in Wage Distributions using Quantile Regression," *Journal of Applied Econometrics*,
- Minnesota Advocates for Human Rights, 2005. "Stop Violence Against Women website." At the following website visited Aug. 24, 2005: www.stopvaw.org/ukraine
- Münich, Daniel, Jan Svejnar and Katherine Terrell, 2005a. "Is Women's Human Capital Valued more by Markets than by Planners?" *Journal of Comparative Economic*, Vol. 33, No. 2:278-299.
- _____, 2005b. "Returns to Human Capital under the Communist Wage Grid and during the Transition to a Market Economy," *Review of Economics and Statistics*, Vol. 87, No. 1: 100-123.

- Newell, Andrew and Barry Reilly, 2001. "The Gender Pay Gap in the Transition from Communism: Some Empirical Evidence," Institute for the Study of Labor (IZA), Discussion Paper No. 268, March.
- _____ 1996. "The Gender Wage Gap in Russia: Some Empirical Evidence," *Labour Economics*, Vol. 3, No. 5: 337-356.
- Oaxaca, Ronald, 1973. "Male-Female Wage Differentials in Urban Labor Markets," *International Economic Review*, Vol. 14, No. 3, October: 693-709.
- Ogloblin, Constantin G., 1999. "The Gender Earnings Differential in the Russian Transition Economy," *Industrial and Labor Relations Review*, Vol. 52, No. 4, July: 602-627.
- Orazem, Peter F., and Vodopivec, Milan, 1995. "Winners and Losers in the Transition: Returns Education, Experience, and Gender in Slovenia," *The World Bank Economic Review*, 9(2): 201-230.
- Tansel, Aysit, 2004. "Public-Private Employment Choice, Wage Differentials and Gender in Turkey," IZA Discussion Paper No. 1262.
- Weichselbaumer, Doris and Rudolf Winter-Ebmer, 2003. "The Effects of Competition and Equal Treatment Laws on the Gender Wage Differential," IZA Discussion Paper No. 822.

Table 1: Policy Timeline

1985	Beginning of <i>perestroika</i> .
1986	Wage reforms introduced in goods sectors.
1990	Ukrainian Council of Ministers formulates a "Program for Transition to a Market Economy" (Nov.)
1991	Independence from the USSR (Aug.) Nationalization of all USSR property in Ukraine (Sept.) Employment Act passes (legitimizes unemployment) Creation of State Employment Service, Employment Fund Decentralization of wage system. Tariff system still used as a benchmark to ensure wage differentials.
1992	Initial price liberalization (Jan.) Small- and large-scale privatization begins Karbovanets (interim currency) introduced Reintroduction of centralized system of wage regulation Decree on Wages establishes minimum wage to be determined by prices of 70 goods needed for ' subsistence. ¹
1993	Income-tax law adopted. Law on Collective Contracts and Agreements establishes legal grounds for collective bargaining. General tariff agreement sets wage coefficients for different categories of workers and sectors based on the minimum wage.
1995	Most prices liberalized Voucher privatization begins Most export quotas and licenses abolished New Law on Wages adopted, strengthening the role of bargaining in setting wages.
1996	New currency (Hryvnia) introduced Constitution adopted, including Article 24, which prohibits gender discrimination.
1999	New "On Subsistence Minimum" law sets a new official minimum consumption basket
2000	Significant reforms introduced in areas of government decision-making, budget, tax, land, and energy sector. ² (e.g. Social privileges for certain population and professional groups were reduced in the 2000 State Budget Law.)
2004	Draft of new Labor Code passed second Parliamentary hearing.
2005	Draft law "Equal Rights for Women and Men and Realization of Equal Opportunities" passed first Parliamentary hearing.

Sources: Aslund (2002), EBRD (1999), ILO (1998), ILO (1995), Chapman (1991).

¹This method was later suspended. Now, the Cabinet of Minister decides the minimum wage, which must be approved by Parliament.

² Binding at all levels of contractual regulation of wages, as agreed by the Cabinet of Ministers and twelve trade union associations.

² See Aslund (2002) for discussion of these reforms.

Table2: Percentage Point Differences in Men's and Women's Labor Force Composition in Each Year

	TOTAL			PUBLIC	PRIVATE
	Men-Women			Men-Women	Men-Women
	86	91	03	03	03
Age					
15-19	-1.3	-2.1	1.4	0.9	1.8
20-29	8.3	4.9	7.8	6.4	8.2
30-39	0.7	1.0	-1.3	1.7	-4.8
40-49	-6.1	-1.5	-6.5	-7.6	-5.2
50-56	-1.7	-2.3	-1.5	-1.5	0.0
Education Levels					
Less than High School	-4.6	-2.5	2.2	0.3	4.2
High School	1.1	-0.3	4.2	3.4	2.6
Vocational	13.3	10.9	11.3	16.4	5.8
Secondary Professional	-8.6	-8.1	-11.4	-14.1	-7.5
Higher Education	-1.3	0.0	-6.3	-6.0	-5.0
Nationality					
Ukrainian	0.6	1.0	-0.5	-1.1	-0.3
Russian	-0.9	-0.7	-0.8	0.6	-1.9
Other (Including Belorussian, Jewish)	0.4	-0.3	1.4	0.5	2.2
Location					
%Kyiv	0.1	0.5	-1.5	-1.5	-2.6
%Other	-0.1	-0.5	1.5	1.5	2.6
Activity of Enterprise					
%Agriculture, Hunting & Forestry	4.8	2.6	3.3	3.2	1.6
%Manufacturing & Mining	8.2	6.1	11.6	15.0	2.8
%Elec, Gas, Water & Construction	4.9	6.1	10.2	10.3	10.3
%Transport, Communic. & Financial ²	-1.6	2.1	1.4	8.5	-10.5
%Public Admin. & Defense	2.4	1.6	1.6	4.7	0.3
%Education, Health & Social Work	-17.3	-17.0	-25.4	-40.0	-1.3
%Other ³	-1.4	-1.4	-2.8	-1.6	-3.2
Ownership Type					
% Public	0.6	-2.4	-12.5	n.a	n.a
% Cooperative	-0.6	0.9	0.1	n.a	-0.4
%DeNovo (incl Self-Emp)	0.1	1.5	5.7	n.a	-0.6
% Privatized	-0.1	0.0	6.8	n.a	0.9

¹ Includes Wholesale/Retail Trade, Repair of Motor Vehicles/Motorcycles; Hotels & Restaurants; Transport, Storage & Communication; Financial Intermediation, Real Estate, Renting & Business Activities.

² Includes Other Community, Social and Personal Service Activities.

Note: Using sample weights.

Table 3: Decomposition of Gaps Within Each Year: All Workers

	10	25	50	75	90	OLS
1986						
(1) Observed gap	0.288 (0.022)	0.368 (0.019)	0.405 (0.000)	0.446 (0.000)	0.464 (0.060)	0.397 (0.015)
(2) Gap with Counterfactual ¹ ($B^M X^M - B^M X^F$)	0.074	0.078	0.042	0.051	0.046	0.059
(3) <i>Counterfactual¹/observed</i>	<i>0.26</i>	<i>0.21</i>	<i>0.10</i>	<i>0.11</i>	<i>0.10</i>	<i>0.15</i>
(4) Gap with Counterfactual ² ($B^M X^M - B^F X^M$)	0.251	0.321	0.348	0.346	0.344	0.336
(5) <i>Counterfactual²/observed</i>	<i>0.87</i>	<i>0.87</i>	<i>0.86</i>	<i>0.78</i>	<i>0.74</i>	<i>0.85</i>
1991						
(1) Observed gap	0.223 (0.000)	0.405 (0.000)	0.439 (0.000)	0.511 (0.000)	0.470 (0.038)	0.411 (0.021)
(2) Gap with Counterfactual ¹ ($B^M X^M - B^M X^F$)	0.047	0.042	0.065	0.057	0.078	0.058
(3) <i>Counterfactual¹/observed</i>	<i>0.21</i>	<i>0.10</i>	<i>0.15</i>	<i>0.11</i>	<i>0.17</i>	<i>0.14</i>
(4) Gap with Counterfactual ² ($B^M X^M - B^F X^M$)	0.254	0.304	0.342	0.348	0.391	0.343
(5) <i>Counterfactual²/observed</i>	<i>1.14</i>	<i>0.75</i>	<i>0.78</i>	<i>0.68</i>	<i>0.83</i>	<i>0.83</i>
2003						
(1) Observed gap	0.069 (0.033)	0.192 (0.013)	0.470 (0.033)	0.504 (0.003)	0.442 (0.048)	0.336 (0.022)
(2) Gap with Counterfactual ¹ ($B^M X^M - B^M X^F$)	0.030	0.101	0.167	0.122	0.083	0.100
(3) <i>Counterfactual¹/observed</i>	<i>0.44</i>	<i>0.53</i>	<i>0.35</i>	<i>0.24</i>	<i>0.19</i>	<i>0.30</i>
(4) Gap with Counterfactual ² ($B^M X^M - B^F X^M$)	0.088	0.170	0.346	0.363	0.343	0.266
(5) <i>Counterfactual²/observed</i>	<i>1.27</i>	<i>0.88</i>	<i>0.74</i>	<i>0.72</i>	<i>0.78</i>	<i>0.79</i>

Observed gaps are estimated from a quantile or OLS regression with no controls and using sample weights.

Note: Standard errors are in parentheses.

The counterfactuals are estimated using the Machado-Mata approach, with separate quantile regressions and separate random samples generated from covariates for men and women in each sector:

$$^1\text{Gap with Counterfactual} = (X^M - X^W)B^M$$

$$^2\text{Gap with Counterfactual} = (B^M - B^W)X^M$$

Table 4: Decomposition of Gaps Across Time, 1986 and 2003: All Workers

Gap	10	25	50	75	90	OLS
(1) Observed in 1986	0.288 (0.022)	0.368 (0.019)	0.405 (0.000)	0.446 (0.000)	0.464 (0.060)	0.397 (0.015)
(2) Observed in 2003	0.069 (0.033)	0.192 (0.013)	0.470 (0.033)	0.504 (0.003)	0.442 (0.048)	0.336 (0.022)
(3) Observed '03/ Observed '86	0.240	0.523	1.159	1.130	0.952	0.847
Counterfactuals for Women:						
(4) Gap with Counterfactual ¹ ($B^{M03}X^{M03} - B^{F03}X^{F86}$)	0.112	0.223	0.415	0.460	0.431	0.328
(5) Counterfactual ¹ /Obs. '86	0.389	0.605	1.024	1.031	0.928	0.827
(6) (5)/(3)	<i>1.620</i>	<i>1.157</i>	<i>0.884</i>	<i>0.913</i>	<i>0.975</i>	<i>0.976</i>
(7) Gap with Counterfactual ² ($B^{M03}X^{M03} - B^{F86}X^{F03}$)	0.054	0.182	0.365	0.467	0.497	0.295
(8) Counterfactual ² /Observed '86	0.189	0.495	0.900	1.047	1.071	0.744
(9) (8)/(3)	<i>0.787</i>	<i>0.947</i>	<i>0.777</i>	<i>0.927</i>	<i>1.125</i>	<i>0.878</i>
Counterfactuals for Men:						
(10) Gap with Counterfactual ³ ($B^{M03}X^{M86} - B^{F03}X^{F03}$)	0.031	0.174	0.371	0.440	0.418	0.282
(11) Counterfactual ³ /Observed '86	0.109	0.472	0.915	0.986	0.900	0.709
(12) (11)/(3)	<i>0.456</i>	<i>0.903</i>	<i>0.789</i>	<i>0.873</i>	<i>0.945</i>	<i>0.838</i>
(13) Gap with Counterfactual ⁴ ($B^{M86}X^{M03} - B^{F03}X^{F03}$)	0.409	0.440	0.478	0.436	0.370	0.441
(14) Counterfactual ⁴ /Observed '86	1.422	1.196	1.180	0.977	0.796	1.110
(15) (14)/(3)	<i>5.931</i>	<i>2.287</i>	<i>1.018</i>	<i>0.865</i>	<i>0.836</i>	<i>1.311</i>

Observed gaps are estimated from a quantile or OLS regression with no controls and using sample weight.

Standard errors are in parentheses.

The following counterfactuals are estimated using the Machado-Mata approach, with separate quantile regressions and separate random samples generated from covariates for men and women in each sector:

¹If women in 03 had Xs of women in 86

²If women in 03 had Bs of women in 86

³If men in 03 had Xs of men in 86

⁴If men in 03 had same Bs of men in 86

Table 5: Decomposition of the Gap Within the Public and the Private Sector, 2003

	10	25	50	75	90	OLS
Public						
(1) Observed gap	0.069 (0.042)	0.223 (0.014)	0.470 (0.036)	0.539 (0.051)	0.516 (0.051)	0.391 (0.028)
(2) Gap with Counterfactual ¹ ($B^M X^M - B^M X^F$)	0.072	0.173	0.301	0.244	0.178	0.211
(3) <i>Counterfactual¹/Observed</i>	1.05	0.78	0.64	0.45	0.34	0.54
(4) Gap with Counterfactual ² ($B^M X^M - B^F X^M$)	0.146	0.249	0.437	0.448	0.416	0.376
(5) <i>Counterfactual²/Observed</i>	2.11	1.12	0.93	0.83	0.81	0.96
Private						
(1) Observed gap	0.069 (0.051)	0.201 (0.069)	0.336 (0.069)	0.236 (0.049)	0.297 (0.058)	0.255 (0.036)
(2) Gap with Counterfactual ¹ ($B^M X^M - B^M X^F$)	0.018	0.019	-0.005	-0.013	-0.034	0.004
(3) <i>Counterfactual¹/Observed</i>	0.26	0.09	-0.02	-0.05	-0.12	0.02
(4) Gap with Counterfactual ² ($B^M X^M - B^F X^M$)	0.115	0.141	0.299	0.347	0.363	0.257
(5) <i>Counterfactual²/Observed</i>	1.67	0.70	0.89	1.47	1.22	1.01

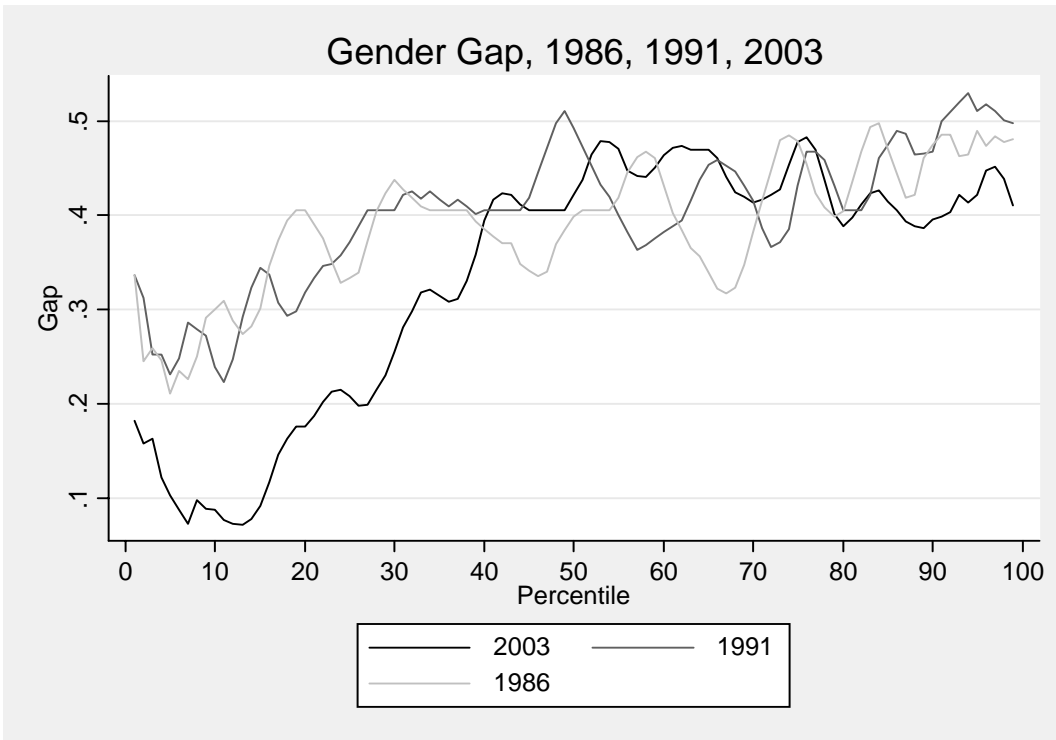
Observed gaps are estimated from a quantile or OLS regression with no controls and using sample weight.

The following counterfactuals are estimated using the Machado-Mata approach, with separate quantile regressions and separate random samples generated from covariates for men and women in each sector:

¹Women in a given sector have their own characteristics (Xs) but are "paid like men" (i.e. men's quantile regression coefficients).

²Women in a given sector have their own Bs but men's characteristics (Xs).

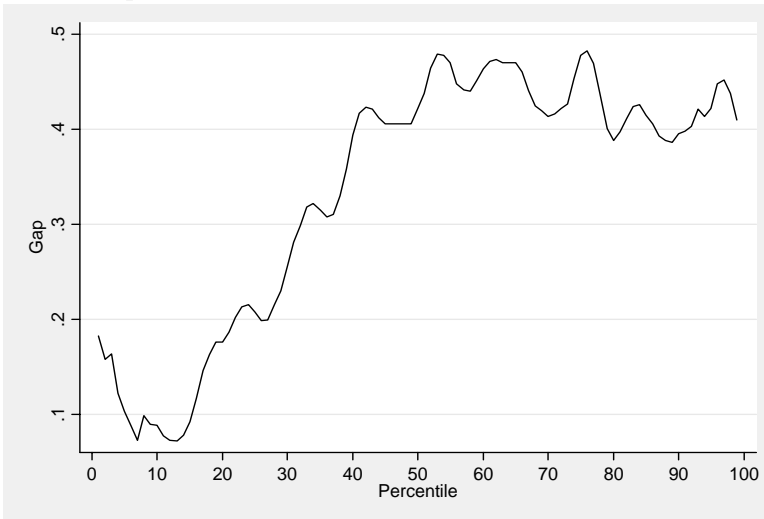
Figure 1: Gender gaps Across the Distribution for 1986, 1991 and 2003



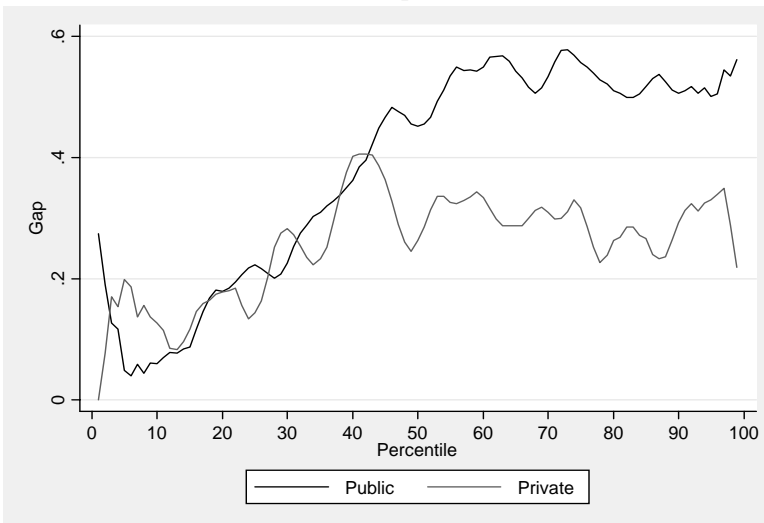
Note: Moving average over three percentiles

Figure 2: Gender Gap in the Public and Private Sectors in 2003

Gender Gap, 2003



Public and Private Sector Gender Gap, 2003



Public Administration, Other State and Private Sector Gaps, 2003

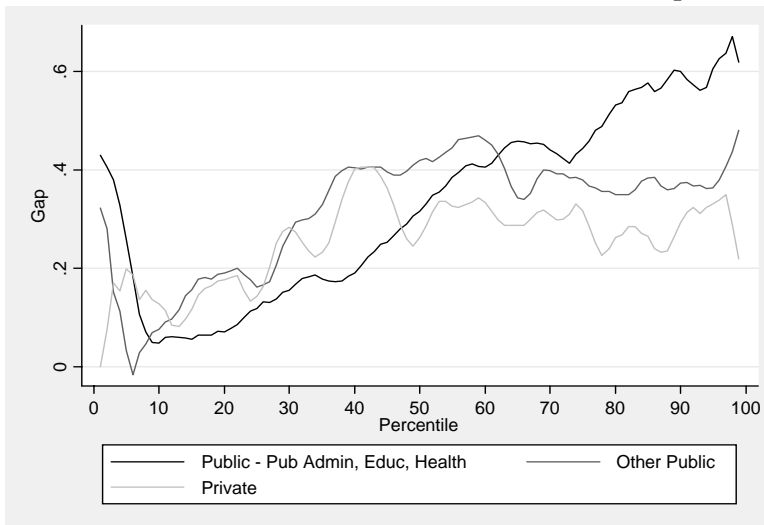
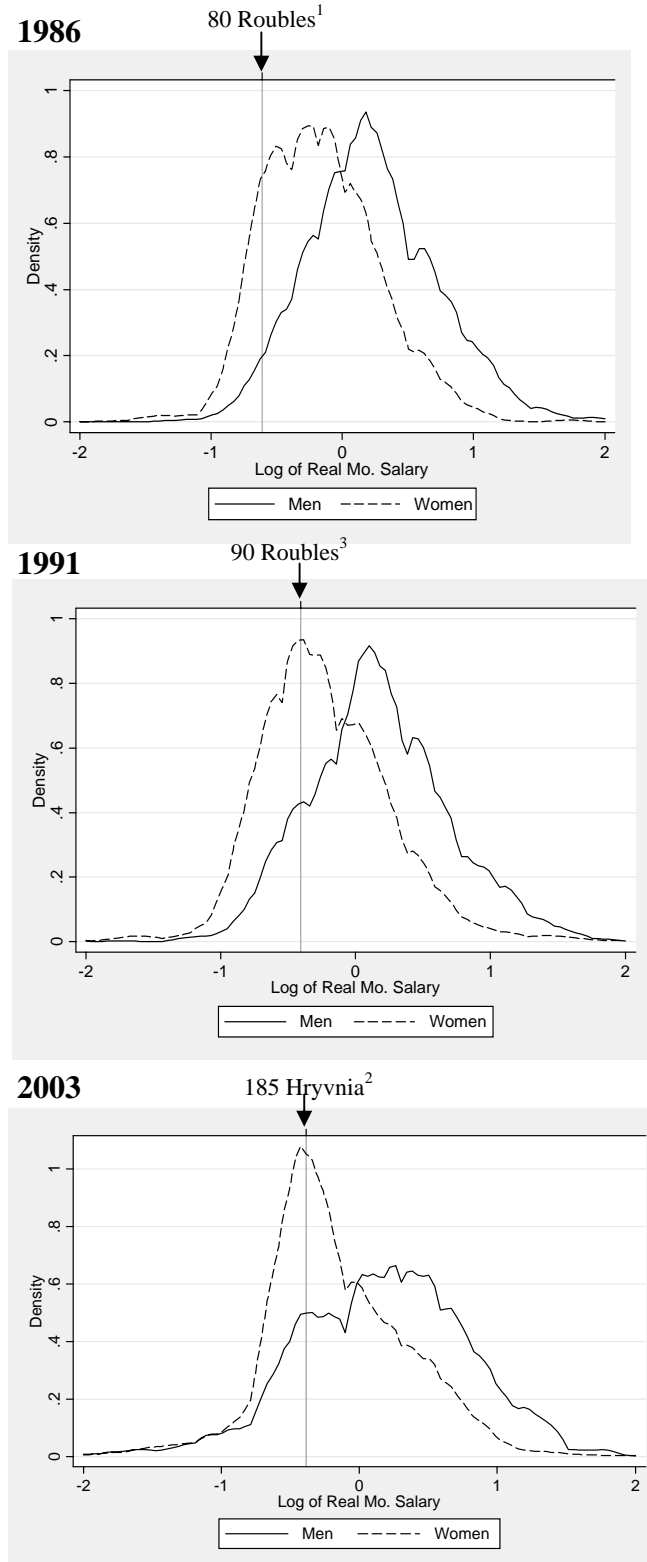


Figure 3. Kernel Density Estimates of Log Wages



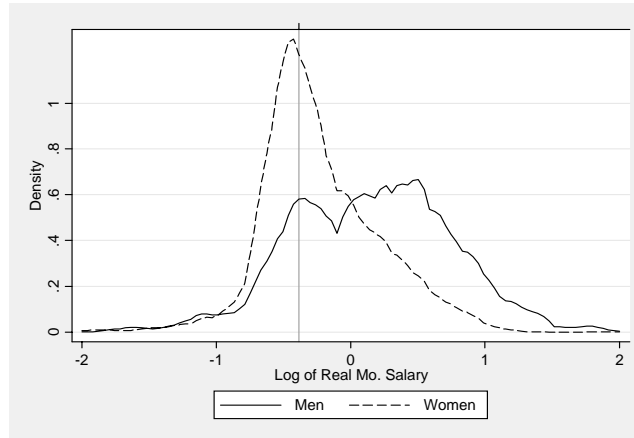
¹ 1985 Minimum Wage Salary (80 Rubles = Log value of -0.613).

² 2003 Minimum Wage (185 Hryvnia = Log value of -0.495).

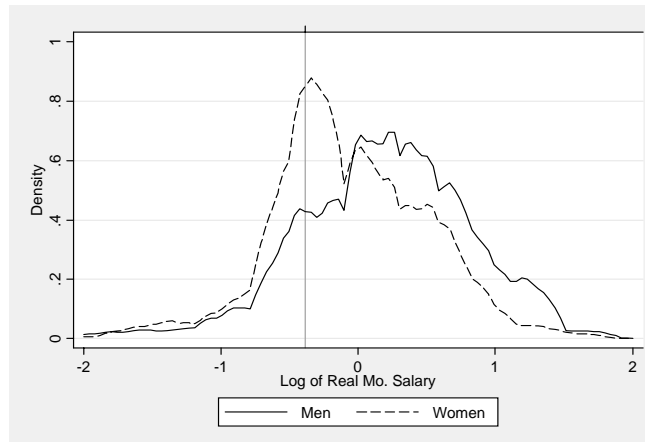
³ 90 Rubles = Log value of -0.384.

Figure 4: Kernel Density Estimates of Men's and Women's Wages in the Private and Public Sectors, 2003

2003 Public



2003 Private



Note: Line is drawn at the 2003 Minimum Wage.

Table A1: Sample Selection (Using Sample Weights)

	Total Sample, 15-56			Analytical Sample Employed FT ¹			Missing Wage/Empl. Info			Employed PT			Unemployed (Job- Seeking)			Out of LF		
	(a)			(b)			(c)			(d)			(e)			(f)		
	86	91	03	86	91	03	86	91	03	86	91	03	86	91	03	86	91	03
MEN																		
Observations	2451	2600	2843	1684	1450	1355	337	675	307	26	29	110	22	56	410	382	390	661
% of Total Sample, age 15-56	100%	100%	100%	69%	56%	48%	14%	26%	11%	1%	1%	4%	1%	2%	14%	16%	15%	23%
Age																		
15-19	17.6	15.1	16.1	2.2	3.1	2.9	5.1	3.4	4.0	0.0	0.0	9.6	56.5	40.2	10.2	71.0	64.7	52.4
20-29	32.9	25.4	24.2	36.2	27.1	27.4	34.8	27.0	27.4	45.5	20.1	18.9	29.8	21.6	30.0	21.4	18.7	13.8
30-39	24.3	26.4	20.9	31.3	31.3	24.7	27.6	32.0	26.3	40.7	43.1	21.3	10.4	23.2	24.7	1.0	3.7	8.4
40-49	14.8	19.0	23.7	18.6	22.6	28.4	19.4	22.8	27.7	13.8	32.9	31.1	3.3	11.5	24.3	1.0	3.3	11.2
50-56	10.3	14.1	15.1	11.7	16.0	16.5	13.2	14.8	14.7	0.0	4.0	19.2	0.0	3.5	10.9	5.6	9.5	14.3
Education Levels																		
Less than High School	20.4	16.7	15.0	12.7	9.6	4.8	17.1	11.2	7.7	5.9	0.0	7.5	35.2	31.9	9.0	45.9	44.4	43.4
High School	27.4	25.6	24.3	26.9	25.1	22.7	24.2	25.1	26.2	38.0	37.2	20.4	22.1	33.0	25.7	30.6	26.3	26.5
Vocational	26.8	28.7	30.3	29.4	31.0	33.4	28.4	32.2	30.3	32.1	39.5	37.4	37.8	20.3	41.3	17.0	17.4	16.4
Secondary Professional	14.9	17.0	17.4	18.0	19.6	21.9	16.4	17.9	18.3	14.2	13.1	16.3	2.3	11.1	16.1	5.4	9.2	8.8
Higher Education	10.5	11.9	13.1	13.1	14.6	17.2	13.8	13.7	17.4	9.8	10.1	18.4	2.6	3.7	8.0	1.2	2.8	4.9
Nationality																		
Ukrainian	78.5	77.7	79.2	78.2	78.7	77.9	78.2	76.2	79.2	97.5	89.3	83.0	78.6	68.3	79.2	78.5	77.2	81.4
Russian	18.1	18.5	16.7	18.3	18.0	17.5	17.5	18.5	16.4	2.5	7.2	11.4	13.5	18.3	18.3	19.0	20.4	14.9
Other (Including Belorussian, Jewish)	3.5	3.9	4.1	3.6	3.3	4.6	4.3	5.3	4.4	0.0	3.5	5.5	8.0	13.4	2.4	2.6	2.5	3.7
WOMEN																		
Observations	3458	3606	3682	2263	1871	1494	521	882	178	47	45	225	17	54	415	610	754	1370
% of Total Sample, age 15-56	100%	100%	100%	65%	52%	41%	15%	24%	5%	2%	1%	6%	0.7%	1%	15%	25%	21%	37%
Age																		
15-19	13.4	14.3	13.1	3.5	5.1	1.5	3.6	5.1	3.0	2.5	6.0	3.1	30.6	34.3	8.2	51.0	41.5	31.0
20-29	26.9	23.0	22.7	27.9	22.2	19.6	26.5	22.7	19.6	25.4	12.2	18.0	48.4	32.6	31.5	24.0	25.0	24.5
30-39	26.4	26.3	20.9	30.6	30.2	26.0	31.4	34.6	26.6	51.8	38.1	27.2	6.8	27.9	23.1	8.8	9.1	12.5
40-49	19.9	19.4	26.6	24.7	24.1	34.9	20.7	23.2	38.8	17.6	37.6	34.6	14.2	5.2	25.5	5.1	5.8	14.6
50-56	13.4	17.0	16.8	13.4	18.4	18.0	17.8	14.4	12.1	2.8	6.1	17.1	0.0	0.0	11.8	11.1	18.6	17.4
Education Levels																		
Less than High School	22.8	18.1	12.2	17.2	12.1	2.6	21.4	12.2	7.0	14.6	8.9	4.9	28.0	14.2	7.4	41.1	37.3	26.7
High School	26.6	26.1	24.7	25.8	25.4	18.5	23.3	24.7	25.0	17.0	0.4	19.1	24.1	27.0	25.7	31.9	28.6	32.2
Vocational	15.6	18.3	20.6	16.1	20.1	22.1	16.5	18.7	23.2	24.8	15.3	19.5	38.9	22.1	26.2	12.1	13.9	17.0
Secondary Professional	22.9	24.7	26.7	26.5	27.8	33.3	24.0	28.0	25.8	27.9	35.5	27.0	6.5	25.8	29.7	11.1	14.3	18.3
Higher Education	12.2	12.9	15.8	14.3	14.6	23.5	14.7	16.4	19.1	15.7	9.6	29.6	2.6	11.0	11.1	3.9	6.0	5.9
Nationality																		
Ukrainian	77.8	77.6	78.5	77.6	77.7	78.5	80.1	77.7	79.5	69.3	81.2	80.5	56.4	74.9	74.4	77.3	77.2	79.2
Russian	19.0	18.8	17.6	19.2	18.7	18.4	16.8	18.4	17.1	30.7	12.2	16.3	43.6	18.4	20.3	18.9	19.5	16.1
Other (Including Belorussian, Jewish)	3.3	3.6	4.0	3.2	3.5	3.2	3.1	3.9	3.4	0.0	6.7	3.2	0.0	6.7	5.3	3.8	3.2	4.7

¹ For 1986, FT means they did not report working 'always' or 'sometimes' part-time; For 2003, FT means reporting between 40 and 80 hours/week, or 30-40 hours/week if it is considered FT at that job.

Table A2: OLS & Quantile Regressions: Men

	1986							1991							2003						
	OLS	10	25	50	75	90	95	OLS	10	25	50	75	90	95	OLS	10	25	50	75	90	95
Nationality (Okrainian/Russian)	0.089** (0.029)	0.011 (0.067)	0.094** (0.030)	0.076* (0.035)	0.091* (0.035)	0.150* (0.067)	0.085 (0.109)	0.169** (0.040)	0.123* (0.060)	0.169** (0.041)	0.136** (0.034)	0.126** (0.044)	0.034 (0.079)	0.313* (0.131)	0.046 (0.040)	-0.019 (0.074)	-0.015 (0.058)	0.085 (0.045)	0.092 (0.065)	0.132 (0.075)	0.018 (0.079)
Other (inc. Byelorussian, Jewish)	-0.066 (0.061)	-0.009 (0.139)	-0.070 (0.065)	-0.116 (0.072)	-0.181** (0.069)	-0.213 (0.130)	-0.052 (0.197)	0.131 (0.090)	0.285** (0.100)	0.085 (0.093)	0.009 (0.075)	0.068 (0.094)	0.072 (0.154)	0.445* (0.225)	0.115 (0.073)	-0.022 (0.127)	-0.075 (0.106)	0.131 (0.086)	0.123 (0.113)	0.525** (0.149)	0.437** (0.139)
Education (Less than HS)																					
High School	0.045 (0.042)	-0.013 (0.094)	0.093* (0.040)	0.079 (0.049)	-0.008 (0.050)	0.069 (0.094)	0.069 (0.165)	-0.005 (0.062)	-0.016 (0.093)	0.035 (0.065)	-0.005 (0.053)	-0.016 (0.069)	-0.065 (0.124)	0.066 (0.155)	0.009 (0.077)	0.151 (0.137)	0.009 (0.110)	0.043 (0.086)	0.053 (0.121)	0.095 (0.156)	-0.273 (0.145)
Vocational	0.112** (0.041)	0.060 (0.090)	0.101** (0.038)	0.174** (0.048)	0.089 (0.048)	0.149 (0.093)	0.255 (0.163)	0.051 (0.061)	0.065 (0.089)	0.056 (0.062)	0.056 (0.051)	0.016 (0.068)	0.101 (0.122)	0.234 (0.149)	0.042 (0.075)	0.180 (0.131)	0.040 (0.106)	0.112 (0.084)	0.068 (0.116)	0.128 (0.152)	-0.221 (0.138)
Secondary Professional	0.191** (0.044)	0.189 (0.097)	0.225** (0.041)	0.251** (0.052)	0.172** (0.052)	0.128 (0.099)	0.209 (0.166)	0.247** (0.064)	0.145 (0.098)	0.155* (0.066)	0.197** (0.054)	0.180* (0.072)	0.402** (0.128)	0.451** (0.164)	0.183* (0.078)	0.286* (0.135)	0.186 (0.110)	0.261** (0.088)	0.205 (0.122)	0.262 (0.158)	-0.015 (0.147)
Higher Ed (Bach, Spec, Masters, PhD)	0.239** (0.048)	0.273** (0.106)	0.350** (0.045)	0.294** (0.055)	0.139* (0.057)	0.192 (0.103)	0.236 (0.170)	0.313** (0.069)	0.298** (0.097)	0.307** (0.069)	0.288** (0.057)	0.333** (0.075)	0.349** (0.130)	0.337 (0.177)	0.394** (0.081)	0.442** (0.140)	0.387** (0.114)	0.464** (0.090)	0.460** (0.125)	0.557** (0.160)	0.221 (0.150)
Age	0.029** (0.009)	0.015 (0.019)	0.014 (0.009)	0.033** (0.011)	0.043** (0.010)	0.024 (0.021)	0.039 (0.035)	0.039** (0.011)	0.034* (0.017)	0.038** (0.012)	0.028** (0.009)	0.043** (0.012)	0.055** (0.021)	0.029 (0.033)	0.036** (0.011)	0.017 (0.021)	0.015 (0.016)	0.042** (0.012)	0.049** (0.018)	0.039 (0.020)	0.050* (0.022)
Age2	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001** (0.000)	-0.000* (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.001* (0.000)
Kyiv	0.103* (0.047)	0.142 (0.118)	0.051 (0.053)	0.137* (0.063)	0.130* (0.061)	0.078 (0.109)	0.004 (0.139)	0.271** (0.063)	0.080 (0.104)	0.054 (0.067)	0.091 (0.057)	0.168* (0.072)	0.359** (0.123)	1.826** (0.191)	0.209** (0.055)	0.004 (0.100)	0.143 (0.090)	0.344** (0.066)	0.282** (0.092)	0.207* (0.103)	0.303* (0.122)
Activity of Enterprise (Agriculture is omitted)																					
Manufacturing & Mining	0.395** (0.032)	0.367** (0.074)	0.407** (0.033)	0.430** (0.039)	0.466** (0.041)	0.403** (0.082)	0.354* (0.155)	0.441** (0.047)	0.352** (0.075)	0.439** (0.049)	0.442** (0.039)	0.451** (0.051)	0.449** (0.093)	0.474** (0.140)	0.740** (0.054)	0.886** (0.097)	0.725** (0.078)	0.813** (0.059)	0.582** (0.088)	0.550** (0.105)	0.313* (0.122)
Electricity, Gas, Water & Construction	0.250** (0.044)	0.367** (0.095)	0.235** (0.045)	0.255** (0.053)	0.172** (0.055)	0.212* (0.107)	0.195 (0.195)	0.306** (0.061)	0.274** (0.097)	0.312** (0.064)	0.400** (0.051)	0.295** (0.066)	0.279* (0.119)	0.236 (0.179)	0.649** (0.062)	0.857** (0.114)	0.547** (0.090)	0.721** (0.069)	0.554** (0.099)	0.592** (0.118)	0.253 (0.132)
Transport, Communic. & Financial ¹	0.173** (0.038)	0.284** (0.087)	0.210** (0.040)	0.243** (0.047)	0.123** (0.047)	0.063 (0.091)	-0.053 (0.167)	0.341** (0.053)	0.235** (0.085)	0.353** (0.056)	0.314** (0.045)	0.326** (0.059)	0.251* (0.107)	0.340* (0.168)	0.654** (0.057)	0.752** (0.099)	0.598** (0.082)	0.745** (0.063)	0.545** (0.093)	0.503** (0.112)	0.249 (0.130)
Public Administration & Defense	0.294** (0.053)	0.400** (0.119)	0.308** (0.057)	0.314** (0.068)	0.294** (0.070)	0.238 (0.136)	0.073 (0.220)	0.356** (0.080)	0.304* (0.126)	0.233** (0.086)	0.230** (0.070)	0.290** (0.091)	0.372* (0.164)	0.713** (0.241)	0.688** (0.080)	0.956** (0.146)	0.615** (0.118)	0.735** (0.091)	0.543** (0.128)	0.460** (0.153)	0.072 (0.161)
Education, Health, & Social Work	-0.131* (0.054)	-0.059 (0.136)	-0.131* (0.056)	-0.128 (0.066)	-0.070 (0.068)	-0.184 (0.115)	-0.256 (0.171)	-0.032 (0.076)	-0.026 (0.110)	0.009 (0.077)	-0.083 (0.065)	-0.077 (0.081)	-0.151 (0.137)	-0.180 (0.224)	0.113 (0.073)	0.534** (0.144)	0.221* (0.107)	0.091 (0.082)	-0.149 (0.120)	-0.223 (0.139)	-0.483** (0.159)
Other ²	0.042 (0.055)	0.149 (0.123)	0.067 (0.056)	0.081 (0.069)	-0.012 (0.070)	-0.079 (0.117)	-0.231 (0.211)	0.231** (0.079)	-0.081 (0.112)	0.130 (0.083)	0.193** (0.067)	0.297** (0.085)	0.172 (0.139)	0.205 (0.238)	0.357** (0.077)	0.615** (0.132)	0.354** (0.106)	0.416** (0.084)	0.221 (0.118)	0.163 (0.135)	-0.150 (0.151)
Constant	-0.649** (0.150)	-0.857* (0.351)	-0.699** (0.169)	-0.841** (0.195)	-0.597** (0.184)	-0.017 (0.391)	-0.109 (0.690)	-0.922** (0.191)	-1.354** (0.294)	-1.232** (0.218)	-0.797** (0.168)	-0.722** (0.221)	-0.560 (0.388)	-0.039 (0.542)	-1.159** (0.202)	-1.779** (0.395)	-1.063** (0.297)	-1.384** (0.228)	-0.935** (0.327)	-0.565 (0.351)	0.051 (0.391)
N =	1666	1666	1666	1666	1666	1666	1666	1430	1430	1430	1430	1430	1430	1430	1340	1340	1340	1340	1340	1340	1340
R-Squared =	0.17							0.15							0.23						

* significant at 5%; ** significant at 1%.

¹ Includes Wholesale/Retail Trade, Repair of Motor Vehicles/Motorcycles; Hotels & Restaurants; Transport, Storage & Communication; Financial Intermediation, Real Estate, Renting & Business Activities.

Table A3: OLS & Quantile Regressions: Women

	1986							1991							2003							
	OLS	10	25	50	75	90	95	OLS	10	25	50	75	90	95	OLS	10	25	50	75	90	95	
Nationality (Ukrainian Russian)	0.027 (0.023)	0.072** (0.025)	0.051** (0.012)	0.025 (0.019)	-0.001 (0.026)	-0.045 (0.039)	-0.091 (0.064)	0.056 (0.031)	0.079** (0.029)	0.042 (0.024)	0.091** (0.032)	0.105** (0.025)	0.018 (0.056)	0.029 (0.096)	0.130** (0.034)	0.054 (0.045)	0.075** (0.025)	0.113** (0.032)	0.146** (0.036)	0.141* (0.064)	0.063 (0.096)	
Other (inc. Byelorussian, Jewish)	0.015 (0.050)	-0.002 (0.050)	0.000 (0.024)	-0.003 (0.041)	-0.064 (0.058)	0.084 (0.080)	0.134 (0.148)	0.050 (0.066)	0.054 (0.056)	-0.025 (0.046)	-0.025 (0.067)	-0.000 (0.050)	-0.128 (0.123)	0.528** (0.134)	0.001 (0.073)	0.165 (0.087)	0.105* (0.052)	0.038 (0.067)	0.102 (0.077)	-0.077 (0.124)	-0.108 (0.167)	
Education (Less than HS High School)	0.078** (0.030)	0.109** (0.030)	0.022 (0.014)	0.109** (0.025)	0.088** (0.033)	0.017 (0.049)	0.014 (0.082)	0.071 (0.044)	0.079* (0.036)	0.038 (0.032)	0.099* (0.044)	0.092** (0.033)	0.030 (0.074)	-0.105 (0.125)	0.188* (0.086)	0.050 (0.104)	0.120* (0.060)	0.227** (0.080)	0.125 (0.089)	0.239 (0.142)	0.220 (0.139)	
Vocational	0.133** (0.034)	0.133** (0.034)	0.093** (0.017)	0.188** (0.029)	0.128** (0.039)	0.064 (0.056)	0.111 (0.093)	0.143** (0.048)	0.076 (0.039)	0.093** (0.035)	0.150** (0.049)	0.120** (0.037)	0.179* (0.084)	0.069 (0.139)	0.201* (0.085)	-0.002 (0.104)	0.121* (0.059)	0.246** (0.079)	0.134 (0.088)	0.277* (0.141)	0.269 (0.138)	
Secondary Professional	0.133** (0.030)	0.174** (0.032)	0.132** (0.015)	0.213** (0.025)	0.096** (0.033)	0.080 (0.051)	0.083 (0.087)	0.178** (0.045)	0.219** (0.036)	0.194** (0.032)	0.198** (0.044)	0.125** (0.034)	0.089 (0.074)	0.038 (0.124)	0.281** (0.084)	0.096 (0.100)	0.153** (0.058)	0.316** (0.078)	0.222* (0.087)	0.403** (0.140)	0.375** (0.129)	
Higher Ed (Bach, Spec, Masters, PhD)	0.394** (0.035)	0.398** (0.038)	0.415** (0.017)	0.473** (0.029)	0.481** (0.038)	0.447** (0.057)	0.374** (0.095)	0.460** (0.050)	0.371** (0.043)	0.422** (0.037)	0.494** (0.050)	0.503** (0.038)	0.490** (0.084)	0.378** (0.135)	0.523** (0.085)	0.241* (0.102)	0.376** (0.059)	0.614** (0.079)	0.533** (0.089)	0.723** (0.141)	0.794** (0.136)	
Age	0.009 (0.007)	0.002 (0.008)	0.005 (0.003)	0.015* (0.006)	0.010 (0.008)	-0.001 (0.011)	-0.018 (0.019)	-0.002 (0.008)	0.023** (0.008)	0.000 (0.006)	0.004 (0.009)	-0.008 (0.008)	-0.024 (0.017)	-0.033 (0.028)	0.012 (0.010)	0.030* (0.012)	0.007 (0.008)	0.007 (0.010)	0.004 (0.011)	0.004 (0.018)	0.004 (0.018)	-0.006 (0.026)
Age2	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000* (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	
Kyiv	0.116** (0.037)	0.109** (0.038)	0.117** (0.019)	0.117** (0.033)	0.077 (0.046)	0.079 (0.074)	0.074 (0.116)	0.355** (0.050)	0.112** (0.040)	0.094* (0.037)	0.085 (0.055)	0.207** (0.044)	0.661** (0.099)	1.958** (0.161)	0.296** (0.044)	0.110 (0.058)	0.136** (0.034)	0.278** (0.044)	0.371** (0.051)	0.354** (0.089)	0.486** (0.126)	
Activity of Enterprise (Agriculture is omitted)																						
Manufacturing & Mining	0.246** (0.030)	0.181** (0.033)	0.208** (0.015)	0.277** (0.025)	0.208** (0.034)	0.270** (0.051)	0.344** (0.084)	0.251** (0.042)	0.197** (0.041)	0.223** (0.032)	0.300** (0.044)	0.221** (0.035)	0.290** (0.074)	0.344** (0.124)	0.362** (0.056)	0.831** (0.070)	0.360** (0.043)	0.269** (0.053)	0.440** (0.061)	0.187 (0.108)	-0.059 (0.157)	
Electricity, Gas, Water & Construction	0.239** (0.048)	0.188** (0.051)	0.233** (0.024)	0.202** (0.040)	0.209** (0.054)	0.248** (0.075)	0.321** (0.106)	0.254** (0.069)	0.321** (0.065)	0.227** (0.050)	0.279** (0.069)	0.223** (0.052)	0.392** (0.116)	0.339 (0.183)	0.444** (0.082)	1.023** (0.099)	0.411** (0.059)	0.382** (0.076)	0.474** (0.084)	0.237 (0.136)	-0.053 (0.168)	
Transport, Communic. & Financial ¹	0.033 (0.033)	0.001 (0.037)	-0.004 (0.017)	0.068* (0.028)	-0.011 (0.038)	-0.024 (0.056)	0.013 (0.090)	0.056 (0.046)	0.067 (0.044)	0.048 (0.035)	0.084 (0.048)	-0.051 (0.037)	0.091 (0.081)	0.198 (0.144)	0.274** (0.056)	0.665** (0.070)	0.230** (0.043)	0.156** (0.053)	0.393** (0.061)	0.185 (0.108)	-0.080 (0.158)	
Public Administration & Defense	-0.015 (0.054)	-0.024 (0.055)	-0.050 (0.027)	-0.000 (0.046)	-0.111 (0.060)	-0.149 (0.085)	-0.009 (0.131)	0.182* (0.075)	0.151* (0.072)	0.068 (0.055)	0.181* (0.077)	0.099 (0.061)	0.275* (0.129)	0.521** (0.177)	0.253** (0.081)	0.828** (0.100)	0.301** (0.059)	0.104 (0.076)	0.299** (0.091)	0.052 (0.169)	-0.343 (0.229)	
Education, Health, & Social Work	-0.112** (0.032)	-0.036 (0.037)	-0.116** (0.017)	-0.124** (0.027)	-0.215** (0.036)	-0.270** (0.052)	-0.182** (0.088)	-0.098* (0.045)	0.010 (0.043)	-0.043 (0.034)	-0.076 (0.047)	-0.251** (0.036)	-0.215** (0.076)	-0.247 (0.128)	-0.013 (0.054)	0.746** (0.065)	0.174** (0.041)	-0.071 (0.051)	-0.099 (0.059)	-0.472** (0.105)	-0.753** (0.156)	
Other ²	0.014 (0.043)	0.038 (0.049)	-0.046* (0.023)	-0.023 (0.036)	-0.042 (0.049)	0.064 (0.076)	0.253 (0.129)	-0.016 (0.061)	0.033 (0.057)	-0.002 (0.047)	-0.015 (0.064)	-0.023 (0.048)	-0.003 (0.110)	0.006 (0.180)	0.166* (0.065)	0.795** (0.083)	0.225** (0.049)	0.061 (0.063)	0.158* (0.072)	-0.088 (0.127)	-0.220 (0.185)	
Constant	-0.578** (0.118)	-0.875** (0.137)	-0.702** (0.062)	-0.771** (0.105)	-0.261 (0.141)	0.177 (0.199)	0.529 (0.327)	-0.496** (0.149)	-1.417** (0.144)	-0.802** (0.116)	-0.696** (0.170)	-0.086 (0.141)	0.461 (0.313)	0.927 (0.537)	-0.938** (0.202)	-2.106** (0.261)	-1.041** (0.151)	-0.815** (0.192)	-0.496* (0.221)	-0.132 (0.353)	0.513 (0.520)	
N =	2230	2230	2230	2230	2230	2230	2230	1849	1849	1849	1849	1849	1849	1849	1475	1475	1475	1475	1475	1475	1475	
R-Squared =	0.15							0.14							0.19							

* significant at 5%; ** significant at 1%.

¹ Includes Wholesale/Retail Trade, Repair of Motor Vehicles/Motorcycles; Hotels & Restaurants; Transport, Storage & Communication; Financial Intermediation, Real Estate, Renting & Business Activities.

² Includes Other Community, Social and Personal Service Activities.

Note: Using sample weights.