

2012

Changes in the Effects of Determinants of Earnings Inequality and Their Labor Implications in Urban China, 1988 - 2002

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Recommended Citation

Mercado, Maira T., "Changes in the Effects of Determinants of Earnings Inequality and Their Labor Implications in Urban China, 1988 - 2002" (2012). *CMC Senior Theses*. Paper 340.
http://scholarship.claremont.edu/cmc_theses/340

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CLAREMONT McKENNA COLLEGE
CHANGES IN THE EFFECTS OF DETERMINANTS OF EARNINGS INEQUALITY
AND THEIR LABOR MARKET IMPLICATIONS IN URBAN CHINA, 1988 - 2002

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FOR
SENIOR THESIS
SPRING 2012
APRIL 23, 2012

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Abstract

This study seeks to analyze the changes in the effects of determinants of earnings inequality and their labor market implications in urban China from 1988 to 2002. It analyzes urban individual data from the 1988, 1995, and 2002 surveys of the China Household Income Project by studying its inequality measures and summary statistics, and by conducting an ordinary least squares regression, quantile regression, and regression-based decomposition analysis. It finds that the labor market has indeed been rewarding human capital variables, in which age and work experience, which are related to seniority, have been decreasing in their contribution to earnings inequality, whereas education and skill-based occupation have been increasing their contributions to earnings inequality. In addition, the labor market has become more discriminatory in terms of gender, which has increased its contribution to earnings inequality, and less discriminatory in terms of minority status and Communist party membership, which have decreased their contributions to earnings inequality. The labor market has also become more segmented in terms of work unit sector, which has increased its contribution to earnings inequality, but has also become less segmented in terms of ownership, which has actually started to contribute to earnings equality. These observations show that urban China's labor market has been becoming more market-oriented and has been progressing overall, except for its increasing gender discrimination and segmentation by sector.

I. Introduction

This study aims to analyze the changes in the effects of determinants of earnings inequality in urban China and their labor market implications during the fourteen-year period from 1988 to 2002. China, the world's most populous country with the world's second largest economy, has had a 10% average growth rate per year from 1978 to 2005, according to official statistics, which have occurred as a result of market reforms that began in 1978. It has also experienced increased urbanization and has a large, relatively young workforce. However, its GDP was one-fifth the size of the United States GDP in 2007, despite having a population that is four times larger (Naughton, 2007). And although standards of living have greatly improved in urban China as a result of increased earnings, there has been an increasing disparity in earnings, even if it has been increasing at a decreasing rate (Cai, Chen, and Zhou, 2010). Deng and Li (2009) found that the gini coefficient, which is one of the main measures of inequality, of urban China has risen from 0.235 in 1988 to 0.302 in 1995 to 0.342 in 2002. Compared to the U.S.'s gini coefficient of 0.408 in 2000, however, this may not seem too alarming; nevertheless, urban China has been experiencing increasing earnings inequality for a long period. Knight and Song (2003) state that China's rapid economic growth may have increased the scarcity of skilled labor

and widened the wage structure, but Cai et al. (2003) argue that the increase in university education in 1998 may have lessened this effect by increasing the supply of skilled workers. They also attribute the influx of workers from the rural parts of China to the depressing of earnings at the lower income groups, since they are competing with urban workers for the same jobs.

Kuznets argued that inequality would increase in the initial stage of development in a country, but that it would decrease in subsequent stages, since growth in certain economic pockets would spread to other parts of the economy (Naughton, 2007). However, Naughton (2007) argues that China's large size and geographic diversity can limit these spillovers, since foreign trade and investment is predominant in coastal cities. As a result, this can help explain why China is still experiencing increasing earnings inequality for the past 30 years. Asuyama (2008) also explains that increasing earnings inequality could signal a move towards a labor market that rewards efficiency, and that it is only problematic if it creates labor market segmentation or if it generates unequal earnings opportunities.

This study analyzes the urban individual data from the 1988, 1995, and 2002 surveys of the China Household Income Project, which was interview-based and was conducted during these three years across the eleven urban provinces of China, and which aimed to measure and estimate the distribution of income in both rural and urban parts of China (Griffin and Renwei, 2010). From these surveys, this study analyzes earnings inequality measures and summary statistics, an ordinary least squares (OLS) regression, a quantile regression, and a regression-based decomposition, in order to explore the changes in the effects of determinants on earnings and earnings inequality in urban China and their labor market implications.¹

¹ These methods will be further explained in the theory and methods section.

Although earnings inequality has also increased between rural and urban areas, this study will focus on earnings inequality within the urban market, since it is rapidly expanding; urban parts of China held 43% of China's population in 2005, migration from the rural parts has increased, and cities and new urban settlements have expanded and developed (Naughton, 2007). This study will also focus on the period from 1988 to 2002, which encompasses both the period of early reforms and of later reforms in urban China, which began in 1978. Following Gustafsson and Shi's explanation of the Chinese system of earnings, earnings are defined as basic wages, bonuses, subsidies, allowances, and other cash income from an individual's work unit, instead of only basic wages, since work units provide further services to its employees (2001). Determinants of earnings and earnings inequality include age, years of work experience, and binary variables within the categories of gender, minority status, Communist party membership, educational level, occupation, work unit ownership form, and work unit sector. Knight and Song (2003) categorized these determinants into discriminatory variables, including gender, minority status, and Communist Party membership; segmentation variables, including work unit ownership form and sector; and human capital variables, including age, work experience, educational level, and skill-based occupation.

Overall, this study aims to understand the evolving nature of earnings inequality in urban China in order to determine if it is a natural consequence of market reforms, which would be reflected by an increase in the labor market's rewards for human capital variables, or if it needs to be addressed, which would be reflected if the labor market is experiencing earnings discrimination or segmentation. It finds that the labor market has indeed been rewarding human capital variables, in which age and work experience, which are related to seniority in a workplace, have been decreasing in their contribution to earnings inequality, whereas education and skill-based occupation have been increasing their contributions to earnings inequality. In

addition, the labor market has become more discriminatory in terms of gender, which has increased its contribution to earnings inequality, and less discriminatory in terms of minority status and Communist party membership, which have decreased their contributions to earnings inequality. The labor market has also become more segmented in terms of work unit sector, which has increased its contribution to earnings inequality, but has also become less segmented in terms of ownership, which has actually started to contribute to earnings equality. These observations show that urban China's labor market has been becoming more market-oriented and has been progressing overall, except for its increasing gender discrimination and segmentation by sector.

II. Urban China's Market Reforms, 1978 – Present

Urban China's market reforms may provide insight into the changes in the effects of determinants of earnings and earnings inequality and their labor market implications. Before 1978, China had a socialist economy controlled by the People's Republic of China, which was established in 1949, and which helped China recover from poverty, war, and civil war (Naughton, 2007). Starting in 1978, China embarked on a strategy of incremental reforms and steady economic progress in its urban parts, which have improved living standards and social stability.

During the early period of reforms, from 1978 to the early 1990's, the command economy began to slowly transition into a market-type economy; the government increased competition, diversified ownership, and introduced new markets. Governmental authority and resources were decentralized in order to foster this change, and the state began to introduce unregulated sectors into the economy, including nonstate firms, such as foreign and joint venture firms, which also helped bring in external technologies and further investment in China. The

state also instigated competition by allowing foreign firms to enter newly created special economic zones, especially in agriculture and manufacturing. Instead of dramatically shifting to a privatized economy, the government focused on increasing competition and on monitoring the performance of state-owned enterprises, or SOE's. In addition, instead of immediately switching from government set prices to market prices, the government established a dual-track system, in which a product had a low state-planned price if it was produced to meet government-mandated output levels, or a higher market price if it was produced above these output levels for the market. The government also shifted its focus away from the energy and natural resources sectors, which had large economies of scale, to low-technology, labor-intensive consumer goods sectors (Naughton, 2007).

This period was also known as the period of “reform without losers” since SOE workers, who made up the largest portion of the labor market, were still protected by the government in terms of employment and wages, especially since SOE's were given soft budget constraints. Knight and Song (2003) explain that during this time, workers were paid according to wage tables or scales, which were usually determined by the worker's occupation, seniority, type of work unit he or she worked for, and the sector that he or she worked in. The share of basic wages as part of an individual's earnings, which were derived from these wage tables, decreased after 1978 as bonuses and subsidies grew in importance. As a result, earnings, which began to include bonuses, began to reflect a worker's performance.

Also during this period, urban workers obtained privileges if they had an urban hukou, or residence permit, that guaranteed membership in a danwei, or work unit, that not only provided a worker with wages, but also provided them with subsidies, bonuses, and other services and benefits, including job security, access to food grains, staple foods, other scarce commodities, health care, pension and other benefits upon retirement, primary and middle school education for

their children, and low-cost housing. However, due to urbanization, many workers from rural areas migrated to work in the cities, and many were not provided with urban hukou status since they had rural hukou status and, thus, they did not receive these privileges (Naughton, 2007).²

The later period of reforms, which began in the 1990's, and which are still in effect, involved contracting the state sector and expanding the private sector and global trade, developing financial and regulatory institutions in order to level the playing field for firms, and increasing the efficiency of the labor market. This era was known as the period of "reform with losers," since many SOE workers were laid off from underperforming firms, which were given harder budget constraints, and since the state sector was less sheltered from competition (Naughton, 2007). In addition, the planning quota for recruitment by state enterprises was abolished, which allowed them to choose their employees, which helped increase labor mobility (Knight and Song, 2003). In contrast to its decentralizing efforts during the earlier period, the central government recentralized in this period in order to strengthen its regulatory and macroeconomic management functions in order to promote macroeconomic conservatism and stability. During this period, a new foreign trade system was established, and the new Company Law, which was made effective in 1994, reorganized SOE's as limited-liability corporations; as a result, state-owned enterprises became responsible for their own profits and losses. Newly opened stock markets also grew during the late 1990's, and China entered the World Trade Organization in 2001, which increased its openness to the world market (Naughton, 2007).

In addition, starting in 1995, wages started to depend on the profitability of the worker's work unit, in addition to wage scales, which has, therefore, increased the efficiency of the labor

² The 1988, 1995, and 2002 surveys unfortunately do not provide information regarding a worker's migrant status, especially since the surveys were only distributed to individuals who live in registered households, and many migrants do not live in registered households in the cities. The 1988 survey did not include any questions regarding a worker's hukou status, and the 1995 and 2002 survey data did not include observations related to a worker's hukou status due to statistical software package limitations.

market. Subsidies, which were set by the government, also decreased after 1988 (Appleton, Song, and Xia, 2005). As a result, during this period of reform, which is reflected in the 1995 and 2002 surveys, earnings began to reflect market earnings, which may predict increasing returns for human capital variables. However, Knight and Song (2003) explain that by 1995, the state sector was still dominant and labor turnover was still low, which has hampered labor mobility, and which has increased the risk of labor market segmentation.

As a result of these market reforms, prices were unified and stable at market prices and goods were produced in surplus without causing economic disruption and social instability, which occurred in other formerly socialist countries in Eastern Europe and Russia. China was able to do this by following a dual-track plan where growth coexisted with the command economy, and where the economy eventually grew out of the plan as the government did not increase its influence or output requirements. However, Naughton (2007) argues that the benefits of the reforms need to be spread, such as by helping employ the unemployed who were laid off from failing firms, especially since work units, not the government, provide social services. Naughton also argues that pension and health-insurance programs need to become more adequate, that the government should protect underprivileged and vulnerable groups, and that the government should promote more education and technology, especially since it used to provide a basic education for everyone during its former command economy.

Overall, urban China's economy has become more competitive, less government-controlled, and more diverse in terms of occupation, ownership form, and sector; these changes have resulted in a market-like economy that has been starting to reward human capital variables, especially since wages have started to be based on a work unit's profitability, and, in turn, a worker's performance and skills, as opposed to prescribed wage scales. It would be interesting to see these changes after analyzing the 1988, 1995, and 2002 survey data. And since the 1988

survey was conducted during the early period of reforms, it would be interesting to see if earnings rewarded human capital variables less in 1988 than in 1995 and 2002, since earnings eventually became less dependent on wage scales over time.

III. Previous Studies on the CHIP: Literature Review

There are various studies that have analyzed the China Household Income Project (CHIP), which includes the 1988, 1995, and 2002 surveys, and they provide valuable information and conclusions with regards to earnings inequality and changes in the effects of determinants of earnings and earnings inequality in urban China from 1988 to 2002. However, they have each defined earnings differently, such as by income or wages, and have approached the individual urban data, as well as the household urban data, with different analyses. Gustafsson and Shi (2001) analyzed the 1988 and 1995 urban household surveys and found increasing earnings from 1988 to 1995, as well as increasing earnings inequality after analyzing Lorenz curves, which measure earnings inequality. Asuyama (2008) studied the 1988, 1995, and 2002 urban individual surveys and confirmed that real earnings did increase in all wage groups, including the lowest-wage group (Asuyama, 2008). Knight and Song (2003) also calculated several wage inequality measures and found a widening dispersion of wage inequality, as exemplified by the observation that the pay of the 10th percentile of the wage distribution rose by 6%, as opposed to the 75% increase of pay at the 90th percentile. Cai et al. (2010) determined from Lorenz curves of earnings data from the Urban Household Income and Expenditure Survey of 1992 - 2003 that wage inequality has been increasing from 1992 to 2003, but at a decreasing rate. As a result, many studies have found increasing earnings, as well as increasing earnings inequality, at a decreasing rate, in urban China.

Liu (2003) states the hypothesis that returns to both education and experience should increase with the transition from a state socialist redistributive economy, where wages are set and labor is allocated in an administrative way, to a market economy, where rewards are provided according to productivity, which is increased by education level and accumulation of skills and experience. This can be applied to urban China. Through an OLS regression, quantile regression, and regression-based decomposition analysis, Knight and Song (2003) found that from 1988 to 1995, productive characteristics, including educational level, age group, and skill-based occupation, were rewarded as market reforms occurred, but that segmentation variables, including ownership of work unit, and discrimination variables, including Communist party membership, gender, and minority status, also resulted in higher returns. Similarly to their 2003 study, Knight and Song (2008) analyzed the 1995 and 2002 surveys and found that gender discrimination rose again, political discrimination remained constant, and that ethnic discrimination fell. They also found that returns to education and occupational skills continued to rise, suggesting that the labor market might have become more competitive between 1995 and 2002, except for the high degree of segmentation by ownership. Deng and Li (2009) argue that the government should reduce segmentation and make the labor market even more competitive and mobile.

Age and work experience have been studied by previous literature. Liu (2003) analyzed the urban household data from the 1988 and 1995 surveys and found that there has been a decrease in workers under the age of 30 from 1988 to 1995 because many were entering college; they also concluded that a higher age leads to higher wages over time since seniority, or length of service with a work unit, which is positively correlated with age, is important in determining wages. Appleton, Song, and Xia (2005) analyzed urban household data from the 1988, 1995, and 2002 surveys and found that returns to work experience increased between 1988 and 1995

but then decreased afterward in 2002; they explain that this may have happened because experience was over-rewarded before urban China's market reforms, and because a higher level of job insecurity after these reforms may have decreased the wages of experienced workers who worked for enterprises that focused on increasing profitability.

With regards to gender, Appleton et al. (2005) found an increasing gender gap that may be explained by the increasing number of women in the workforce in the lower income groups. Liu (2003) also found a gender gap increase from 1988 to 1995, and attributes this to the fact that the government commanded gender equivalence in terms of work choice and pay before market reforms, but that after market-oriented reforms, the market became stronger in affecting job choice and wage determination for women. Knight and Song (1993) explain that female workers' wages peak and fall earlier than those of men, especially since women tend to retire earlier than men. However, they also determined that higher education protects women against discrimination by providing them access to jobs where there is less discrimination, and that there is less discrimination against women who are part of the Communist Party.

With regards to Communist Party membership and minority status, Appleton et al. (2005) explain that although Communist Party membership used to have a higher earnings premium, which may show the importance of loyalty, power, and patronage on earnings, this premium has decreased from 1988 to 2002. This implies that the labor market may be becoming more efficient by not discriminating as much against non-party members. When explaining the Communist Party membership premium, Knight and Song (1993) explain that Communist Party members are usually highly educated, older, male, employed by the state, and working in professional, managerial and cadre occupations and in the party, government and social organizations sector. They explain further that experience and achievement are important for selection into the Communist Party, and that party members were also better able to keep highly

paid jobs than other workers in 1988. In addition, Appleton et al. (2005) found little or no evidence of increased wage discrimination against ethnic minorities from 1988 to 2002. The government has tried to discourage discrimination based on minority status, and this has most likely been effective.

With regards to education, Appleton et al. (2005) found that returns to education have been rising steadily in urban China from 1988 to 2002. The number of college graduates has also been increasing rapidly (Naughton, 2007). Knight and Song (1993) found that education provided higher returns because it is complementary to on-the-job skill acquisition and because it is used to allocate workers to jobs; better educated workers secure jobs that offer further progress up the institutionally determined wage scales. Knight and Song (2008) explain that quantile differences in the coefficients of an explanatory variable may reveal a relationship between it and unobserved influences, and therefore concluded that the coefficient of education may be greater at higher quantiles of workers' earnings distribution because education and ability might be complementary. Gustafsson and Shi (2001) found that the earnings ratio between people of different levels of education is larger at the bottom of the earnings distribution than at the top of the distribution, which is in contrast to what is observed in many developed economies. Thus, they explain this by stating that higher education in urban China serves more as insurance against receiving low earnings than as a method for obtaining higher earnings.

Previous studies have also analyzed occupation, work unit ownership, and work unit economic sector. With regards to occupation, Liu (2003) found an increase in the number of professional workers and a decrease in the number of laborers, which may indicate a change in the industrial structure where labor-intensive industries are declining and where capital-intensive industries are increasing. In terms of ownership forms, Knight and Song (1993) found that high-paying foreign firms attracted well-educated workers, since many of them need workers with

English language and management skills, and that low-paying private, local firms tended to employ the less-educated and women. Appleton et al. (2005) found that urban collective employment decreased from 1988 to 2002; urban collectives are collectively owned and managed institutions created and managed by cities, counties, towns, and urban neighborhoods, and are responsible for their own profits and losses, which affects the income of their members. Concerning work unit sectors, Asuyama (2008) found that the manufacturing industry declined from 1995 to 2002, and that in 1988, service workers had less earnings, but that these then grew in 2002, since it takes some time to acquire new skills required for a new industry and to change jobs from old to new industries. Deng and Li (2009) also explain that the public services sectors and monopolistic industries, including the financial and insurance services sectors, usually paid more than the competitive sectors, such as the manufacturing and trade sectors.

After conducting a regression-based decomposition, Asuyama (2008) found that work experience was the largest positive contributor to the level of earnings inequality in 1995, that the contributions of education, occupation, and industry increased from 1988 to 2002, that the contribution of Communist Party membership decreased throughout this period, and that the residual was the largest factor. Deng and Li (2009) studied the urban household information data from the 1988, 1995, and 2002 surveys, and after implementing a regression-based decomposition, they found that work experience has reduced its effect on earnings inequality, and that seniority, which is related to age, and occupation almost completely explain earnings inequality in a planned economy, which is slightly similar to that of 1988. These observations will be analyzed further in the regression-based decomposition analysis.

Similarly to Knight and Songs' 2003 and 2008 studies, I will analyze the changes in the effects of determinants of urban earnings inequality in 1988, 1995, and 2002 and their labor market implications, by using an ordinary least squares regression, quantile regression, and

regression-based decomposition analysis. However, instead of separately analyzing the changes from 1988 to 1995 and from 1995 to 2002, I will analyze these changes continuously from 1988 to 2002, and I have also added a work experience variable to my study and defined earnings differently from Knight and Song, by defining earnings as an individual's personal annual earnings, including regular wages, bonuses, subsidies, allowances, and other cash income from an individual's work unit.

IV. Theory and Method

This study will analyze earnings inequality measures, and will implement the ordinary least squares (OLS) regression, quantile regression, and regression-based decomposition method of individual annual earnings, at 2002 price levels, on key variables, in order to explore the changes in the effects of determinants of earnings inequality in urban China and their labor market implications.³ Earnings inequality measures will include the gini coefficient and the 90/10 ratio, which compares earnings from the 90th percentile of the earnings distribution to that of the 10th percentile. These measures can help further analyze the change of earnings inequality from 1988 to 2002 and the change in its structure. The OLS regression will determine the change in the impact of variables on earnings over this time period, which could also provide insight into the change in their impact on the trend of earnings inequality from 1988 to 2002. Quantile regressions will then be conducted to analyze the change of this impact on earnings at different quantiles, or segments, of the wage distribution, which could provide insight into the effects of variables on the internal structure of earnings inequality at different quantiles from 1988 to 2002. This will also help us determine if explanatory variables are affecting earnings differently among many earnings groups. The regression-based decomposition analysis will then

³ Prices were adjusted by using China's CPI index, which is provided by the World Bank (Trading Economics, 2010).

analyze the relative contribution of each variable to the level of earnings inequality from 1988 to 2002.

Inequality Measures

The gini coefficient and the 90/10 ratio will be analyzed to gain insight into earnings inequality from 1988 to 2002. The gini coefficient ranges from 0 to 1, where 0 indicates perfectly equally distributed earnings, and where 1 indicates that all earnings are concentrated in one individual (Naughton, 2007). It will be calculated from the data of *anearnings*, or annual personal earnings, for the years 1988, 1995, and 2002.⁴ The 90/10 ratio, which indicates the dispersion of earnings structure, is a ratio of average earnings, or *anearnings*, at the 90th percentile of the earnings income distribution to those of the 10th percentile (Knight and Song, 2003). Therefore, higher values of the gini coefficient will indicate higher levels of earnings inequality in an economy, and higher values of the 90/10 ratio will indicate a growing dispersion of earnings.

Ordinary Least Squares Regression

The ordinary least squares, or OLS, regression method, will be used to estimate the earnings functions for 1988, 1995, and 2002, where the dependent variable is *lnearnings*, which is the logarithm of an individual's personal annual earnings.⁵ The independent variables will include age, years of work experience, gender, minority status, Communist party membership, educational level, occupation, work unit ownership, and work unit sector. The OLS regression will analyze these variables in order to determine the change in their impact on earnings over this time period, which could also provide insight into the trend of earnings inequality from 1988 to 2002, since increasing returns may indicate increasing earnings inequality. In order to determine

⁴ See Table A1 in the Appendix for the Variable Description.

⁵ See Table A1 in the Appendix for the Variable Description.

the percent effects of these variables on earnings, *lnearnings* will be regressed on these variables in the log-linear OLS method, as expressed below

$$\ln(\widehat{Y}_i) = \widehat{\beta}_0 + \widehat{\beta}_1 X_{1i} + \dots + \widehat{\beta}_k X_{ki}, i = 1, \dots, n \text{ and} \quad (1)$$

$$\widehat{u}_i = Y_i - \widehat{Y}_i, i = 1, \dots, n$$

The values of the coefficient $\widehat{\beta}_k$ shows how a one-unit increase in X_{ki} , or the independent variable, results in a $100 * \widehat{\beta}_k$ % change in the dependent variable *lnearnings*. And since a majority of the independent variables in this study are binary, $100 * \widehat{\beta}_k$ % will describe the percent change to *lnearnings* when the individual possesses the binary characteristic. In addition, \widehat{u}_i is the error term of the estimation (Stock and Watson, 2007).

Similarly to the OLS regression method, Liu (2003) defines the Mincerian regression, which is widely used in labor economics, as

$$\ln(Y_i) = \beta_0 + \beta_1 S + \beta_2 EXP + \beta_3 EXP^2 + \sum_{i=4}^n \beta_i X_i + \varepsilon_i \quad (2)$$

where $\ln(Y_i)$ is the natural logarithm of average annual real earnings, “S” indicates years of schooling, “EXP” indicates years of work experience, “EXP²” indicates the square of the years of work experience, X_i includes other determinants, including dummy variables for gender, political capital, occupation, ownership of the workplace, and industry sector, and where ε_i is the residual of the regression. In this study, we will apply the Mincerian regression and include additional determinants, following the log-linear OLS method.

Quantile Regression

The quantile regression method will be used to analyze the change of the impact of determinants on earnings at different quantiles of the earnings distribution in order to gain more insight into their effects on the internal structure of earnings inequality according to quantiles. This will help us determine how a variable differs in its impact on earnings at different earnings groups over the three survey years. In comparison to the OLS regression method, which aims to

estimate the mean of the dependent variable, the quantile regression method aims to estimate specified quantiles, which will be the 20th, 40th, 50th, 60th, and 80th quantiles in this study, of the dependent variable, *lnearnings*. And rather than minimizing the sum of the squares of the residuals, which is implemented under the OLS regression method, the quantile regression method minimizes the sum of the absolute residuals. Where q in $0 < q < 1$ is the quantile, the regression can be obtained by minimizing the sum of the absolute deviations of the residuals, weighted according to each specific quantile that is to be analyzed. Consider a quantile-regression model where the q th quantile is estimated by

$$Q_q(y) = a_q + b_{q,1}x_1 + b_{q,2}x_2 + \dots + b_{q,i}x_i \quad (3)$$

The values of the coefficient $b_{q,i}$ shows how a one-unit increase in x_i , or the independent variable, results in a $100*b_{q,i}$ % change in the dependent variable *lnearnings* at the q th quantile of the earnings distribution. And since a majority of the independent variables in this study are binary, this will describe the $100*b_{q,i}$ % change to *lnearnings* at the q th quantile when the individual possesses the binary characteristic. And for each observation i , let r_i be the residual

$$r_i = y_i - \sum_k \beta_k x_{ki}$$

and let the multiplier h_i be

$$h_i = \{2q \text{ if } r_i > 0 \text{ and } 2(1 - q) \text{ if otherwise}\}$$

where the quantity being minimized with respect to β_k is $\sum_i |r_i| h_i$, so that quantiles other than the median are estimated by weighting the absolute residuals. For example, in order to estimate the 75th quantile, negative residuals will be given a weight of 0.50 and positive residuals will be given a weight of 1.50 (Stata Press, 2007). As a result, the quantile regression method will be used to determine if the independent variables have different effects on *lnearnings* at different

quantiles of the earnings distribution for all three years, which can help us determine their effect on earnings inequality when comparing the different quantiles.

Regression-Based Decomposition

The regression-based decomposition method will be used to analyze the relative contribution of each independent variable to the level of earnings inequality for the years 1988, 1995, and 2002. The regression-based decomposition method, which was used in Fields (2002), is compatible with a regression analysis by running a standard semi-log earnings-generating function in order to determine a variable's percent contribution to the level of inequality of *lnearnings* for this study. And since this will be conducted throughout the three years, we can then observe the change in the contribution of each variable on earnings inequality. Positive values will indicate that the variable has contributed to an increase in inequality, whereas negative values will indicate that the variable has contributed to a decrease in inequality. Knight and Song (2003) adjust Fields's method in order to study how characteristics, instead of earnings sources, determine earnings through a stochastic process. They explain that $\ln y_i = \sum \beta_k x_{ik}$ where x_k is the characteristic k , and where the error term occurs when $\beta_k = 1$. The contribution of characteristic k to the level of inequality of earnings is equal to

$$\pi_k = \frac{\beta_k \text{cov}(x_k, \ln y)}{\text{var}(\ln y)} \quad (4)$$

which is, in essence, the partial regression coefficient of earnings on characteristic k , holding all other variables constant (β_k), multiplied by the total regression coefficient of characteristic k on earnings, holding nothing else constant, $\text{cov}(x_k, \ln y)/\text{var}(\ln y)$. In addition, Fields (2002) explains how equation (4) is equivalent to

$$\begin{aligned} s_k(\ln y) &= \frac{\text{cov}(\beta_k x_k, \ln y)}{\text{var}(\ln y)} \\ &= \frac{\beta_k \sigma(x_k) \rho(x_k, \ln y)}{\sigma(\ln y)} \end{aligned} \quad (5)$$

$$= \frac{\beta_k \text{cov}(x_k, \ln y)}{\text{var}(\ln y)}$$

$$= \pi_k$$

Equation (5) can be directly computed by STATA, where $s_k(\ln y)$ is the relative factor inequality weight, which shows the k 'th factor's percentage contribution to the level of inequality of *lnearnings*. When binary variables are explanatory variables, Fields (2002) defines the generic factor "industry" as the sum of the industry dummy variables, which can also be applied to other binary categories, such as education, occupation, and work unit ownership. As a result, the regression-based decomposition will provide important information on how each independent value has affected the level of inequality of *lnearnings* during the years 1988, 1995, and 2002. In addition, the residuals will indicate the contribution to the level of inequality of *lnearnings* from unobserved variables.

V. Data Description and Summary Statistics

The China Household Income Project surveys for the years 1988, 1995, and 2002 were conducted by an international group of economists and by the Economics Institute of the Chinese Academy of Social Sciences (CASS). These surveys, which consisted of pencil and paper interviews, are the only available sources of almost nation-wide data on wage and other individual and household characteristics in China. The urban provinces included in these surveys were Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Henan, Hubei, Guangdong, Sichuan, Yunnan, and Gansu.⁶ The smaller samples of the 1995 and 2002 surveys were due to budget constraints (Shi, 1999).⁷ Since we are focusing on earnings, which are adjusted at 2002 price levels, in units of yuan, only workers aged 16 or older who were earning income were included

⁶ Sichuan which was added in the 1995 survey, and included Chongqing, which was included in the 2002 survey as a separate province.

⁷ See Table 2 for survey sample sizes.

in the sample. Knight and Song (2003) categorized the determinants into discriminatory variables, which include gender, minority status, and Communist Party membership; segmentation variables, which include work unit ownership and sector; and human capital variables, which include age, work experience, educational level, and skill-based occupation.⁸ It is also important to note the influence of unobserved characteristics on earnings and earnings inequality, since the variables analyzed in this study will not explain them entirely.

Table 1: Annual Earnings Summary Statistics (in 2002 price levels, measured in yuan)			
Year	1988	1995	2002
Mean	4,610.74	6,686.56	10,793.97
10th percentile	1,826.37	1,775.31	1,545.96
90th percentile	9,218.62	15,272.46	28,759.43
90/10 ratio	5.05	8.60	18.60
Gini coefficient (%)	23.13	29.66	35.94

Source: China Household Income Project: 1988, 1995, and 2002 Surveys

Table 1 provides annual earnings summary statistics, where annual earnings are adjusted to 2002 price levels and are measured in yuan. Mean annual earnings rose by 45% from 1988 to 1995, and by 61.4% from 1995 to 2002, which shows that average earnings have been increasing at an increasing rate. The gini coefficient has increased by 28.2% from 1988 to 1995, and then by 21.2% from 1995 to 2002. This shows that there is indeed increasing earnings inequality, as the wealthiest groups are getting wealthier, and as the least wealthy groups are getting less wealthy, but that this increase in inequality is occurring at a decreasing rate, which coincides with previous literature on this topic. Mean annual earnings in the 10th percentile of the earnings distribution decreased by 2.8% from 1988 to 1995, and then by 12.9% from 1995 to 2002. This shows an increasing decline of the lowest earnings bracket. Mean annual earnings in the 90th percentile increased by 65.7% from 1988 to 1995 and then by 88.3% from 1995 to 2002, also

⁸ See Table A1 in the Appendix for the Variable Description.

showing an increasing rising of the highest earnings bracket. The 90/10 ratio increased by 70.3% from 1988 to 1995, and then by 116.3% from 1995 to 2002. As a result, this shows that earnings inequality did not just increase, but that its structure widened as well, as shown by the 90/10 ratio.

Table 2: Summary Statistics						
Year	1988		1995		2002	
Number of Observations	17,539		11,703		14,993 ¹	
Variable	Mean	Earnings (yuan)	Mean	Earnings (yuan)	Mean	Earnings (yuan)
<i>age</i>	37.29	4610.74	38.49	6,686.56	45.28	8,406.92
<i>wrkexp</i> ¹	NA	NA ²	19.36	6,686.56	20.14	8,406.92
Variable	Proportion (%)	Earnings (yuan)	Proportion (%)	Earnings (yuan)	Proportion (%)	Earnings (yuan)
<i>female</i>	47.52	4,204.20	47.17	6,071.78	49.26	9,193.47
<i>male</i>	52.43	4,979.19	52.83	7,235.41	50.74	12,347.95
<i>min</i>	3.61	4,577.01	4.24	6,114.26	4.10	10,831.33
<i>han</i>	95.63	4,617.35	95.76	6,711.89	95.90	10,791.88
<i>comm.</i>	23.92	5,573.27	25.16	8,196.96	33.34	13,049.95
<i>notcomm</i>	75.09	4,311.01	74.84	6,178.89	66.66	9,665.86
Highest Educational Level Achieved Variables						
<i>coll</i>	12.66	5,445.58	8.13	8,555.99	8.33	17,404.94
<i>prof</i>	11.13	4,971.38	32.81	7,323.54	17.73	13,660.00
<i>midd</i>	63.44	4,395.81	54.02	6,122.95	65.61	9,685.53
<i>elem</i>	12.22	4,562.27	5.03	5,561.64	8.26	6,819.04
Occupation Variables						
<i>owner</i>	0.63	4,721.16	0.76	6,531.26	3.18	11,109.13
<i>proftechn</i>	15.84	5,222.88	22.25	7,648.23	14.32	14,866.79
<i>head</i>	1.80	6,402.95	11.60	8,568.07	7.10	16,891.34
<i>offwrk</i>	23.59	4,866.92	20.57	6,634.64	13.76	12,661.45
<i>laborer</i>	52.68	4,182.30	16.31	5,179.19	6.56	8,651.85
<i>otherocc</i>	4.77	5,625.89	28.45	6,067.76	54.60	8,699.27
Work Unit Ownership Variables						
<i>state</i>	78.52	4,804.44	81.00	6,950.17	23.04	11,898.13
<i>urbcoll</i>	20.06	3,900.64	15.01	5,163.53	4.68	8,375.91
<i>priv</i>	0.10	1,967.14	0.38	4,767.05	8.88	9,582.86
<i>jt</i>	0.30	7,582.22	1.17	8,369.14	1.12	15,498.73
<i>foreign</i>	0.04	5,164.80	0.12	17,427.41	0.36	18,102.96
<i>othero</i>	0.32	3,082.74	2.22	6,110.57	38.98	8,480.12
Work Unit Economic Sector Variables						
<i>agr</i>	0.97	4,542.27	1.62	7,237.26	0.83	12,807.90
<i>manu</i>	42.88	4,424.28	40.60	6,194.82	16.96 ⁵	10,486.68

mining	4.08	4,463.47	1.06	6,790.84	1.61	10,830.73
const	3.36	4,695.10	2.88	6,890.95	2.21	13,205.36
transp	6.75	5,059.85	4.87	7,447.37	5.31	13,091.79
trade	14.06	4,651.89	13.75	5,879.01	8.33	9,413.07
realest	2.34	4,190.96	3.67	6,914.91	10.00	10,846.42
health	4.60	4,854.16	4.49	7,540.60	3.47	14,280.43
edu	7.28	4,951.08	7.35	7,496.81	6.11	15,345.18
scires	2.08	5,277.00	2.34	7,927.01	1.19	18,591.35
finins	1.53	4,518.30	1.97	7,908.41	1.82	14,783.54
govtparty	8.53	4,916.93	11.62	7,296.23	8.15	14,454.44
othersect	0.56	4,038.40	0.62	7,067.20	1.51	11,704.60

Source: China Household Income Project: 1988, 1995, and 2002 Surveys

Notes:

1. See Table A1: Variable Description.
2. The variable *wrkexp* only had 10,197 observations, due to missing observations, which lowered the number of observations for the 2002 regressions.
3. Earnings are listed at 2002 price levels, in units of yuan.
4. The proportions for each category will not add up to exactly 100% due to the presence of missing observations for certain variables.
5. This proportion of the manufacturing sector may be understated, since approximately 60.4% of the work unit sector observations were missing.

Table 2 provides summary statistics from the 1988, 1995 and 2002 surveys, where annual earnings are adjusted to 2002 price levels. The average age of individuals surveyed has increased from 1988 to 2002, reflecting an aging working population. This may be due to the increased attendance at educational institutions, which would delay individuals' entry into the workforce. This could also be attributed to the increased number of workers who have passed the age of retirement, since many workers are now not forced to retire at a certain age, such as in the past. And since the average number of years of work experience has also increased from 1988 to 2002, this could also be attributed to the increased number of workers who have passed the age of retirement. Average earnings have also increased with age and work experience, which are generally positively correlated, from 1988 to 2002, which indicates that although age and work experience may disequalize earnings, these higher returns for older and more experienced workers may reflect the effective functioning of labor markets. However, seniority,

which is related to age and work experience, may also play a factor in increasing earnings, as Liu (2003) explains.⁹

The proportion of women in the workforce has also increased overall from 47.52% in 1988 to 49.26%, in 2002, indicating that there is almost an equal representation of men and women in the workforce. This may be due to increased work opportunities for women in the urban parts of China, and to a culture that encourages both genders to work. However, average earnings for women have been consistently lower than those of men, being 84.4% of men's average earnings in 1988, 83.9% in 1995, and 74.5% in 2002, which may indicate increasing earnings discrimination for women. As a result, even if there are now more women in the workforce, they are being paid even less compared to men than in the past. Liu (2003) attributes this increasing gender gap to the observation that there are increasing numbers of women working in lower-paid jobs, and also argues that the government does not have the power anymore to enforce its former policy of equal pay for both genders.

It is also very interesting that although workers who are part of a national ethnic minority group have received 99.1% of the average earnings of workers of Han origin in 1988, and then 91% in 1995, they received slightly higher earnings in 2002. This shows that although there might have been earnings discrimination against ethnic minorities from 1988 to 1995, this was reversed in 2002, possibly indicating increased fairness in the labor market, especially since the government has made great efforts to eliminate minority discrimination.

In addition, there has been an increasing rise in the proportion of workers who are part of the Communist Party or Communist Youth League, since almost one-quarter of the workforce were party members in 1988 compared to about one-third in 2002. This implies that people may

⁹ The 1988 survey did not include any questions regarding a worker's seniority in a work unit, and the 1995 and 2002 survey data did not include observations related to a worker's seniority status due to statistical software package limitations.

have found it more beneficial to become members of this party, either for political reasons or for the possible increase in earnings attributed to being part of the party, especially if one is a leader within the party. Communist workers have also earned consistently higher earnings than non-party members, earning 29.3% more on average in 1988 and 35% more in 2002. This may indicate that the labor market, which is still influenced by the Communist Party, still favors party members, and discriminates against non-party members, or that individuals accepted into the party tend to earn higher earnings. Knight and Song (1993) also explain that Communist Party members usually are better educated and work in higher positions compared to non-party members.

Even though the proportion of workers whose highest educational level was college or graduate school decreased from 1988 to 2002, the proportion of workers whose highest educational level was professional school, junior college, middle level professional school, technical secondary school, upper middle school, which is equivalent to secondary school, or lower middle school has increased overall from 1988 to 2002. This indicates that the distribution of education has grown more in the middle levels of education, since the proportion of workers whose highest level of education was elementary school or below has also decreased from 1988 to 2002. In addition, workers whose highest educational level was college or graduate school earned on average 19.4% more than those whose highest level of education was elementary school or below in 1988, and then earned 155.2% more in 2002. This implies that the labor market is starting to reward education, a human capital variable, more. However, in 1988, workers whose highest level of education was elementary school or below actually earned 3.8% more than workers whose highest educational level was middle level professional school, technical secondary school, upper middle school, or lower middle school. This may indicate the importance of age, seniority, and possibly Communist Party membership, over educational

background with regards to earnings during the early period of market reform. Nevertheless, educational level may have overall contributed to increased earnings inequality among workers with different educational backgrounds.

The proportion of workers who are owners or managers of private or individual enterprises, are self-employed, are heads of institutions or enterprises, or who are factory directors or managers, has increased from 1988 to 2002, which indicates an increase in leaders in the workforce. The proportion of laborers has decreased dramatically, comprising 52.68% of the workforce in 1988, and then 6.56% of the workforce in 2002; both of these observations correspond with those of Liu (2003). However, this dramatic decrease in the proportion of laborers may be overestimated, since the 1995 and 2002 surveys were worded slightly vaguely when asking if an individual was a laborer, and many laborers may have placed themselves in the “other” category, which increased dramatically from 1988 to 2002. Market reforms may have led to a diversification of occupations, which are now part of the “other” category, and workers in other occupations comprised 4.77% of the workforce in 1988 and then 54.60% in 2002. In addition, heads of institutions or enterprises, who have earned the highest earnings from 1988 to 2002, earned an average of 53.1% more earnings than laborers in 1988, who have earned the lowest earnings from 1988 to 2002, and 95.2% more in 2002. This shows that the labor market has become more diverse in terms of occupations, offering more services-based occupations as opposed to a manual labor occupations, and that occupations may be exhibiting increased earnings inequality among different types of occupations.

The proportion of workers who work in state-owned work units has decreased significantly from 1988 to 2002, comprising 78.52% of the labor market in 1988, and then 23.04% in 2002, which corresponds with previous literature; however, it was still the second largest type of ownership in 2002. The proportion of workers who work in work units owned by

urban collectives has also decreased from 20.06% in 1988 to 4.68% in 2002, which corresponds with what Appleton et al. (2005) observed. Private ownership has also increased during this period, from 0.10% in 1988, when privately-owned work units were extremely rare, to 8.88% in 2002, which indicates the steady privatization of the economy. Joint-venture-owned and foreign-owned companies have also increased from 1988 to 2002, indicating that the economy has opened up more to the international market. Other types of ownership have also greatly increased, comprising 0.32% of the workforce in 1988 and then 38.98% in 2002, the largest segment, indicating the increasing diversity of types of ownership in the economy, which is a sign of progress in the labor market. In addition, the highest-paying work units in 1988, which were joint-venture-owned, paid almost four times as much as the lowest-paying work units, which were privately-owned; in 2002, the highest paying work units, which were foreign-owned, paid approximately twice as much as the lowest paying work units, which were urban collective-owned. This can indicate a decrease in earnings inequality through an ownership perspective.

Although the percentage of workers who work in the manufacturing sector declined from 1988 to 2002, as Asuyama (2008) pointed out, the manufacturing sector has been the largest sector from 1988 to 2002, which coincides with the fact that China manufactures a large amount of the world's products. The proportion of workers who work in the real estate, public utilities, or personal and consulting services has increased from 2.34% in 1988 to 10% in 2002, and the slight increase in the financial and insurance services and of "other" sectors from 1988 to 2000 can imply that the economy might be shifting to more services-based industries. It is also interesting to note that the government, party organizations, and social organizations sector has been relatively stable throughout this period, which reflects China's unique situation where relatively free markets coexist with the Chinese government. With regards to earnings, the scientific research or technical services sector paid an average of 30.7% more earnings than the

“other” sector in 1988, and in 2002, it paid an average of 97.5% more earnings than the lowest-paying sector, which was the trade, restaurants and catering, materials supply and marketing, or warehousing sector. In addition, the government and party organization and financial services sectors, which are more monopolistic, did indeed pay more than the manufacturing and trade sectors, which are more competitive, as Deng and Li (2009) explained. This can reflect increasing earnings inequality among workers from different economic sectors.

Overall, the working population is getting older, more experienced, receiving more female workers, has more Communist Party members, and is becoming better educated. In addition, occupations, work unit ownership forms, and economic sectors have been diversifying, which signal the beginnings of a shift from a once manual-labor, state-sector dominated market into a services-oriented, diverse labor market. Most of these variables seem to be helping the labor market become more effective and market-oriented.

VI. Empirical Findings

Earnings inequality is a very complex measure that varies over time and is affected by various explanatory variables. The OLS regression analysis will provide information on how each independent variable is associated with earnings from 1988 to 2002, providing insight into each variable’s contribution to the *trend of earnings inequality or equality over time*. For example, if a variable has increasing returns from 1988 to 2002, this might mean that it is contributing to increasing earnings inequality during this period because it is resulting in larger gaps as it is increasing earnings more. On the other hand, the quantile regression analysis looks more closely at the internal workings of earnings for each year separately, by providing information on how each variable contributes to earnings at different quantiles, and, therefore, how each variable contributes to the *internal makeup of earnings inequality according to*

earnings quantile for each separate year. For example, if a variable is resulting in higher earnings at the upper earnings quantiles, then this means that it is contributing to earnings inequality at these quantiles, since the wealthier are increasing in earnings. The regression-based decomposition analysis will provide the percent contributions of each variable to the *level of earnings inequality for each year.*

Ordinary Least Squares Regression Analysis

Table 3: Summary of Comprehensive Regression of <i>lnearnings</i>, 1988-2002			
Dependent Variable:	1988	1995	2002
<i>lnearnings</i>			
<i>age</i>	0.075** (0.0017)	0.061** (0.007)	0.037** (0.0068)
<i>age_2</i>	-0.00076** (0.00002)	-0.00079** (0.00009)	-0.00043** (0.00008)
<i>wrkexp</i> ¹	NA	0.025** (0.0038)	0.017** (0.0005)
<i>wrkexp_2</i> ¹	NA	-0.00013 (0.00009)	-0.000042 (0.00008)
<i>female</i>	-0.098** (0.0059)	-0.096** (0.011)	-0.13** (0.012)
<i>min</i>	-0.022 (0.015)	-0.068** (0.025)	0.030** (0.029)
<i>comm</i>	0.056** (0.0078)	0.074** (0.014)	0.042 (0.014)
Highest Educational Level Achieved Variables			
<i>coll</i>	0.14** (0.013)	0.23** (0.040)	0.28** (0.05)
<i>prof</i>	0.095** (0.013)	0.16** (0.034)	0.15** (0.046)
<i>midd</i>	0.078** (0.0089745)	0.088** (0.029)	0.082* (0.04)
Occupation Variables			
<i>owner</i>	0.045 (0.050)	0.031 (0.061)	0.26** (0.036)
<i>proftechn</i>	0.076** (0.011)	0.17** (0.02)	0.25** (0.025)
<i>head</i>	0.15** (0.022)	0.16** (0.023)	0.27** (0.029)
<i>offwrk</i>	0.0401** (0.008)	0.11** (0.018)	0.18** (0.025)
<i>otherocc</i>	0.065** (0.016)	0.10** (0.016)	0.070** (0.021)

Work Unit Ownership Variables			
<i>state</i>	0.12** (0.0072)	0.19** (0.015)	0.23** (0.024)
<i>priv</i>	-0.52** (0.088)	0.23* (0.096)	0.093** (0.029)
<i>ju</i>	0.60** (0.050)	0.62** (0.049)	0.578* (0.05)
<i>foreign</i>	0.24 (0.14)	1.31** (0.14)	0.70** (0.082)
<i>othero</i>	-0.19** (0.050)	0.078 (0.07)	0.208** (0.028)
Work Unit Economic Sector Variables			
<i>agr</i>	-0.02 (0.028)	0.022 (0.04)	0.084 (0.054)
<i>mining</i>	-0.0093 (0.014)	0.017 (0.049)	-0.0039 (0.039)
<i>trade</i>	0.021* (0.008)	-0.044** (0.016)	-0.057** (0.022)
<i>scires</i>	-0.00073 (0.02)	0.073* (0.034)	0.32** (0.047)
<i>finins</i>	-0.021 (0.023)	0.28** (0.036)	0.24** (0.037)
<i>govtparty</i>	-0.0768** (0.012)	0.018 (0.018)	0.081** (0.028)
Intercept	6.52** (0.033)	6.69** (0.123)	7.34** (0.13)
SER	0.36	0.53	0.57
R²	0.335	0.254	0.270
Adjusted R²	0.333	0.252	0.267
Number of observations	17,479	11,466	10,161

Notes:

1. See Table A1: Variable Description.

2. The omitted categories from the binary variables are being male, not a Communist Party member, being of Han origin, having elementary school or less than elementary school as the highest level of education, having the occupation of a laborer, working in an urban collective-owned work unit, and working in the manufacturing sector.

3. Individual coefficients are statistically significant at the *5% or **1% significance level, and standard errors for each coefficient are included in parentheses.

Table 3 shows a summary from the comprehensive ordinary least squares regression of *lnearnings* on various determinants for the years 1988, 1995, and 2002. From 1988 to 2002, age has had a decreasing effect on earnings, with one additional year of age being associated with a 7.5% increase in annual earnings in 1988, 6.1% in 1995, and 3.7% in 2002. This may indicate that seniority, which was an important part, and still partly is, of China's bureaucratic system and

culture, is having a smaller impact on earnings, which is a sign of progress for the labor market. However, its positive coefficients follow the standard relationship between earnings and length of employment, which is highly correlated with age (Knight and Song, 1993). The negative coefficients on *age_2* are also expected, considering the inverted-u shape of the age-income curve, where earnings rise as skills are obtained over time, but which eventually decline as skills are lost or become obsolete (Knight and Song, 1993). Years of work experience has also decreased in its effect on earnings. One additional year of work experience is correlated with a 2.5% increase in earnings in 1995, compared to a 1.7% increase in 2002, implying that the labor market may be becoming more efficient, since work experience was overrewarded in the past. The negative coefficients on *wrkexp_2* are also expected, considering the inverted-u shape of earnings distribution as years of work experience increases. Although both age and work experience are human capital variables that are expected to be rewarded, their decreased effects may in fact be signs of a transition to a market economy that rewards individuals more on performance than on age, seniority, or work experience, which was overvalued before. Their decreasing effects on earnings could also imply their decreasing effects on earnings inequality, since they are resulting in lower gaps.

With respect to discriminatory variables, female workers may be experiencing increased discrimination with respect to earnings from 1988 to 2002, since being female reduced earnings by 9.8% in 1988 compared to 13% in 2002. This increased gender gap may imply this variable's increased contribution to earnings inequality from 1988 to 2002. Knight and Song (1993) explain that men may have preferential access to jobs with longer incremental wage scales or access to jobs that require more vocational skills. Also, women commonly have less opportunities to acquire human capital through education and training and are paid less through job discrimination or earnings discrimination (Knight and Song, 1993). Being part of the

Communist Party or Communist Youth League as opposed to being part of no party or another party has been correlated with increased returns from 5.6% in 1988 to 7.4% in 1995, but has had a decreased effect in 2002, increasing earnings only by 4.2%. This may indicate that Communist party membership may indeed have an earnings premium, but that its contribution to earnings inequality over time may be decreasing. This premium may be due to the hypothesis that the labor market, which is still partly influenced by the government, still seems to favor politically acceptable workers, and/or that party members tend to be more successful. Knight and Song (1993) explain that between 1978 and 1984 the educational level of party leaders rose dramatically, from 2% of the members having a college education to 51%. In addition, this decreased premium coincides with that of Appleton et al. (2005). Being a national minority compared to being of Han origin has decreased earnings, but this effect was insignificant in 1988; however, in 1995, it was correlated with a 6.8% reduction in earnings in 1995 and a 3% increase in 2002. Knight and Song (1993) state that ethnic minorities are usually from poorer parts of the country, and that the government has attempted to outlaw ethnic discrimination. This may indicate that minority status is having a decreased effect on earnings inequality across time because it is resulting in smaller gaps, and even higher earnings in 2002. These variables, which could be considered as discriminatory variables, imply that there may be increasing earnings discrimination based on gender and decreasing earnings discrimination based on party membership and minority status.

Returns to graduating from college or graduate school, and professional school or junior college, and middle level professional school, technical secondary school, upper middle school, or lower middle school, as compared to getting an elementary school education or lower, have been positive and increasing from 1988 to 2002. They are also ranked according to educational level, except for a slight decrease in returns for middle level professional school, technical

secondary school, upper middle school, or lower middle school in 2002. Graduating from college or graduate school has been associated with significant returns, increasing earnings by 14% in 1988, 23% in 1995, and 28% in 2002. This indicates that education is becoming more important in determining earnings, and that investment in human capital is becoming more beneficial, which implies that the labor market is becoming more efficient by increasingly rewarding workers' human capital. Knight and Song (1993) state that education is complementary to on-the-job skill acquisition and that it is used to allocate workers to jobs, and so, more educated workers often secure jobs that offer further progress up the wage scales. They also explain that a strong correlation between educational level and earnings is stronger in developing countries, which have a scarcity of educated labor. Furthermore, this implies that education may be contributing to earnings inequality from 1988 to 2002 at an increasing rate.

Working as an owner or manager of a private or individual enterprise, professional or technical worker, head of an institution or enterprise, office or clerical worker, or as other occupations, as compared to a laborer, has been associated with positive returns from 1988 to 2002. Owners or managers of private or individual enterprises had 3.1% higher earnings than laborers in 1995 and 26% more in 2002; this is a large increase that indicates increasing rewards for workers with higher human capital and leadership skills. Working as the head of an institution or enterprise has resulted in the most returns, increasing earnings by 15% in 1988, 16% in 1995, and 27% in 2002, which indicates that human capital, leadership skills, and possibly, personal connections and political capital, are very beneficial. Returns to professional or technical workers have also been high, implying that investment in education, which is necessary for this type of occupation, can lead to even further returns in this occupation. These observations also imply that the labor market has been rewarding non-laborer occupations more,

which are human capital variables, and, as a result, occupation variables may be contributing to earnings inequality, since they are resulting in larger earnings gaps from 1988 to 2002.

Working in a state-owned enterprise or other publicly-owned company, privately-owned company, joint-venture-owned company, foreign-owned company, or other type of work unit, as compared to an urban collective-owned company, has been correlated with positive returns in earnings, except for 1988, where privately-owned companies and other types of ownership led to less returns than urban collective-owned companies. This indicates that during early reforms, urban collectives tended to pay more than the nascent private and other types of companies. In addition, this indicates that urban collectives have been generally associated with lower earnings, especially since they are smaller in scale than state-owned enterprises. State-owned enterprises or other publicly-owned companies have led to increasing returns, indicating that they may be performing better financially, especially after underperforming SOE's were closed down in the 1990's. Returns to privately-owned, joint-venture-owned, and foreign-owned companies reached a peak in 1995, implying that they grew rapidly from 1988, when they emerged, and then stabilized by 2002. Returns to joint-venture-owned and foreign-owned enterprises have also been significant, where foreign-owned companies have increased earnings by 24% in 1988, 131% in 1995, and 70% in 2002. This major effect on earnings indicates that foreign companies are succeeding in the urban Chinese market, and that the urban Chinese economy is opening up and becoming more efficient. Knight and Song (1993) also explain that foreign employers attract well-educated workers, which leads to higher earnings. Other types of ownership have led to increasing returns, by reducing earnings by 19% in 1988 compared to urban collectives to increasing earnings by 7.8% in 1995, and then by increasing earnings 20.8% in 2002. This indicates that the labor market is becoming more diverse, and that a privatizing economy is

starting to reward people more for their performance as opposed to their connection to a government-owned company.

Working in the scientific research or technical services sector as compared to the manufacturing sector has had dramatically increasing returns from 1988 to 2002, by reducing earnings by 0.07% in 1988, increasing earnings by 7.3% in 1995, and then by increasing earnings by 32% in 2002. Similarly, working in the financial or insurance services sector has also increased earnings, and both of these examples reflect increasing returns to human capital, which are necessary for these sectors, as well as the development of the financial sector, which is crucial for the growth of the urban Chinese economy. Manufacturing is still a large component of the economy, but since the economy was focused more on manual labor in the past, its declining returns may indicate the beginnings of a shift to a more services-oriented economy. In addition, working in the trade, restaurants and catering, materials supply and marketing, or warehousing sector has actually been experiencing decreasing returns, increasing earnings by 2.1% in 1988, and then by reducing earnings by 4.4% in 1995 and by 5.7% in 2002. This may be due to the increasingly competitive nature of this sector, which may be a sign of increasing efficiency of the labor market as well, and it is one of the few sectors, along with mining, that still provide less earnings than manufacturing. Working in the government, party organizations, or social organizations and the agriculture, forestry, animal husbandry, or fishing sectors has also steadily increased earnings compared to the manufacturing sector from 1988 to 2002. This indicates that the economic sectors are becoming more diversified and that the government and agricultural sectors are performing well. Since a majority of the non-manufacturing sectors have been experiencing increasing returns, this might imply that they are contributing towards earnings inequality from 1988 to 2002.

Overall, these OLS regressions imply that age and work experience have had positive effects on earnings at a decreasing rate, gender discrimination may have increased while party membership and minority discrimination has decreased, education has resulted in increasing returns, non-laborer occupations have resulted in increasing returns, ownership forms other than urban collectives have resulted in different effects on earnings, and that a majority of non-manufacturing sectors have been resulting in increased earnings. These observations indicate that the labor market has been providing higher returns for human capital variables, such as age, work experience, educational level, and skill-based occupation, but that it has also experienced higher gender discrimination. And even if party membership discrimination and minority discrimination may have decreased, the labor market may be experiencing increasing segmentation by work unit sector, which has diversified and spread out in terms of earnings. These results are similar to those concluded by Knight and Song (2003). However, since the adjusted R-squared values for all three surveys have been at most 0.33, we must consider that there are other variables that explain annual earnings, and, as a result, earnings inequality, as well, which may have underestimated or overestimated our conclusions. These could include unobserved abilities of individuals, omitted variables such as size and profitability of a firm, and errors in earnings data (Asuyama, 2008).

Quantile Regression Analysis

Table 4: Summary of Comprehensive Quantile Regression of <i>l</i>earnings for the 20th and 80th Quantiles, 1988 – 2002						
Quantile	0.20			0.80		
Year	1988	1995	2002	1988	1995	2002
<i>age</i>	0.0838**	0.065**	0.030**	0.054**	0.031**	0.047**
<i>wrkexp</i> ¹	NA	0.029**	0.025**	NA	0.023**	0.002
<i>female</i>	-0.091**	-0.090**	-0.15**	-0.081**	-0.067**	-0.11**
<i>min</i>	0.0094	-0.04	0.039	-0.048**	-0.061*	-0.03
<i>comm</i>	0.052**	0.060**	0.045**	0.031**	0.051**	0.031
Highest Educational Level Achieved Variables						
<i>coll</i>	0.17**	0.26**	0.28**	0.075**	0.19**	0.34**

<i>prof</i>	0.14**	0.17*	0.16**	0.037**	0.14**	0.21**
<i>midd</i>	0.11**	0.10*	0.084	0.028**	0.099*	0.15**
Occupation Variables						
<i>proftechn</i>	0.085**	0.20**	0.29**	0.067**	0.085**	0.24**
<i>head</i>	0.097**	0.16**	0.30**	0.029**	0.12**	0.27**
<i>offwrk</i>	0.042**	0.10**	0.19**	0.010**	0.056*	0.17**
<i>otherocc</i>	0.092**	0.12**	0.086**	0.061**	0.076**	0.074**
Work Unit Ownership Variables						
<i>state</i>	0.15**	0.21**	0.25**	0.11**	0.17**	0.19**
<i>jv</i>	0.46**	0.55**	0.59**	0.74**	0.66**	0.65**
<i>foreign</i>	0.047	1.15**	0.74**	0.58*	1.42**	0.72**
Work Unit Economic Sector Variables						
<i>agr</i>	-0.039	0.043	0.15*	0.033	0.054	0.033
<i>trade</i>	-0.032**	-0.046*	-0.083*	0.014**	-0.018	-0.01
<i>scires</i>	0.0017	0.16**	0.35**	-0.079	-0.0059	0.39**
<i>finins</i>	0.0011	0.28**	0.28**	-0.17	0.32**	0.26**
<i>govtparty</i>	-0.079**	0.073**	0.15**	-0.085**	-0.050*	0.06*

Notes:

1. Please refer to Table A1: Variable Description.
2. This sample includes all individuals aged 16 or over who are employed.
3. The omitted categories from the binary variables are being male, not a Communist Party member, being of Han origin, having elementary school or less than elementary school as the highest level of education, having the occupation of a laborer, working in an urban collective-owned work unit, and working in the manufacturing sector.
4. Individual coefficients are statistically significant at the *5% or **1% significance level.
5. Number of Observations: 17,479 for 1988, 11,466 for 1995, and 10,161 for 2002.

Table 4 shows a summary of the quantile regression of \ln earnings on various determinants at the 20th, 40th, 50th, 60th, and 80th quantiles of the earnings distributions for the years 1988, 1995, and 2002. Similarly to Knight and Song's 2008 analysis, age resulted in higher returns at the lower quantiles of the earnings distribution. This may imply that higher-paying jobs are paying less attention to age, and, similarly, to seniority, than lower-paying jobs. Even though age may be increasing earnings at a decreasing rate, as shown by the OLS regressions, and, therefore, contributing to earnings inequality at a decreasing rate, age is contributing more to earnings at the lower quantiles, or, equivalently, contributing less to earnings inequality at the lower quantiles, since the lower income groups are gaining more earnings. This also applies to work experience, which implies that higher-paying jobs are paying less attention to work experience, which is also similar to seniority, and which was overvalued

before, than lower-paying jobs. Similarly, even though work experience may be increasing earnings at a decreasing rate, as shown by the OLS regressions, and, therefore, contributing to earnings inequality at a decreasing rate, work experience is contributing more to earnings at the lower quantiles than at the upper quantiles, or, equivalently, it is contributing less to earnings inequality at the lower quantiles.

Discriminatory variables, such as being female results in lower earnings at the 20th quantile compared to the 80th quantile, reducing earnings by 15% in 2002 at the 20th quantile compared to 11% at the 80th quantile. This implies that as an individual earns more money, usually after obtaining a higher position or after obtaining more work experience, gender is not as important in determining earnings, and that gender discrimination occurs more at the lower earnings bracket. There are similar results for being an ethnic minority as well. Being an ethnic minority as opposed to of Han origin reduces earnings by 6.7% at the 40th quantile in 1995 compared to 6.1% at the 80th quantile, and though this may not be a large difference, it also indicates that there may be more minority discrimination at the lower earnings groups.¹⁰ Similarly, higher-paying jobs tend to pay less attention to minority status than lower-paying jobs, implying that higher-paying jobs are become more market-oriented by focusing on productive factors. In addition, being a Communist Party member as opposed to being a member of another party or of no party increased earnings by 4.5% in 2002 at the 20th quantile compared to 3.1% at the 80th quantile. These observations imply that there has been less discrimination, in terms of gender, minority status, and Communist party membership, at the higher earnings groups, which follows what Knight and Song (1993) observed. As a result, although being female has been resulting in increased gender discrimination, or increased earnings inequality from 1988 to 2002, as shown by the OLS regressions, being female is contributing less to inequality at the higher

¹⁰ See Table A4 in the Appendix.

quantiles. In addition, minority status and Communist party membership may be contributing less to earnings inequality from 1988 to 2002, due to their decreased returns over time, as shown by the OLS regressions, but they are both also contributing less to inequality at the higher quantiles. As a result, at the higher earnings groups, earnings may be based more on performance than on discriminatory variables, which signals the beginnings of a shift to a free labor market.

Graduating from college or graduate school compared to elementary school or below initially led to higher returns at the lower income groups by increasing earnings by 17% in 1988 at the 20th quantile and by 7.5% at the 80th quantile, but has recently led to lesser returns at the lower income groups by increasing returns by 28% in 2002 at the 20th quantile and 34% at the 80th quantile. This implies that during the early market reforms, education was more rewarding at the lower income groups, since there was a scarcity in educated labor, but that by 2002, when people were generally more educated, during the later period of reforms, education led to higher marginal returns at the higher income groups, especially since it is correlated with on-the-job skill acquisition and ability. The returns on these variables are also ranked according to educational level, implying that higher education is indeed resulting in higher returns. In addition, college graduates earned 3.33 times more than middle school graduates at the 20th quantile in 2002, compared to 2.27 times more at the 80th quantile, which coincides with what Gustafsson and Shi observed in 2001, that a higher education in China is more of an insurance against receiving low earnings than as a means to earn even higher earnings. As a result, education may be contributing to earnings inequality at an increasing rate, since it is exhibiting higher returns from 1988 to 2002, as shown by the OLS regressions, but it used to contribute more to earnings, or, equivalently, less to earnings inequality, at the lower quantiles in 1988, and then switched to contributing more to earnings, or more to earnings inequality, at the higher

quantiles in 2002. Education is now more beneficial at the higher income groups, possibly because there is increased demand at the higher-paying positions for higher education, which is a good sign for the labor market.

Being a head of an enterprise or institution compared to a laborer increased earnings by 30% in 2002 at the 20th quantile and by 27% at the 80th quantile. As a result, obtaining a higher position was more marginally beneficial at the lower income groups, since it resulted in a higher “jump” up the ladder. Being a professional or technical worker compared to a laborer increased earnings by 29% in 2002 at the 20th quantile and by 24% at the 80th quantile. By the same token, this shows that investing in education and human capital, which would enable an individual to become a professional or technical worker, results in higher returns at the lower income groups. As a result, non-laborer occupations seem to be contributing to earnings inequality from 1988 to 2002 as shown by the OLS regressions, but they also seem to be contributing less to earnings inequality at the lower quantiles since the lower earnings groups are growing faster with regards to these higher-paying occupations.

Working under a state-owned or other publicly-owned company compared to an urban collective-owned company increased earnings by 25% in 2002 at the 20th quantile and by 19% at the 80th quantile. As a result, working in a state-owned company is more marginally beneficial at the lower income groups. Similarly, working under a foreign-owned company compared to an urban collective-owned company increased earnings by 74% in 2002 at the 20th quantile and by 72% at the 80th quantile; as a result, it is more beneficial to work in a foreign-owned company if an individual is part of the lower income groups. These examples show that non-urban collectives are benefiting the lower income groups more than the higher income groups, which may contribute less to earnings inequality at the lower quantiles. This is also supported by the

implications in the summary statistics analysis, which observed that ownership might be decreasing earnings inequality.

Working in the scientific research or technical services sector compared to the manufacturing sector increased earnings by 35% in 2002 at the 20th quantile and by 39% at the 80th quantile. This shows that it is actually more beneficial to work in the scientific research or technical services sector if an individual is part of the higher income groups. This is probably so because the manufacturing sector is still a major sector in the economy and can provide relatively better earnings for the lower income groups, and because the labor market rewards human capital, which is more prevalent in the higher income groups, more in this sector, which tends to pay more. Working in the financial and insurance services sector compared to the manufacturing sector increased earnings by 28% in 2002 at the 20th quantile and by 26% at the 80th quantile. As a result, it is more beneficial to work in the financial and insurance services sector compared to the manufacturing sector if an individual is part of the lower income groups because it will elevate the individual to a much higher earnings level. As a result, non-manufacturing sectors seem to be contributing to earnings inequality from 1988 to 2002, as shown by the OLS regressions, but they are exhibiting different effects on earnings inequality across the quantiles.

Overall, age and work experience are contributing less to earnings inequality at the lower quantiles than at the upper quantiles, being female, a minority, and Communist Party member is contributing less to earnings inequality at the higher quantiles, education is now contributing more to earnings at the higher quantiles, non-laborer occupations seem to be contributing less to earnings inequality at the lower quantiles, non-urban collectives may be contributing less to earnings inequality at the lower quantiles, and non-manufacturing sectors seem to exhibit different effects on earnings inequality across the quantiles.

Regression-Based Decomposition Analysis

Table 5: Regression-Based Decomposition: Summary of Additional Summary Statistics			
Contributions of Explanatory Variables to Level of Inequality of <i>lnearnings</i> (%)			
Dependent Variable:	1988	1995	2002
<i>lnearnings</i>			
Residual	75.82	62.71	71.96
Age	18.80	-1.064	9.98
Years of Work Experience¹	NA	29.46	5.86
Female	1.63	1.24	1.66
Minority	-0.0021	0.057	0.006
Communist Party Member	1.61	1.26	0.60
Education	1.14	1.78	2.91
Occupation	2.02	1.11	4.42
Ownership Form	3.43	2.40	-0.532
Work Unit Sector	-0.296	1.05	3.14
Total	100.00	100.00	100.00
Number of Observations	17,479	11,466	10,161

Notes:

1. See Table A1: Variable Description.

2. The omitted categories from the binary variables are being male, not a Communist Party member, being of Han origin, having elementary school or less than elementary school as the highest level of education, having the occupation of a laborer, working in an urban collective-owned work unit, and working in the manufacturing sector.

Table 5 shows the summary of the regression-based decomposition of the level of inequality of *lnearnings* for the years 1988, 1995, and 2002. Age increased the level of inequality of *lnearnings* by 18.8% in 1988, decreased the level of inequality by 1.06% in 1995, and increased it again by 9.98% in 2002. In addition, age was the largest component to the level of inequality in 1988 and 2002, apart from the residual, which comprised of 75.82% of earnings inequality in 1988 and 71.96% in 2002, and which includes unobserved variables and other explanatory variables that were not included in these surveys. As a result, age increased earnings inequality from 1988 and 2002, but at a decreasing rate; this was also implied by the OLS regression, which saw decreasing returns to age from 1988 to 2002. Its positive contribution to

earnings inequality is expected, considering that an older individual tends to have more work experience and earns higher earnings on average, and its decreasing effect may be due to the decreasing influence of seniority, which is related to age, as a result of market reforms. It probably decreased earnings inequality, or equivalently, equalized earnings, in 1995, as seniority was starting to lose its importance.

Years of work experience was the largest explained contributor to earnings inequality in 1995, which was also observed by Asuyama (2008), and which increased inequality by 29.46% that year, and then increased inequality by 5.86% in 2002. These positive contributions are expected, since individuals with more work experience tend to earn higher earnings; its decreasing effect may also be due to the decreasing influence of seniority, which is partially related to work experience. This was also implied by the OLS regressions, since work experience had a decreasing positive effect on earnings. For 1995, this effect was probably very significant because it probably includes some of the effects of age, which decreased during this year.

With regards to discriminatory variables, being female has increased the level of earnings inequality in 1988 by 1.63%, 1.24% in 1995, and by 1.66% in 2002, which coincides with implications made from the OLS regression analysis, since it implies increased gender discrimination from 1988 to 2002. Being a minority has actually decreased the level of earnings inequality, or, equivalently, equalized earnings, in 1988 by 0.002%, and then increased the inequality by 0.06% in 1995, and then increased it by 0.006% in 2002. This can partly be explained by the fact that being a minority actually increased earnings in 1988 as shown in Table 3, which would explain its equalizing effect, and by the fact that the OLS regression shows that it implies decreased minority discrimination, which is shown here by the decreasing contribution of minority status to the level of earnings inequality. Communist Party membership has

increased the level of inequality by 1.61% in 1988, 1.26% in 1995, and then by 0.6% in 2002. This shows a consistently shrinking effect of Communist Party membership on earnings inequality, which is supported by its decreasing effect on earnings as shown by the OLS regressions, which imply decreasing party membership discrimination. Communist Party membership was quite important in determining earnings when urban China was under a command economy, but as it is transitioning into a market economy, these effects are declining. As a result, this regression-based decomposition shows increasing gender discrimination and decreasing minority and party membership discrimination.

Education, which comprises of graduating from college or graduate school, professional school or junior college, and from middle level professional school, technical secondary school, upper middle school, or lower middle school, has contributed towards increasing the level of earnings inequality by 1.14% in 1988, 1.78% in 1995, and by 2.91% in 2002. This also coincides with the results from the OLS regression analysis, where educational level variables increased in their impact on earnings from 1988 to 2002. As a result of market reforms, the urban Chinese market is increasingly rewarding human capital, which is beneficial for individuals who have access to education.

Occupation, which consists of owners or managers of private or individual enterprises, the self-employed, professional or technical workers, heads of institutions or enterprises or factory directors or managers, office workers or clerical workers, and other types of occupations, also contributed towards increasing the level of earnings inequality by 2.02% in 1988, 1.11% in 1995, and then by 4.42% in 2002. This implies that the labor market is increasingly rewarding human capital, since it takes certain investment in this to obtain certain occupations, which is beneficial to individuals who have access to human capital. Occupation is, as a result, increasing earnings inequality, which was also implied from the OLS regression analysis.

Ownership form of an individual's work unit, which consists of state-owned or locally public-owned, privately-owned, joint-venture-owned, foreign-owned, and other types of ownership, has increased the level of earnings inequality by 3.43% in 1988, 2.40% in 1995, and then actually decreased it by 0.53% in 2002. This implies that ownership is starting to equalize earnings, and that although it started to show labor market segmentation due to its contribution to earnings inequality, it has decreased this effect by recently contributing towards equalizing inequality, which was also implied by the quantile regression analysis. This means that ownership is starting to not be a large determinant of an individual's earnings, which is a good sign for the labor market, since individuals usually do not have control over what type of ownership their work unit has. Deng and Li (2009) also explain that as SOE reforms progressed and as efficiency-based wage structures became predominant, the contribution of ownership status to earnings inequality declined.

An individual's work unit sector, which consists of the following variables: *agr*, *mining*, *const*, *transp*, *trade*, *realest*, *health*, *edu*, *scires*, *finins*, *govtparty*, and *othersect*, has decreased the level of earnings inequality in 1988 by 0.29%, and then increased it by 1.05% in 1995 and by 3.14% in 2002.¹¹ This increase was also implied by the OLS regression, and this shows that there has been growing segmentation in the urban Chinese labor market, which can become harmful and create market asymmetries; however, its contributions to inequality have been relatively small. In addition, sector's initial contribution to earnings equality could be explained by the fact that earnings were based more off of wage scales, and less off of sector. Deng and Li (2009) explain that following the tighter budget constraints placed on SOE's and the expansion of nonpublic sectors, earnings became more closely related to firm performance, and since a

¹¹ See Table A1 for the Variable Description.

work unit's sector influences its profitability, work unit sector became more influential in determining earnings.

To summarize, in 1988, the largest contributors to the level of earnings inequality were age, ownership, and occupation, in ranked order, and the equalizing variables were work unit sector and minority status, in ranked order. This follows what Deng and Li (2009) concluded, that seniority, which may be measured by age, and occupation were the largest contributors to earnings inequality in 1988, especially since they were the largest determinants of earnings, which were based off of wage scales, which tended to depend on the worker's occupation. And since earnings were mainly based off of wage scales in 1988, ownership probably disequalized earnings because SOE's tended to pay more since they were protected by the government. Work unit sector may have been equalizing in 1988 because this was the time when diverse sectors were just starting to emerge, and minority status was probably equalizing since the government still had authority to discourage minority discrimination. In 1995, the top disequalizing variables were work experience, ownership, and education, and the equalizing variable was age. Work experience, which was related to seniority, was most likely still a major component in determining earnings, and ownership was still a main determinant of earnings as well. Education probably became more disequalizing once jobs started to reward it more efficiently. In 2002, the largest contributors to earnings inequality were age, work experience, and occupation, and ownership form was the equalizing variable. As a result, age, work experience, and skill-based occupation, which are human capital variables, are being rewarded more efficiently by the labor market, and ownership's equalizing effect may be decreasing the presence of segmentation in the still inflexible labor workforce.

As a result, from 1988 to 2002, age and work experience have been contributing to earnings inequality at decreasing rates, being female has contributed to earnings inequality at

increasing rates, while being a minority and a Communist party member have contributed to earnings inequality at decreasing rates. Education and occupation have contributed to earnings inequality at increasing rates, work unit ownership has been decreasing earnings inequality and has recently contributed to earnings equality, and work unit sector has contributed to earnings inequality at an increasing rate.

VII. Conclusion

After analyzing earnings and earnings inequality measures from the 1988, 1995, and 2002 surveys of the China Household Income Project, we have concluded that earnings have increased, and that earnings inequality has increased, but at a decreasing rate, from 1988 to 2002. From analyzing summary statistics, we have confirmed that urban China's labor market is indeed becoming more market-oriented, as shown by the increased diversity of ownership forms and work unit sectors. The ordinary least squares regressions have implied that the labor market is starting to reward human capital variables more, including education and skill-based occupation, but that it is decreasing its rewards to age and work experience as well, which may actually mean that it is becoming more efficient, since seniority, which is related to age and work experience, is decreasing in influence. And even though minority and party membership discrimination have decreased, gender discrimination is increasing, as well as labor market segmentation by sector. The quantile regressions have given insight into each variable's effect on earnings inequality by earnings quantile, and suggest that ownership has been contributing to less earnings inequality at the lower quantiles and has recently contributed to earnings equality. Similarly to the OLS regressions, which analyzed the effect of variables on earnings in general, the regression-based decomposition has shown that human capital variables have been contributing to earnings inequality; education and skill-based occupation have been increasing their contributions to

earnings inequality, whereas age and work experience have been decreasing their contributions to earnings inequality. In addition, the decomposition analysis has shown that minority status and Communist party membership have been decreasing their contributions to earnings inequality, that gender has been increasing its contribution to earnings inequality, and that work unit sector has been increasing its contribution to earnings inequality. And similarly to the quantile regressions, the decomposition analysis shows that ownership has actually started to equalize earnings.

Overall, the labor market has indeed been rewarding human capital variables, in which age and work experience, which are related to seniority, have been decreasing in their contributions to earnings inequality, and whereas education and skill-based occupation have been increasing their contributions to earnings inequality. In addition, the labor market has become more discriminatory in terms of gender, which has increased its contribution to earnings inequality, and less discriminatory in terms of minority status and Communist party membership, which have decreased their contributions to earnings inequality. The labor market has also become more segmented in terms of work unit sector, which has increased its contribution to earnings inequality, but has also become less segmented in terms of ownership, which has actually started to contribute to earnings equality. From these observations, it is clear that a variable's effect on earnings over time provides insight into its effect on earnings inequality over time, which, in turn, provides insight into its effect on the labor market. As a result, although increasing earnings inequality has been leading to increased gender discrimination and segmentation by sector, it is increasing at a decreasing rate, which could lessen these effects. In addition, earnings inequality in urban China has also been leading to decreased minority and party membership discrimination and to increased rewards for human capital variables, including education and skill-based occupation; the labor market's decreasing rewards for age and work

experience may actually reflect its increased efficiency, as seniority, which is related to work experience and age, has been decreasing in influence. These observations show that urban China's labor market has been progressing overall and has been becoming more market-oriented. However, gender discrimination and segmentation by sector need to be addressed, since they are resulting in unequal rewards for female workers and are hampering urban China's progress of transitioning into a properly-functioning labor market.

It would be interesting to analyze the effect of additional variables, such as a worker's hukou, or residence, status, smoking habits, job satisfaction, method of obtaining their job, and seniority, on earnings and earnings inequality.¹² It would have also been desirable to extend this study to a longer time period as well, since in 2004 there was a shortage of low-skilled workers, which increased their wages in China's southern coastal region, which may contribute to a reduction in the earnings gap between the highly skilled and low-skilled (Asuyama, 2008).¹³ In addition, Asuyama (2008) notes that the new labor contract law of 2008 may make the labor market less flexible because it has made it harder for employers to dismiss employees as it imposed restrictions on the termination of employees' contracts, which would further limit labor market mobility and increase segmentation. Earnings inequality, which is affected by determinants and other unobserved variables, provides valuable information about urban China's labor market, and it should be continued to be analyzed alongside China's economic growth in order to ensure that China is heading in a stable and healthy direction.

¹² The 1988 survey did not include this information, and the 1995 and 2002 surveys did not include these observations due to limitations in statistical software packages.

¹³ The latest CHIP survey was conducted in 2002.

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Appendix

Table A1: Variable Description	
Variable	Definition
<i>anearnings</i>	The individual's personal annual earnings, including regular wages, bonuses, subsidies, allowances, and other cash income from work units, in units of yuan, and in real terms, adjusted to 2002 price levels.
<i>lnearnings</i>	The logarithm of the individual's personal annual earnings, in units of yuan, and in real terms, adjusted to 2002 price levels.
<i>age</i>	The individual's age in numerical format.
<i>age_2</i>	The squared value of the individual's age.
<i>wrkexp</i>	The total number of an individual's years of work experience. This variable was not included in the 1988 survey, and since its estimation resulted in a large amount of missing observations, it was excluded from the 1988 results.
<i>wrkexp_2</i>	The squared value of an individual's years of work experience. This variable was not included in the 1988 survey, and since its estimation resulted in a significant amount of missing observations, it was excluded from the 1988 results.
<i>female</i>	A binary variable that indicates if an individual is female. (1=female/0 not)
<i>male</i>	A binary variable that indicates if an individual is male. (1=male/0=not)
<i>min</i>	A binary variable that indicates if an individual is a national ethnic minority. (1=minority/0=not)
<i>han</i>	A binary variable that indicates if an individual is of Han origin. (1=Han/0=Not)
<i>comm</i>	A binary variable that indicates if an individual is a member of the Communist Party or of the Communist Youth League. (1=Communist/0=Not)
<i>notcomm</i>	A binary variable that indicates if an individual is a member of a party other than the Communist Party or of no party. (1=Not Communist/0=Communist)
Highest Educational Level Achieved Variables	
<i>coll</i>	College or graduate school (1=college/0=not)
<i>prof</i>	Professional school or junior college (1=professional/0=not)
<i>midd</i>	Middle level professional, technical secondary school, upper middle school, or lower middle school (1=middle level/0=not)
<i>elem</i>	Less than three years of primary school to primary school (1=elementary/0=not)
Occupation Variables	
<i>owner</i>	Owner or manager of private or individual enterprise, or self-employed (1=owner/0=not)
<i>proftechn</i>	Professional or technical worker (1=professional/0=not)
<i>head</i>	Head of institution or enterprise, division head in institution or enterprise, or factory director or manager (1=owner/0=not)
<i>offwrk</i>	Office worker or clerical worker (1=office/0=not)

<i>laborer</i>	Laborer (1=laborer/0=not)
<i>otherocc</i>	Other occupation (1=other/0=not)
Ownership of an Individual's Work Unit Variables	
<i>state</i>	State-owned, at central or provincial level, or other publicly-owned, or state share-holding company (1=state/0=not)
<i>urbcoll</i>	Urban collective (1=urban/0=not)
<i>priv</i>	Private or individual enterprise, or self-employed (1=private/0=not)
<i>jv</i>	Sino-foreign joint venture (1=joint venture/0=not)
<i>foreign</i>	Foreign-owned (1=foreign/0=not)
<i>othero</i>	Other ownership (1=other/0=not)
Individual Work Unit Economic Sector Variables	
<i>agr</i>	Agriculture, forestry, animal husbandry, fishing, or water conservancy (1=agriculture/0=not)
<i>manu</i>	Manufacturing (1=manufacturing/0=not)
<i>mining</i>	Mining or geological survey and prospecting (1=mining/0=not)
<i>const</i>	Construction (1=construction/0=not)
<i>transp</i>	Transportation, communications, posts, or telecommunications (1=transportation/0=not)
<i>trade</i>	Trade, restaurants and catering, materials supply and marketing, or warehousing (1=trade/0=not)
<i>realest</i>	Real estate, public utilities, or personal and consulting services (1=real estate/0=not)
<i>health</i>	Health, physical culture, sports, or social welfare (1=health/0=not)
<i>edu</i>	Education, culture, art, mass media, or entertainment (1=education/0=not)
<i>scires</i>	Scientific research or technical services (1=scientific/0=not)
<i>finins</i>	Finance or insurance (1=finance/0=not)
<i>govtparty</i>	Government, party organizations, or social organizations (1=government/0=Not)
<i>othersect</i>	Other sector (1=other/0=Not)

Source: China Household Income Project: 1988, 1995, and 2002 Surveys

Table A2: Additional Summary Statistics						
Year	1988		1995		2002	
Variables	Min	Max	Min	Max	Min	Max
<i>anearnings</i>	0	73,232.05	0	62,540.27	0	160,000
<i>age</i>	16	79	16	76	16	93
<i>wrkexp*</i>	NA	NA	0	47	0	43
<i>Remaining Binary Variables</i>	0	1	0	1	0	1

Source: China Household Income Project: 1988, 1995, and 2002 Surveys
 *See Table A1: Variable Description

Table A3: Comprehensive Regression of <i>larnings</i>, 1988-2002			
Dependent Variable:	1988	1995	2002
<i>larnings</i>			
<i>age</i>	0.075** (0.0017)	0.061** (0.007)	0.037** (0.0068)
<i>age_2</i>	-0.00076** (0.00002)	-0.00079** (0.00009)	-0.00043** (0.00008)
<i>wrkexp</i> ¹	NA	0.025** (0.0038)	0.017** (0.0005)
<i>wrkexp_2</i> ¹	NA	-0.00013 (0.00009)	-0.000042 (0.00008)
<i>female</i>	-0.098** (0.0059)	-0.096** (0.011)	-0.13** (0.012)
<i>min</i>	-0.022 (0.015)	-0.068** (0.025)	0.030** (0.029)
<i>comm</i>	0.056** (0.0078)	0.074** (0.014)	0.042 (0.014)
Highest Educational Level Achieved Variables			
<i>coll</i>	0.14** (0.013)	0.23** (0.040)	0.28** (0.05)
<i>prof</i>	0.095** (0.013)	0.16** (0.034)	0.15** (0.046)
<i>midd</i>	0.078** (0.0089745)	0.088** (0.029)	0.082* (0.04)
Occupation Variables			
<i>owner</i>	0.045 (0.050)	0.031 (0.061)	0.26** (0.036)
<i>proftechn</i>	0.076** (0.011)	0.17** (0.02)	0.25** (0.025)
<i>head</i>	0.15** (0.022)	0.16** (0.023)	0.27** (0.029)
<i>offwrk</i>	0.0401** (0.008)	0.11** (0.018)	0.18** (0.025)
<i>otherocc</i>	0.065** (0.016)	0.10** (0.016)	0.070** (0.021)
Work Unit Ownership Variables			
<i>state</i>	0.12** (0.0072)	0.19** (0.015)	0.23** (0.024)
<i>priv</i>	-0.52** (0.088)	0.23* (0.096)	0.093** (0.029)
<i>jv</i>	0.60** (0.050)	0.62** (0.049)	0.578* (0.05)
<i>foreign</i>	0.24 (0.14)	1.31** (0.14)	0.70** (0.082)
<i>othero</i>	-0.19** (0.050)	0.078 (0.07)	0.208** (0.028)
Work Unit Economic Sector Variables			

<i>agr</i>	-0.02 (0.028)	0.022 (0.04)	0.084 (0.054)
<i>mining</i>	-0.0093 (0.014)	0.017 (0.049)	-0.0039 (0.039)
<i>const</i>	0.018 (0.015)	0.0043 (0.031)	0.077* (0.034)
<i>transp</i>	0.059** (0.011)	0.14** (0.024)	0.19** (0.024)
<i>trade</i>	0.021* (0.008)	-0.044** (0.016)	-0.057** (0.022)
<i>realest</i>	-0.085** (0.018)	0.040 (0.028)	0.032 (0.02)
<i>health</i>	-0.024 (0.014)	0.099** (0.026)	0.13** (0.032)
<i>edu</i>	-0.053** (0.012)	0.07** (0.022)	0.13** (0.029)
<i>scires</i>	-0.00073 (0.02)	0.073* (0.034)	0.32** (0.047)
<i>finins</i>	-0.021 (0.023)	0.28** (0.036)	0.24** (0.037)
<i>govtparty</i>	-0.0768** (0.012)	0.018 (0.018)	0.081** (0.028)
<i>othersect</i>	-0.118** (0.038)	-0.07 (0.066)	0.051 (0.04)
Intercept	6.52** (0.033)	6.69** (0.123)	7.34** (0.13)
SER	0.36	0.53	0.57
R²	0.335	0.254	0.270
Adjusted R²	0.333	0.252	0.267
Number of observations	17,479	11,466	10,161

Notes:

1. See Table A1: Variable Description.

2. The omitted categories from the binary variables are being male, not a Communist Party member, being of Han origin, having elementary school or less than elementary school as the highest level of education, having the occupation of a laborer, working in an urban collective-owned work unit, and working in the manufacturing sector.

3. Individual coefficients are statistically significant at the *5% or **1% significance level, and standard errors for each coefficient are included in parentheses.

Table A4: Comprehensive Quantile Regression of *lnearnings* for the 20th, 40th, 50th, 60th, and 80th Quantiles, 1988 - 2002

Quantile	0.20			0.40			0.50			0.60			0.80		
Year	1988	1995	2002	1988	1995	2002	1988	1995	2002	1988	1995	2002	1988	1995	2002
<i>age</i>	0.0838**	0.065**	0.030**	0.070**	0.052**	0.027**	0.066**	0.047**	0.023**	0.06**	0.041**	0.025**	0.054**	0.031**	0.047**
<i>age_2</i>	-0.0009**	-0.0008**	-0.0004**	-0.0007**	-0.0007**	-0.0003**	-0.0007**	-0.0006**	-0.0003**	-0.0006**	-0.0005**	-0.0003**	-0.0005**	-0.0004**	-0.0005**
<i>wrkexp</i> ¹	NA	0.029**	0.025**	NA	0.022**	0.019**	NA	0.019	0.016**	NA	0.020**	0.014**	NA	0.023**	0.002
<i>wrkexp</i> ²	NA	-0.0002	-0.00019	NA	-0.00009	-0.000062	NA	-0.00005	0.000003	NA	-0.0001	0.00003	NA	-0.0002**	0.0002**
<i>female</i>	-0.091**	-0.090**	-0.15**	-0.082**	-0.074**	-0.12**	-0.076**	-0.066**	-0.12**	-0.073**	-0.065**	-0.11**	-0.081**	-0.067**	-0.11**
<i>min</i>	0.0094	-0.04	0.039	-0.011	-0.067**	0.075*	-0.021	-0.059**	0.056*	-0.031*	-0.060**	0.029	-0.048**	-0.061*	-0.03
<i>comm</i>	0.052**	0.060**	0.045**	0.041**	0.057**	0.041**	0.033**	0.049**	0.042**	0.039**	0.045**	0.031*	0.031**	0.051**	0.031
Highest Educational Level Achieved Variables															
<i>coll</i>	0.17**	0.26**	0.28**	0.14**	0.16**	0.26**	0.12**	0.17**	0.29**	0.10**	0.19**	0.27**	0.075**	0.19**	0.34**
<i>prof</i>	0.14**	0.17*	0.16**	0.10**	0.079*	0.15**	0.076**	0.099*	0.18**	0.066**	0.12*	0.15**	0.037**	0.14**	0.21**
<i>midd</i>	0.11**	0.10*	0.084	0.087**	0.033	0.085*	0.067**	0.046	0.11**	0.056**	0.067	0.094**	0.028**	0.099*	0.15**
Occupation Variables															
<i>owner</i>	0.023	-0.018	0.19**	-0.0039	0.045	0.20**	0.031	0.072	0.25**	0.038	0.069	0.24**	0.10*	0.016	0.33**
<i>proftechn</i>	0.085**	0.20**	0.29**	0.069**	0.14**	0.25**	0.066**	0.12**	0.22**	0.065**	0.089**	0.19**	0.067**	0.085**	0.24**
<i>head</i>	0.097**	0.16**	0.30**	0.099**	0.13**	0.23**	0.11**	0.13**	0.19**	0.13**	0.10**	0.18**	0.029**	0.12**	0.27**
<i>offwrk</i>	0.042**	0.10**	0.19**	0.034**	0.087**	0.16**	0.027**	0.076**	0.14**	0.023**	0.054**	0.13**	0.010**	0.056*	0.17**
<i>otherocc</i>	0.092**	0.12**	0.086**	0.063**	0.088**	0.099**	0.069**	0.090**	0.075**	0.071**	0.073**	0.068**	0.061**	0.076**	0.074**
Work Unit Ownership Variables															
<i>state</i>	0.15**	0.21**	0.25**	0.12**	0.18**	0.29**	0.12**	0.19**	0.28**	0.12**	0.20**	0.25**	0.11**	0.17**	0.19**
<i>priv</i>	-0.60**	0.073	0.037	-0.57**	0.039	0.13**	-0.62**	0.19	0.082*	-0.46*	0.20	0.098*	-0.57**	0.38	0.087
<i>juv</i>	0.46**	0.55**	0.59**	0.66**	0.56**	0.59**	0.63**	0.58**	0.57**	0.76**	0.56**	0.59**	0.74**	0.66**	0.65**
<i>foreign</i>	0.047	1.15**	0.74**	0.12	0.92**	0.87**	0.27	1.20**	0.76**	0.24	1.16**	0.86**	0.58*	1.42**	0.72**
<i>othero</i>	-0.40**	-0.020	0.18**	-0.35*	0.18	0.23**	-0.24	0.13	0.21**	-0.18	0.12	0.18**	0.043	0.24*	0.15**
Work Unit Economic Sector Variables															
<i>agr</i>	-0.039	0.043	0.15*	0.0033	0.018	0.056	-0.015	0.0059	0.0046	-0.019	-0.0060	0.052	0.033	0.054	0.033
<i>mining</i>	0.020	0.12*	0.059	0.0084	0.034	0.044	-0.015	0.011	0.0029	0.0060	0.019	-0.0057	0.012	-0.046	-0.04
<i>const</i>	0.0041	-0.029	-0.024	0.0093	0.0084	-0.0005	0.010	-0.019	0.047	0.021	-0.048	0.052	0.017*	-0.034	0.12**
<i>transp</i>	0.038**	0.077*	0.22**	0.032*	0.13**	0.21**	-0.079**	0.12**	0.19**	0.047**	0.13**	0.20**	0.017**	0.17**	0.19**
<i>trade</i>	-0.032**	-0.046*	-0.083*	-0.011	-0.026*	-0.07**	-0.064	-0.033**	-0.063*	0.010	-0.028*	-0.034	0.014**	-0.018	-0.01
<i>realest</i>	-0.099**	-0.053	-0.0022	-0.069**	-0.020	0.046*	-0.066**	0.011	0.048*	-0.072**	0.022	0.068*	0.057	0.18**	0.10**
<i>health</i>	-0.017	0.14**	0.15**	-0.023*	0.11**	0.19**	-0.033**	0.11**	0.17**	-0.032**	0.088**	0.17**	-0.016	0.084*	0.16**
<i>edu</i>	-0.038**	0.11**	0.17**	-0.039**	0.076**	0.14**	-0.051**	0.032*	0.14**	-0.048**	0.015	0.15**	-0.17**	0.0039	0.15**
<i>scires</i>	0.0017	0.16**	0.35**	-0.016	0.071**	0.40**	-0.015	0.025	0.37**	-0.014	0.016	0.37**	-0.079	-0.0059	0.39**
<i>finins</i>	0.0011	0.28**	0.28**	0.010	0.26**	0.28**	0.010	0.24**	0.23**	0.00032	0.28**	0.23**	-0.17	0.32**	0.26**
<i>govtparty</i>	-0.079**	0.073**	0.15**	-0.083**	0.015	0.13**	-0.079**	-0.017	0.093**	-0.091**	-0.025*	0.087**	-0.085**	-0.050*	0.06*
<i>othersect</i>	-0.20*	-0.048	0.0072	-0.069	-0.066	0.12**	-0.064	-0.015	0.098*	-0.042	0.018	0.12*	-0.18	-0.022	0.12**

Table A4 Notes:

1. Please refer to Table A1: Variable Description.
2. This sample includes all individuals aged 16 or over who are employed.
3. The omitted categories from the binary variables are being male, not a Communist Party member, being of Han origin, having elementary school or less than elementary school as the highest level of education, having the occupation of a laborer, working in an urban collective-owned work unit, and working in the manufacturing sector.
4. Individual coefficients are statistically significant at the *5% or **1% significance level.
5. Number of Observations: 17,479 for 1988, 11,466 for 1995, and 10,161 for 2002.

Table A5: Regression-Based Decomposition: Contributions of Explanatory Variables to Inequality of <i>lnearnings</i> (%)			
Dependent Variable:	1988	1995	2002
<i>lnearnings</i>			
Residual	75.82	62.71	71.96
Age	18.80	-1.064	9.98
Years of Work Experience¹	NA	29.46	5.86
Female	1.63	1.24	1.66
Minority	-0.0021	0.057	0.006
Communist Party Member	1.61	1.26	0.60
Highest Educational Level Achieved Variables			
Education	1.14	1.78	2.91
<i>coll</i>	1.94	1.41	2.86
<i>prof</i>	0.64	1.62	1.43
<i>midd</i>	-1.43	-1.25	-1.38
Occupation Variables			
Occupation	2.02	1.11	4.42
<i>owner</i>	0.0021	0.0001	-0.55
<i>proftechn</i>	0.95	1.86	2.92
<i>head</i>	0.46	1.52	2.42
<i>offwrk</i>	0.38	-0.0091	0.72
<i>otherocc</i>	0.23	-0.74	-1.09
Work Unit Ownership Variables			
Ownership Form	3.43	2.40	-0.532
<i>state</i>	2.63	2.08	0.098
<i>priv</i>	0.22	-0.041	-0.88
<i>jv</i>	0.37	0.37	0.49
<i>foreign</i>	0.0052	0.35	0.32
<i>othero</i>	0.21	-0.023	-0.56
Work Unit Economic Sector Variables			
Work Unit Sector	-0.296	1.05	3.14
<i>agr</i>	-0.0029	0.0051	0.02
<i>mining</i>	0.013	0.0038	0.0014
<i>const</i>	0.0071	-0.0007	0.015
<i>transp</i>	0.17	0.16	0.30
<i>trade</i>	-0.019	0.25	0.47
<i>realest</i>	0.15	-0.024	-0.14
<i>health</i>	-0.064	0.17	0.31
<i>edu</i>	-0.28	0.22	0.74
<i>scires</i>	-0.027	0.10	0.59
<i>finins</i>	0.0036	0.23	0.33
<i>govtparty</i>	-0.30	0.081	0.54
<i>othersect</i>	0.06	0.0037	-0.015

Total	100.00	100.00	100.00
Number of Observations	17,479	11,466	10,161

Notes:

1. See Table A1: Variable Description.
2. The omitted categories from the binary variables are being male, not a Communist Party member, being of Han origin, having elementary school or less than elementary school as the highest level of education, having the occupation of a laborer, working in an urban collective-owned work unit, and working in the manufacturing sector.
3. The contributions of Education, Occupation, Ownership Form, and Work Unit Sector were calculated by taking the sum of the contributions of each binary variable under its corresponding category, which is also conducted by Fields (2002).