What Drives Changes in Wage Inequality in Ukraine's Transition?*

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ABSTRACT:

This paper uses new micro data from the Ukrainian Longitudinal Monitoring Survey (ULMS) to examine changes in wage inequality from 1986 to 2003. We establish how much inequality increased, and what drives the increase: changes in the labor force composition or changes in the wage structure from the communist to the market system. We also ask whether the institution of the minimum wage played a role in the level of inequality and its change over time. We find that wage inequality rose moderately, and more for men than for women. Applying the DiNardo, Fortin and Lemieux (1996) decomposition method we learn that changes in the wage structure explain almost the entire rise in inequality. We identified significant increases in the returns to human capital and widening wage differentials among industrial activities and ownership types, but these differentials were not significantly different for men and women. Although relatively less important in its impact, changes in the composition of the labor force did affect the change in inequality. If the labor force in 2003 had the same worker characteristics as the labor force in 1986, overall inequality would have been even higher in 2003. The younger, less-educated workers, and those working in agricultural or industrial activities, the state sector and large firms were more likely to have left the labor force by 2003, with some differences between men and women. Finally, we find that the minimum wage did indeed play a role in lowering inequality from what it might have been, but only for women.

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1. Introduction

There has been great interest in examining the changes in the structure and dispersion of wages brought about by the transition to market based economies in the countries of Central and East Europe (CEE) and the Former Soviet Union (FSU).[1] It was expected that the introduction of market forces would change the structure of wages and the composition of production across economic sectors. Given the highly compressed wage grids under communism and relatively low returns to higher education, it was expected that the wage structure would broaden as returns to human capital rose but it was not clear how these changes would affect the relative wage inequality of men and women. Would changes in the demand for labor resulting from market forces and the introduction of private ownership result in compositional changes that would increase or decrease women's inequality more than men's? Would the introduction of more flexibility in the labor market (e.g. allowing part-time work and unemployment) and concurrent shifts in labor supply result in more or less wage inequality?

In this paper we examine changes in the distribution of wages of men and women in Ukraine, a country for which there is little microeconomic analysis of the transition and which, owing to the Orange Revolution, has become a focal country in terms of economic and foreign policy assistance. We use new household data from the 2004 Ukrainian Longitudinal Monitoring Survey (ULMS) to answer two sets of questions: a) To what extent did wage inequality rise? b) Can we explain the extent to which the rise in inequality was due to changes in the composition of the labor force versus changes in the structure of wages (returns to human capital and various job characteristics) brought about by the transition to a market economy? For each of these questions we are interested in the differences for men vs. women. We apply the semi-parametric and decomposition technique developed by Dinardo, Fortin and Lemieux (1996).

The paper is structured as follows: Ukraine's transition experience is described in Section 2. An explanation of the data source and methodology is found in Sections 3 and 4, respectively. The analysis of the changes in inequality is in Section 5, followed by conclusions in Section 6.

[1] See for example, Keane and Prasad (2002), Munich, Svejnar and Terrell (2005), Newell (2001), Newell and Socha (2005) for studies of changes in the wage structure in the transition countries and Milanovic (1999) and Atkinson and Micklewright (1992) for studies of changes in inequality in these economies.

2. Macroeconomic and Institutional Context

Prior to its independence from the Soviet Union in 1991, Ukraine's economy was characterized by many of the same features found in other countries of the FSU and CEE. It was largely based on heavy industry and agriculture; military-industry accounted for 40% of the industrial labor force, and agriculture was almost 25% of the labor force (ILO, 1995). As in other Soviet Republics, there was no official unemployment and wages were determined by a centralized tariff or wage grid, so there was little room for employers to determine wages. The centralized tariff system consisted of wage coefficients by grade, and took into account time worked and work conditions. Wages in the Soviet Union were compressed, and the official minimum subsistence wage was set close to the average wage (Ogloblin, 1999).

During *perestroika,* some of the rigidity of the wage system was loosened as Gorbachev tried to spur growth by decentralizing parts of the economy and expanding the cooperative sector. In 1986, wage reforms were introduced in the non-service sector. Enterprises were required to finance wage increases, which were nevertheless still centrally-mandated. It was expected that the hardening of the budget constraint would force enterprises to release redundant workers and would lead to faster growth in labor productivity, relative to growth in wages. Between 1987 and 1989, 3.3 million workers were released but a high percentage was rehired in different positions in the same enterprise as enterprises restructured in response to the new pay conditions (Chapman, 1991).

Since independence, Ukrainian policymakers have undertaken several wage reforms. In April 1991, the centralized system of wage determination was abolished with the Law on Enterprises, which promoted wage bargaining between trade unions and employers and gave enterprises autonomy to determine wage levels and payment systems. The only requirement (according to Article 19) was to use the tariff system as a benchmark to ensure wage differentials between workers according to profession, skill, complexity and conditions of work. But, with rapid wage growth in 1992, the government pushed to reintroduce a centralized system of wage regulation for the public sector. A general tariff agreement was concluded in 1993, followed by industry, regional and enterprise level agreements. The general agreement set wage coefficients for different categories of workers and branches of industry on the basis of the minimum wage (described below). The primary aim of the tariff system was to limit wage inflation by controlling wages; a second aim was to limit wage differentials between enterprises and sectors

of the economy, which were considered too large compared to other countries. However, this system was only in effect for two years as in May 1995 a new Law on Wages was adopted, which strengthened the role of bargaining in setting wages and salaries (ILO, 1998).

In 1992, Ukraine established a minimum wage in the Decree on Wages. However, during the Soviet period there was a minimum subsistence wage in effect, whose level was determined by prices of 70 basic goods needed for subsistence. From the end of 1977 to 1986, it was set at 70 rubles (Chapman, 1991). In 1992, with the new Decree, the minimum wage continued to be set according to the price of a basic of basic goods for a short while, but soon thereafter, changes to the minimum wage were decided by the Council of Ministers, with final approval by parliament. The minimum wage was revalued several times in 1992 (the year of hyperinflation); from 1993 to early 1996 it was not changed and its nominal level remained at 60,000 karbovanets. In March 1996, it was increased to 1.5 million karbovanets (15 hryvnya). However, due to high inflation, the minimum wage was "merely a symbolic sum" during this period. (ILO, 1998) As seen in Figure 1, the minimum wage fell significantly relative to the average wage until 1994, when it was less than 5 percent of the latter, but it rose to 10 percent in 1996 and to 30 percent in 1998. In 2003, the year of our survey, the minimum wage in Ukraine was set at 185 hryvnas a month (approximately $34.69), which amounted to about 40 percent of the average wage.

With regard to other aspects of the transition, Ukrainian policymakers have taken a gradual approach to reform rather than the "shock therapy" approach taken in many other countries in the region. A timeline of major policy changes are noted in Table 1. In 1992 some prices were liberalized but it was not until 1995 that most prices were liberalized. The privatization process was initiated in 1992 and mass privatization of large-scale enterprises began in 1995 but increased rapidly only in 2000. The new government chose a privatization strategy that would disperse ownership of state-owned enterprises (Pivovarsky, 2001). From 1992-1994, 1,240 medium and large enterprises were privatized through buyouts by managers and employees; the 1995-1998 mass privatization programs privatized 9,240 enterprises through auctions. In 1998, large-scale privatization occurred on a case-by-case basis, with the pace increasing in 2000. By 2001, almost 60,000 small-scale enterprises were sold through cash auctions or tenders (Elborgh-Woytek and Lewis, 2002). Despite these significant moves toward privatization, the private sector environment faces challenges: there are many bureaucratic

burdens and a few interest groups or 'clans' control many areas of the economy, especially in industry (Elborgh-Woytek and Lewis, 2002). Currently, it is the largest enterprises, especially in the energy sector, that remain to be privatized.

As with most of the former Soviet republics, Ukraine has had a difficult transition process. As Figure 1 shows, GDP declined dramatically at annual rates as high as 20% until the mid-1990s, and inflation reached over 10,000% during 1992. Independent Ukraine experienced economic growth for the first time in 2000. Despite the declines in GDP and hyperinflation, employment in Ukraine decreased very little, a pattern seen in other FSU countries.[2] Unemployment rates remained very low, at less than 1% until 1996. However, the official figures as reported by the National Bank of Ukraine, are based only on those who register themselves at state offices as unemployed, which are often more likely to be women. ILO estimates meanwhile are higher, at over 12% in the 1999 and 2000. Partial unemployment (forced leaves and shorter working hours), and informal activity has been common, and many Ukrainians have also begun migrating to gain work abroad.

3. Data

The data source is the first wave of the Ukrainian Longitudinal Monitoring Survey (ULMS), administered from April 11 until June 30, 2003. The ULMS is the first nationally representative longitudinal survey of Ukrainian households. The sample contains 4,056 households and 8,621 individuals. In addition to demographic information on each member of the household, the survey contains 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.

For this analysis, we created two samples (1986 and 2003) of individuals ages 15-60 who reported a monthly salary and were working full time (between 40 and 80 hours per week).[3] These samples were then pooled. The time points chosen for the analysis – 1986 and 2003 – capture the pre- and post-transition economic environments. In 1986, perestroika policies had

[2] See Boeri and Terrell (2002) for a description of this pattern.

[3] These ages were selected since the retirement age in Soviet Ukraine and present day Ukraine is 55 for women and 60 for men. We restrict the sample to full-time work (40 hours/week) in the 2003 sample since there was no part-time work during Soviet times. We do not include individuals who reported working more than 80 hours per week, due to potential misreporting.

not yet begun, and in 2003, most stages of economic reform (price liberalization, privatization, and macroeconomic stabilization) were complete.

Since the 1986 data are obtained retrospectively, i.e. looking 16 years back, it can be argued that people may have had difficulty remembering their wages and employment status at that time. However, we expect the recall error to be relatively small since 1986 was the year of the Chernobyl nuclear explosion, which most Ukrainians remember vividly. Studies have shown that having an important event as a reference point, respondents are less likely to have recall lapse. Moreover, since wages set in the communist grid were clearly defined and did not change much through time, we expect them to be more easily remembered. [4]

The wage data are taken from a question on "net contractual monthly salary" for a main job in 1986 and 2003.[5] In light of Ukraine's two currency changes and the levels of hyperinflation, it is a difficult task to transform the salary data into accurately comparable units. Continuous price level data from 1986 beyond the transition are unavailable. Converting salary data into U.S. dollars is also problematic, since currency under socialism was considered non-convertible. Ukraine's currency in 1986 was the Soviet ruble, and as Kornai (1992: 342) suggests, "Ultimately, there is no way of telling what a ruble is worth in dollars." Two types of ruble exchange rates are available -- official and black market rates. As the Soviet Union reformed, the black market in foreign exchange quickly increased (Kornai, 1992). The following method was used to account for both the currency changes and inflation: 1986 monthly salaries (in *rubles*) and 2003 monthly salaries (in *hryvnia*) were converted to U.S. dollars using the ruble to dollar black market exchange rate in 1986[6] and the hryvnia to dollar official exchange rate in 2003.[7] The U.S. Consumer Price Index was then used to convert these values into real terms.[8] While this method results in some distortion, it will not affect our analysis of the relative 1986 and 2003 inequality.

In addition to issues of conversion, we must keep in mind some other potential limitations of the salary data. Similar to Russia, Ukraine had a significant problem with wage

[4] We 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.
[5] 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% of the 1986 and 2003 samples reported having had a second job.
[6] As reported in *The World Currency Yearbook, 1986/1987*.
[7] The hryvnia-dollar exchange rate was obtained from the National Bank of Ukraine website.
[8] The U.S. CPI data was obtained from the U.S. Dept. of Labor, Bureau of Labor Statistics website.

arrears. However by the time of our survey, lack of payment of wages was less frequent than it had been earlier: 10.4 percent of the workers in our sample reported having wage arrears in 2002. This share was higher for men (12.1) than for women (8.8). Nevertheless, the problem of wage arrears does not effect in our analysis of inequality since we use data from the "net contractual monthly salary." [9]

Finally, we only analyze the data of individuals with non-zero monthly salary data. We do not adjust the salary data for hours worked per month and hence include only full-time workers, working 40 hours or more per week. If individuals reported a wage of zero or did not provide salary data, they are not included in the sample. Exclusion of these groups will lower inequality from what it would have been if a) those who are part-time workers tend to have lower wages; b) those who are out of the labor market, and hence do not report a wage, tend to be from the lower end of the wage distribution; and c) those who do not respond to the salary question are most likely at the upper tail of the distribution. Brainerd (1998) reports that in Russia wages in the upper tail of the wage distribution may be underreported due to "innovative schemes" to evade taxes or 'under the table' wage payments.[10] This is also likely to be the case in Ukraine.

To get a sense of the characteristics of individuals included and excluded from the sample, we compiled the summary statistics in Table 2. We show in columns (a) the characteristics of the entire sample of men and women aged 15-60 in 1986 and 2003 and in columns (b) the characteristics of the analytical sample of full-time workers with no missing data. Columns (c) and (d) report the characteristics of the individuals with missing wage data and who were employed for less than 40 hours a week in each year. As can be seen from the comparison of columns (b) with columns (c) and (d), the individuals excluded from the sample have similar characteristics to those of the full-time workers with no missing data, hence discarding them does not bias our sample.

Table 2 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 15-60 that were unemployed or out of the labor force, respectively. The unemployment rates rose from 1% to 14% for men and

[9] Lehmann, et al. (2003) develop counterfactual wage densities for Russia, which provide the distribution of wages in the absence of wage arrears. They suggest that studies that do not account for wage arrears may overestimate wage-inequality.

[10] Brainerd mentions practices such as paying employees life insurance payments rather than wages or compensating workers with non-monetary benefits.

from 0% to 11% for women over the period.[11] 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 (40 percent) than for men (25 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 15-60 year old age group. In general, they tend to be younger (15-19), with less than a high school education, and unmarried.

We consider both demographic characteristics and job characteristics in our analysis. The demographic variables include age, nationality, and education. The education variable is coded as the highest level completed. Due to the nature of the Soviet and Ukrainian educational systems, individuals with the same years of schooling may have different skills and educational attainment. 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). The job characteristic variables include location (Kyiv or outside of Kyiv), activity of the enterprise (or industry at the one digit level), ownership type (state, private, or de novo), and firm size (1-49, 50-249, 250-999 and 1000+ employees).

Table 3 reports summary statistics for the 1986 and 2003 samples of men and women using sample weights. It shows the distinct compositional changes in the wage-earning population. Among men, mostly the middle-aged (30-39) left the labor force by 2003, while among women, younger women (20-29) left. For men and women, the nationality shares do not change considerably, which is not surprising since many Russians continued to live and work in Ukraine after the fall of the USSR, unlike in some other FSU countries. The education category reveals the exit of the less-educated men and women. The share of men with less than high school education drops by 9%, while the share of women drops by over 16%. The share of workers with high school degrees also drops considerably.

The differences in the shares of activity of enterprise, location, ownership type, and firm sizes also reflect changes occurring in other transition countries. Most notably, the share of workers in agriculture and heavy industry decreased, while the shares in service activities rose.

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

The sector with the greatest increase among men is the transportation and telecommunication sector, while among women the greatest increase is in the education, health, and social protection. There was an increase in the share of workers in the capital city of Kyiv by 2003, with 2.7% more men and 4.7% more women working in Kyiv. By 2003, both the small- and large-scale privatization programs were complete, so we see decreases in men and women working in the state sector, and for very large firms. A greater share of women work in the state sector than men in 2003, but more women are employed in micro/small firms than men. Since *perestroika* reforms, which introduced some forms of private ownership, had begun by 1986, there are small shares of cooperative and privatized enterprises in the 1986 sample.

4. Methodology

As noted earlier, we are seeking answers to two broad questions: 1) How much change is there in the male and female wage distributions from 1986 to 2003? and 2) Which factors are more important in accounting for these changes: i) change in the wage structure or ii) change in the distribution of worker characteristics?

To address the first question, we calculate for each of the two years several measures of wage dispersion: standard deviation, Gini, Theil and three fractile measures (e.g. the 10-90 differential, or the difference between the 10^{th} and 90^{th} percentile of the log wage distribution). To address the second question, we use the methodology of DiNardo, Fortin, and Lemieux (1996), henceforth DFL. The most common approaches used to compare and decompose gender earning differentials are the Oaxaca (1973) decomposition and the technique of Juhn, Murphy, and Pierce (1993). This approach, however, is limited to explaining differences in means of wages and mean characteristics. DFL have developed a methodology for decomposing the entire densities of wages along the lines of the Oaxaca decomposition. They use the classical kernel density estimator modified to the case of attaching sample weights to each observation. Following the notation and methodology of DFL, each individual observation can be viewed as a vector (w, z, t), where w is wage, z is a vector of individual attributes, and t is a date. The joint distribution of wages and attributes conditional on the date can be defined as $F(w, z|t)$. The density of wages at some time, $f_t(w)$ is then expressed as the integral of the density of wages conditional on some individual attributes and on a date t_w, $f(w|z, t_w)$, over the distribution of individual attributes $F(z|t_z)$ at date t_z, or: $f(w; t_w=t, t_z=t)$

Utilizing the semiparametric procedure in DFL (1996), we develop counterfactual densities of wages in Ukraine to compare the kernel densities of wages.[12] For example, we estimate the density that would have existed in 2003 if the distribution of demographic and job characteristics of the workers had remained as in 1986 *and* workers were paid according to the wage structure of 2003, where:

$$f(w; t_w=2003, t_z=1986) = \int f(w|z, t_w=2003)\, \Psi_z(z)\, dF(z|t_z = 2003) \quad (1)$$

and $\Psi_z(z)$ is a "reweighting" function where:

$$\Psi_z(z) = dF(z|\, t_z = 1986) / dF(z|\, t_z = 2003) \quad (2)$$

The weight ($\Psi_z(z)$) – the probability of being in period *t*, given worker characteristics *z* – is estimated using a logit model, which predicts the probabilities that Prob(t = 1986). To reweight, we then create a new weight which is a product of our sample weight and the weight obtained from the predicted probability obtained from the logit model[13]. Using the reweighted sample, we can then calculate counterfactual measures of inequality and wage levels, and use kernel density estimates to draw counterfactual densities of wages.[14] These counterfactual measures of and density functions are what would have prevailed in 2003 if the distribution of demographic and/or job characteristics had remained at 1986 levels.

Using the DFL (1996) re-weighting method, we can decompose the changes in the 1986 and 2003 densities into the effects of changes in the distribution of demographic characteristics and changes in the distribution of job characteristics. We carry out a sequential decomposition of the form:

$$\begin{aligned} &f03(w) - f86(w) = \\ &(1)\ [f(w;\, t_w=03,\, t_{dem}=03,\, t_{job}=03) - f(w;\, t_w=03,\, t_{dem}=86,\, t_{job}=03)] + \\ &(2)\ [f(w;\, t_w=03,\, t_{dem}=86,\, t_{job}=03) - f(w;\, t_w=03,\, t_{dem}=86,\, t_{job}=86)] + \\ &(3)\ [f(w;\, t_w=03,\, t_{dem}=86,\, t_{job}=86) - f(w;\, t_w=86,\, t_{dem}=86,\, t_{job}=86)] \end{aligned} \quad (4)$$

[12] The bandwidth selected is the optimal bandwidth determined by Stata.

[13] The logit model is then of the form $p(1986 = 1) = \exp(\beta_0 + \beta_z Z)/(1 + \exp(\beta_0 + \beta_z Z))$. The reweight is created by multiplying the sample weight by $(p/(1-p))$, where p is the predicted probability from the logit model.

[14] With the estimated probability density functions, the area under the curve between various wage levels is the probability that an individual chosen at random will have a wage between the two values. This method is also described in Johnston and DiNardo (1997), pages 370 – 379. Also see DiNardo and Tobias (2001).

Part (1) is the effect of demographic characteristics, part (2) is the effect of job characteristics, and part (3) is the unexplained portion. To calculate each part of the decomposition, a logit model is first estimated predicting the probability of being in the 1986 sample, given all the included demographic and job characteristics. Each 'piece' or covariate in our model can either be held at 1986 or 2003 levels. To hold a factor at the 2003 level, we simply assign the logit coefficient for that factor a zero before calculating the predicted probability used to create the new weight.[15]

By examining the coefficients on the logit model and the descriptive statistics in Table 2b, we can determine which shifts in the structure of the labor force are driving the results. In order to gain an understanding of which shifts in the returns to human capital and returns to job characteristics (β's) are driving the changes in the distributions and wage levels, we also estimate basic human capital earnings regressions in 1986 and 2003 for men and for women separately. In these models, the natural log of real wages of individuals is a function of demographic characteristics (nationality, education level attained, age, square of age, and location) and job characteristics (activity of enterprise, ownership type, and firm size). Then, utilizing Chow tests on pooled data, we test whether there are significant changes in the returns to characteristic over 1986-2003 among men and women.

5. Analysis

5.1 Changes in Inequality

The rise in wage inequality in Ukraine from 1986 to 2003 was significant. As seen in Table 4, the standard deviations of wages (overall) rose by 0.089 and the Gini ad Theil coefficients rose by 1.5 and 0.4 percentage points, respectifely. Men's wage inequality rose more than women's as the standard deviations of their wages rose by 0.116 and 0.100, respectively and the Gini coefficients rose by 1.9 and 1.4 percentage points, respectively. The fractile measures indicate which parts of the distribution changed and how the patterns differ for men and women. Whereas dispersion grew throughout the distribution for men, with larger widening in the bottom half as compared to the top, for women we find the opposite pattern: dispersion in the bottom half actually fell, while dispersion at the grew in the top half.

[15] For example, using estimates from our model $p(1986 = 1) = \exp(\beta_0 + \beta_{dem}X_{dem} + \beta_{job}X_{job})/(1 + \exp(\beta_0 + \beta_{dem}X_{dem} + \beta_{job}X_{job}))$, to hold job characteristics at the 2003 level, we would first calculate $p(1986 = 1) = \exp(\beta_0 + \beta_{dem}X_{dem} + 0*X_{job})/(1 + \exp(\beta_0 + \beta_{dem}X_{dem} + 0*X_{job}))$ to obtain p, and then calculate the new weight.

These patterns can be seen clearly in Figure 2, where we present the kernel density estimates of the log of real wages in 1986 and in 2003 for the entire population (panel A) and for men and women (panel B). The distributions of real wages for all workers in 2003 relative to 1986 lost mass in the middle of the distribution and gained mass in the lower part of the distribution. There is a notable truncation in both years which corresponds to the minimum (subsistence) wage in 2003 (1986). The shapes and positions of the men's and women's distributions are even more strikingly different in both years: The women's distribution is truncated on the left whereas the men's distribution is more symmetrically distributed in both years[16]. Hence, it is the women who are at the minimum wage, especially in 2003 when the peak density is 1.0 at the log of 3.55, which corresponds to the minimum wage in that year, $34.69 or 185 hryvnia. In 1986 the minimum subsistence wage is also binding for women, but fewer women are at this wage given the peak density is lower (0.85) at that point and the distribution is wider and flatter in the middle. Whereas the shape of the women's wage p.d.f. changed from being broad in the middle in 1986 to peaking at the minimum in 2003, the men's distribution changed from being narrowly peaked at the middle to being broader and flatter, with more mass at the lower part of the distribution. In both years, the women's distribution lies to the left of the men's. Both distributions shifted to the left over time, reflecting the decline in real wages over this period.

5.2. Counterfactuals and Decomposition Analysis

To better understand what is driving the changes in men's and women's wage distributions, we use the DFL methodology. This allows us to test the counterfactual of what would have happened to the distribution of men's and women's wages if the distribution of worker and job characteristics (Xs) had not changed from 1986. Which changes in characteristics were most important: job or demographic? We can also examine the impact of the change in the structure of wages (returns to human capital and differential pay for job characteristics) or the β's in a wage regression, by comparing the actual distribution with the counterfactual distribution which asks: what if the wage structure had not changed from 1986? Finally, we can assess which set of factors is relatively more important.

[16] Our results differ from the findings of Brainerd (1998) for Russia during the early transition period (1991-1994) in that she finds the changes for women were more equal throughout the distribution, with the bottom widening more than the top. The differences could be due to a number of reasons. It is possible that the minimum wage, which had

Figure 3 and 4 show the impact of reweighting the 2003 male and female densities with 1986 characteristics. The difference between the actual 2003 density (solid line) and the hypothetical 2003 density (dashed line) represents the effect of changes in either demographic and/or worker characteristics or the returns to these characteristics. The figures in the top left corner (3a and 4a) demonstrate what the 2003 density would have looked like if the wage structure (β's) in 2003 had been the same as in 1986. In both cases, the distribution would have had more mass in the middle of the distribution and less in the left tail. The effect of this "experiment" appears more pronounced for women (4a); their mean would have shifted to the right indicating that the fall in real wages would not have been so great.

Figures 3b (men) and 4b (women) show that if the measurable job and demographic characteristics in 2003 had been the same as in 1986, men's wage density would not have changed very much, but it would have added mass at the lower tail and at the peak of the distribution. Again, for women, this experiment has a bigger effect than for men as it adds much more mass at the peak and it reduces mass on the right side of the p.d.f. much more.

Comparing Figures 3c and 3d (and 4c with 4d), we can decompose the effects of changes in job characteristics and changes in demographic characteristics. For men, it seems that these two sets of characteristics have countervailing effects: the 1986 job characteristics pull the distribution to the right while the 1986 demographic characteristics pull the distribution to the left, albeit to a lesser extent. This explains the small net effect of the two combined forces in Figure 3b. We see from Figures 4c and 4d that women experience these same countervailing forces but changes in the demographic characteristics are stronger and are more of what is driving the changes in the women's distribution.

As these kernel density functions suggest, for both genders, changes in the structure of wages (unexplained changes) had a much larger impact on the distributions than changes in the job or demographic characteristics of the labor force. However, the effect of changes in demographics has a greater impact on the women's wage distribution than among men.

While the kernel densities give us a sense of which factors (β's or X's) are more important in driving the shapes in the male and female wage distributions, we can more precisely draw conclusions about their relative impact on changes in inequality from the decompositions

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deteriorated in this period, was not truncating the distribution at the higher point we find it binding in 1986 and 2003. It may also be due to the fact that unlike our sample, hers is not restricted to full-time workers.

of the changes in six measures of inequality presented in Table 5. [17] These results confirm that most of the increase in inequality is due to changes in the wage structure or β's, which includes the constant or unexplained part of the regression. In most cases, the changes in the wage structure explain over one hundred percent of the increase in inequality (with the percentages being larger for men) indicating that the changes in the demographic and job characteristics of the workers have a countervailing effect. The changes in worker characteristics explain between 10 and 45 percent of the change in overall inequality but a larger percent of the change in the fractile measures, indicating that they play a more important role and have different effects in the bottom and top parts of the distribution.

To see exactly how the changes in the X's and β's affected the change in inequality, we turn to Table 6. In the first panel we repeat the actual levels and changes in inequality (six measures) for men and women as a benchmark. In the next two panels we present two counterfactuals: a) what the change in inequality would have been had workers been paid with the 2003 wage structure but had 1986 demographic and job characteristics (i.e., X86B03); b) what the change in inequality would have been had workers been paid with the 1986 wage structure but had 2003 demographic and job characteristics (i.e., X03B86). In the final column of each panel we present the difference-in-difference to indicate whose inequality grew more rapidly – men's or women's.

Beginning with an analysis of changes in overall inequality (as measured by the standard deviation, Gini and Theil coefficients), the findings in Table 6 show that if in 2003 the job characteristics had been the same as in 1986, overall inequality would have risen more than it actually did, for both men and women (Panel 2). For men, each of the three measures would have risen by 25% more than the actual rise, whereas for women the standard deviation and Gini would have risen by only 12-18% more, but the Theil would have risen by 40% more. On the other hand, if in 2003 workers had been paid with the 1986 wage structure and retained their 2003 demographic and job characteristics (X03B86), the rise in wage inequality would have been far less than it actually was (Panel 3). The counterfactual rise would have been only about

[17] An attempt was made to decompose the Xs into the job vs. the demographic characteristics (and even further by specific characteristic). We found that when we carried out the reverse order decomposition, the results did not hold. DFL acknowledge a problem with sequential decompositions, as the effect of a factor depends on the ordering of the elements in the decomposition.

16-25% of the actual rise for men and 5-17% of the actual rise for women. The change in the β's are clearly driving the net results for changes in overall inequality.

However, these same statements cannot be made for the changes in the different parts of the distribution. Beginning with changes in the upper half (50-90) of the distribution, we note that the rise would have been smaller if in 2003 men or women had either the same Xs or the same βs as in 1986. Moreover, the role of the Xs is more important than the role of the βs for men as the rise in the 50-90 inequality would have been 4.5% less with X86 and only 1.7% less with the former wage structure (B86). For women, the βs continue to be more important: the rise in the 50-90 inequality would have been 3.5% less with X86 but 18.9% less with the former wage structure (B86).

It is instructive to look more closely at the bottom half of the distribution since this is where there is a divergence in the patterns of changes in inequality for men and women: inequality fell for women (by 10.5 percentage points) and rose for men (by 17.0 percentage points) in the bottom half of the distribution according to the 10-50 fractile measure. If in 2003 women in the bottom half had the same Xs as in 1986, the fall would not have been as large (1.5% less) and if men had had the same Xs as in 1986, the rise would have been slightly higher (by 2.4%). On the other hand, if the βs had been as in 1986, inequality for men in the bottom half of the distribution would not have risen at all, whereas for women it would have risen, rather than fallen.

In sum, the change in the wage structure has played a more important role in the increase in inequality. The change in the demographics have also played a role, but in a countervailing way as the new composition of the work force in 2003 actually contributed to reducing the rise in inequality from what it would have been if there were no change in the composition of the workforce. Different factors are at play in the top half and bottom half of the distribution and they differ for men and women. We next try to understand which Xs and which βs are important in the changes in inequality, with an examination of the coefficients from the logit model and the log wage regressions.

5.3. Shifts in the Demographic and Job Characteristics that explain these findings:

In order to understand which demographic and job characteristics are most important in the changes in inequality, we turn to the logit models used to estimate the predicted probabilities *p* for our analysis, which are reported in Table 7. It is clear from the coefficients that a man 20-

49, with less than high school education and working in a large state-owned firm in the agricultural or industrial sector outside of Kyiv is more likely to be in the 1986 sample than in the 2003 sample. For women, the same characteristics hold, with some differences: women in all age groups except 50-60 were more likely to be working in 1986 than in 2003. For women, nationality mattered – if a woman was Russian she would more likely be in the 1986 sample than in the 2003 sample. We note that the constant term, the unexplained portion, is larger for women than for men.

As we saw earlier in Table 3, the 2003 share of working women in the 20-29 age brackets declined by 5.5 percentage points while the share of older women, ages 50-60 rose by almost the same. Moreover, the share of women with less than high school education fell by 16.1 percentage points while the share with higher education rose by 10.6 percentage points. Hence, it would seem that the lower paid women were being substituted with higher paid women and this can explain the fact that the inequality at the higher end of the distribution grew while it fell at the lower end. As for industrial structure, the share of women in agriculture and industry also declined (6.8 and 9.8 percentage points, respectively), as the share of women in education, health and social protection rose (10.2 percentage points). Hence it would seem that most of the 24.0 percent decline of employment of women in this period occurred with women in the bottom part of the distribution leaving more rapidly than women in the middle or top.

The logit results in Table 7 and descriptive statistics in Table 3 inidcate that the changes in the composition of the employed men and the decline in their employment (only 3.4 percent) were much smaller than women's. The share with less than high school education declined but by only 9 percentage points and the share of the young (20-29) only declined by 1.5 percentage points. The more dramatic shifts for men occurred in changes in the job characteristics: shifts out of the state sector were larger than for men and shifts into the new small private sector were also much larger. Since wages in small/micro firms are lower than wages in medium and large firms, the large movement of men into these micro firms helps explain the rise of men's wage inequality in the lower half of the distribution.

5.4 Change in the Structure of Wages

The results of the human capital earnings regressions for each year for men and women are shown in Appendix Table A.3, but our principal interest is in the changes in these coefficients over time for men and for women, and their difference-in-differences, which are

presented in Table 8. The number of coefficients that change significantly over time are indicative of the degree to which the wage structure changed.

We can see from Table 8 that the returns to various demographic characteristics have changed. Regarding returns to human capital, we note that the returns to education increase for all higher education levels in 2003, but the 1986-2003 difference is only statistically significant for women with a secondary professional education and men with higher (university) educations. This limited significance is striking in comparison to the significant increase in the return to higher education in many other transition economies (see, e.g., Munich, Svejnar and Terrell, 2005a, 2005b). It seems that the returns to "general human capital," as proxied by the age (or experience) profile, have not changed over time. This is not surprising as this seems to be the finding in several other studies of transition economies. Regarding nationality, Russian women appear to be paid more in 2003 relative to Ukrainians.

As for job characteristics, the wage premium associated with jobs in any economic activity rose relative to wages in agriculture for both men and women. (It does not appear however that the differences among the non-agricultural industries are significant, although we have not tested for this). The significance of the difference-in-difference for the three coefficients on industry, utilities and transportation and communication indicates that men's earnings rose relatively faster than women's in these activities. Given that these are high wage activities, this would explain some of the increase in the upper half of the distribution for men relative to women.

6. Conclusion/Summary

Ukrainians have experienced a difficult transition to market with dramatic declines in GDP and hyperinflation. The principal question that we address, using the ULMS data, is to what extent inequality rose for men vs. women, and to what extent did changes in the wage structure vs. changes in the composition of the workers explain the rise in inequality. We have found that:

Wage inequality in the Ukraine rose moderately relative to other FSU countries and men's overall wage inequality rose faster than that of women. The latter finding is consistent with findings for Poland (Keane and Prasad, 2002) and Russia (Brainerd, 1998).

Women experienced "positive" growth in inequality in that dispersion grew in the top half of the distribution and actually declined in the bottom half. Men's inequality grew more in

the bottom half than in the top half of the distribution. Minimum wages appear to play an important role in the truncation of women's distribution. The finding of the impact of the minimum wage is counter to what has been surmised in the literature for the FSU countries. For example, Brainerd (2000; 1998) suggests that the significant widening of the lower half of the distribution in Russia and Ukraine as compared to other transition countries was due to the low and deteriorating minimum wage in these countries. We find it played an important role for women in both 1986 and in 2003, although it is the case that the level of the real minimum wage fell substantially during the 1990s and may not have played a binding role at that time.

Overall inequality in 2003 would have been higher if men and women working at that time had the same demographic and job characteristics as workers in 1986. From the logit analysis we note that employed individuals in 1986 (as compared to those employed in 2003) were younger (for women), less educated, and more likely to be working in the agricultural or industrial sectors, state sector and large or very large firms. We note that among men, reweighting by any of these 1986 characteristics seems to increase measures of dispersion in all parts of the distribution. It seems that job characteristics play an important role, and within that, the large movement of men into the small-scale sector helps explain the increase of inequality in the low end of the distribution. For women, reweighting by 1986 demographic characteristics also increases inequality throughout, but especially so in the bottom half of the distribution as there were many more women with low education levels than in 2003. This finding confirms earlier findings by Hunt (2002) for Germany and Newell and Socha (2005) for Poland where low-skilled female workers dropped out of the labor force more so than other groups.

Overall inequality in 2003 would have been significantly lower if men and women had been paid according to the 1986 wage structure. Like Newell and Socha (2005), we find that changes in the wage structure and labor force composition pull inequality in opposition directions. Our decomposition allows us to state unequivocally that changes in the wage structure explain the lion's share of increase in inequality. The sources of the changes in the wage structure, found from estimating human capital earnings functions separately for men and for women in 1986 and 2003 and examining the differences for men and women over time as well as their differences-in-differences, are in both demographic and job chacracteristics. For both men and women, wages rose more for the more educated, for non-agricultural jobs relative to agriculture and for the larger firms relative to the smaller firms. These findings have been

confirmed for other transition countries as well. The literature on changes in the returns to human capital in transition countries has consistently shown that a factor driving the increase in inequality was the more rapid increase in the returns to higher education relative to lower levels of education in these economies (e.g. Jolliffe and Campos, 2005; Flanagan, 1998; Münich, Svejnar and Terrell, 2005b; Keane and Prasad, 2002; Orazem and Vodopivec, 1997; and Rutowski, 1996). Others have shown that a key change in the wage structure during transition is the private sector wage premium (Keane and Prasad, 2002; Adamchik and Bedi, 2000; Newell, 2005). Other than the study by Munich et al. (2005), we have not seen evidence on the relative changes in the wage structure for men and women in transition. We have shown here that there was essentially no difference in the growth of these premiums between men and women. This finding is also consistent with findings for other transition economies. According to Munich et al. (2005), changes in return to human capital during the transition were very similar for men and women in the Czech Republic, Estonia, Hungary, Poland, and Slovenia.

Hence we conclude that the rise in inequality is largely due to the market forces changing the wage structure, more than the composition of the labor force, and that changes in the wage structure were similar for men and women and hence due not explain the more rapid growth of men's wage inequality. What does explain the difference between men's and women's change in inequality are: a) the institution of the minimum wage, which is holding up the bottom of women's wage distribution; and b) the more rapid change in the composition of employed women from 1986 to 2003, with larger declines in the share of employed women with less education and who are younger.

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Table 1: Policy Timeline

1985	Beginning of *perestroika.*
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 for public sector
	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 the minimum wag
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
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.)

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

[1] This 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.

Table 2: Sample Selection, By Gender

	Total Sample, 15-60		*Analytical Sample* Employed FT[1]		Missing Wage/Empl. Info		Employed PT		Unemployed (Job Seeking)		Out of LF	
	(a)		*(b)*		(c)		(d)		(e)		(f)	
	86	***03***	***86***	***03***	***86***	***03***	***86***	***03***	***86***	***03***	***86***	***03***
MEN												
Observations	2452	2977	1385	1338	637	284	26	195	22	423	382	737
% of Total Sample, age 15-60	100%	100%	56%	45%	26%	10%	1%	7%	1%	14%	16%	25%
Age												
%15-19	13.5	15.0	1.9	2.8	2.1	4.2	0.0	9.7	50.9	12.2	67.4	44.3
%20-29	28.3	23.3	29.0	27.5	30.0	28.9	37.7	17.4	30.1	28.6	22.7	12.1
%30-39	27.0	20.3	30.3	24.3	36.5	24.6	43.5	24.0	13.6	24.1	1.3	8.6
%40-49	21.0	22.8	26.4	27.0	22.8	26.9	18.8	29.1	5.4	23.7	1.8	11.7
%50-60	10.2	18.5	12.5	18.4	8.6	15.5	0.0	19.8	0.0	11.4	6.9	23.4
Education Levels												
%Less than High School	15.1	13.8	14.0	4.9	9.8	7.2	6.8	8.1	31.6	9.3	29.5	36.2
%High School	28.5	24.9	26.6	23.3	26.7	26.7	40.7	18.3	22.9	25.6	38.9	28.4
%Vocational	27.9	30.3	28.6	32.5	28.9	30.5	30.3	38.4	39.3	40.7	22.4	18.6
%Secondary Professional	16.3	17.6	17.4	22.0	19.5	18.7	12.8	15.8	2.4	16.4	7.2	10.5
%Higher Education*	12.2	13.4	13.5	17.4	15.2	16.9	9.5	19.4	3.8	8.0	2.1	6.2
Nationality												
%Ukrainian	78.1	78.8	77.2	78.2	79.2	79.4	96.6	77.7	79.8	79.2	78.0	79.5
%Russian	18.4	17.0	19.6	17.3	16.0	16.0	3.4	16.9	12.1	18.2	19.4	16.3
%Other (Including Byelorussian, Jewish)	3.5	4.3	3.2	4.5	4.8	4.5	0.0	5.4	8.0	2.7	2.7	4.2
Marital Status												
%Unmarried	30.1	40.9	16.9	28.1	18.0	32.0	17.3	32.8	87.1	47.5	88.6	65.9
%Married	69.9	59.1	83.1	71.9	82.0	68.0	82.7	67.2	12.9	52.6	11.4	34.1
WOMEN												
Observations	3461	3907	1831	1391	954	168	47	365	17	425	612	1558
% of Total Sample, age 15-60	100%	100%	53%	36%	28%	4%	1%	9%	0%	11%	18%	40%
Age												
15-19	11.5	12.5	3.3	2.4	2.3	5.3	2.1	2.3	28.0	9.1	47.6	26.0
20-29	26.3	21.1	25.0	19.5	28.9	17.4	24.0	18.4	50.2	30.5	25.4	20.9
30-39	27.1	20.4	26.3	26.7	39.7	28.0	51.6	26.0	8.5	24.0	9.8	11.4
40-49	23.2	24.8	31.4	32.5	19.9	36.8	19.9	35.5	0.0	24.1	6.5	13.9
50-60	11.9	21.3	14.0	19.0	9.3	12.5	2.4	17.8	13.3	12.4	10.8	27.9
Education Levels												
Less than High School	18.0	12.1	18.9	2.8	13.5	8.1	10.4	2.5	22.3	8.0	23.6	24.7
High School	28.1	25.8	27.2	20.0	23.6	25.8	18.4	17.0	26.7	26.0	40.1	33.2
Vocational	16.3	20.3	16.4	22.2	15.5	22.3	25.2	20.1	41.2	25.7	15.9	16.8
Secondary Professional	24.4	26.4	25.3	32.1	28.0	25.0	29.4	32.3	7.0	29.2	14.9	18.9
Higher Education*	13.2	15.5	12.2	22.8	19.3	18.9	16.6	28.1	2.8	11.1	5.5	6.4
Nationality												
Ukrainian	77.8	78.6	77.1	78.2	80.0	76.6	68.9	81.7	73.8	74.5	77.1	79.5
Russian	19.0	17.5	19.7	18.4	16.8	19.9	31.1	15.7	26.2	20.4	19.0	16.0
Other (Including Byelorussian, Jewish)	3.3	4.0	3.2	3.3	3.2	3.5	0.0	2.7	0.0	5.2	3.9	4.5
Marital Status												
Unmarried	24.9	38.5	18.1	34.1	19.2	36.3	18.9	28.3	54.0	44.6	51.3	43.5
Married	75.1	61.5	81.9	65.9	80.8	63.7	81.1	71.7	46.1	55.5	48.7	56.5

Table 3: Changes in the Characteristics of Men and Women Working Full-Time (Using Sample Weight)

	Males					Females				
	1986		2003		2003-1986	1986		2003		2003-1986
	%	Obs	%	Obs	Δ%	%	Obs	%	Obs	Δ%
Age										
% 15-19	1.86	26	2.75	37	0.89	3.32	61	2.41	34	-0.91
% 20-29	28.96	401	27.49	368	-1.47	25.04	459	19.52	272	-5.52
% 30-39	30.32	420	24.27	325	-6.05	26.25	481	26.68	371	0.43
% 40-49	26.39	366	27.04	362	0.65	31.42	575	32.51	452	1.09
% 50-60	12.47	173	18.45	247	5.98	13.97	256	18.88	263	4.91
Nationality										
% Ukrainian	77.21	1066	78.20	1042	0.99	77.09	1403	78.21	1082	1.12
% Russian	19.58	270	17.27	230	-2.31	19.70	359	18.46	255	-1.24
% Other (Inc. Byelorussian, Jewish)	3.22	44	4.53	60	1.31	3.21	58	3.33	46	0.12
Education Levels										
% Less than High School	13.97	191	4.92	66	-9.05	18.92	342	2.82	39	-16.10
% High School	26.57	363	23.27	311	-3.30	27.22	492	20.04	279	-7.18
% Vocational	28.56	391	32.51	435	3.95	16.42	297	22.21	309	5.79
% Secondary Professional	17.43	238	21.95	294	4.52	25.28	457	32.13	447	6.85
% Higher Education[1]	13.47	184	17.35	232	3.88	12.16	220	22.80	317	10.64
Marital Status										
% Unmarried	16.89	234	28.13	376	11.24	18.11	332	34.14	475	16.03
% Married	83.11	1151	71.87	962	-11.24	81.89	1499	65.86	916	-16.03
Location										
%Kyiv	5.93	79	8.67	111	2.74	6.00	106	10.19	134	4.19
%Other	94.07	1248	91.33	1166	-2.74	94.00	1657	89.81	1185	-4.19
Activity of Enterprise										
%Agriculture & Forestry	18.97	256	11.46	152	-7.51	14.09	256	7.27	101	-6.82
%Industry	38.27	521	30.02	399	-8.25	31.37	569	21.57	298	-9.80
%Elec., Gas, Water & Construction	1.80	139	14.28	190	12.48	5.21	95	4.17	58	-1.04
%Transport, Post & Telecomm.[2]	8.32	224	24.12	320	15.80	19.50	354	23.45	324	3.95
%Public Admin. & Defense	4.25	85	5.86	78	1.61	3.32	60	4.56	63	1.24
%Education, Health & Social Prot.	10.69	74	7.91	105	-2.78	19.63	356	29.82	412	10.19
%Other[2]	1.20	76	6.36	84	5.16	6.88	125	9.16	127	2.28
Ownership Type										
% State (incl Coop)	91.75	1264	47.02	618	-44.73	91.88	1678	58.58	799	-33.30
%DeNovo (incl Self-Emp)	0.37	5	25.51	335	25.14	0.92	17	19.79	270	18.87
% Privatized (incl Intl Org)	7.88	109	27.47	361	19.59	7.20	132	21.64	295	14.44
Firm Size										
% Micro\Small (1-49)	14.18	178	34.90	417	20.72	31.16	508	40.73	519	9.57
% Med (50-249)	27.05	339	28.06	335	1.01	24.27	396	28.02	357	3.75
%Large (250-999)	23.33	293	15.54	186	-7.79	20.51	334	15.94	203	-4.57
% XL (1000+)	35.45	445	21.50	257	-13.95	24.06	392	15.31	195	-8.75
Total Obervations		1385		1338	-3.4%		1831		1391	-24.0%
	1986		2003		2003-1986	1986		2003		2003-1986
	Mean	Std. Dev.	Mean	Std. Dev.	ΔMean	Mean	Std. Dev.	Mean	Std. Dev.	ΔMean
Mean Age	36.47	10.24	37.68	11.36	1.21	37.38	10.51	39.08	10.44	1.70
Mean Log Salary	4.32	0.50	4.07	0.61	-0.25	3.91	0.41	3.77	0.54	-0.14
Mean Real Salary ($2003)	85.67	48.50	70.51	43.73	-15.16	55.15	28.80	50.67	34.83	-4.48

[1] Higher Education includes Bachelor, Specialist, Masters or PhD

[2] Includes Sale, Maintenance and Repair of Motor Vehicles, Financial Intermediation, Real Estate

Table 4: Levels of Inequality in 1986 and 2003

	Total			Men			Women		
	1986	2003	***2003-1986***	1986	2003	***2003-1986***	1986	2003	***2003-1986***
Std. Dev.	0.512	0.601	***0.089***	0.498	0.614	***0.116***	0.442	0.542	***0.100***
10-90	1.322	1.400	***0.078***	1.253	1.511	***0.259***	1.117	1.211	***0.094***
10-50	0.629	0.563	***-0.065***	0.588	0.758	***0.170***	0.511	0.405	***-0.105***
50-90	0.693	0.836	***0.143***	0.665	0.754	***0.089***	0.606	0.806	***0.199***
Gini	0.070	0.085	***0.015***	0.064	0.084	***0.019***	0.063	0.077	***0.014***
Theil	0.008	0.012	***0.004***	0.007	0.012	***0.005***	0.006	0.011	***0.004***

Table 5: Decomposing Changes in Inequality for Men and Women

	Total (Actual) Change*	Δ Xs:	Unexplained (Bs):
Men			
Std Dev.	0.116	-0.027	0.143
		-(23%)	(123%)
10-90	0.259	-0.024	0.283
		-(9%)	(109%)
10-50	0.170	-0.069	0.239
		-(41%)	(141%)
50-90	0.089	0.045	0.044
		(51%)	(49%)
Gini	0.019	-0.005	0.024
		-(25%)	(125%)
Theil	0.005	-0.001	0.006
		-(25%)	(125%)
Women			
Std Dev.	0.100	-0.012	0.112
		-(12%)	(112%)
10-90	0.094	0.015	0.079
		(16%)	(84%)
10-50	-0.105	-0.019	-0.086
		(18%)	(82%)
50-90	0.199	0.035	0.165
		(17%)	(83%)
Gini	0.014	-0.003	0.017
		-(18%)	(118%)
Theil	0.004	-0.002	0.006
		-(38%)	(138%)

* Actual change is f(2003)-f(1986). The effect of Xs and Bs is how much of the change between the 2003 and 1986 density is explained by replacing the actual 2003 density with the counterfactual density.

Table 6: Actual and Counterfactual Levels of Inequality for Men and Women in 1986 and 2003

1. Actual

	Men			Women			Diff-in-Diff
	1986	2003	***2003-1986***	1986	2003	***2003-1986***	Men-Women
Std. Dev.	0.498	0.614	***0.116***	0.442	0.542	***0.100***	***0.016***
10-90	1.253	1.511	***0.259***	1.117	1.211	***0.094***	***0.165***
10-50	0.588	0.758	***0.170***	0.511	0.405	***-0.105***	***0.275***
50-90	0.665	0.754	***0.089***	0.606	0.806	***0.199***	***-0.111***
Gini	0.064	0.084	***0.019***	0.063	0.077	***0.014***	***0.005***
Theil	0.007	0.012	***0.005***	0.006	0.011	***0.004***	***0.001***

2. Counterfactual*

	Men			Women			Diff-inDiff
	1986	2003*	***2003*-1986***	1986	2003*	***2003*-1986***	**Men-Women**
Std. Dev.	0.498	0.641	***0.143***	0.442	0.554	***0.112***	***0.031***
10-90	1.253	1.535	***0.283***	1.117	1.196	***0.079***	***0.204***
10-50	0.588	0.827	***0.239***	0.511	0.425	***-0.086***	***0.325***
50-90	0.665	0.709	***0.044***	0.606	0.771	***0.165***	***-0.121***
Gini	0.064	0.089	***0.024***	0.063	0.080	***0.017***	***0.007***
Theil	0.007	0.013	***0.006***	0.006	0.012	***0.006***	***0.001***

*Paid as in 2003 with 1986 Demographic & Job Characteristics (X86B03)

3. Counterfactual**

	Men			Women			Diff-inDiff
	1986	2003**	***2003**-1986***	1986	2003**	***2003**-1986***	**Men-Women**
Std. Dev.	0.498	0.528	***0.030***	0.442	0.459	***0.017***	***0.013***
10-90	1.253	1.324	***0.072***	1.117	1.139	***0.022***	***0.049***
10-50	0.588	0.588	***0.000***	0.511	0.523	***0.012***	***-0.012***
50-90	0.665	0.737	***0.072***	0.606	0.616	***0.010***	***0.062***
Gini	0.064	0.068	***0.004***	0.063	0.065	***0.001***	***0.002***
Theil	0.007	0.007	***0.001***	0.006	0.007	***0.000***	***0.001***

**Paid as in 1986 with 2003 Demographic & Job Characteristics (X03B86)

Table 7: Logit Models

Dependent Variable: 1986 Dummy	Men	Women
Age Group (15-19 Omitted)		
20-29	1.477**	0.391
	(0.392)	(0.316)
30-39	1.567**	-0.138
	(0.393)	(0.312)
40-49	1.078**	-0.609*
	(0.391)	(0.310)
50-60	0.510	-1.227**
	(0.398)	(0.322)
Nationality (Ukrainian omitted)		
Russian	0.287*	0.325**
	(0.137)	(0.125)
Other (inc. Byelorussian, Jewish)	-0.041	-0.004
	(0.273)	(0.277)
Education (Less than HS omitted)		
High School	-1.583**	-1.908**
	(0.242)	(0.242)
Vocational	-2.027**	-2.752**
	(0.237)	(0.250)
Secondary Professional	-2.012**	-2.470**
	(0.247)	(0.238)
Higher Ed (Bach, Spec, Masters, PhD)	-1.985**	-2.837**
	(0.257)	(0.249)
Kyiv	-0.315	-0.475*
	(0.226)	(0.196)
Activity of Enterprise (Agriculture is omitted)		
Industry	-0.256	0.417*
	(0.181)	(0.203)
Electricity, Gas, Water & Construction	-0.659**	-0.195
	(0.207)	(0.267)
Transport, Post and Telecommunications[1]	-0.618**	0.019
	(0.189)	(0.202)
Public Administration & Defense	-1.183**	-1.182**
	(0.254)	(0.270)
Education, Health, & Social Protection	-1.259**	-1.235**
	(0.234)	(0.190)
Other[2]	-0.720**	-0.491*
	(0.250)	(0.238)
Ownership Type (State is omitted)		
DeNovo	-4.686**	-4.622**
	(0.440)	(0.338)
Privatized	-2.208**	-2.098**
	(0.141)	(0.145)
Firm Size (Small (1-49) is omitted)		
Medium (50-249)	0.254	-0.205
	(0.154)	(0.126)
Large (250-999)	0.679**	0.033
	(0.176)	(0.147)
X-Large (1000+)	0.672**	-0.123
	(0.178)	(0.162)
Constant	1.368**	3.845**
	(0.444)	(0.406)
N =	2284	2706

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

[1] Includes Sale, Maintenance and Repair of Motor Vehicles, Financial Intermediation, Real Estate.

[3] Includes Other Service Activities, Municipal Services.

Table 8: Difference in Log Wage Regression Coefficients, 2003-1986

	2003-1986 Men	2003-1986 Women	2003-1986 Men-Women
Nationality (Ukrainian omitted)			
Russian	-0.069	0.102 **	-0.171 **
Other (inc. Byelorussian, Jewish)	0.027	-0.008	0.035
Education (Less than HS omitted)			
High School	0.044	0.153 *	-0.109
Vocational	0.038	0.093	-0.055
Secondary Professional	0.086	0.179 *	-0.093
Higher Ed (Bach, Spec, Masters, PhD)	0.207 **	0.137	0.070
Age	-0.010	0.005	-0.015
Age2	0.001	0.000	0.001
Kyiv	0.130	0.210 **	-0.080
Activity of Enterprise (Agriculture is omitted)			
Industry	0.317 **	0.052	0.265 **
Electricity, Gas, Water & Construction	0.378 **	0.121	0.257 **
Transport, Post and Telecommunications[1]	0.398 **	0.178 **	0.220 **
Public Administration & Defense	0.387 **	0.314 **	0.073
Education, Health, & Social Protection	0.268 **	0.125 *	0.143
Other[2]	0.291 **	0.154 *	0.137
Ownership Type (State is omitted)			
DeNovo	0.070	-0.023	0.093
Privatized	-0.051	0.084	-0.135 *
Firm Size (Small (1-49) is omitted)			
Medium (50-249)	-0.153 **	0.018	-0.171 **
Large (250-999)	-0.077	0.079	-0.156 *
X-Large (1000+)	-0.015	0.062	-0.077
Constant	-0.415	-0.631 **	0.216

* significant at 10%; ** significant at 5%.

[1] Includes Sale, Maintenance and Repair of Motor Vehicles, Financial Intermediation, Real Estate

[3] Includes Other Service Activities, Municipal Services.

Table A1: Log-Wage Regressions

	1986 Males	2003 Males	1986 Females	2003 Females
Gender Male				
Nationality (Ukrainian omitted)				
Russian	0.109**	0.040	0.021	0.123**
	(0.033)	(0.044)	(0.027)	(0.037)
Other (inc. Byelorussian, Jewish)	0.041	0.068	0.004	-0.004
	(0.070)	(0.082)	(0.057)	(0.080)
Education (Less than HS omitted)				
High School	0.022	0.066	0.077*	0.230*
	(0.046)	(0.081)	(0.033)	(0.093)
Vocational	0.055	0.093	0.129**	0.222*
	(0.044)	(0.080)	(0.039)	(0.093)
Secondary Professional	0.163**	0.249**	0.128**	0.307**
	(0.049)	(0.082)	(0.034)	(0.091)
Higher Ed (Bach, Spec, Masters, PhD)	0.223**	0.430**	0.402**	0.539**
	(0.052)	(0.084)	(0.041)	(0.092)
Age	0.039**	0.029**	0.014	0.019
	(0.010)	(0.010)	(0.008)	(0.010)
Age2	-0.001**	-0.000**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Kyiv	0.098	0.228**	0.015	0.225**
	(0.060)	(0.063)	(0.047)	(0.050)
Activity of Enterprise (Agriculture is omitted)				
Industry	0.251**	0.568**	0.206**	0.258**
	(0.041)	(0.058)	(0.037)	(0.060)
Electricity, Gas, Water & Construction	0.244**	0.622**	0.220**	0.341**
	(0.050)	(0.063)	(0.054)	(0.080)
Transport, Post and Telecommunications[1]	0.140**	0.538**	0.076*	0.254**
	(0.044)	(0.058)	(0.038)	(0.058)
Public Administration & Defense	0.284**	0.671**	-0.011	0.303**
	(0.068)	(0.091)	(0.065)	(0.082)
Education, Health, & Social Protection	-0.126	0.142	-0.078*	0.047
	(0.066)	(0.077)	(0.039)	(0.058)
Other[2]	0.087	0.378**	0.058	0.212**
	(0.064)	(0.078)	(0.049)	(0.069)
Ownership Type (State is omitted)				
DeNovo	0.172	0.242**	0.208	0.185**
	(0.179)	(0.049)	(0.122)	(0.046)
Privatized	0.014	-0.037	0.029	0.113**
	(0.046)	(0.041)	(0.039)	(0.041)
Firm Size (Small (1-49) is omitted)				
Medium (50-249)	0.190**	0.037	0.118**	0.136**
	(0.043)	(0.045)	(0.029)	(0.036)
Large (250-999)	0.262**	0.185**	0.097**	0.176**
	(0.046)	(0.055)	(0.032)	(0.045)
X-Large (1000+)	0.381**	0.366**	0.215**	0.277**
	(0.047)	(0.055)	(0.035)	(0.049)
Constant	3.098**	2.683**	3.313**	2.682**
	(0.187)	(0.198)	(0.143)	(0.203)
N =	1174	1110	1534	1172
R-Squared =	0.23	0.28	0.20	0.22

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

[1] Includes Sale, Maintenance and Repair of Motor Vehicles, Financial Intermediation, Real Estate.

[3] Includes Other Service Activities, Municipal Services.

Figure 1. Ukraine's Macroeconomic Trends

Figure 1a.

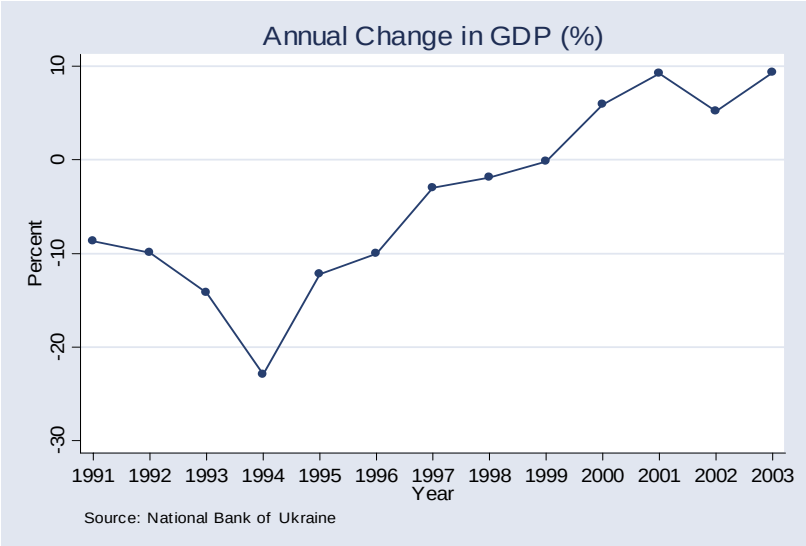


Figure 1b.

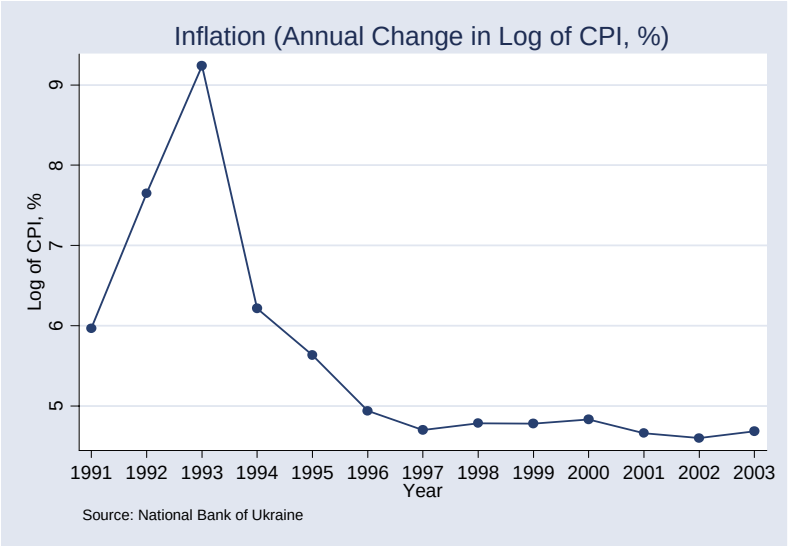


Figure 1c.

Figure 1d.

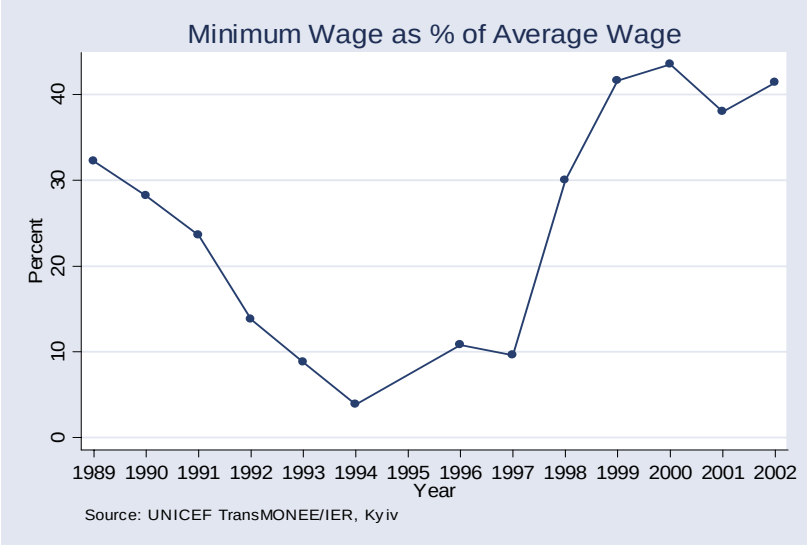


Figure 2: Kernel Density Estimates of Log of Real Wages, 1986 and 2002

A. All Workers

B. Men and Women

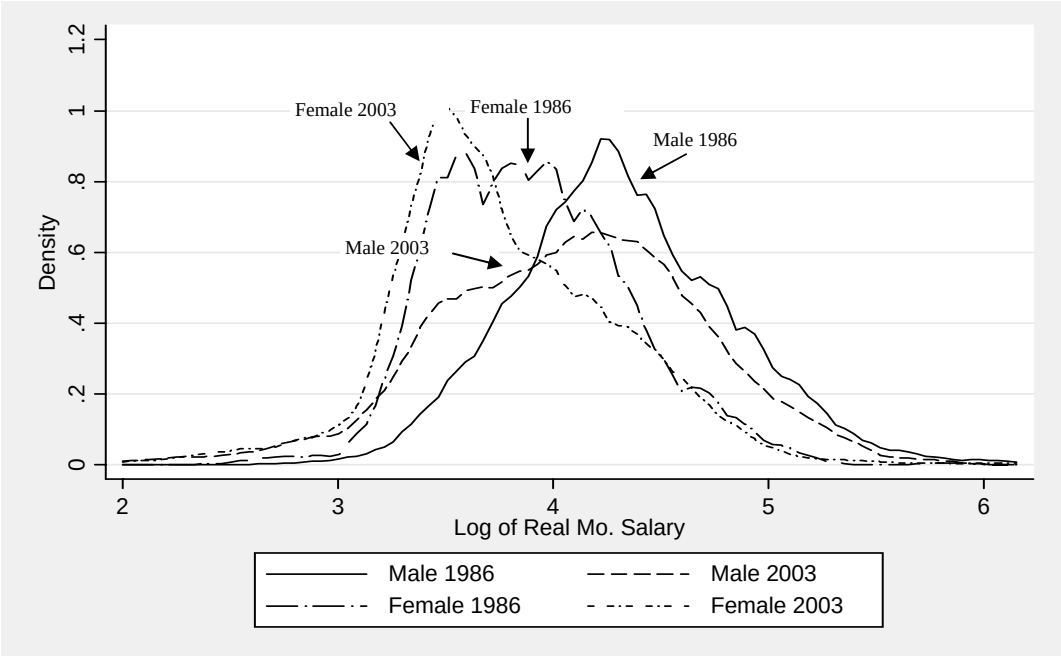
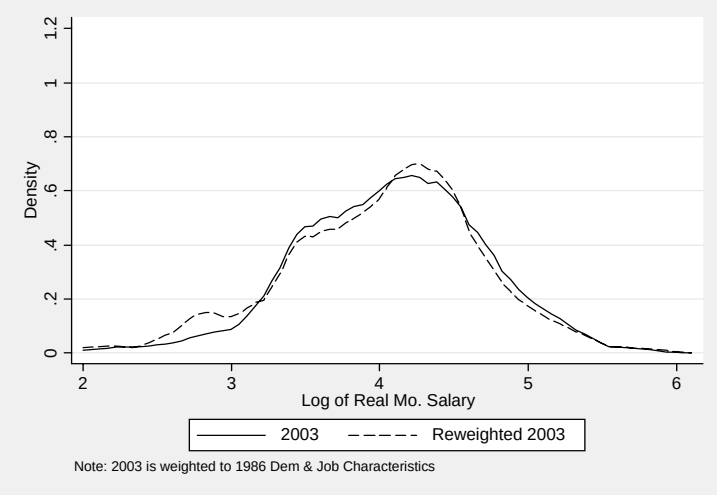


Figure 3: Kernel Density Estimates of Log Wages, Actual and Counterfactual: Men

3a) BETAS, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=86, t_{dem}=03, t_{job}=03)

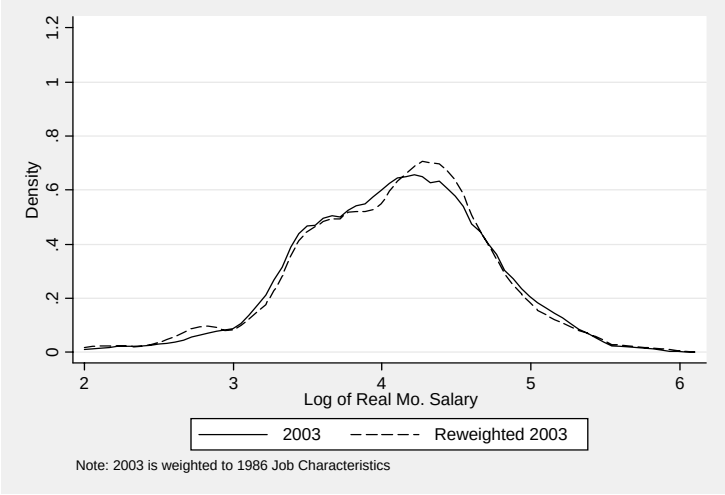
Note: 1986 is weighted to 2003 Dem & Job Characteristics

3b) X's, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=03, t_{dem}=86, t_{job}=86)



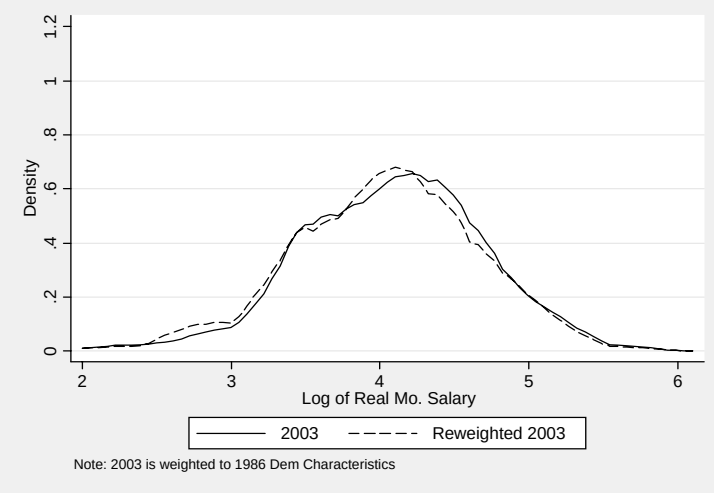
Note: 2003 is weighted to 1986 Dem & Job Characteristics

3c) JOBS, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=03, t_{dem}=03, t_{job}=86)



Note: 2003 is weighted to 1986 Job Characteristics

3d) DEMOGRAPHICS, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=03, t_{dem}=86, t_{job}=03)

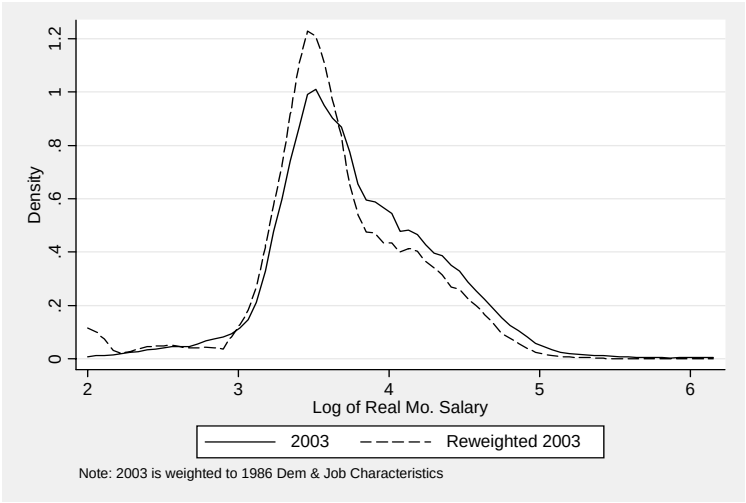


Note: 2003 is weighted to 1986 Dem Characteristics

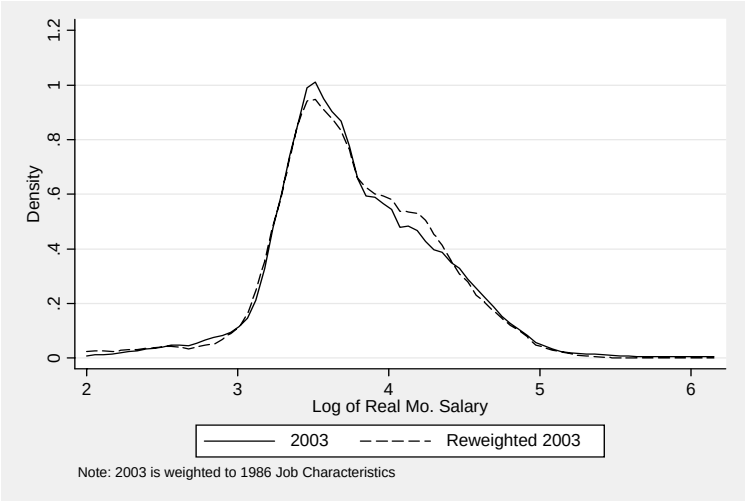
Figure 4: Kernel Density Estimates of Log Wages, Actual and Counterfactual: Women

3a) BETAS, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=86, t_{dem}=03, t_{job}=03)

3b) X's, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=03, t_{dem}=86, t_{job}=86)



3c) JOBS, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=03, t_{dem}=03, t_{job}=86)



3d) DEMOGRAPHICS, f(w; t_w=03, t_{dem}=03, t_{job}=03) and f(w; t_w=03, t_{dem}=86, t_{job}=03)