Understanding Changes in Gender Earnings Differentials during Economic Transition: The East German Case

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PRELIMINARY

Abstract

Relative wages have changed dramatically after the collapse of communist regimes in Central and Eastern Europe. Though the basic facts have been well documented, little is known about their underlying causes. This paper studies the determinants of the gender wage gap in East Germany and its evolution over time. In contrast to most other transition economies, wage differentials between East German men and women have fallen during the 1990s. Preliminary results suggest that selective withdrawal from the labor force alone cannot explain this phenomenon. Women earn much lower returns to labor market skills accumulated after unification than men, which actually increases the gender wage gap. Current research explores the role of changing skill prices, job reallocation and institutional forces in explaining the dynamics of gender wage differentials in East Germany over the 1990s.

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1 Introduction

Rising labor force participation of women in Western Europe and North America has fueled interest in the determinants of differences in labor market outcomes between men and women. For European integration, the economic position of women in transition countries, some of which have recently joined or are expected to join the European Union, is thereby of central concern. In the former socialist economies, participation rates of women were with around 85 percent very high, while the femal-male wage ratio was around 70 percent at the end of the 1980s. Figure 1 taken from Brainerd (2000) shows that the wage ratio between men and women of socialist countries in 1989 was actually lower than in many Western European countries.

With the regime change, labor markets and the wage structure in particular underwent dramatic changes. The gender wage gap has in most cases decreased during the transition - with the exception of Russia and the Ukraine.[1] Though the basic facts have been well documented, little is known about the underlying causes. Even less is known how changes in public policies like the decline in public or employer-provided child care has affected the welfare and labor market opportunities of women. Distinguishing changes in labor demand from gender-specific supply responses is however crucial for analyzing human capital investment, occupational choices and labor supply decisions of women, their decisions about fertility and the allocation of resources within the household. These in turn have important implications for the design of social welfare and family support programs.

The analysis addresses the following questions: first, how do the relative wages of women adjust after the regime change in East Germany? Second, do labor market outcomes and opportunities differ between cohorts with longer work experience and recent labor market entrants? Women with substantial work experience in the old regime are potentially more vulnerable to changes in relative wages across occupations and industries. In contrast, younger women are more likely to take advantage of new job opportunities in newly emerging occupations and industries. Third, are behavioral adjustment or changes in underlying pricing of labor market skills driving differences in labor market outcomes? Fourth, have

[1] See for example Brainerd (1998), Newey and Reilly (1997) and Oglobin (1999) for Russia, Orazem and Vodopivec (2000) for Slovenia, and Hunt (2000) and Bonin and Euwals (2001) for East Germany. Brainerd (2000) and Svejnar (1999) provide a good survey of the available evidence for several transition economies.

labor market institutions and government policies helped women to adapt to the new economic system or have they harmed some women?

The empirical application uses data from East Germany. The analysis is part of a larger research project to compare the determinants of changes in relative wages for men and women in economies undergoing transition, in particular to compare East Germany with Russia. The East German case is in itself interesting for at least three reasons: first, it experienced the most rapid and radical transformation after 1989. Thus, changes on the demand side and supply responses should be visible shortly after unification. Second, labor market outcomes and the pricing of labor market skills more specifically can be compared to West Germany, a highly adcanced economy sharing the same institutional framework. This facilitates to separate changes in the structure of labor demand from institutional forces and identify its effect on relative wages. Finally, the government shaped East Germany's transition path with heavy interventions in and outside the labor market.

The results suggest that labor market opportunities between men and women differed substantially during the 1990s. Women earn substantially lower returns to work experience and occupational skills that are accumulated after unification than men. Most of the relative gains of working women in the labor market occurred within occupations and industries. Rising returns to education have affected men and women in a similar fashion, largely because their education levels are very similar.

Hunt (2002) suggests the decline in the East German gender wage gap in the 1990s could be driven largely by low-wage women dropping out of the labor market. The analysis in this paper shows that while withdrawal from the labor force is important, especially among older men and women, it cannot itself explain the decline in the gender wage gap early in the transition process. The reason is that many high-wage women select ouf of the labor force shortly after unification. This appears to be related to income effects through rising spousal wages, which supports the findings of Bonin and Euwals (2001). They provide evidence that rising reservation wages lower the participation probabilities of East German women after unification. After 1995, selection ouf of the labor force is mostly negative confirming Hunt's analysis.

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The structure of this paper is as follows. The next section introduces the data and provides descriptive

evidence on changes in the gender wage gap and the wage structure after unification. Section 3 traces changes in the overall wage structure and how they have affected men and women and therefore the gender wage ratio. Section 4 reports the empirical findings on the employment margin, while Section 5 looks at the role of government and labor market institutions. Finally, Section 6 discusses the welfare and policy implications and concludes.

2 Descriptive Evidence

2.1 Starting Position at the Eve of Unification

The empirical analysis is based on the German Socio-Economic Panel (GSOEP) from 1990 to 2001.[2] The annual survey, conducted in West Germany since 1984, was extended to East Germany in June 1990, just before currency union between the East and West was established. For East Germany, the sampling population consisted of all households, whose head was a citizen of the former German Democratic Republic in 1990. The dataset contains detailed labor market histories, demographic variables, wages and other sources of income for over 6,000 West Germans and 4,000 East Germans from 1990 until 2001. The samples are restricted to individuals between age 20 and 60. In addition, the self-employed, individuals in the military forces or full-time education and those not working full-time in 1989 are excluded. The survey follows household members that move within Germany as well as new households that split from sample households. The East and comparison West German samples are defined on the basis of residence in June 1990 and not where the household has lived in the year of the survey. Thus, the East German sample contains both households, that reside in East Germany and those that moved to West Germany at some point after unification.

Table 1 shows summary statistics for East German women at the eve of unification in June 1990 and two comparison groups: East German men and West German women. Within East Germany, men and women have similar educational attainment. This is somewhat different from other transition countries, where women are more highly educated, in particular with respect to tertiary education than men. We

[2] The survey structure of the GSOEP is very similar to the Panel Study of Income Dynamics (PSID) in the United States. See Appendix A for details on the construction of the sample and definition of key variables. Wagner et al. (1993) provide a good introduction to the English public-use file of the GSOEP.

therefofre expect aggregate changes in skill prices to affect men and women in a similar fashion. With respect to distribution across 1-digit industries, men are more likely to be employed in agriculture and manufacturing and much less likely to be in services or the public sector. This distribution at the eve of unification would favor women if transition involves a decline of the primary and secondary sector. Similar differences hold for the distribution of East German men and women across occupations.[3]

German unification also provides the unique opportunity to compare the labor market performance in the transition of East German to West German women, which face the same institutional framework and aggregate shocks. Compared to the West, four things are noteworthy: first, East German women are more highly educated than women in the West, mostly because few women in the East have no vocational degree. Second, women have much higher participation rates and work longer hours than their Western counterparts. Participation rates reached almost 80 percent, but was only 45 percent in the West. High female labor force participation has been one distinctive characteristic of the former socialist and communist economies. In addition, Eastern women work on average full-time, while Western women are more likely to work part-time. The difference in hours is however to a large extent driven by longer working hours for all employees in the East. Third, more East German women live in households with children. Increases in fixed costs of work related to the changing availability of childcare will therefore affect Eastern women more. Finally, a comparison of the distribution across industries, occupations and firm types shows that Eastern women are more often employed in agriculture and less likely in the service sector. In contrast, they are more likely to be in administrative or professional occupations and less likely to work as a clerk than West German women.

To see how prices for observable labor market skills differed among men and women at the eve of unification, Table 2 reports a Mincer earnings regression for Eastern men and women as well as Western women in 1989, almost half a year before the fall of the Berlin wall.[4] The first specification (column (1)-(3)) contains only the standard variables for educational degrees (with the omitted category no vocational degree), potential work experience and its square, controls for state of residence and marital status.

[3] Women were generally overrepresented in health and education occupations, in part because they offered more flexible working hours than jobs in the manufacturing sector and part-time work was almost unknown. Overall, occupational seggregation before the regime change was lower than in Western countries before the regime change.

[4] Data about earnings in May 1989 were collected retrospectively in the first wave in1990.

Returns to vocational and university degree were much higher in the West. To the extent that transition increases returns to education, this should increase wage convergence with the West. While women earn similar returns to vocational degrees than men, returns to a university degree are actually higher. With respect to work experience, East German women earn higher rates to return than women in the West and also somewhat higher than Eastern men. If the regime change leads to a depreciation of specific skills as proxied by potential labor market experience, this would therefore hurt women more than men and delay wage convergence to West German women.

In column (4)-(6), occupation and 1-digit industry dummies are added as controls. While returns to experience are not affected, returns to education are cut in half. Controlling for industry and occupation, women in the East actually earn higher returns to educational degrees than Westen women before the regime change.

2.2 Changes in Wages for Men and Women in the 1990s

With currency union in June 1990, East Germany imported the legal and economic system from West Germany as well as most of its labor market institutions. The liberalization of prices and sudden exposure to foreign and West German competition together with the official exchange rate of 1:1 hit the Eastern economy hard.[5] Gross Domestic Product declined by 15.6 percent in 1990 and another 22.7 percent in 1991. At the low point in 1991, East Germany's GDP was only two-thirds of its 1989 level. After that, GDP grew a sizeable seven or eight percent but regained its pre-unification level only in 1995. Since then, output has grown by no more than one percent - well below West German levels.

How did the transition process affect relative wages of East German men and women? Figure 2 shows the evolution of the mean and median gender pay gap in East Germany during the 1990s. Three periods of the adjustment process can be distinguished. In the first year after unification, the gender gap in hourly wages decreases on average, while the median is unchanged. Between 1991 and 1993, relative wages of women increase relative to Eastern men. After 1993, the gender wage gap remains essentially constant or even decreases slightly.

If cohorts differ in their observable market skills or are differently affected by the transition process,

[5] See Akerlof et al. (1991) for a lucid analysis of the initial economic shock.

this might also affect the gender pay gap given these differences or changes are partially gender-specific. Table 3 then shows the gender wage gap for different age groups over the first decade of the transition process. For West Germany, the pattern of relative wages is consistent with results found in other industrialized countries: the gender pay gap is much higher for young women under 25 and declines monotonically with age both for the mean and median. The pattern remains stable over time even though all age groups experience some convergence to male wage levels. In East Germany, the pattern is very different. In 1990, the gender wage gap declines across age groups except for the youngest group, which has lower relative wages than those aged 25-34. In 2000 in contrast, older women earn relatively the same than the young. While there is no monotonic pattern across age groups, all age groups experience some relative gains over time.

Several recent studies provide evidence that the gender wage gap differs substantially across the wage distribution. In industrialized countries, the gap increases at higher percentiles, which gives rise to the glass ceiling effect (see for example Albrecht et al, 2003). To see how transition affected relative wages at different parts of the wage distribution, Table 4 shows the gender wage gap at several percentiles. In West Germany, the wage gap increases at higher percentiles in the first half of the 1990s, but the differences are overall small. The reverse pattern is true in East Germany: women at lower percentiles earn relatively less to men for the whole period from 1990 to 2000. For young (under 25) and older (45-54 years) women, a more hump-shaped relationship seems to hold: women in the middle part of the distribution earn the highest relative wages while women at the lower and upper end of the hourly wage distribution earn relatively lower wages.

- median of women in male earnings distribution (add)

3 Changes in the Overall Wage Structure

While the early literature on determinants of the gender wage gap focused heavily on differences in observable labor market skills and differences in returns to those skills, several authors have argued that changes in the overall wage structure through aggregate shocks in demand or changes in labor market institutions will also affect relative wages unless the respective subgroups have similar position in the

overall wage distribution.[6]

As most transition countries, East Germany witnessed a substantial rise in wage inequality over the 1990s. Figure 3a shows the evolution of the 90th-10th percentile differential in log hourly wages for East German men and women[7]. For both men and women, wage inequality rises throughout the transition but the increase is much larger for women. The changes for women are of similar magnitude, though higher in percentage terms, than those observed in the United States during the 1980s (Katz and Murphy, 1992) and much higher than in Poland (Keane and Prasad, 2002). For men in contrast, changes are much smaller than in Poland and only about half the change in the United States over the 1980s.

Figure 3b plots the 90-10th percentile difference in wage residuals from a log earnings equation with dummies for five-year experience groups, the three education groups and interaction terms between experience and education as regressors. To account for changing returns to labor market skills over time, the equation is estimated year-by-year and separately for men and women. Residual wage inequality is substantial as the pooled regression explains only between 10 to 20 percent of the overall variation in wages. Similar results have been found for Poland where the residual also accounts for 80 percent of overall wage inequality. Inequality within education and experience groups exhibits a strong upward trend for both men and women during the 1990s. The increase within 10 years after unification is much bigger than changes in residual wage inequality in the United States over the 1980s. For women, all of the increase in wage inequality is driven by unobservables, whereas for men residual inequality is lower than the overall wage inequality.

Unlike other transition countries, East Germany experienced remarkable aggregate wage growth over the 1990s with average annual growth rates of 14 log points. Most of it was concentrated in the first five years, when wages grew a stunning 23.1 log points per year. Table 5 decomposes wage growth by observable characteristics and distinguishes the early period of adjustment (1990-95) from the later period

[6] See for example, Juhn, Murphy and Pierce, 1992; Blau, 1998; Blau and Kahn, 1997; 2000). Blau and Kahn (2002) discuss the potentially important role of institutions, in particular labor unions, to push wages at the bottom of the wage distribution, which benefits women. In most industrialized countries, there exists a long-term trend of a declining gender wage gap, which is closely related to the changing occupational distribution of women and in particular to women entering traditionally male occupations. Recent evidence suggest that occupational and employer seggregation is an important determinant explaining roughly 50 percent of the observed gender wage gap adjused for differences in other observable characteristics (Bayard at al , 2003).

[7] The analysis was also done for monthly wages and yielded very similar results. This implies that changes in the distribution of hours worked among age groups is not a driving factor of age-specific wage differentials.

(1996-2000). Over the whole period, wage growth is slightly higher for women and younger workers (aged 25-34 years) but remarkably uniform across educational groups.

3.1 Skill Depreciation Effects

Several studies have shown that specific skills accumulated in the socialist economy depreciated after the regime change (Brainerd, 1998; 2000; Gathmann, 2004; Svejnar, 1999). It is however less clear whether there are gender-specific differences in these skill depreciation effects. One piece of evidence for the obsolescence of socialist work experience comes from age-earnings profiles. Figure 7 shows smoothed cross-sectional age-earnings profiles for East German men and women pooled over all years using local linear regression. As in other transition economies, profiles for both men and women are very flat over the course of the life-cycle. Wages for East German men (women) increase until about age 35 (40) and then flatten and even decline in the case of women.[8]

To estimate the returns to the labor market experience carried over from the socialist regime and contrast it with returns to new specific capital accumulated since unification (see also Mincer and Ofek, 1982 for an application to female labor force participation), the following pooled earnings equation is estimated

$$\ln w_{it} = \alpha_t + \beta' X_{it} + \gamma_1 OExp + \gamma_2 OExp^2 + \lambda_1 NExp_{it} + \lambda_2 NExp_{it}^2 + \varepsilon_{it}$$

where $OExp$ denotes old socialist work experience, $NExp$ work experience since unification and X other control variables like education and demographic characteristics[9]. Since employment rates for both men and women were high in the socialist economy and unemployment rates were below 2 percent, the empirical measure of old experience is essentially a dummy variable for people born in the same year and the same years of schooling. The new work experience variable is derived from calendar files that report the actual employment status for each month. Variation in new experience across individuals thus comes

[8] A similar picture emerges for different education groups. Age-earnings profiles for East German men and women are flat or even decline for the two lower education groups early in the transition process. The profiles for West German men and women with vocational degree peak much later at age 50, while the peak for those without a vocational degree is between age 30 and 35. Wages of the highly skilled in the West increase throughout the working life until age 60. For high skilled women, the wage profile in the West is also much steeper early in the career.

[9] Since the vast majority of individuals in the sample finished their formal education before 1989, the analysis does not distinguish between formal educational degrees from the socialist regime and new educational degrees aquired after unification.

from unemployment and temporary nonemployment spells after 1990.

The results for East German men and women are reported in Table 4. The estimates confirm that socialist labor market experience has lost its economic value in the post-unification labor market. Returns to 'socialist' work experience are not statistically significant from zero for men across all specifications and small or zero for women. In contrast, returns to work experience accumulated after unification are very large for men, but much smaller for women. This mirrors the large aggregate wage gains in the early years after unification documented above. The much lower returns to new work experience for women suggest that changes in the wage structure during transition affected men and women differently. Column (2) and (5) add occupation and industry dummies. Conditional on occupation and sector, returns to new experience are somewhat lower.[10]

The high returns to new work experience could be driven by selection effects because variation in the new experience variable relies on unemployment and nonemployment spells. If selection into work is positive and covariances between new work experience and other control variables are ignored, this leads to an upward bias in (λ_1, λ_2). In the multivariate case actually estimated, the direction of the bias depends on all covariances and can thus not be determined a-priori. Estimation of a fixed effect model that controls for time-invariant unobserved heterogeneity in levels however confirms this interpretation. Returns to new experience including fixed effects decline by more than 30 percent for both men and women. With respect to age-specific returns to new experience (column (3) and (6)), selection effects work however against the expected finding of higher returns to new experience for younger workers. This is true as long as the larger employment decline among older workers reported in Section 2 translates into a more severe upward bias in the experience coefficients. Another potential explanation for the high returns to new experience is that the data only covers the first twelve years of the transition process. If wage profiles with respect to new experience are steep at the beginning of the post-1990 working career, the returns mainly reflect the steep portion of the wage profile similar to new labor market entrants. While data constraints prohibit a fully nonparametric approach, a spline function was used with the knot placed at four years of experience. The result confirm that returns decline with accumulated experience:

[10] Very similar results were found if the sample is restricted to those working in East Germany. In contrast to what age-earnings profiles above suggested, interaction terms between old work experience and education were not significant. Thus, the depreciation of socialist skills appears to have affected all education levels.

while the return to the first four years of experience after unification is 0.43, it falls to 0.07 for the years 5 to 11.

To calculate the relative loss from the decline in returns to labor market experience for men and women between 1989 and 1990, the following thought experiment was used. Suppose that the wall had fell and everything had happened as it did but returns to labor market experience had remained at their 1989 level. How much higher would wages of high-experience worker be? To calculate the counterfactual, wage regressions for 1989 and 1990 were estimated separately for men and women. Then, the wage distribution in 1990 was predicted conditional on experience and experience squared. The counterfactual log hourly wage for 1990 in the absence of skill depreciation was then calculated by adding labor market experience in 1990 evaluated at 1989 returns to the conditional wage. The results show that wage losses from skill depreciation for high-experience men and women were large. For women with 35 or more years of potential work experience, the wage loss amounts to 23 percent of 1990 log wages while for men in the same experience category it is even 30 percent of the actual log wage in 1990.[11]

3.2 Sectoral Shifts and East-West Migration

Migration to West Germany has been an important phenomenon in East Germany, especially for younger workers. Overall, almost ten percent of East Germany's population moved West between 1990 and 2000. Another seven to eight percent commute to West Germany for work. Among under 35 years-old, 13 percent work in the West, while less than 5 percent of those 45 and older migrated or commute to the West for work.[12] Similarly, if younger workers have lower mobility costs and are more likely to take advantage of new job opportunities in the emerging private sector, this might increase their relative wages. The effect of job and geographic mobility on relative wages depends crucially on the type and extent of movements and its distribution among age groups.

Table 9a shows the percentage change in the employment rate across seven occupations and seven industries between 1990 and 2000. The first thing to note is that movements between occupations and

[11] An alternative interpretation of the relative decline of wages after unification is that labor market experience was overvalued in the socialist economy. The fact that returns to work experience in socialist East Germany in 1989 were actually smaller than in West Germany (Bird, Schwarze and Wagner, 1994) speaks however against this argument.

[12] Migrants and commuters to West Germany earn on average 23 German Marks per hour or a 28 percent premium over those working in East Germany. They are somewhat better educated with on average 12.6 years of education relative to 12 years for those remaining in East Germany and less likely to be women.

industries have been substantial among all age groups for both men and women.[13] Older men were as likely and older women more likely to switch occupations or industries than younger East Germans. Overall, there were substantial flows out of agriculture, manufacturing and the related occupation of agricultural or production workers for all age groups. On the other hand, the construction industry and the private service sector (trade and repair as well as other services) have increased their employment share after unification. There is also substantial heterogeneity of movements across age groups. For example, older women of 45 and above were much more likely to be employed in the public administration and the education or health sector than younger women.

To see how these differences affected relative wages, the wage gains between 1990 and 2000 are decomposed into a component due to East-West migration (including commuters with a job in West Germany), wages effects of occupational and sectoral shifts and wage changes within occupations and sectors respectively (see Donohue and Heckman, 1991 for details of the procedure). Writing average hourly wages of group $g = m, f$ as

$$E_g = P_g^W E_g^W + P_g^E \left(\sum_{j=1}^{J} P_g^j E_g^j \right)$$

where P_g^W and E_g^W are the fraction and associated wages of group g working in West Germany. P_g^E denotes the fraction of the workforce working in East Germany and P_g^j the employment rate in occupation (or sector) j with associated wage E_g^j. Percentage wage gains of group g can then be decomposed into three components:

$$\begin{aligned} d\ln E_g \quad = \quad & \left[\left(\frac{P_g^W E^W}{E} \right) d\ln P^W + \left(\frac{P_g^E}{E} \right) \sum_{j=1}^{J} P_g^j E_g^j d\ln P_g^E \right] + \\ & + \left(\frac{P_g^E}{E} \right) \sum_{j=1}^{J} P_g^j E_g^j d\ln P_g^j + \left(\frac{P_g^E}{E} \right) \sum_{j=1}^{J} P_g^j E_g^j d\ln E_g^j \end{aligned} \tag{3.1}$$

The first term measures the percentage change in wages from movements of workers between East and

[13] Job changing rates (job-to-job transitions) that also include movements within occupations and sectors were however much higher among younger workers. For example, 21 (21.5) percent of 25-34 years-old men (women) changed jobs each year while only 13.5 (11.7) percent of men (women) 55 and above. See Hunt (2001) for an analysis of job mobility and individual wage growth.

West Germany. The second term represents the contribution of occupational or sectoral shifts in the East German workforce while the last term measures the contribution of wage changes within occupations or sectors for group g. Changes in relative wages between men and women can then be computed by subtracting relative wage growth of women from that of men using (3.1).

The results of this decomposition, done separately for occupations and economic sectors, are reported in Table X. The top part of the table shows that the wage gains of women have been predominantly driven by wage gains within occupations or sectors. East-West migration has also played some role while shifts between occupations or sectors have been unimportant in explaining absolute wage gains. The bottom part shows the contribution of each mechanism to relative wage gains of women. Here, the results are quite different from the overall gains. Migration has decreased relative wages of women to men. This relative loss is however compensated by higher relative wage gains within occupations or sectors. The role of employment shifts between occupations or sectors in contrast is small except for women 55 and above for which industrial and to a lesser extent occupational shifts have increased relative wages. In sum, reallocation across industries and occupations in East Germany has only had a minor impact on wage differentials across age groups.

- changes in occupational distribution and occupational demand shifts (add). Newey and Reilly (1996) for example provide evidence that there was substantial occupational seggregation in Russia after the regime change. However, they show that most of the wage differences is however due to differentials within occupational groups. This implies that 'vertical occupational seggregation'(men and women occupy different jobs within the same occupation) is more important than horizontal sorting across occupations. See also Juradja and Harmgart (2003) for East Germany.

3.3 Returns to Other Labor Market Skills

- returns to education

- unobservable skills (see decomposition procedure in Juhn et al)

...to come...

4 The Decline in Employment and the Gender Pay Gap

Mirroring the initial collapse of aggregate production (see Section 2), employment plummeted by 25 percent in the first two years and declined a further 10 percent in 1992. While all transition economies have experienced large declines in their workforce early in the transition, employment decline has been especially pronounced in East Germany (see Burda and Hunt, 2001).[14] Figure X plots the fraction of East Germans not in the labor force for men and women in East Germany by age group. Nonemployment rates have risen for both genders and all age groups but the increase is higher for women. The increase is most dramatic among those 55 and older. Further, unemployment rates have reached 20 percent in the late 1990s, roughly twice West German levels.

However, it is not only the number of people in the nonemployed pool that matters but also its composition. If there is a large turnover, that is high entry and exit rates into nonemployment, this might have a different effect on relative wages between men and women than if there is low turnover. To see the dynamic of movements along the employment margin, Figure 7 shows the evolution of entry and exit rates into nonemployment over the 1990s for men and women in East Germany.[15] Two facts are noteworthy: first, entry rates into nonemployment are much higher for men than for women throughout the transition process while exit rates are only slightly higher for men. This implies that men have on average a longer nonemployment duration than women in East Germany. If there is unobserved heterogeneity driving the selection into and out of employment, this would imply that the pool of nonemployed men is more negatively selected than the pool of women. Holding entry and exit rates constant, this would tend to increase the gender wage ratio. Since entry rates are however higher for men, the effect on the gender pay gap is not clear a-priori.

To get a sense of the nature of the selection bias in terms of observable skills, Table 6 reports

[14] To ease the initial blow, the federal government heavily engaged in active labor market policies and offered early retirement schemes for those 55 and above. 5.1 percent of the sample (6.7 percent from 1990-95) were employed in active labor market programs (ALMP). The incidence is higher among young workers (for example, 6.4. percent of 25-34 years old but only 3.1 percent of those 55 and older or 4.6 of the 45-54 years old during 1990-1995) while wages are lower than in regular jobs (see Eichler and Lechner (2001) for an analysis of the wage effects of ALMP in East Germany). For early retirement, almost 900,000 people at or above 55 left the labor force until the program expired in December of 1992. Incentives to leave the labor force in that age group remained strong throughout the 1990s as the newly introduced (West) German pay-as-you-go system pension system encourages early retirement (Boersch-Supan and Schmidt, 2001). Pension benefits amount to around 70 percent of average lifetime earnings while in socialist East Germany, very low pensions encouraged people to remain in the workforce as long as possible.

[15] For details of the calculation procedure, see Juhn (1992).

employment rates separately by educational groups. Conditional on age, employment increase with education. For example, 63.4 percent of men aged 25-34 without vocational degree are employed while employment among those with university degree in the same agegroup reaches 96.3 percent over the whole period. For women in the same age group, employment rates are 55.7 percent for the low-skilled and 78.6 percent for the high-skilled. For men, the employment gap between high- and low-skilled conditional on age is higher for older workers and more importantly is decreasing for younger workers over time, but constant or increasing for older men. This suggests that the average education level among older workers increases relative to the average education in his agegroup. For women, the employment gap increases both for the oldest and the youngest agegroup.

If education is taken as an indicator of the skill level of labor market dropouts, Table 6 suggest that the decline in employment among the low-skilled would overstate aggregate wage increases and thus wage convergence between East and West. As an alternative measure of labor market skill, Figure 9 compares the wages of those dropping out of the labor market in the next year relative to those continuously employed conditional on both groups being employed in the current year. Note that this comparison excludes long-term labor market dropouts, which overstates wages of nonworkers if the long-term nonemployed and unemployed are low-wage workers. Early in the transition process, wages of future nonworkers are about 10 percent lower than for continuing workers for both men and women. This suggest that there is no strong differential selection effect out of employment across gender early in the transition. The second thing to note is that the relative wages of future nonworkers decline consistently over the 1990s. This implies that those dropping out of the labor market in later years are getting worse relative to those remaining in employment. Whether this last fact increases the selection bias in the gender wage ratio over time depends however crucially on the relative number of labor market dropouts across years. The wage ratio for men is more volatile and tends to be on average to be higher than for women. Thus, selection effects might be stronger for women, which would bias the gender wage ratio upward. Hunt (2002) even argued that most of the increase in the wages of East German women relative to men after unification was indeed driven by selection effects.[16]

[16]Note: there are at least two other channels through which the transition changed labor force participations decisions and relative wages. The introduction of the West German tax system might have provided strong disincentive affects to participate in the labor market. Similarly, the decline of available childcare, which had often been provided by firms in the

To analyze the effects of selection on the gender wage ratio, two methods are employed: the first one assumes that all nonworkers In East and West Germany are from the lower half of the wage distribution and the fraction of nonworkers in the sample does not exceed fifty percent. Under this assumption, the median of the full wage distribution can be recovered from the observed wages by adjusting the median of workers for the fraction of censored observations from nonworkers (Neal and Johnson, 1996)[17]. Figure 9a shows median relative wages between East and West including nonworkers under this assumption. The gender wage ratio is now much lower than if calculated from the sample of workers. This essentially reflects the higher dropout rates of women.

To quantify the effect of selective withdrawal on relative wages more formally, a selection model is estimated where a fourth-order polynomial of the labor force participation probability is included as a control function. The marginal effects for the participation equation are shown in Table A1 in the Appendix.[18] Variables for the demographic structure of the household and several measures for nonlabor income of the household are included in the first stage but excluded from the wage equation (see notes to Table A1 for details). The estimates show that age has a strongly negative effect on participation for men and an even stronger one for women. For example, men aged 45-54 years are between 8.5 and 9.8 percent less likely to work than the reference group under 25. Women in the same age group are between 12.3 and 15.5 percent less likely. Overall, only 20 percent of the variation in labor force participation can be explained by the model. Selection effects turn out to be important in the wage equation. The F-test of joint significance of the fourth-order polynomial in the participation probability reported at the bottom of the table is significant at the 1 percent level.

Based on the estimates, wages are predicted for men and women. Figure 9b plots the gender wage ratio in East Germany accounting for selective withdrawal. The corrected gender wage ratio is still declining

socialist economy, after unification might have increased fixed costs of work for women with children. These issues are left for future exploration.

[17] The assumption that all nonworkers earn wages below the median for workers is not innocuous. If some nonworkers are in fact high-wage workers, the corrected plot understates the wage gains of East Germans relative to West Germans in the labor market. More importantly, relative wages in East Germany are misleading if young and old labor market dropouts come from different parts of the wage distribution. For example, if young nonworkers are high-wage earners and older nonworkers low-wage earners, the fanning out documented in Figure 6 would still understate the true relative wage gains of younger workers.

[18] The analysis here implicitly assumes that changes in reservation wage are the driving the changes in relative employment. Alternatively, labor market opportunities could have declined relatively more for older workers (see for example Juhn, 1992 for a framework to distinguish between the two in the United States).

early in the transition, but almost flat after 1991/92 and below the gender wage ratio from the sample of workers. Male labor market dropouts are mostly from the lower part of the wage distribution. The same is not necessarily true for women where the selection corrected wages are above those for workers early in the transition. This is especially true for women aged 55 and older where the corrected wages are above actual wages of working women until 1994. Later in the transition process, those dropping out of the labor force at all ages are on average drawn from the lower part of the wage distribution.

- decline in labor market opportunities or labor supply choices (add)

5 Role of Government and Labor Market Institutions

5.1 Public Sector Employment

One reason for the relatively good performance of older workers in East Germany could be high employment rates in the government sector. Wage setting in the public sector is strongly determined by seniority like age or tenure in the public sector for both civil servants and regular employees or workers. If a large fraction of older workers is employed in the government sector, changes in aggregate wages across age groups could mask relative wage losses in the private sector. While government jobs can be found in all sectors of the economy, they are most concentrated in the public adminstration and education and health sector. Over the whole period, overall government employment declines from 34.5 percent in 1990 to 30.5 in 2000 while employment in the public administration actually increased from 22.6 percent in 1990 to 27.9 percent in 2000. Table 8a shows that older men are almost twice as often employed in the government sector (30 percent of men aged 55 and older compared to only 15 percent among those under 25). Overall employment in the government is much higher among women, but differences across age groups much smaller early in the transition process. Government employment declines for younger men and women in the second half of the 1990s, while it increases for older women and 45-54 years-old men but decreases for men 55 and older.

The impact of government employment on relative wages depends on two factors: wage differentials across gender within the government sector as well as wage levels between the government and other sectors. For example, if the government pays on average lower wages than the private sector but wage

differentials between men and women in government jobs are smaller, the effect on relative wages is ambiguous. The bottom part of Table 8 compares wages between government and non-government sector during the 1990s. Wages are always higher in the government sector for women and for men except for those under 35 early in the transition. The wage differential between government and other sectors of the economy increases over time for most age groups, but especially for older men. The effect of govenrment employment on the gender wage ratio is therefore a-priori ambiguous.

To evaluate the total effect of government employment on wage differentials across age groups, Table 9 shows the result of a wage simulation in which older workers are given the government employment rates and educational levels of younger workers but get paid the returns of their respective age group (see Heckman and Todd, 2000). To compute the counterfactual wage of men, their wage distribution is first calculated conditional on government employment and education. In a second step, returns of men and mean characteristics of women are added (see notes of Table 9 for details of the underlying regression model). While shortly after unification (1990/91), government employment has no impact on the gender wage ratio, there is a small positive effect (from the perspective of women) later in the transition period (1999/2000). Overall, the effect of high employment in the government sector on relative wages remains small.

5.2

Have unions benefitted women (at least those remaining in the labor market) more than men?

Labor unions were a powerful player early in the East German transition process where wage bargaining like in the West takes place on an industry and state level. Immediately after unification, the employer side was not well organized. Most managers had no experience with wage bargaining and their employment prospects in the firms they managed were just as uncertain as the fate of their firms. This led to little resistance to large wage increases in the initial period after unification. In contrast, on the union side, bargaining was quickly taken over by Western unions. The success of Western unions was impressive: until 1991, membership rates were on average 50 percent compared to 33 percent in the West (Burda and Funke, 2001). Union coverage reached almost 100 percent as all companies in the employers' association are bound by the negotiated wage agreements. After 1993, unions increasingly lost support as

it became clear that most companies could not sustain the negotiated wage increases. Union membership rates dropped to only 22 percent in the East until 2000. Today, roughly thirty percent of employees have their wages set by firm-level negotiations with many paying below the bargained wages at the industry level (*Tariflohn*). Previous studies on transition countries did not find an effect of the union status on earnings (see Flanagan, 1995 for the Czech Republic; Belka et al, 1994 for Poland).

A large portion of the capital inflow occurred as part of the privatization of East Germany's state-owned enterprises. Production in the socialist economy, organized in large industrial conglomerates (so called *Kombinate*), had been highly concentrated both vertically and horizontally.[19] The *Treuhand* (trust agency), a federal agency established in March 1990, sold around 25 percent of Eastern German companies to investors by the end of 1991 and over 75 percent by the end of 1994 when it was dissolved. Early on, the Treuhand often heavily subsidized currently unprofitable companies under its management to secure jobs.

6 Conclusion

- what are the incentives created in the new system for men and women?

- policy implications

- future extensions: occupational demand shifts using more detailed IAB data

...to come...

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[19] In the socialist regime, industrial production was concentrated in only 8,000 *Kombinate*, which together employed around 3.7 million workers. Most firms had only one supplier and no competitors. The central planning agency took care of distributing the goods, determined its price and worker compensation. Though some conglomerates could be privatized as a whole, most had first to be restructured and split into smaller firms to make them attractive to investors.

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A German-Socio Economic Panel

The results in this paper are based on the annual German Socio-Economic Panel from 1990 to 2001. The West German and immigrant samples (Sample A and B) contain individuals living in West Germany in 1984, in which the household head is a German citizen (Sample A) or citizen of Turkey, Italy, Spain, Greek or Yugoslavia respectively (Sample B). To be sampled in the East German sample (Sample C), the household head had to be a citizen of the former German Democratic Republic in 1990. This avoided sampling West Germans who had moved to East Germany between the fall of the wall in November of 1989 and June 1990. It also excluded the roughly 3 percent foreigners living in the former GDR. To construct an appropriate comparison group, only individuals with German citizenship are included in the West German sample from either the original West German or immigrant sample. The resulting dataset is an unbalanced panel for each region.

The survey follows indvidiuals moving from East to West and vice versa. Internal migrants are however kept in their original sample. Thus, the East German sample contains both people who migrated to West Germany after 1990 and those who stayed in East Germany. The survey does not follow individuals moving abroad. Aggregate statistics from the Federal Statistical Office however show that outmigration of East and West Germans was negligible over the sample period. The samples are restricted to those born between 1931 and 1973. In addition, the self employed, individuals in the military or engaged in full-time education and those with missing observations on key variables such as education, age or earnings are excluded.

The logarithm of gross hourly wage is used as measure of wage income. Since short-term work was frequently used by firms early in the transition process and East Germans work longer hours than West Germans, hourly wages are a better measure for labor market outcomes than monthly wages. Hourly wages are calculated from gross earnings in the month prior to the interview plus 1/12 of bonus payments such as holiday benefit, Christmas bonus, bad weather compensation and additional monthly salaries. These additional compensations account for around 8-10 percent of annual earnings in Germany. Total monthly gross earnings are then divided by total monthly hours worked derived from the actually worked hours per week times 4.2.

All wage and income measures are deflated by the consumer price index available from the Federal Statistical Office with 1995 as the base year. Because socialist subsidies for basic goods, especially transport, utilities and housing, were only gradually abolished after unification, price levels initially differed substantially between East and West Germany. To adjust for these differences, a power purchase parity measure calculated by the SOEP-team is used to translate a German mark earned in the East to the corresponding amount in the West. This measure is available from 1991 until 2001. The information is supplemented for the year 1990 from a study conducted by Krause (1994). It should however be kept in mind that the PPP for 1990 is not as reliable than the later indices, mainly because the basket of goods was slightly adjusted after 1992.

The unemployed, nonemployed or employed categories are derived from monthly calender data on individual employment states. An individual is considered employed if it reports part-time or full-time employment for nine or more months in the previous year. The nonemployment state consists of individuals who retired, are on maternity leave or work in the home sector. Unemployed are those registered with the local labor office. If this procedure does not assign an employment status, the main activity in a given year is assigned as employment status. Finally, to adjust for differences in educational systems between East and West Germany (see Krueger and Pischke, 1995 for a detailed discussion), a recoding of East German into West German educational degrees was used, which is provided by the German Institute of Economic Research.

Table 1: Starting Position of Men and Women in Germany in 1990

		East German Men		East German Women		West German
		Mean	Std. Dev.	Mean	Std. Dev.	Mean
Demographics	Age	39.3	11.181	38.5	10.846	38.4
	Under 25	0.090	0.287	0.090	0.286	0.125
	25-34 Years	0.265	0.441	0.277	0.447	0.297
	35-44 Years	0.278	0.448	0.298	0.458	0.249
	45-54 Years	0.231	0.421	0.224	0.417	0.235
	55 and Older	0.136	0.343	0.112	0.315	0.094
	Married	0.773	0.419	0.780	0.415	0.714
	Single	0.062	0.241	0.109	0.312	0.144
	Children in Household	0.764	0.425	0.773	0.419	0.662
Labor Market Skills	Education	12.0	2.245	11.8	2.087	11.2
	No Vocational Degree	0.030	0.171	0.076	0.264	0.259
	Vocational Degree	0.866	0.340	0.847	0.360	0.676
	University Degree	0.104	0.305	0.077	0.267	0.065
	Potential Experience	21.2	11.372	20.6	11.402	21.0
	Hours Worked per Week	38.3	11.707	42.7	9.665	32.8
Employment	Employed	0.672	0.469	0.776	0.417	0.454
	Unemployed	0.037	0.189	0.126	0.332	0.014
	Nonemployed	0.291	0.454	0.098	0.297	0.504
	Agriculture	0.165	0.371	0.088	0.283	0.006
	Manufacturing	0.515	0.500	0.316	0.465	0.284
	Services	0.177	0.382	0.243	0.429	0.349
	Public Sector	0.128	0.335	0.319	0.466	0.306
	Other	0.014	0.119	0.035	0.184	0.054
	Administrator/Professional	0.182	0.386	0.175	0.380	0.081
	Technician	0.081	0.272	0.297	0.457	0.265
	Clerk	0.034	0.181	0.156	0.363	0.240
	Sales Worker	0.025	0.157	0.146	0.353	0.192
	Agricultural/Production Worker	0.231	0.422	0.076	0.265	0.054
	Service Worker	0.373	0.484	0.072	0.259	0.062
	Unskilled Worker	0.074	0.262	0.078	0.269	0.107
	Small Firm	0.072	0.258	0.102	0.302	0.167
	Medium Firm	0.607	0.489	0.570	0.495	0.298
	Large Firm	0.321	0.467	0.328	0.470	0.535
Earnings	Gross Earnings 1989	1171.73	355.49	869.91	323.43	2669.16
	Gross Earnings 1990	1316.01	396.01	992.78	362.99	2868.17
	Net Household Income	1977	707.42	1899	690.86	3738.77
	Observations	1,622		1,692		2364

Notes: The summary statistics describe the characteristics of German nationals in East and West Germany for 1990-2001. Migrants between East and West are retained in their original sam vocational degree has not finished any vocational training but could have finished minimum schooling (9 years of schooling) or an intermediate schooling degree (10 years of schooling). An individ degree category if she completed vocational training or has a high school degree but no tertiary education. Finally, individuals with university education have completed a degree in any type Fachhochschulen. The definition of employment states is derived from monthly calendar data on the main economic activity. Firm sizes are defined as follows: small firms have less than 20 emp firms employ between 20 and 2000 and large firms 2000 or more people. Occupation changers are individuals that change between one-digit ISIC codes. Industry switchers change their NACE cod to ISIC rev. 3) across subsequent jobs. Earnings and income variables are monthly values and deflated to 1995 German Marks.

Women
Std. Dev.
11.184
0.331
0.457
0.432
0.424
0.292
0.452
0.351
0.473
2.151
0.438
0.468
0.247
11.575
11.799
0.498
0.119
0.500
0.076
0.451
0.477
0.461
0.227
0.272
0.441
0.427
0.394
0.226
0.241
0.310
0.373
0.458
0.499
1424.50
1541.29
2872.38

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Table 2: Returns to Labor Market Skills in 1989

	Women East	Men East	Women West	Women East	Men East	Women West
	(1)	(2)	(3)	(4)	(5)	(6)
Vocational Degree	0.1389	0.139	0.162	0.0701	0.0982	0.077
	(0.0541)*	(0.0634)*	(0.0382)**	(0.0561)	(0.0616)	(0.0372)*
University Degree	0.4998	0.3758	0.5642	0.2847	0.2138	0.2523
	(0.0773)**	(0.0747)**	(0.0534)**	(0.0874)**	(0.0754)**	(0.0678)**
Work Experience	0.0705	0.0607	0.0297	0.0686	0.0567	0.0265
	(0.0075)**	(0.0070)**	(0.0057)**	(0.0079)**	(0.0073)**	(0.0055)**
Work Experience ^2	-0.0013	-0.0011	-0.0006	-0.0013	-0.0011	-0.0005
	(0.0002)**	(0.0001)**	(0.0001)**	(0.0002)**	(0.0001)**	(0.0001)**
Married	-0.0855	0.0609	-0.0705	-0.0807	0.0506	-0.0322
	(0.0362)*	(0.0378)	(0.0289)*	(0.0380)*	(0.0378)	(0.0263)
State Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Occupation Dummies	No	No	No	Yes	Yes	Yes
Industry Dummies	No	No	No	Yes	Yes	Yes
Observations	1326	1416	1063	1265	1350	1031
R-squared	0.14	0.16	0.14	0.18	0.22	0.25

Notes:

Table 3: Evolution of Gender Wage Gap in East and West Germany

Age Groups	1990 Mean	1990 Median	1990 MedCorr	1995 Mean	1995 Median	1995 MedCorr	2000 Mean	2000 Median	2000 MedCorr
East Germany									
Under 25	0.853	0.844		0.896	0.934		0.941	0.975	
25-34 Years	0.906	0.937		0.931	0.887		0.900	0.882	
35-44 Years	0.907	0.874		0.988	1.006		0.965	1.011	
45-54 Years	0.816	0.807		0.942	0.937		0.953	1.004	
55 and Older	0.793	0.741		0.929	0.910		0.909	0.919	
West Germany									
Under 25	0.889	0.850		0.879	0.866		0.943	0.873	
25-34 Years	0.873	0.829		0.817	0.869		0.838	0.882	
35-44 Years	0.768	0.752		0.797	0.796		0.715	0.750	
45-54 Years	0.675	0.673		0.703	0.737		0.711	0.723	
55 and Older	0.608	0.693		0.626	0.666		0.668	0.701	

Table 4: Evolution of the Gender Wage Gap across the Wage Distribution

	1990			1995			2000		
	Overall	Under 25	45-54	Overall	Under 25	45-54	Overall	Under 25	45-54
East									
10th percentile	0.847	0.875	0.806	0.865	0.957	0.868	0.824	0.929	0.848
25th percentile	0.861	0.816	0.846	0.919	0.827	0.950	0.878	1.093	0.877
50th percentile	0.872	0.844	0.807	0.940	0.934	0.937	0.949	0.975	1.004
75th percentile	0.875	0.915	0.809	0.979	0.957	0.918	0.965	0.981	0.948
90th percentile	0.884	0.833	0.817	0.952	0.948	0.904	0.959	0.896	0.958
West									
10th percentile	0.625	0.896	0.621	0.661	0.968	0.578	0.667	1.181	0.568
25th percentile	0.714	0.800	0.651	0.748	0.815	0.692	0.718	0.950	0.633
50th percentile	0.731	0.850	0.673	0.785	0.866	0.737	0.771	0.873	0.723
75th percentile	0.733	0.860	0.653	0.774	0.920	0.738	0.759	0.913	0.743
90th percentile	0.722	0.884	0.716	0.745	0.879	0.662	0.724	0.946	0.752

Table 5: Growth in Log Hourly Wages in East Germany

	1990-2000	1990-1995	1996-2000
Overall	0.143	0.231	0.039
Men	0.138	0.221	0.039
Women	0.149	0.244	0.039
No Vocational Training	0.147	0.300	-0.009
Vocational Training	0.144	0.229	0.039
University Degree	0.134	0.236	0.047
25-34 Years Old	0.158	0.237	0.054
45-54 Years Old	0.136	0.232	0.023
Men			
No Vocational Training			
25-34 Years Old	0.046	0.419	-0.048
45-54 Years Old	0.158	0.249	0.037
Vocational Training			
25-34 Years Old	0.144	0.213	0.047
45-54 Years Old	0.136	0.217	0.025
University Degree			
25-34 Years Old	0.200	0.295	0.115
45-54 Years Old	0.110	0.196	0.040
Women			
No Vocational Training			
25-34 Years Old	0.126	0.325	0.027
45-54 Years Old	0.143	0.240	-0.013
Vocational Training			
25-34 Years Old	0.169	0.250	0.053
45-54 Years Old	0.146	0.253	0.018
University Degree			
25-34 Years Old	0.187	0.290	0.078
45-54 Years Old	0.118	0.256	0.018

Table 6: Depreciation of Socialist Work Experience after Unification, 1990-2001

	Men			*Women*		
	(1)	(2)	(3)	(4)	(5)	(6)
Old Experience	0.002	0.0016	-0.0009	0.0124	0.0071	0.0029
	(0.0017)	(0.0017)	(0.0027)	(0.0018)**	(0.0017)**	(0.0030)
Old Experience Squared	0	-0.0001	-0.0001	-0.0003	-0.0002	-0.0001
	0.0000	0.0000	(0.0001)	(0.0000)**	(0.0000)**	(0.0001)
New Experience	0.5847	0.5384	0.5486	0.1942	0.1431	0.0864
	(0.1874)**	(0.1996)**	(0.2087)**	(0.0624)**	(0.0616)*	(0.0826)
New Experience Squared	-0.0351	-0.0336	-0.0386	0.0032	-0.0043	0.0009
	(0.0123)**	(0.0129)**	(0.0158)*	(0.0046)	(0.0045)	(0.0095)
New Experience*(25-34 yrs)			-0.0005			0.0449
			(0.0558)			(0.0546)
New Experience*(25-34 yrs)^2			0.0052			-0.0041
			(0.0091)			(0.0084)
New Experience*(35-44 yrs)			-0.0111			0.0516
			(0.0561)			(0.0540)
New Experience*(35-44 yrs)^2			0.0057			-0.004
			(0.0092)			(0.0083)
New Experience*(45-54 yrs)			-0.0024			0.0533
			(0.0565)			(0.0547)
New Experience*(45-54 yrs)^2			0.0043			-0.005
			(0.0092)			(0.0084)
New Experience*(55 and older)			-0.0039			0.1114
			(0.0587)			(0.0596)
New Experience*(55 and older)^2			0.0032			-0.0104
			(0.0093)			(0.0086)
Vocational Training	0.1403	0.0885	0.075	0.305	0.154	0.1553
	(0.0339)**	(0.0338)**	(0.0347)*	(0.0278)**	(0.0264)**	(0.0265)**
University Degree	0.4658	0.2416	0.221	0.6585	0.3133	0.3084
	(0.0356)**	(0.0375)**	(0.0383)**	(0.0310)**	(0.0302)**	(0.0307)**
Migrant or Commuter to West	0.1703	0.2032	0.2034	0.1004	0.151	0.1496
	(0.0173)**	(0.0174)**	(0.0175)**	(0.0244)**	(0.0231)**	(0.0231)**
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
State Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age Dummies	No	No	Yes	No	No	Yes
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	No	Yes	Yes	No	Yes	Yes
Occupation Dummies	No	Yes	Yes	No	Yes	Yes
R-Squared	0.39	0.47	0.47	0.39	0.55	0.55
Observations	7001	6733	6733	6642	6398	6398
F-Test Age-Specific Returns			2.35			2.27
Prob > F			0.0159			0.0204

Notes: The results are basd on a pooled regression of log hourly wages on the variables specified. Robust standard errors are reported in parentheses. Coefficients with * are significant the 5 percent, those with * at the 1 percent level. The reference educational group is no vocational degree and the reference age group are those under 25. Other controls are whether the person is married and firm tenure (the latter added in column (2)-(3) and (5)-(6) only). The occupation and industry dummies in column (2) and (5) control for 7 occupational and 12 industry categories.

Table 7: Employment Rates by Gender, Age and Education

	Under 25	25-34	35-44	45-54	55 and Older
Men					
Overall					
No Vocational Degree	0.72	0.75	0.63	0.68	0.29
Vocational Degree	0.90	0.92	0.90	0.87	0.61
University Degree	1.00	0.96	0.96	0.93	0.71
1990-1992					
No Vocational Degree	0.65	0.61	0.57	0.74	0.47
Vocational Degree	0.92	0.93	0.92	0.93	0.75
University Degree	1.00	0.94	0.96	0.94	0.81
1998-2000					
No Vocational Degree		0.83	0.70	0.73	0.24
Vocational Degree		0.91	0.89	0.81	0.61
University Degree		0.98	0.95	0.94	0.66
Women					
Overall					
No Vocational Degree	0.46	0.56	0.51	0.48	0.28
Vocational Degree	0.71	0.71	0.78	0.77	0.48
University Degree	1.00	0.79	0.89	0.91	0.66
1990-1992					
No Vocational Degree	0.62	0.86	0.63	0.63	0.35
Vocational Degree	0.72	0.78	0.86	0.87	0.53
University Degree	1.00	0.78	0.92	0.91	0.58
1998-2000					
No Vocational Degree		0.59	0.49	0.42	0.31
Vocational Degree		0.68	0.74	0.72	0.53
University Degree		0.77	0.86	0.93	0.70

Notes : Employment rates are calculated from monthly calendar data. A person is employed if employment was the main activity over the year.

Table 8: Employment and Wages in Government Sector

	Under 25	25-34	35-44	45-54	55 and Older
Employment (%)					
Men					
1990	19.8	25.1	25.7	23.2	32.6
1990-1995	15.2	23.5	24.0	24.6	30.3
1996-2000	28.6	18.0	19.1	26.4	27.6
Women					
1990	43.1	47.0	46.2	45.5	46.1
1990-1995	34.2	39.0	43.6	44.7	49.1
1996-2000	0.0	0.0	0.0	0.0	0.0
Wages					
Men					
1990-1995					
Government	9.70	12.58	14.26	14.45	13.89
Other	12.08	13.49	13.86	13.91	13.63
1996-2000					
Government	16.98	21.93	23.06	25.38	25.58
Other	13.76	20.19	20.18	21.06	19.66
Women					
1990-1995					
Government	10.44	12.83	15.09	14.40	13.92
Other	8.97	11.18	11.46	10.68	10.16
1996-2000					
Government	17.99	20.50	24.81	24.05	24.08
Other	14.46	16.72	18.23	17.01	17.08

Notes: The table reports employment rates in the government sector (*Oeffentlicher Dienst*). Government employment comprises most of the public adminstration and educational and health sector but government employees can also be found in any other sector of the economy (for example, agriculture). No distinction is made between civil servants (*Beamte*), which cannot be fired, and other employees which can (*Arbeiter and Angestellte*).

Table 9: Gender Wage Ratio Adjusted for Government Employment

	1990/91	1994/95	1999/2000
Eastern Men and Women			
Actual Log Hourly Wage Men	2.11	2.82	2.97
Actual Log Hourly Wage Women	2.04	2.84	3.01
Adjusted for Government Employment	2.04	2.83	3.00
Adjusted for Education and Government	2.03	2.83	2.97
Adjusted for Education, Migration and Government Employment	2.03	2.84	2.99
Eastern and Western Women			
Actual Log Hourly Wage Western Women	2.11	2.82	2.97
Actual Log Hourly Wage Eastern Women	2.06	2.82	3.01
Adjusted for Government Employment	2.05	2.82	2.99
Adjusted for Education and Government	2.07	2.82	2.98
Adjusted for Education, Migration and Government Employment	2.07	2.82	2.99

Notes: The table reports predicted mean log hourly wages after adjusting the distribution of government employment, education and West migration to the group of 25-34 years-old of the same gender. The underlying wage equation was estimated without correcting for selection into employment and included the following additional variables: education, experience and experience squared, marital status, whether the individual worked in West Germany as well as dummy variables for seven occupations and seven economic sectors (see Table 9a for a complete list).

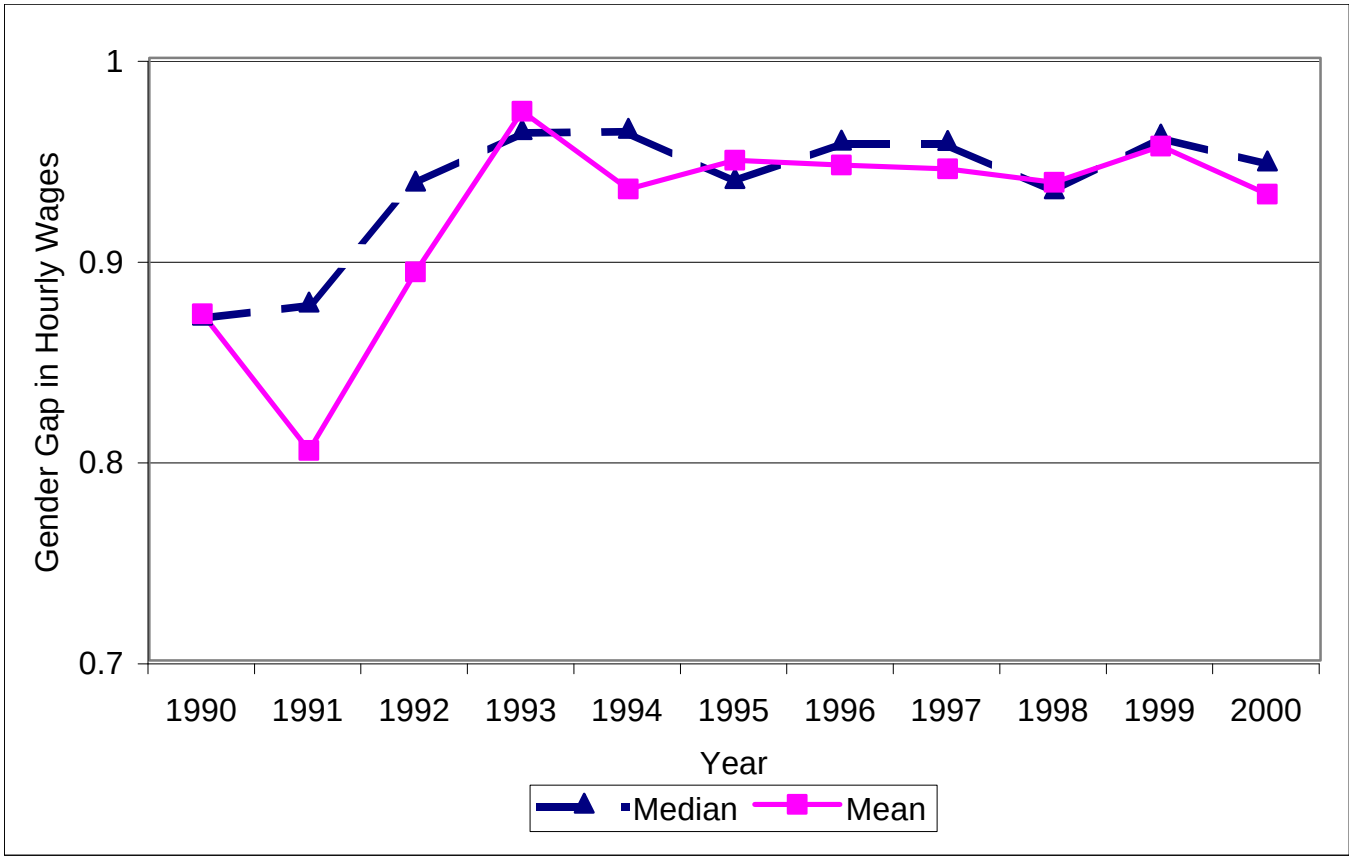
Table 10: Employment in Private and Union Covered Sector

	Under 25	25-34	35-44	45-54	55 and Older
Union Covered					
Men					
1990	0.688	0.669	0.653	0.697	0.550
1990-1995	0.667	0.657	0.662	0.716	0.649
1996-2000	0.735	0.646	0.670	0.737	0.715
Women					
1990	0.762	0.709	0.699	0.783	0.000
1990-1995	0.749	0.731	0.725	0.748	0.809
1996-2000	0.824	0.710	0.730	0.740	0.767
Private Firms					
Men					
1990	0.388	0.409	0.423	0.434	0.382
1990-1995	0.578	0.550	0.567	0.557	0.531
1996-2000	0.739	0.743	0.689	0.751	0.691
Women					
1990	0.270	0.301	0.358	0.313	0.245
1990-1995	0.704	0.700	0.664	0.646	0.585
1996-2000	0.453	0.458	0.501	0.461	0.400
Newly Founded Firms (conditional on being private)					
Men					
1991	0.095	0.098	0.043	0.047	0.000
1990-1995	0.271	0.297	0.262	0.218	0.204
1996-2000	0.529	0.668	0.536	0.470	0.468
Women					
1991	0.051	0.102	0.066	0.061	0.036
1990-1995	0.684	0.658	0.571	0.538	0.509
1996-2000	0.356	0.300	0.300	0.266	0.328

Table 11:Wage Premia in Private and Union Covered Sector by Age

	Under 25	25-34	35-44	45-54	55 and Older
Union Covered					
Men					
Yes	12.64	16.52	18.14	18.53	21.38
No	13.03	15.37	15.53	16.41	16.92
Women					
Yes	11.70	15.20	18.82	18.44	21.85
No	9.30	12.77	14.15	12.60	13.32
Private Firms					
Men					
Yes	10.36	13.76	14.85	15.41	15.76
No	8.22	11.65	13.10	13.25	12.78
Women					
Yes	9.86	12.08	13.28	12.64	13.92
No	8.19	11.35	13.95	12.36	13.77
Newly Founded Firms (conditional on being Private)					
Men					
Yes	13.84	15.93	17.13	16.91	17.76
No	8.95	12.30	13.71	14.82	14.93
Women					
Yes	12.20	13.82	16.01	14.41	15.78
No	8.26	10.93	11.65	11.76	12.70

Figure 2: Evolution of the Gender Wage Gap in East Germany



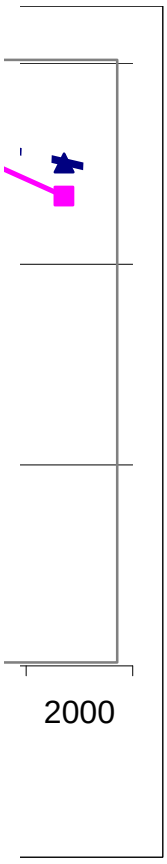

2000

Figure 3a: Evolution of Wage Inequality in East Germany

Figure 3b: Evolution of Residual Wage Inequality in East Germany

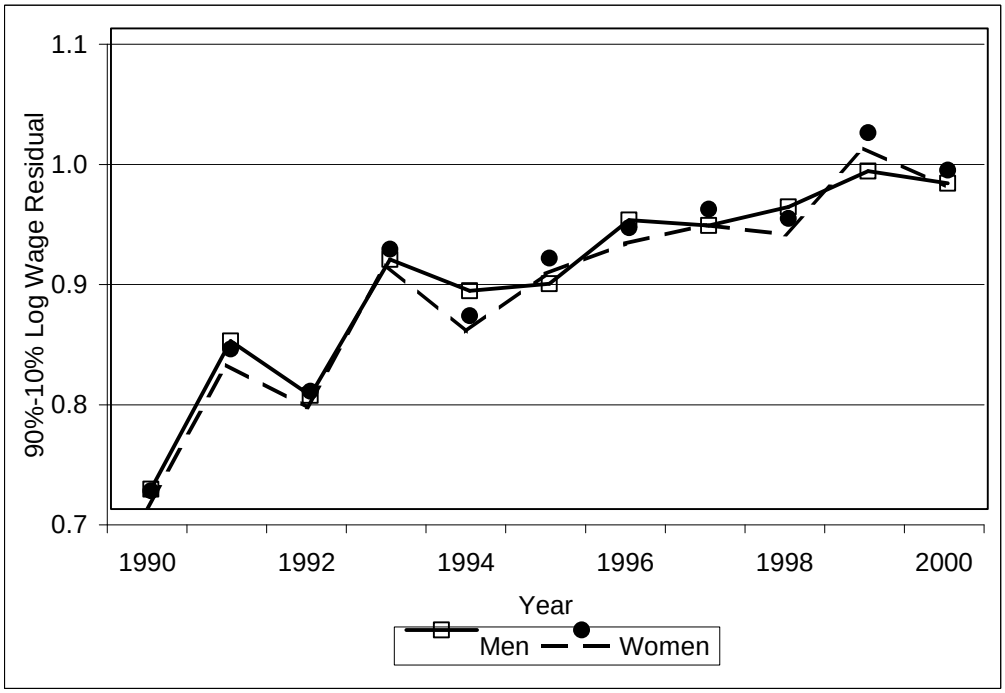
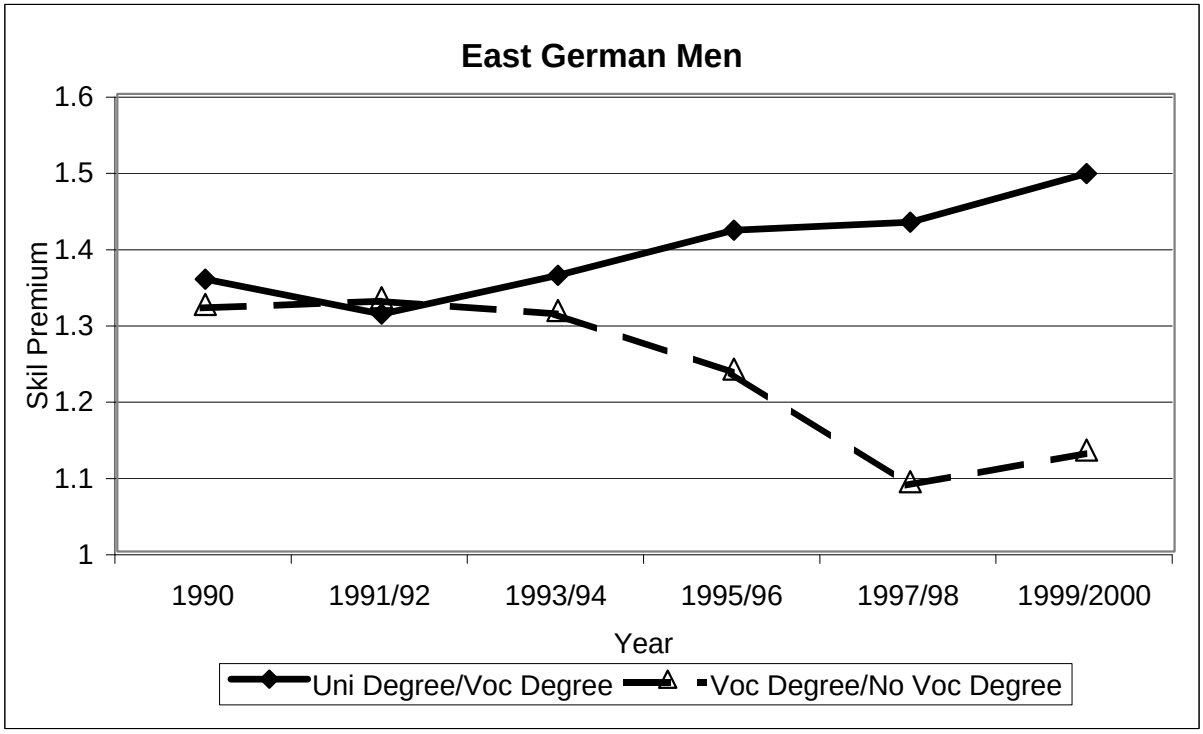


Figure 4: Evolution of Skill Premium



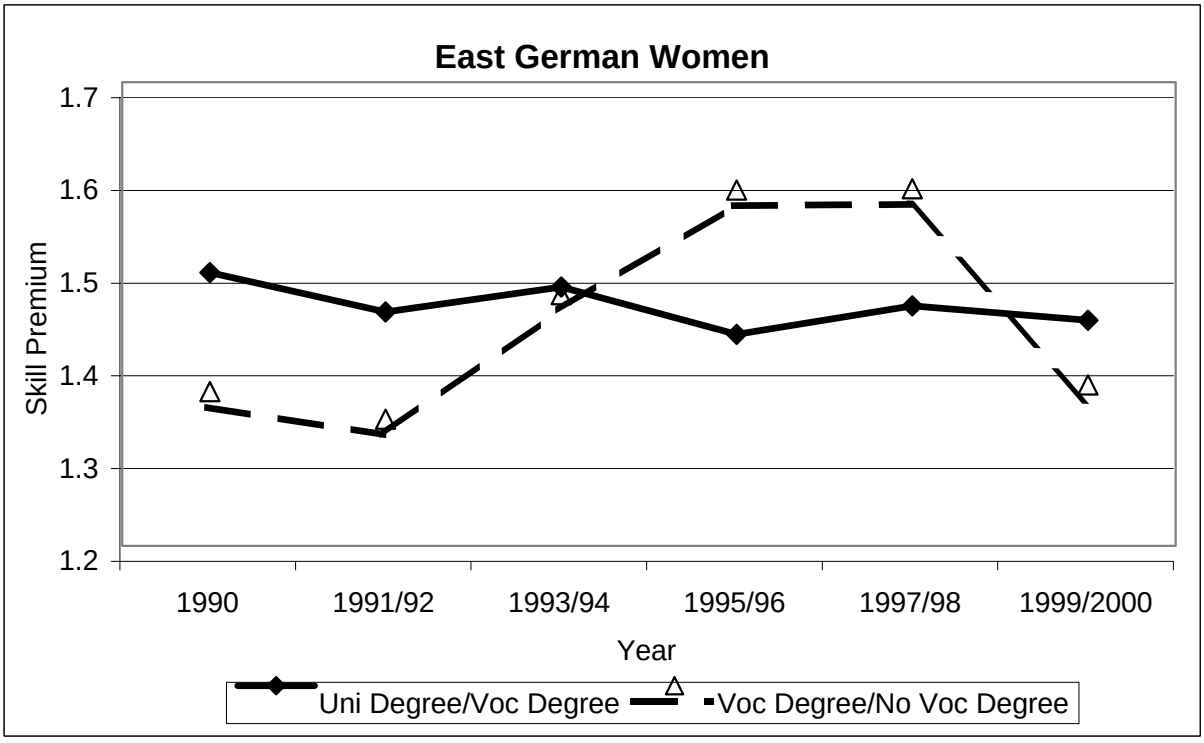


Figure 5: Pooled Life-Cycle Earnings Profiles in East Germany

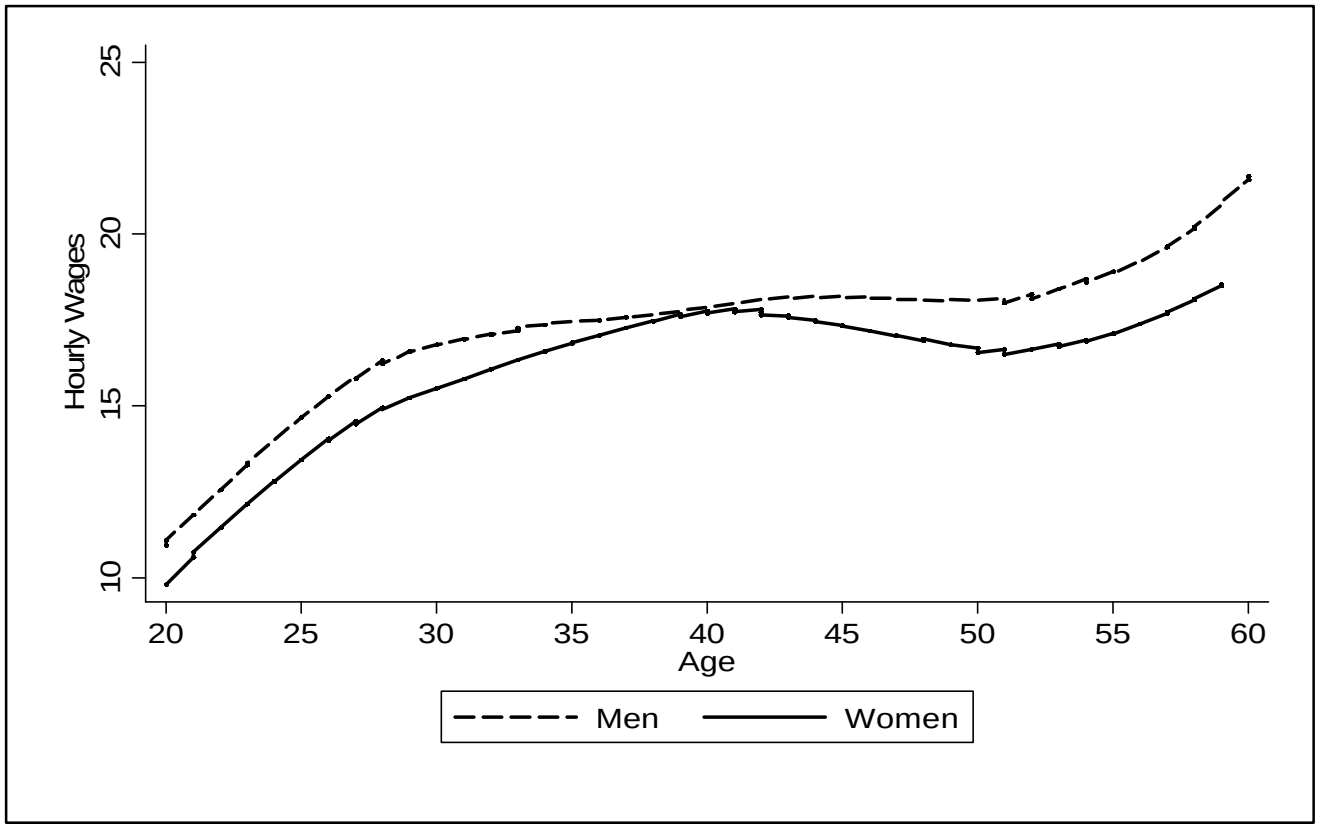
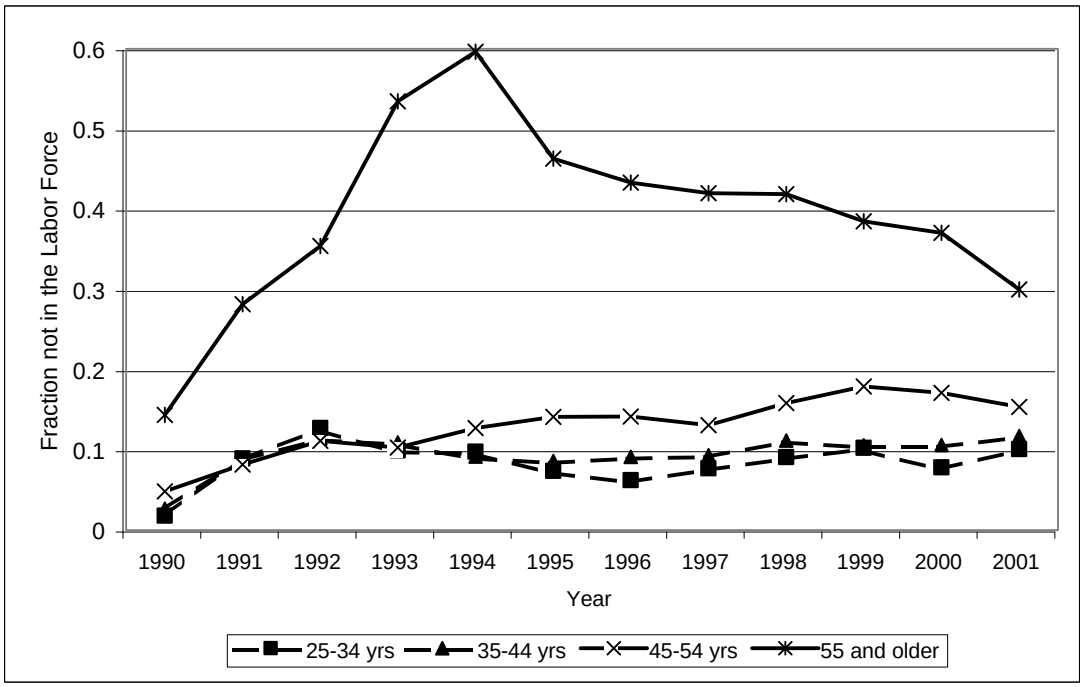
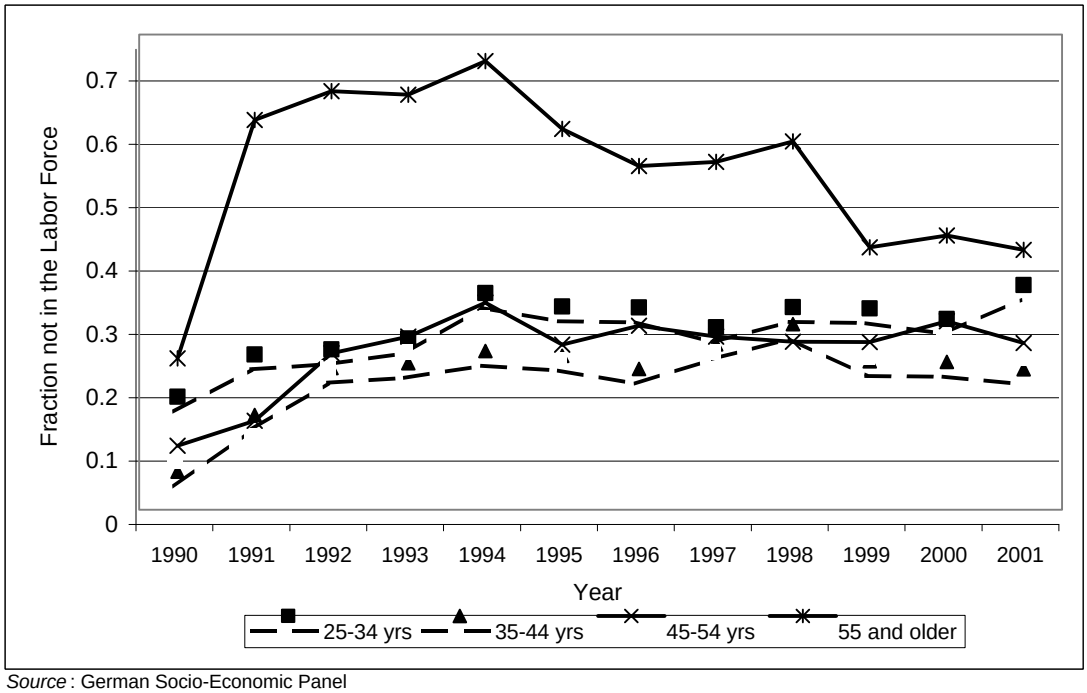


Figure 6a: Fraction Not in Labor Force, East German Men by Age



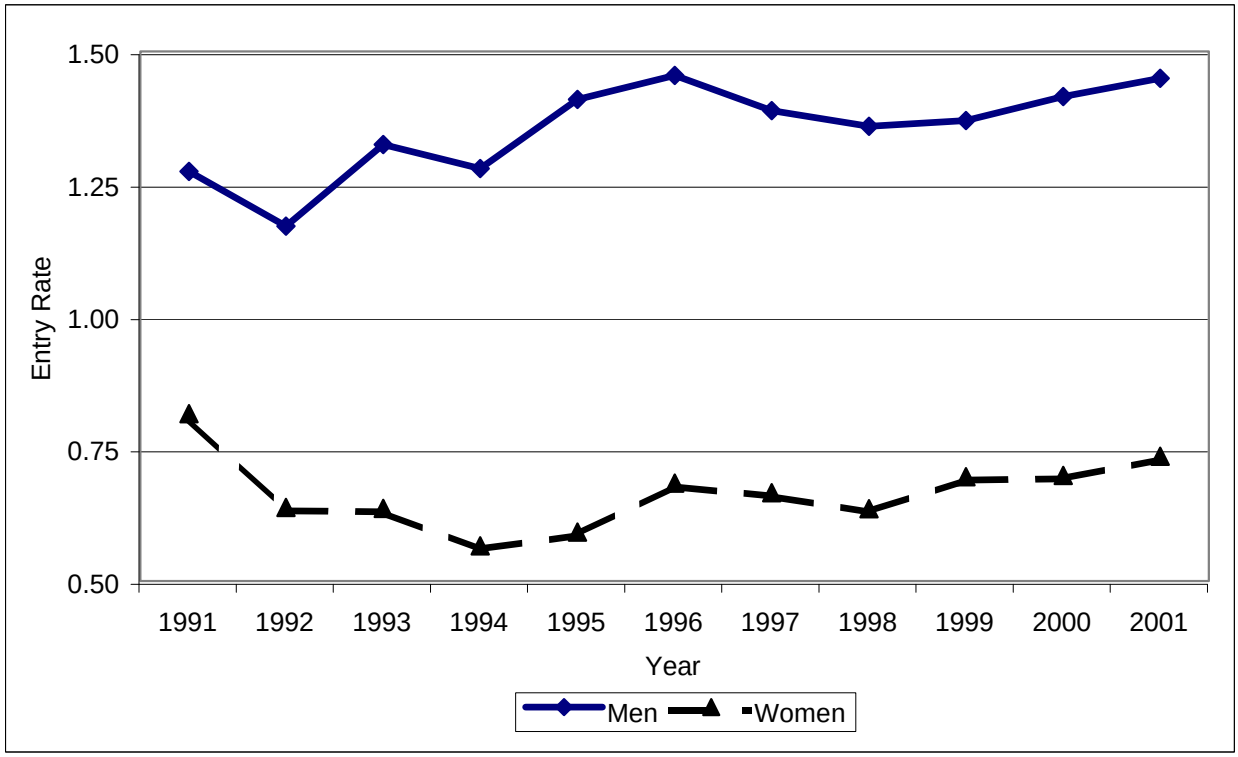
Source: German Socio-Economic Panel

Figure 6b: Fraction Not in Labor Force, East German Women by Age



Source: German Socio-Economic Panel

Figure 7: Entry and Exit Rates into Nonemployment by Gender



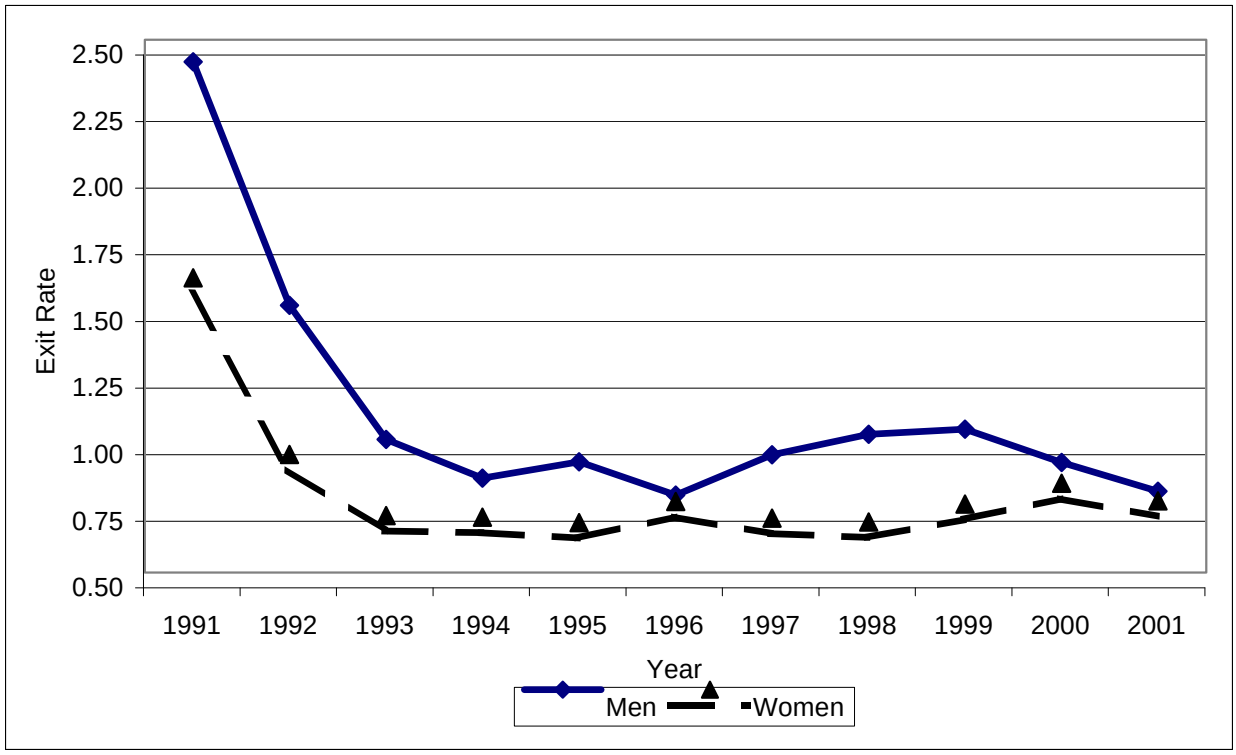
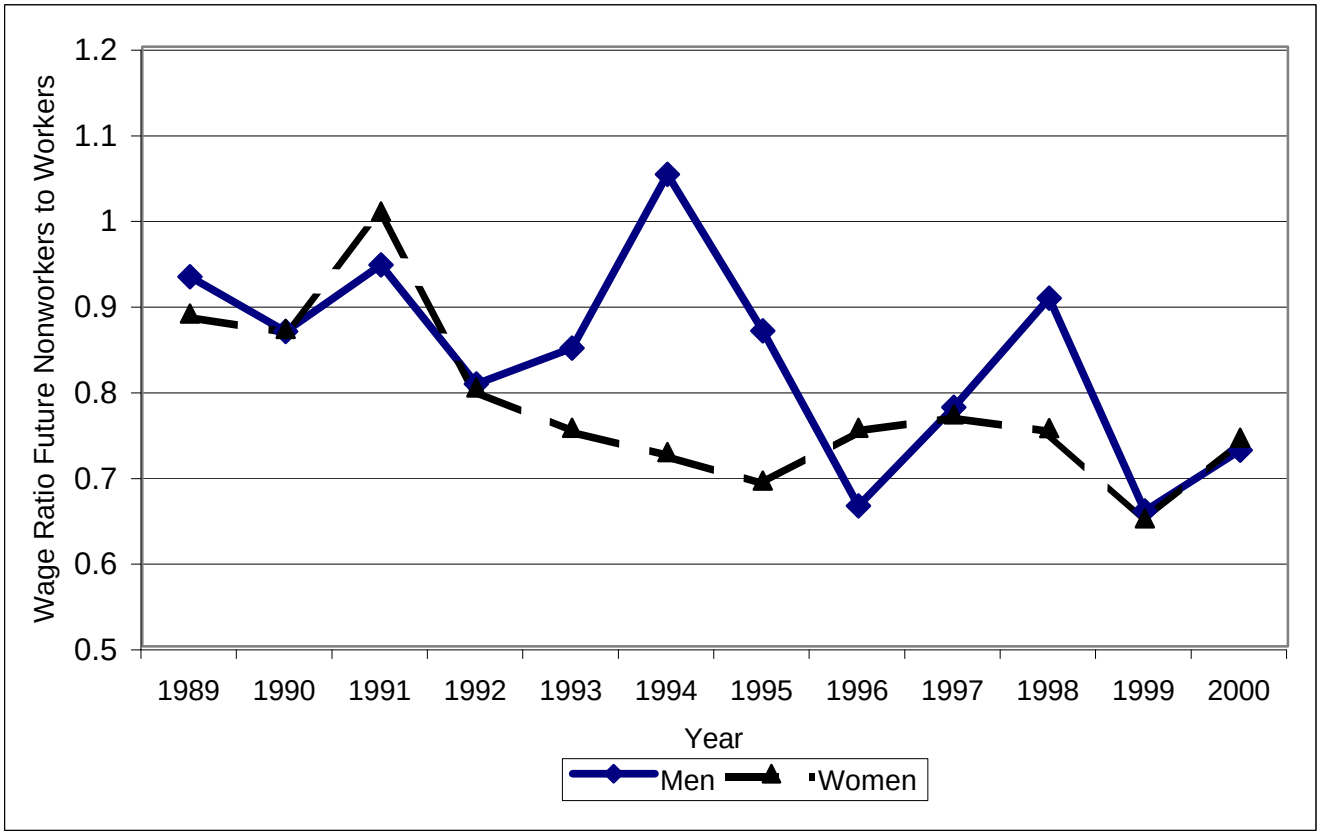


Figure 8: Comparison of Wages for Workers and Future Nonworkers



Notes: The figure shows wages of those working in the current year but leaving employment in the following year relative to those remaining employed in both years.

Figure 9: Gender Wage Ratio under Median Assumption

Notes: The figures report relative wages across the two age groups. Calculations are based on log hourly wages (actual) and predicted hourly wages from a selected corrected wage equation, whose first stage is reported in Table A1 in the appendix (column (2) for men and (4) for women). The second-stage wage equation contains controls for education, age, state and year dummies, marital status, months unemployed last year, whether the person is living in West Germany as well as a truncated polynomial of the selection probability from the first stage.

Figure 10: Gender Wage Ratio Using Semiparamteric Selection Model