Gender Inequality in Education and Employment: China's Urban Labor Markets in Transition, 1982-2005 ${ }^{1}$

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#### Abstract

(Abstract) This paper examines the trend in gender inequality in educational attainment and nonagricultural employment in China's transitional urban labor markets in the 1990s. Based on the analyses of the micro-sample data from the 1982, 1990 and 2000 population censuses and from the 2005 mini-census, we found that: (1) gender gap in education, though still existing, has been substantially reduced due to the educational expansion in the 1990s; (2) unlike what have been found in other countries, increase in women's education in China did not lead to higher labor force participation rate. Instead, women's employment rate drops over time, though not as dramatically as does men's; (3) despite the fact that education increases in the likelihood of employment, such effect has declined over time for both men and women; (4) marriage has different effect on the employment for men and women. While married men are more likely to hold employment than non-married men, married women are less likely to do so than nonmarried women; among married women, those with birth in the previous year are less likely to hold employment over time. The evidence suggests a return to traditional gender roles that used to be reshaped by the socialist ideology on gender equality. We conclude that such entry and exit mechanisms need to be included in the examination of the gender earnings inequality in urban China's transitional labor markets.


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## Introduction

Gender inequalities in education, employment, and earnings have been widely documented by social scientists in western societies (Reskin 2003). Scholars have referred to some specific institutional arrangements, such as occupational segregation, welfare state, family responsibility and gender role, to explain how gender inequality actually works (e.g.,. Roos 1983; Reskin 1991; Petersen and Morgan 1995; Beggs 1995; Morris and Western 1999; Grusky and Charles 2001).

This paper extends the analysis of the gender processes in urban China undergoing a dramatic institutional transition from state socialism and market capitalism as well as economic industrialization and social modernization. Specifically, we raise research questions in two contexts: the expansion of education and reduced gender gap in educational attainment; the transformation of urban China's labor markets. On the one hand, a substantial number of literatures have reported the decreasing gender gap in school enrollment and educational attainment in China (Bauer et al. 1992; Lavely 1990; Hannum 2005). This trend has been reconfirmed with both the census and survey data (National Bureau of Statistics 2005), consistent with secular trends experienced in developed countries.

Empirical analyses of gender inequality in earnings in context of China's market transition have found little change over time (Shu and Bian 2003). This remains a puzzle given the fact that substantial changes in inequality patterns that are well documented by the literature in the market transition debate, and especially the increasing effects of human capital on earnings (e.g., Wu 2002; Wu and Xie 2003). Analyses of the data in the 1980s in China have also shown that the rise of female education lead to employment in more high-status occupations (Bauer 1992). Indeed, occupational gender segregation is found to decline from 1990 to 2000 ( Wu and Wu 2008). If occupational segregation is an important mechanism in creating earnings inequality between men and women in the labor markets, one would expect the gender gap in earnings to be declining in urban China, as observed in most other countries.

On the other hand, the institutional transition to market economy has gradually dismantled the socialist ideology aiming to promote gender equality. Privatization and the profit motive may have created incentive for discrimination based on gender (Zhang, Hannum and Wang 2008). Therefore, with more workers transferring from the state to the market sectors, one would expect the gender gap in earnings to be increasing over time in China (Gustafsson and Li 2000).

This paper brings into an attention of a key process in examining the linkage between the change in gender educational gap and earnings gap: labor force participation or employment. We place the change in gender labor force participation in the context of transition of China's labor markets and investigate the determinants of employment. Beginning in the late 1980s and early 1990s, China's urban labor markets have been undergoing a fundamental transformation. The permanent employment system under state socialism was ceased and layoff and unemployment rate increased. The job opportunities for new graduates have also been squeezed. Even university graduates now face great challenges in getting a job. Over time, urban China's labor force
participation has decreased dramatically. Such a drop may vary by different social groups. The purpose of this paper is to document such a trend, focusing on the gender gap, and its implication for labor market inequality.

## Data, Variables, and Methods

We analyze the micro-sample data from Chinese population census, 1982, 1990, and 2000 and the mini-census in 2005: 1 per thousand samples for the census data and 0.2 per thousand for the mini-census data. We restrict the sample to those with urban nonagricultural occupations whose ages are between 20 and 54 years old and students in school. We limit the age under 55 because the official retirement age for women is 54 in urban China and gender difference is of the research interest in this paper..

Despite the changing questions on employment status in different waves of censuses, employment status is coded as 1 if the respondent has a job and 0 otherwise. This is the key dependent variable we would like to look at.

The independent variables include gender, education, cohort, and marital status. Gender is a dummy variable (female $=1$ ). Education is coded in 4 levels: $1=$ primary school or below; $2=$ junior high school; $3=$ senior high school; $4=$ college or above. We also code age into 7 groups: $20-24,25-29,30-34,35-39,40-44,45-49$, and 50-54. Marital status is coded as a dummy variable (currently married=1).

In multivariate analysis, we employ binary logit models to examine the determination of employment, namely,

$$
\ln \frac{p}{1-p}=\alpha+\beta^{\prime} X
$$

where $p$ is the probability of participation, X is the vector of independent variables and $\beta^{\prime}$ is the vector of estimated coefficients. To examine the temporal trend, the model can be expressed equivalently as

$$
\ln \frac{p}{1-p}=\alpha+\beta^{* \prime} X+\delta^{\prime} S,
$$

where $S=t X, t$ is a set of scalar dummy variables indicating the census years, and $\delta$ is a vector of parameters representing the interaction effects between independent variables and time $(t)$ (Wooldridge 2003, Chapter 13).

Because the sample was clustered within city districts/counties, an adjustment of standard errors is needed in regression analyses. All the models reported were estimated using Stata 10.0, with robust standard errors corrected for clustering on sampling units (districts/counties).

In the following, we first describe the general trends in gender gap in education and labor force participation, then model determinants of employment for men and women in each years (1982, 1990, 2000, and 2005). To examine the temporal trend in gender difference in employment, we pool the data from the four years together, and estimate models with interaction terms between year and gender. We also examine the changing role of education in determining employment over time for males and for females separately. Finally, we focus on the factor of family responsibility (birth) in determining employment for married women.

## Descriptive Results

Table 1 shows the gender gaps in educational attainment beyond the 9 -year compulsory education in urban China from 1982-2005. This is the period when China's education has been expanded (secondary school in the 1980s and 1990s and tertiary school since the later 1990s). In urban areas, the gender gap is mainly in tertiary education, which has been decreasing dramatically (the odds ratio drops from 2.1 in 1982 to 1.3 in 2005).

## [Table 1 about here]

The expansion in education is said to bring into higher rate of labor force participation, especially for women, as observed in other countries. This does not happen in China. As see in right two columns of Table 2, the national rate of labor force participation drops from 97.8 percent to 92.1 percent for men and 82.9 percent to 77.0 percent for women. If rural residents who typically have a higher rate of participation in agriculture are excluded, the changes are even more evident: the urban labor force participation rate drops from 96.5 percent in 1982 to 86.4 percent in 2000 for men and from 79.4 percent to 62.2 percent for women.
[Table 2 about here]
If we restrict the sample to those who are aged between 20 and 54 years old and have completed school and plot the rate by age, in a life course perspective, such trend in gaps over time becomes even more evidence. First, the lines for 1982 and 1990 are quite close, and the lines for 2000 and 2005 are quite close, suggesting the fundamental changes of the urban labor market in the 1990s. Second, there is a consistent gender gap, which seems to be enlarging for young women. Finally, the turning point for participation rate is around 50 for men and 45 for women in the 1980s, even the official retirement age is 60 for men and 55 for women in China. In 2000 and thereafter, the turning point has moved to even younger age for both men and women.
[Figure 1 about here]
Table 3 provides descriptive statistics for variables included in the analysis. Overall, the employment rate drops from 88.7 in 1982 to 73.5 in 2005. On the other hand, people with college education increased from 4.2 percent to 17.5 percent in urban areas.
[Table 3 about here]

## Research Findings for Multivariate Analysis

In Table 4, we run binary logit model for men and women separately for each year. Models 1 to 4 include gender, education, marital status and cohort only, whereas Models 1a to 4a add the interaction terms between gender and education, and gender and marital status. Results show that 1) there is a consistent gender gap in all years;
2) education promotes employment, and especially for women
3) married people are more likely to be employed, but further analysis shows this is true only for men. Married women are less likely to be employed.
[Table 4 about Here]

In Table 5, we pool the data together and specifically test the temporal trend. Model 1 shows that the likelihood of having a job declines over time, but the gender gap was relatively reduced, as indicated by the positive coefficients of the interaction terms between gender and year in Model 2. These results suggest that, while the employment rate drops for both men and women, men's reduction is even more greater than women's, given the fact that almost 100 percent men of the given age held employment when the reform started.

## [Table 5 about Here]

Table 6 further shows that, among those who retreated from the employment, more and more of them indeed hold higher education, as indicated by the negative coefficients of the interaction terms between education and years.
[Table 6 about here]
Table 7 tabulates the reasons for those who do not work. There is a clear gender difference: while a large proportion of men said that they are laid off/unemployed (still in labor force looking for jobs), majority of women are doing household work (retreating from the labor force). Such percentages are even higher in 2000 and 2005 than in 1982 and 1990. Therefore, when employment opportunities become squeezed when China's urban reform proceeded further in the 1990s, leading to high rate of unemployment, women tend to withdraw from the labor force and assume their traditional role and become household wives. The female labor force participation rate that was artificially brought up by the socialist gender ideology now regresses to the level close to the Chinese/Asian societies with similar cultural tradition (Hong Kong, Taiwan, Korea and Japan).

$$
\text { [Table } 7 \text { about Here] }
$$

To further explore the trend, we estimate the model for married women only. In addition to the variables included in the previous analysis, whether she had birth in the previous year of the census/survey years are also included in the model. Model 7a shows that the birth event has negative impact on employment/labor force participation. Model 7b, with interaction terms between birth event and years, further demonstrates that such event becomes more and more important in determining whether women would withdraw from the labor market and take care of the family.

$$
\text { [Table } 8 \text { about Here] }
$$

## Summary and Conclusions

1. Gender gap in education is reduced since the 1980s;
2. While education promotes labor fore participation, especially for women, the labor force participation rate decline for both men and women because of fundamental changes in labor market reforms in the 1990s. The gender gap in labor force participation declines.
3. Marriage play different role in determining labor force participation for men and for women. Having a birth event in previous year negatively affects the likelihood of employment, and such an effect increases over time, suggesting Chinese women are returning to the traditional gender role to some extent.
4. Despite the expansion of education for women, there is a gender counter-revolution in China's labor market reform since the 1990s. To what extent this process will affect
gender inequality in the labor market outcomes such as earnings need further investigation.

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Table 1: Gender Gap in Educational Attainment, Urban China from 1982 to 2005

|  | Senior HS |  | or above $\%$ | Senior High School $\%$ |  | College or above $\%$ |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Men | Women | Men | Women | Men | Women |  |
| 1982 | 29.4 | 26.0 | 24.0 | 23.3 | 5.4 | 2.7 |  |
| 1990 | 38.9 | 33.3 | 29.5 | 28.4 | 9.4 | 4.9 |  |
| 2000 | 46.3 | 40.2 | 30.2 | 29.0 | 16.2 | 11.2 |  |
| 2005 | 47.2 | 40.6 | 27.7 | 25.0 | 19.5 | 15.5 |  |

Table 2. Gender Gap in Labor Force Participation Rate, 1982-2005

|  | Urban \% |  |  | National \% |  |
| :--- | :--- | :---: | :--- | :---: | :---: |
|  | Men | Women | Men | Women |  |
| 1982 | 96.5 | 79.4 | 97.8 | 82.9 |  |
| 1990 | 94.7 | 76.4 | 97.8 | 87.3 |  |
| 2000 | 86.3 | 63.9 | 93.8 | 82.1 |  |
| 2005 | 86.4 | 62.2 | 92.1 | 77.0 |  |

Table 3: Descriptive Statistics for Selected Variables Included in Analysis, 1982-2005

| Variables | 1982 | 1990 | 2000 | 2005 |
| :--- | :---: | :---: | :---: | :---: |
| Labor force participation | 0.887 | 0.862 | 0.749 | 0.735 |
| Female | 0.455 | 0.468 | 0.495 | 0.496 |
| Education |  |  |  |  |
| $\quad$ Primary School or lower | 0.354 | 0.226 | 0.145 | 0.134 |
| Junior high school | 0.368 | 0.411 | 0.421 | 0.427 |
| Senior high school/technical | 0.237 | 0.290 | 0.297 | 0.264 |
| College or higher | 0.042 | 0.073 | 0.138 | 0.175 |
| Age group |  |  |  |  |
| 20-24 | 0.179 | 0.188 | 0.130 | 13.7 |
| $25-29$ | 0.208 | 0.202 | 0.181 | 14.8 |
| $30-34$ | 0.159 | 0.166 | 0.184 | 17.6 |
| $35-39$ | 0.120 | 0.154 | 0.173 | 16.9 |
| $40-44$ | 0.120 | 0.112 | 0.128 | 15.1 |
| $45-49$ | 0.119 | 0.089 | 0.120 | 11.5 |
| $50-54$ | 0.096 | 0.090 | 0.089 | 10.6 |
| Marital Status (married=1) | 0.787 | 0.811 | 0.818 | 0.819 |
| Number of Cases | 84,508 | 153,239 | 233,920 | 83,909 |

Table 4. Binary Logit Model Predicting the Likelihood of Having a Job, Men and Women in Urban China (1982-2005)

|  | 1982 |  | 1990 |  | 2000 |  | 2005 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Model 1 | Model 1A | Model 2 | Model 2a | Model 3 | Model 3a | Model 4 | Model 4a |
| Female | -2.064 | -0.850 | -1.774 | -0.745 | -1.289 | -0.596 | -1.415 | -0.563 |
| Education Primary s [omitted] |  |  |  |  |  |  |  |  |
| Junior high s | 1.512 | 0.962 | 1.380 | 0.940 | 0.254 | $-0.029^{\text {d }}$ | 0.087 | $-0.031{ }^{\text {f }}$ |
| Senior high s | 2.160 | 1.540 | 2.217 | 1.408 | 0.729 | 0.120 | 0.293 | $-0.091{ }^{\text {f }}$ |
| College or above | 3.151 | 2.393 | 3.368 | 2.789 | 1.923 | 1.153 | 1.489 | 0.911 |
| Married (yes=1) | 0.403 | 1.684 | 0.455 | 1.694 | 0.233 | 1.041 | 0.186 | 1.018 |
| Age 20-24 [omitted] ${ }^{\text {c }}$ |  |  |  |  |  |  |  |  |
| 25-29 | 0.166 | 0.213 | 0.099 | 0.168 | $-0.013^{\text {c }}$ | $0.053{ }^{\text {d }}$ | $-0.031^{\text {e }}$ | $0.022^{\text {f }}$ |
| 30-34 | 0.439 | 0.451 | 0.580 | 0.627 | -0.028 ${ }^{\text {c }}$ | $0.009{ }^{\text {d }}$ | $0.007{ }^{\text {e }}$ | $0.035^{\text {f }}$ |
| 35-39 | 0.527 | 0.533 | 0.906 | 0.968 | -0.061 | -0.035 | $0.006{ }^{\text {e }}$ | $0.015^{\text {f }}$ |
| 40-44 | 0.320 | 0.331 | 0.709 | 0.743 | -0.207 | -0.192 | -0.183 | -0.181 |
| 45-49 | -0.344 | -0.365 | -0.005 ${ }^{\text {a }}$ | $-0.019^{\text {b }}$ | -0.539 | -0.541 | -0.690 | -0.704 |
| 50-54 | -1.588 | -1.735 | -1.135 | -1.310 | -1.381 | -1.448 | -1.535 | -1.608 |
| Interaction terms | - |  |  |  |  |  |  |  |
| Women*junior high s | - | 0.705 | - | 0.564 | - | 0.342 | - | $0.082^{\text {f }}$ |
| Women*senior high s | - | 0.698 | - | 1.076 | - | 0.863 | - | 0.052 |
| Women*college | - | 1.072 | - | 1.388 | - | 1.152 | - | 0.804 |
| Women*married | - | -1.964 |  | -2.076 | - | -1.478 | - | -1.440 |
| Constant | 2.369 | 1.715 | 1.298 | 0.870 | 1.406 |  | 1.713 | 1.322 |
| Pseudo R ${ }^{2}$ | 0.286 | 0.304 | 0.257 | 0.281 | 0.130 | 0.146 | 0.140 | 0.156 |
| N | 84508 |  | 153239 |  | 233920 |  | 83909 |  |

Notes: standard errors are omitted to conserve space here. Except otherwise marked, all coefficients are statistically significant at .01 .
a. $p$ value is 0.883 ;
b. $p$ value is 0.590 ;
c $p$ values are 0.534 and 0.207 , respectively;
d. $p$ values are 0.682 and 0.120 , respectively;
e. $p$ values are $0.402,0.850$, and 0.878 , respectively;
f $p$ values are $0.654,0.065,0.548,0.330,0.675$ and 0.136 , respectively;

Table 5. Binary Logit Model Predicting the Likelihood of Having a Job, Men and Women in Urban China (1982-2005)

|  | Model 5 | Model 5a |
| :---: | :---: | :---: |
| Female | -1.459 | -1.980 |
| Education (primary school [omitted] |  |  |
| Junior high | 0.672 | 0.669 |
| Senior high | 1.123 | 1.126 |
| College or above | 2.258 | 2.251 |
| Age (20-24 [omitted]) |  |  |
| 25-29 | 0.063 | 0.062 |
| 30-34 | 0.142 | 0.141 |
| 35-39 | 0.151 | 0.149 |
| 40-44 | $-0.301^{\text {a }}$ | $-0.031^{\text {b }}$ |
| 45-49 | -0.483 | 0.480 |
| 50-54 | -1.433 | -1.436 |
| Married | 0.274 | 0.273 |
| Year (1982 [omitted]) |  |  |
| 1990 | -0.437 | -0.647 |
| 2000 | -1.420 | -1.913 |
| 2005 | -1.500 | -1.922 |
| Interaction |  |  |
| 1990*women |  | 0.274 |
| 2000*women |  | 0.681 |
| 2005*women |  | 0.571 |
| Constant | 2.480 | 2.873 |
| Pseudo R ${ }^{2}$ | 0.185 | 0.187 |
| N | 555576 |  |
| Standard errors are omitted to conserve space. Except for otherwise noted, all coefficients are statistically significant at .05 .$\begin{aligned} & \mathrm{a} \mathrm{p}=0.064 \\ & \mathrm{~b} . \mathrm{p}=0.064 \end{aligned}$ |  |  |

Table 6. Binary Logit Model Predicting the Likelihood of Having a Job, Men and Women in Urban China (1982-2005)

|  | Men | Women |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Model 6a | Model 6b | Model 6c | Model 6d |
| Education (primary school [omitted] |  |  |  |  |
| Junior high | 0.307 | 0.893 | 0.768 | 1.676 |
| Senior high | 0.464 | 1.341 | 1.384 | 2.172 |
| College or above | 1.458 | 2.430 | 2.632 | 3.440 |
| Age (20-24 [omitted]) |  |  |  |  |
| 25-29 | 0.168 | 0.173 | 0.129 | 0.129 |
| 30-34 | -0.070 | -0.053 | 0.290 | 0.313 |
| 35-39 | -0.161 | -0.129 | 0.323 | 0.379 |
| 40-44 | -0.346 | -0.303 | 0.134 | 0.207 |
| 45-49 | -0.549 | -0.520 | -0.456 | -0.394 |
| 50-54 | -1.427 | -1.404 | -1.664 | -1.602 |
| Married | 1.289 | 1.285 | -0.477 | -0.503 |
| Year (1982 [omitted]) |  |  |  |  |
| 1990 | -0.554 | -0.554 | -0.414 | -0.523 |
| 2000 | -1.746 | -1.126 | -1.350 | -0.683 |
| 2005 | -1.752 | -1.060 | -1.468 | -0.509 |
| Interaction |  |  |  |  |
| 1990*Junior high | - | -0.149 | - | -0.307 |
| 1990*Senior high | - | -0.196 | - | 0.142 |
| 1990*College or above | - | $0.147^{\text {a }}$ | - | 0.598 |
| 2000*Junior high | - | -0.894 | - | -1.386 |
| 2000*Senior high | - | -1.173 | - | -1.227 |
| 2000*College or above | - | -1.245 | - | -1.113 |
| 2005*Junior high | - | -0.870 | - | -1.612 |
| 2005*Senior high | - | -1.377 | - | -1.754 |
| $2005 *$ College or above | - | -1.444 | - | -1.710 |
| Constant | 2.465 | 2.083 | 1.431 | 1.117 |
| Pseudo R ${ }^{2}$ | 0.111 | 0.115 | 0.163 | 0.174 |
| N | 286651 |  | 267825 |  |

Standard errors are omitted to conserve space. Except for otherwise noted, all coefficients are statistically significant at .05 .
${ }^{\text {a. }}$ Here $p=0.623$.

Table 7. Reason for Not Working, Men and Women 1982-2005

|  | 1982 |  | 1990 |  | 2000 |  | 2005 |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | men | women | men | women | men | women | men | Women |
| Household work | 4.7 | 71.8 | 3.3 | 70.5 | 7.8 | 81.1 | 6.8 | 76.0 |
| Unemployed/layoff | 19.9 | 4.3 | 55.3 | 8.3 | 35.1 | 7.0 | 25.3 | 5.9 |
| Retired/quit | 36.7 | 21.1 | 21.6 | 17.4 | 8.4 | 1.6 | 3.2 | 0.7 |
| Others | 38.7 | 2.7 | 39.7 | 3.8 | 48.6 | 10.3 | 64.7 | 17.4 |
| Total | 100.0 | 99.9 | 99.0 | 100.0 | 99.0 | 100.0 | 100.0 | 100.0 |
| N | 1626 | 7930 | 4336 | 16828 | 5490 | 19887 | 1784 | 6103 |

Table 8. Binary Logit Model Predicting the Likelihood of Having a Job for Married Women in Urban China, 1982-2005

| Urban China, 1982-2005 |  |  |
| :--- | :---: | :---: |
| Education (primary school [omitted] | Model 7a | Model 7b |
| Junior high | 0.750 |  |
| Senior high | 1.458 | 0.745 |
| College or above | 2.924 | 1.453 |
| Age (20-24 [omitted]) |  | 2.930 |
| $25-29$ | 0.336 |  |
| $30-34$ | 0.448 | 0.333 |
| $35-39$ | 0.459 | 0.448 |
| $40-44$ | 0.263 | 0.457 |
| $45-49$ | -0.314 | 0.262 |
| $50-54$ | -1.519 | -0.313 |
| Birth in previous year | -0.696 | -1.516 |
| Year (1982 [omitted]) |  | -0.322 |
| 1990 | -0.377 |  |
| 2000 | -1.408 | -0.358 |
| 2005 | -1.541 | -1.371 |
| Interaction |  | -1.490 |
| $1990^{*}$ birth | - |  |
| $2000 *$ birth | - | -0.261 |
| $2005 *$ birth | - | -0.507 |
| Constant | 0.863 | -0.909 |
| Pseudo R ${ }^{2}$ | 0.168 | 0.835 |
| N |  | 0.168 |

Figure 1. Age-Specific Labor Force Participation Rate in Urban China, 1982-2005



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