

Education Attainment and The labor market in China, 1989-2013

Wei Chi

School of Economics and Management, Tsinghua University

Richard Freeman

Harvard University and NBER

Hongbin Li

School of Economics and Management, Tsinghua University

Abstract:

China's emerging labor market was buffeted by changes in demand and supply and institutional changes in the last two decades. In addition, China's higher education witnessed a huge expansion in enrollment and thus in the supply of college graduates. Using the Chinese Urban Household Survey data from 1989 to 2009, and a Chinese College Students Survey from 2000-2013, our study shows that the market responded with substantial changes in the structure of wages and in employment and types of jobs that workers obtained that mirrors the adjustments found in labor markets in advanced economies. However, the one place where the Chinese labor market appears to diverge from the labor markets in advanced countries is the rapid convergence in earnings and occupational positions of cohorts who entered the job market under more or less favorable conditions. On this dimension, China's labor market seems more flexible than those in other countries. Three related factors may explain this pattern: (1) the rapid growth of China's economy; (2) the high rate of employee turnover; (3) the relative weakness of internal labor markets in China. Bottom line, the Chinese labor market has responded about as well as one could expect to the changes in the demand and supply factors and institutional shocks in this critical period in Chinese economic history.

JEL classification code: J3

Key words: Education attainment; Chinese labor market; supply and demand factors; earnings dispersion; occupation position; cohort effect

Education is one of the most important forms of human capital (Becker, 1964). At the individual level, education is related higher income, lower unemployment likelihood, and better occupation. At the national level, higher educational attainment leads to better social outcomes on child mortality, fertility, education of children, income equality, and economic growth (Barro, Caselli, and Lee, 2013; Barro and Lee, 1994; Breierova and Duflo, 2004; Cutler et al., 2006; de Gregorio and Lee, 2002). As an important indicator of world development in educational attainment, the percentage of people with tertiary education among the total population aged 15 and over increased from 2.2% in 1950 to 14.2% in 2010 worldwide (Barro and Lee, 2013). Further, our calculation shows that while the world tertiary education enrolment has been increasing, the contribution of developing countries to the total tertiary-education enrolment increased from 42% to 65%, and the contribution of developed countries declined from 44% to 26% during the period 1990-2010 (Table 1). Among developing countries, China's contribution to the world tertiary education enrolment alone increased from 6% to 17% from 1990 to 2010. This rapid increase has to do with significant college expansion in China that occurred during this period. How did the huge number of newly added supply of college graduates fare in the labor market? What is the implication for their income growth and occupational attainment?

Unlike advanced countries, until China began its post-Mao economic reforms, the country did not have a genuine labor market. State owned enterprises were the only source of demand for labor. Administrative agencies assigned workers to firms, so individual choice did not determine labor supply. Then China began the process of transitioning from a state-run economy to a more market-driven one. The early reforms focused on agriculture and product markets but slowly the government freed firms to make labor demand decisions and freed workers to choose their own places of work, creating a genuine labor market. This paper uses data from the National Bureau of Statistics' (NBS) Urban Household

Survey¹ from 1989 through 2009, which covers the period when both China's higher education had been expanded rapidly and labor market had developed, to examine how the emergent labor market influenced the wage, employment, and occupational attainment of fresh college graduates in comparison with more experienced workers. Our research agenda is related to previous studies that have examined relations between college expansion and rising inequality (Meng et al. 2013), and between college expansion and the unemployment rate of graduates (Li et al., 2014). Compared to prior work, our research scope is broader— under the supply-demand framework, we examine how tertiary education developed in China compared to other countries and between different levels of colleges, and how demands evolved with the economic reform, and how the demands met the supply influencing both the level and dispersion of earnings, and employment and occupational attainment of college graduates.

We develop a pooled cross-province time series data set from the NBS files to assess market responses to shifts in supply and demand. Since NBS household data covered the period up to 2009, we used another data from Chinese College Students Survey (CCSS) conducted by the China Data Center of Tsinghua University, 2010-2013, to analyze the more recent trend of income and occupation for college graduates.² Similar to other developed or developing countries, China has two distinct types

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NBS has conducted the Urban Household Survey yearly since 1986. The aggregate statistics are published in China Statistical Yearbooks. The NBS urban household surveys use a stratified two-stage random sampling method. In the first stage, NSB selects cities and counties according to population size to ensure the sample is representative of the urban population. In the second stage, within each selected location, the survey samples sub-districts (street committees), resident committees, and households successively. Each year 1/3 of the households from the second stage are rotated out and replaced by new households, so that the sample is renewed every 3 years. The NBS urban household survey begins with items on the individual's demographic and employment status, followed by various month-end income forms. The rest of the survey records information on the household's daily expenditure. Local NBS offices collect the data, which is then aggregated into the annual data. The NBS urban household surveys did not ask about hours of work until 2002, so we could not calculate the hourly wage rate and instead used annual earnings. Unlike the U.S. Current Population Survey, the NBS asks respondents the year when they start working, which allows us to identify different entry cohorts of workers.

² Chinese College Students Survey (CCSS) was conducted by the China Data Center of Tsinghua University in May and June of each year, 2010- 2013. The sampling method used is stratified random sampling, with locations (Beijing, Shanghai, Tianjin, Northeastern China, Eastern China, Central China, and Western

of colleges, 3-year and 4-year colleges. Three -year colleges are professional and vocational schools. They admit students through college entrance examination as 4-year colleges, but the scores for admission to 3-year colleges are significantly lower than to 4-year colleges. Moreover, unlike in the United States where students in a community college can transfer to a 4-year university if they wish to further pursue the bachelor degree, students in 3-year colleges in China must take another general examination to get into a 4-year university and this admission route to a 4-year university is subject to quota. We find that:

(1) Replacing administrative decisions with market wage determination widened educational differentials between 4-year and 3-year college graduates, and between colleges and high school or below education levels. Overall, 4-year college students fared most during the two decades. However, in recent years, the data seems to indicate the wage advantages of 4-year college graduates is weakening.

(2) The wages and employment of young college graduates varied with the market conditions when they first sought work, much as the wages and employment vary with business cycles in the US and other advanced countries. But whereas in those countries cohort effects persist for over a decade, in china cohort effects associated with the supply/demand balance diminished within three years.

(3) Direct measures of supply and demand factors impacted the employment, wage and occupation of college graduates. Higher cohort sizes reduced earnings and increased the dispersion of earnings, largely for starting graduates. Rising GDP raised the level and dispersion of earnings, again more for starting graduates than for more experienced workers. But the labor market also adjusted to change with changes in the rate of joblessness and changes in the occupational position of workers with

China) and type of college (Tier 1–7) as stratifying variables. Each sampled university was assigned a weight based on sampling probability. In each college, approximately 300 students were randomly selected from the graduating class as survey respondents. The questionnaire was designed in collaboration with experts in other disciplines, such as sociology and education. The survey in each college was supervised by one to three college administrators. The survey team was trained in Beijing for several days. The students were asked to complete the questionnaires, after which the questionnaire forms were placed into coded envelopes to guarantee anonymity. The submitted questionnaires were then collected by the survey administrators in the college.

given years of education.

Overall, colleges graduates fared most from the economic development and reforms in China, although their advantages decreased due to the expansion of colleges exceeding the growth of demand for college graduates in recent years. However, young graduates catch up fairly rapidly, suggesting greater wage flexibility in China.

Transition to Genuine Labor Market

We start our analysis with a brief summary of the economic reforms that created a functioning labor market in China. Prior to the reforms state owned enterprises (SOE) employed nearly all urban workers. Enterprises could not lay off workers and rarely discharged them for poor performance, effectively creating “iron rice bowl” life-time employment. The state assigned workers to jobs in work units and did not permit them to change jobs on their own accord. The labor bureau used the same wage grid to determine workers’ salaries across enterprises, industries and regions. The grid included 8 grades for blue-collar workers and 24 grades for white-collar including professional, technical, and managerial employees. The wage differences across enterprises, industries and regions, were small. The state set wages at a low level, but work units provided benefits to employees such as free housing, pension, child care, and medical service. Individual SOEs paid retirees the same salaries as when they were working. The wage structure was highly compressed.

In the 1980s, the central government loosened its grip on the labor market. It allowed SOEs to set wages for their employees though the government still controlled the total payroll. It allowed SOEs to fire employees who did not perform adequately, though SOE jobs remained more secure than jobs in private or foreign and joint ventures. Passage of “the CPC’s Resolution on Economic Institutional Reform” in 1984 allowed for greater variation in pay across and within establishments (Zhang et al., 2005).

After 1990, Ministry of Labor started piloting a new job-based pay system in selected state enterprises. It conducted a job evaluation exercise and then paid employees a base salary according to

the position they hold.³ The base pay also reflects the market value of the job. As cash compensation became more market-based, the government relieved enterprises from providing housing, medical service, and pension benefits to their employees. Housing was privatized, and the government established social funds of pension, health, and unemployment insurance. In these reforms the state differentiated among workers who retired before 1997, those who started work before 1997 and were still working then and those who started after 1997 in ways that meant that the reforms had a smaller impact on the older cohorts than on younger cohorts. For example, the older cohorts receive housing subsidy if their firm did not provide them apartments, while newer cohorts are not entitled to such benefits. This policy is described as “New People new rule, old people old rule”.

In the mid and late 1990s state enterprises laid off millions of workers, which raised joblessness among urban workers. By the mid 1990s the labor bureau no longer allocated college graduates to jobs; individuals could choose their own workplace (Wei et al., 1997). In the 2000s as employment shifted to town and country enterprises and eventually to private enterprises, the government enacted laws that made it easier for the All China Federation of Trade Unions (ACFTU) to organize workers and encouraged ACFTU unions to represent workers rather than being “transmission belts” for the state and party. The Contract Labor law, which took effect in 2008, required firms to give migrant workers written contracts and strengthened worker rights to obtain permanent jobs.

Changes in Demand and Supply

The incipient labor market faced huge shifts in demand and supply associated with China's transition to a more market-based economy. Demand for labor increased massively due to China's rapid post reform economic growth. From the late 1980s to 2009, the annual average GDP growth rate was 9.6% according to official government statistics, albeit with business cycle swings around the average growth rate (Gong and Lin, 2008; Gao, 2007; Imai, 1996). NBS's China Statistical Yearbooks

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Ministry of Labor, “Notice on the Relevant Issues Concerning Experiment of Job-Based Pay System” (Document No. 2 [1992]). http://www.chinaorg.cn/zcfg/zcfg/2007-12/19/content_5153002.htm.

show that GDP growth rates plunged to 4.1 and 3.8 percent in 1989 and 1990, reaching the lowest level since the reform, and experienced another slow-down in 1998-1999. China expanded steadily from 2000 to 2008-2009 when the global financial crisis broke out. Part of China's increased demand for labor stemmed from exports. From 1989 to 2000 exports increased at an annual average rate of 16%. After China joined the WTO in 2001, the annual export growth rate increased to over 20%. Rapid export growth raised the demand for labor, especially low-skilled manufacturing workers. Another driver of China's economic growth was domestic fixed capital investment (FCI). The ratio of FCI to GDP increased from 27% to 65% during 1989-2009. The result of the strong economic growth was that employment increased from 520 million in the late 1980s to 740 million in 2009.

On the *supply* side, China's population of working age persons has varied with the size of birth cohorts. The size of birth cohorts declined during the Great Famine period 1958-1961, then increased in the baby boom in the 1960s. There was another birth bust in the late 1970s as the Great Famine cohort entered reproductive age, followed by a mild baby boom in the early 1980s. The demographic cycle produced a large increase in supply in the 1980s when the post-famine baby boomers entered the labor force. Investments in education boosted the supply of skilled workers massively in the 1990s and 2000s. Enrollments in high school increased from 2.4 million in the late 1980s to 8.2 million in 2009. The number of persons graduating college annually increased 570,000 in 1989 to about 6 million in 2009. Figure 1 further shows the enrolment of 3-year and 4-year colleges in China, in comparison to the enrolment of 2-year and 4-year institutes in the US. China higher education enrolment increased more rapidly than that in the US during the period 1994-2012. China's 4-year college enrolment increased more than the 3-year college enrolment. Since 2009 3-year college enrolment has almost been constant while the 4-year college enrolment was still on the trend of rising. Korean tertiary-education enrolment has reached the highest level (102% in 2008-2009) and declined to 98% in 2012. In China, college enrollment has expanded significantly, and it has not reached the turning point where the enrollment rate, especially enrolment of 4-year colleges, started to decline.

Since the major labor market reforms in wage determination took place from the 1990s through the 2000s (Zhang et al., 2005; Appleton et al. 2005; Knight and Song, 2003), the Urban Household files provide evidence on the way in which the incipient labor market determined wages and employment for graduates with different education levels in a period of huge economic change. CCSS data provides further evidence on college graduates' labor market performance since 2009 in the era of post-financial crisis.

Education, Experience, and Cohort Earnings Differentials

Figure 2 shows that differentials in earnings between educational groups were small at the outset of the period and increased rapidly after 1992 but leveled off after 2004. We also examine earnings differentials between 3-year and 4-year college graduates in China. In the United States, research showed that graduates of 2-year community colleges and 4-year universities earned different earnings. The median earnings of the 25 years old or over with some college and associate degree was \$31,906, while the median earnings of those with bachelor degree was \$47,510 (US census, 2012). In China 4-year university graduates earned 30% more than 3-year college graduates in the early 1990s, and the gap increased to as high as 60% in 2009, which was similar to the earnings gap between associate and bachelor degrees in the US in 2009.⁴ Post 2009, CCSS data shows that the starting salary between 4-year and 3-year colleges narrowed (Figure 2b). Because of stronger demand for technicians in the manufacturing and service sectors, and because of large expansion of 4-year university admission, the wage gap between 3-year and 4-year college graduates was no longer expanding in China.

We estimated the average elasticity of substitution between the two kinds of college graduates during the period 1994-2009. The dependent variable is the wage ratio of the first-year earnings of 4-year college graduates to 3-year college graduates ($\ln \text{earnings}_{4\text{-year}} - \ln \text{earnings}_{3\text{-year}}$), calculated based

⁴ Fan et al. (2010) used the regression discontinuity design to gauge the estimate of return to 4-year universities, relative to 3-year colleges. The estimate was 40% higher earnings for males and 60% higher for females as the result of 4-year university degree.

on NBS household survey for 1994-2009. The independent variable, indicating the supply of 4-year relative to 3-year college workers, is the ratio of the annual number of graduates between the two college degrees, sourced from China Statistical Yearbooks. The annual number of 3-year and 4-year college-graduates began to be separately reported in the yearbook since 1994. The demand factor is controlled for by including the percentage of new entrants to the labor force starting at white-collar occupations each year, and/or the returns to white-collar occupations each year holding occupations constant. Both variables are calculated by authors based on the NBS data, because China Statistical Yearbooks do not report employment or earnings by occupation. The estimate is $-0.07 - 0.14$ with standard error estimated around 0.28, and is statistically insignificant.

Figure 3 shows that experience pay differentials were relatively high at outset, decreased in the 1990s, bottomed out in 1999, then increased after 2000. Under the centrally planned system, the wage increase was based on seniority. The wage level increased steadily with years of experience, which explained the high experience pay differentials at outset. In the 1990s, the increased market forces determination of wages altered the pay-experience profile. Since 2000, as the result of rapid development of labor market, the return to experience re-emerged as a market mechanism that determines the pay level.

Since the data in both figures are averages unadjusted for other attributes of workers, they will be affected by changes in workers' characteristics over time and across the groups. To see whether the pattern of differentials in the figures hold up in the presence of other characteristics of workers, we estimated earnings differentials for education and years of experience from regressions that included measures of other characteristics (see regressions in Appendix A). The pattern of earnings coefficients for education and experience over time resemble those in figures 2 and 3. Together, figures 2 and 3 and the Appendix regressions suggest that young and educated workers benefited most from the transformation of labor market in the early 1990s, but that increased supplies of young educated workers narrowed the educational differential while widening the experience differential.

In developed countries the wages and employment of younger workers vary more with economic conditions than do those of older workers. Cohorts that begin their work lives during a recession obtain lower earnings than cohorts that begin their work lives during boom years. Studies have also found that the earnings differentials due to the temporary conditions of the time of entry into the job market tend to persist for much of the work life (Rauum and Røed, 2006; Oreopoulos et al., 2006; Kahn, 2006; Oyer, 2006; Baker et al., 1994; Beaudry and DiNardo, 1991; Freeman, 1981.) To see whether cohort starting earnings vary substantially in China and whether cohort effects persist over time, we tabulated the log earning for workers who just left school to begin work and the earnings of the same cohorts three and five years later.

Column 1 of table 2 records the annual earnings of graduates who started work in each year from 1989 to 2009 based on NBS data. Since graduation takes place in June, the earnings cover at most one half a year. Graduates who did not find work within six months of graduation are not included in the sample. Column 2 records the annual earnings of that same cohort in the first full year after leaving school. The table also records earnings of that cohort with 3 and 5 years of experience in the job market. For example, the 1989 figures in column 1 give earnings in the first half year of work life for graduates in that year, the earnings in column 2 give earnings for the same group in 1990, while the earnings in column 3 give that cohort's earnings in 1992 and the earnings in column 4 give cohort earnings in 1994. By inspection starting earnings are more volatile than earnings in the first year, which are more volatile than earnings in the third and fifth year. Formally, the standard deviation of the *annual growth* of earnings in 1989 to 2004, when we have earnings for all of the relevant groups are: 0.125 (starting); 0.081 (first year); 0.078 (third year); 0.078 (fifth year). As in other countries the earnings of new entrants in China varies more over time than the earnings of the same cohort later in its working life.

Columns 5 to 8 of table 2 record the difference in mean earnings of workers at their first post-schooling job and three or five years later. Although the Urban Household Survey does not have

longitudinal data for individuals, we can infer the longitudinal wage growth for a cohort from the cross section data. The difference in pay between persons of age n in year 0 and age $n+t$ t years in the future is an unbiased estimate of change in earnings for the cohort. This is because the survey is a random sample in both periods.

To see whether a cohort that starts with relatively low earnings due to a bad labor market when they first enter the job market catches up with other cohorts or falls further behind, and conversely whether a cohort that starts with relatively high earnings due to a good labor market loses its advantage over time we regressed the changes in earnings in columns (5)-(8) on an estimate of whether the starting salary reflected a good or bad initial market. The estimated market condition was the residual from a regression of \ln starting salary on a time trend. Panel A of table 3 records the regression coefficients and standard errors for the relation between cohort growth and the residual of the cohort's starting growth. The results show substantial "regression to the mean" in the form of sizable negative coefficients on starting or first year earnings. If the starting salary was lower in a year by 10% from the predicted trend, the growth rate in the first 3-5 years would be 12-14% percent higher than it otherwise would have been, implying an approximately 3 year catch up period. This is a much faster catch-up than is found in the US and other advanced countries.

Dispersion of Pay

Figure 4 and Figure 5 display two measures of wage inequality: the variance of \ln earnings and the ratio of the earnings of workers in the 75th percentile to the earnings of those in the 25th percentile of the earnings distribution for all workers and for those with specified levels of experience. Both measures show a huge increase in dispersion from relatively low levels at the outset to high levels at the end of the period, albeit with variation over time. Consider, for example, the pattern of change in the variance of \ln earnings. The variance more than triples from 0.20 in 1989 to peak at about 0.65 in 2008 and then falls to 0.55 in 2009. Within each experience group, moreover, both the variance and the quantile measure of inequality increase substantially, especially during the 1990s. And dispersion

increased more for the older groups of workers than for the younger group of workers. This is different from the pattern of increase in wage dispersion in the US, where dispersion increased more for younger workers than for older workers (Autor et al., 2008; 2005). A likely reason for the greater increase in dispersion among the older workers is that their pay was still compressed from the pre-reform labor market, creating exceptionally low dispersion at the beginning of our period.

Focusing on young workers with 1-3 years of work experience, we found that the increasing pay dispersion over time was mainly driven by the pattern for college graduates (Figure 5 and 6). Earnings dispersion among those with high school or below education first increased and then decreased during the two decades 1992-2009. Moreover, between the two levels of college graduates, earnings dispersion among 4-year college graduates was usually higher than that among 3-year college graduates. This pattern was also observed in the CCSS data, especially for 2011 and 2012 (Figures 5b and 6b).

Quantitative Adjustments

Labor markets do not rely exclusively on price adjustments to deal with shifts in demand and supply. They also respond through quantitative adjustments in the form of changes in hours worked, unemployment, conditions of work, and so on. The Urban Household Survey does not identify workers without of jobs who actively search for work, so we cannot measure the impact of the changing market conditions on the standard rate of unemployment. Instead we focus on the employment rate – the ratio of persons in a given group employed – and on the quality of jobs that the employed obtain -- measured as the proportion of the group who work in jobs that would seem to fit more educated workers – managerial, professional, technical and clerical jobs. The Urban Household Survey does not have more detailed information on occupations for a more refined measure of the jobs.

Figure 7 shows that the employment rate fell during the reform period, particularly in the mid to late 1990s as SOEs displaced workers and again in the early 2000s and late 2000s when economic

growth slowed. The figure also shows the near universal pattern in which the less experienced group of workers had lower employment rates than more experienced workers. Among the least experienced young workers, education did not make much difference in their employment rate in the 1990s (Figure 8). After 2002, however, the employment rate of those with high school or below education became clearly lower than that of college graduates. Between 3-year and 4-year college graduates with 1-3 years of experience, NBS data shows that 4-year college graduates had a higher employment rate than 3-year college graduates from 2002 to 2009, but the gap was narrowing. Post-2009, CCSS data shows that the initial employment rate (i.e. the percentage of students who received at least one job offer at the time of graduation of the total graduating students) was higher for 3-year college graduates (Figure 8b). This is particularly due to the low initial employment rate of graduates from less prestigious 4-year universities.

Figure 5 looks at the quality of jobs that the employed get, in terms of the proportion of workers in a white collar occupation for workers with different years of schooling. As in the case of earnings growth over time 3-year and 4-year college graduates witnessed different trends in occupational attainment. Four-year college graduates experienced a decline in the good-occupation rate while 3-year college, high school and junior high graduates had a slight increase in the rate. Before the reform, the government assigned 4-year college graduates to white collar jobs. Post 2000 the expansion of 4-year university admission increased the supply of 4-year college graduates so much that market demand was not enough to employ the same proportion in those areas as in the past. This is a normal labor market response to huge increases in the supply of graduates. Post 2009, CCSS data shows that 4-year college graduates had a higher good-occupation rate than 3-year college graduates, and the differences between prestigious and average 4-year colleges were not as evident as that for the gap in the starting salary or employment rate (Figure 9b versus Figure 2b or 8b). This finding suggests that the labor market response to the 4-year education expansion is mainly manifested in the employment rate rather than in occupational attainment. The 4-year college graduates are either unwilling or unable to do the

job that 3-year college graduates are trained for, and thus suffer from the lower employment rate.

Figure 10 shows that the proportion of workers who obtain white collar jobs in a cohort rises with experience. The line for starting workers is the lowest in most years while the line for workers with five or more years experience is the highest in almost every year. The proportion of the workers starting in good jobs varies substantially more over time than the proportion of more experienced workers in good jobs.⁵ The figure also shows that the gap between the two groups widened in recent years.

To see whether workers who started in a less desirable job recovered over time (as occurred with earnings) we regressed the change in the proportion of workers in a good job of a cohort on the estimated “excess” proportion of that cohort who started in a good occupation – the deviation of the proportion from a time trend. The estimates in panel B of table 3 for starting jobs and jobs in the first year after leaving school show negative coefficients on the starting or first year job similar to the negative coefficients in earnings in panel A of the table. The results suggest that if the starting occupation was lower in a year by 10%, the growth rate in the first 3-5 years would be 7-17% percent higher, and it would take approximately 3-4 years to catch up in terms of occupational attainment. Again, the effect of entering in a weak or strong labor market decays fairly quickly.

Estimated Demand and Supply Effects from Provincial Data

Our analysis has shown what happened over time, but time series data is inadequate to estimate the impacts of shifts in demand and supply on the structure of wages or measures of quantitative adjustment. Accordingly, we developed a pooled time series cross province data set from the Urban Household Survey We calculated mean earnings, dispersion of earnings, and the quantitative measures

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To see whether the pattern of occupation status is affected by personal characteristics, we run regressions of starting, 1st, 3rd, and 5th year occupation on entry year dummies and measures of individual’s personal characteristics. The regression results are in the Appendix B. The results show similar differences by experience and time to those in the figures.

of labor outcomes for workers entering the labor market at different years for each province. We also estimated the size of cohorts and the average education, and experience level of workers by entry year for each province. We merged these data with China Statistical Yearbook measures of GDP, exports, and fixed capital investment at the province level. We then estimated the relation between a measure of the supply of workers -- the ln number of persons in a cohort in a province-- and a measure of demand -- ln GDP in the province -- on labor market outcomes for cohorts with different levels of experience.

Table 4 reports the results of this analysis for three groups of workers: workers in the first year of their career after leaving school; workers with three years of experience; and workers with five years of experience. Since provinces differ substantially in their economic development, the regressions under the title “models with province dummies” include dummies for each of the provinces. Since provinces may also differ in the speed of reforms and adjustments, the regressions under the title “models with dummy variables and province trends” also include independent trend terms for each province.

There are three findings in the table. First, the coefficients on the cohort size variable and on entry year GDP are much greater and statistically significant for the workers in their first year than for those with three or five years experience. Cohort size has a sizable negative impact on mean ln earnings, and a significant positive effect on standard deviation of ln earnings, and the log of the quartile differences in earnings for the workers beginning their careers compared to much weaker effects for the other groups. Being in a large cohort depresses starting wages and increases the dispersion of pay for the group but the cohort size effects largely disappear for the older groups.

Second, the coefficients on the entry year ln GDP variable are weaker in the models that include province trends than in those that do not. Absent province trends, entry year GDP has a significant impact in every calculation for all of the groups. Higher province level GDP raises earnings, raises dispersion of pay and raises the employment rate and the proportion of workers in

white collar jobs, as shift in demand for labor should do. Addition of the province trends reduces the significance of the estimated coefficients in all the calculations and essentially eliminates the effect of entry year GDP for workers with five years of work experience.

Third, the calculations show that cohort size and entry year GDP have weaker and less consistent effects on the employment rate and percentage of workers in white collar jobs than on the wage variables. The estimated effects for cohort size are significant only on the employment rate for workers in the first year of their career while the estimated effects for entry year level GDP are strong for several groups.

In sum, the province level data in table 3 supports the notion that changes in supply and demand impact starting workers more than others and that cohort effects are short-run only. We interpret the positive coefficients on the size of cohort and on ln GDP on the measures of dispersion as reflecting similar phenomenon: an increase in the number of workers spreads workers over a larger number of firms with differing wages; while an increase in GDP increases in the number of places hiring workers, which also spreads workers over jobs with differing wages.

Finally, we estimated the impact of changes in demand as a cohort gains experience on changes in earnings conditional on the initial earnings of the cohort. The dependent variable in these regressions is the change in mean earnings for a cohort from year 1 to year 3 from year 1 to year 5 by province and year. The independent variables are the growth of GDP and the ln earnings of the cohort in year 1. The estimated coefficients on the demand side variables show the sensitivity of longitudinal earnings patterns to changes in demand as a cohort ages. The estimated coefficients on the ln earnings in the first year provide another test of the “catch up effect” in longitudinal earnings growth, in this case conditional on the increase in demand. The estimates provide strong support for both the effect of demand factors and for catch-up. Workers with lower starting earnings had a greater earnings growth from year 1 to 3, 3 to 5, and 1 to 5. Stronger economic growth coincided with the greater earnings growth.

Conclusion

In addition to fast economic development, China has made a significant achievement in the human capital development, especially in tertiary education, in past decades. We show that the share of China's tertiary education enrolment in the world almost tripled from 1990 to 2010. The further examination reveals that the 4-year college enrolment increased more rapidly than 3-year college enrolment in China, especially post-2000. The unprecedented development of tertiary education and hence the dramatic increase in the supply of fresh college graduates have not been fully analyzed in terms of how the demand met with the supply and what are the implications for the graduates. Using the NBS household data covering the period 1989-2009 and CCSS data collected from a large random sample of college students for 2010-2013, our analysis shows that during the 20-year period, college graduates, especially graduates from 4-year universities, fared most from the economic development in terms of earnings, employment rate and occupational attainment. However, post-2000, with the huge increase in the supply of 4-year college graduates relative to 3-year college graduates, the advantage of 4-year college graduates in the labor market has declined. The gap between college graduates and high school or lower level graduates in earnings, employment, and occupational attainment has also narrowed in the 2000s. The CCSS data further shows that since 2010, 3-year college graduates even did better than 4-year college graduates in the initial employment rate.

Compared to the countries such as South Korea where the tertiary-education enrolment rate has reached above 100% and showed the trend of decline in recent years, China still has a room to further improve the tertiary education enrolment. However, China's economy started to show signs that the rate of increasing supply of college graduates may have exceeded the rate of the demand increase for them, hence causing the negative impact on fresh college graduates' labor market outcomes.

The one place where the Chinese labor market appears to diverge from labor markets in advanced countries is the rapid convergence in earnings and occupational position of education-cohorts who entered the job market under more or less favorable conditions. On this dimension China's labor

market seems more flexible than those in other countries. Three related factors may explain this pattern: 1) the high rate of turnover in China, where prior to 2008 average turnover rate was over 15% and reached 30% in some sectors, that would create great opportunities for people to recover or to lose; and 2) the relative weakness of internal labor markets in China, in which firms place employees through less formal hiring systems and modes of wage setting than in firms in more developed economies.; and 3) the rapid growth of the Chinese economy, which may overwhelm short term fluctuations in the fortunes of particular cohorts. This feature could help college graduates who start in a large graduating cohort or less-favorable economic conditions to quickly adjust to and catch up with experienced-workers' earnings, employment, and good-occupational rates.

China's emerging labor market was buffeted by huge changes in demand, and supply in the 1990s and 2000s. Our analysis shows that the market responded with substantial changes in the structure of wages and in employment and types of jobs held that largely mirror the adjustments found in labor markets in advanced countries. Using province level data over time, we find that wages, dispersion of wages, employment rates and the percent of workers who obtain white collar jobs are substantially affected by supply measured by cohort size and demand measured by GDP.

The one place where the Chinese labor market appears to diverge from labor markets in advanced countries is the rapid convergence in earnings and occupational position of cohorts who entered the job market under more or less favorable conditions. On this dimension China's labor market seems more flexible than those in other countries. Three related factors may explain this pattern: ; 1) the high rate of turnover in China, where prior to 2008 average turnover rate was over 15% and reached 30% in some sectors, that would create great opportunities for people to recover or to lose; and 2) the relative weakness of internal labor markets in China, in which firms place employees through less formal hiring systems and modes of wage setting than in firms in more developed economies.; and 3) the rapid growth of the Chinese economy, which may overwhelm short term fluctuations in the fortunes of particular cohorts. Bottom line, the Chinese labor market has responded

about as well as one could expect to the huge changes in supply and demand that impacted it in the
period under study.

Table 1: Tertiary Education Enrolment

	1990	2000	2010
World	(67,222,985)	(99,180,321)	(180,536,086)
Developing countries (%)	42	53	65
China	6	7	17
India	7	9	11
Developed countries (%)	44	36	26
US	20	13	11

Data source: UNESCO Institute of Statistics

Note: in parenthesis is world total enrolment in tertiary education, all programs, both sexes; Percentages are the contribution of countries to the world total enrolment in tertiary education, calculated by authors.

Table 2: Starting earnings, earnings in the 1st, 3rd, and 5th year, and earnings growth

	<u>Log earnings</u>				<u>Log earnings growth</u>			
	Starting (1)	1st year (2)	3rd year (3)	5th year (4)	Starting- 3rd year (5)=(3)-(1)	Starting- 5th year (6)=(4)- (1)	1st - 3rd year (7)=(3)-(2)	1st - 5th year (8)=(4)-(2)
1989	5.670	6.360	6.906	7.172	1.236	1.502	0.546	0.812
1990	5.663	6.450	7.001	7.147	1.338	1.484	0.551	0.697
1991	5.906	6.741	6.991	7.145	1.085	1.239	0.25	0.404
1992	6.114	6.893	7.139	7.192	1.025	1.078	0.246	0.299
1993	6.292	6.936	7.181	7.319	0.889	1.027	0.245	0.383
1994	6.192	7.016	7.114	7.455	0.922	1.263	0.098	0.439
1995	6.381	7.051	7.224	7.465	0.843	1.084	0.173	0.414
1996	6.531	7.117	7.352	7.581	0.821	1.05	0.235	0.464
1997	6.568	7.202	7.573	7.757	1.005	1.189	0.371	0.555
1998	6.538	7.383	7.547	7.701	1.009	1.163	0.164	0.318
1999	6.724	7.360	7.535	7.825	0.811	1.101	0.175	0.465
2000	6.672	7.428	7.626	8.002	0.954	1.33	0.198	0.574
2001	6.866	7.416	7.774	8.111	0.908	1.245	0.358	0.695
2002	6.704	7.474	7.923	8.223	1.219	1.519	0.449	0.749
2003	6.841	7.652	8.014	8.375	1.173	1.534	0.362	0.723
2004	7.061	7.685	8.112	8.569	1.051	1.508	0.427	0.884
2005	7.044	7.845	8.264					
2006	7.265	8.022	8.421					
2007	7.437	8.055						
2008	7.401	8.242						
2009	7.491							

Source: NBS urban household survey data; author's calculation

Table 3: Regressions of Change in Cohort Earnings or Occupational Position on Cohort Starting Position

Panel A: the dependent variable is growth in ln Earnings

	ln Earnings 3rd year/starting	ln Earnings 5th year/starting	Ln earnings 3rd year/1st		Ln earnings 5th year/1 st
Starting earnings	-0.012*** (0.002)	-0.014*** (0.002)			
1st year earnings			-0.012*** (0.002)	-0.011*** (0.002)	-0.018*** (0.002)
1st year earnings squared				0.0006** (0.0003)	
Constant	1.024*** (0.021)	1.277*** (0.023)	0.296*** (0.021)	0.243*** (0.027)	0.544*** (0.017)
Number of obs.	16	16	16	16	16
Adj. R ²	0.721	0.765	0.644	0.744	0.862

Panel B: the dependent variable is the change in proportion of workers in managerial, professional, technical and clerical jobs

	3rd year- starting	5th year- starting	3rd year- 1st		5th year -1st
Starting occupation	-0.010*** (0.002)	-0.013*** (0.002)			
1st year occupation			-0.007*** (0.002)	- 0.006*** (0.002)	-0.013*** (0.002)
1st year occupation ²				0.0006* (0.0003)	
Constant	0.053*** (0.010)	0.053*** (0.010)	0.041*** (0.009)	0.029*** (0.011)	0.103*** (0.008)
Number of obs.	16	16	16	16	16
Adj. R ²	0.751	0.751	0.445	0.523	0.776

Source: NBS urban household survey data; author's calculation

Note: In Panel A, starting or 1st year earnings are relative earnings, indicating to what extent the earnings exceed the time trend, equal to the gap between actual starting/1st year earnings and the predicted ones from time trend, in percent. In Panel B, starting or 1st year occupation is the percentage of employees starting in good occupation in excess of time trend, equal to actual percentage minus the predicted value in percent.

*, **, *** indicate statistical significance at the 10, 5, and 1% level.

Table 4: Regression Coefficients linking Labor Outcomes to cohort size and entry year GDP, pooled Province by Year data set, 1988-2008

	Models with province dummies	Models with province dummies and province trends				
		Cohort Size	Entry yr Ln GDP	Adj. R ²	Cohort Size	Entry yr Ln GDP
First year at work						
Mean ln earnings		-0.762**	0.824***	0.886	-0.908***	0.548***
Std deviation of ln earnings		1.426***	0.040***	0.109	1.509***	0.047
Log (earnings in 75 th q-tile/ earnings in 25 th q-tile)		0.786**	0.042***	0.063	0.900***	0.097*
Employment rate		-0.102*	0.013***	0.219	-0.115**	0.020***
% in white collar jobs		-0.103	0.057***	0.286	-0.035	0.009
Three years work experience						
Mean ln earnings		-0.573**	0.740***	0.853	-0.443**	0.276***
Std deviation of ln earnings		0.433**	0.061***	0.146	0.473***	0.053
Log (earnings in 75 th q-tile/ earnings in 25 th q-tile)		0.819***	0.084***	0.131	0.877***	0.082
Employment rate		-0.021	0.010***	0.082	-0.045	0.016**
% in white collar jobs		-0.015	0.063***	0.299	-0.050	0.029
Five years work experience						
Mean ln earnings		-0.223	0.653***	0.809	-0.253	0.071
Std deviation of ln earnings		0.279	0.056***	0.188	0.386*	0.002
Log (earnings in 75 th q-tile/ earnings in 25 th q-tile)		0.012	0.093***	0.173	0.223	0.079
Employment rate		-0.005	0.003	0.073	-0.002	0.003
% in white collar jobs		-0.067	0.066***	0.261	-0.165	0.006

Note: NBS urban household survey data; China Statistical yearbooks; There are total 31 provinces excluding Taiwan, Hong Kong, and Macao. Chongqin municipal reported statistics separately from Sichuan province since 1996. To keep consistency, we merge Chongqin data back into Sichuan province. This gives 30 observations per year for 21 years, for 630 observations..

*, **, *** indicate statistical significance at the 10, 5, and 1% level.

Table 5: Demand and supply, starting earnings, and earnings growth

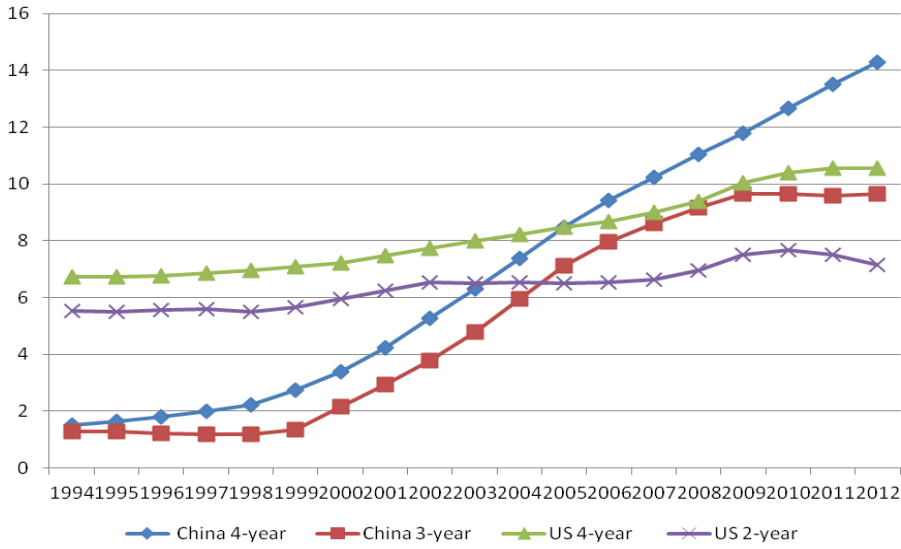
	Earnings growth year1-3	Earnings growth year3-5	Earnings growth year1-5
Log starting earnings	-0.240***		-0.388***
GDP growth year1-3	0.342***		
GDP growth year3-5		0.078	
GDP growth year1-5			0.155***
constant	2.212***	1.945***	3.676***
Number of obs.	600	540	540
Adj. R ²	0.243	0.151	0.395

Source: NBS urban household survey data; China Statistical yearbooks

Note: There are total 31 provinces excluding Taiwan, Hong Kong, and Macao. Chongqin municipal reported statistics separately from Sichuan province since 1996. To keep consistency, we merge Chongqin data back into Sichuan province. Thus there are 30 observations per year for 20 years (1988-2007) for year1-3 earnings growth regressions, and 18 years (1988-2005) for year1-5 and 3-5 growth regression.

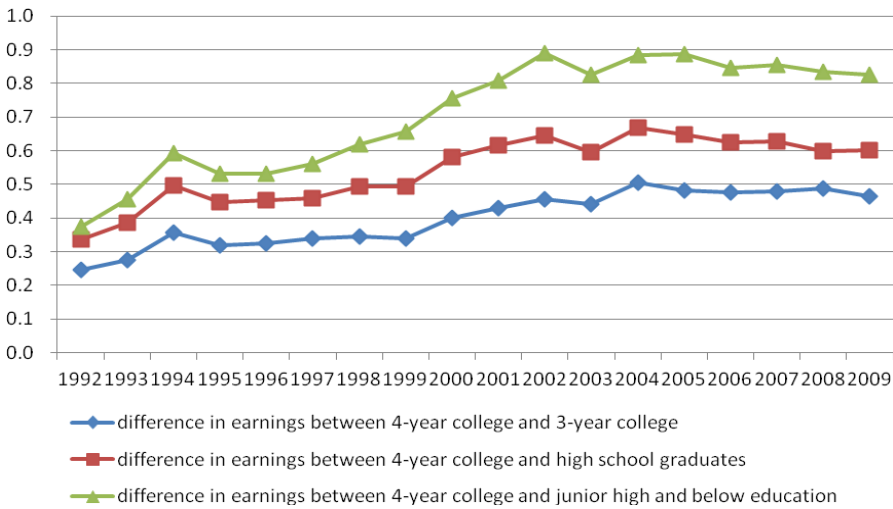
*, **, *** indicate statistical significance at the 10, 5, and 1% level.

Figure 1: College enrollment in China and United States:



Source: China data are from China Statistical Yearbooks 1996-2013; US data from National Center for Education Statistics

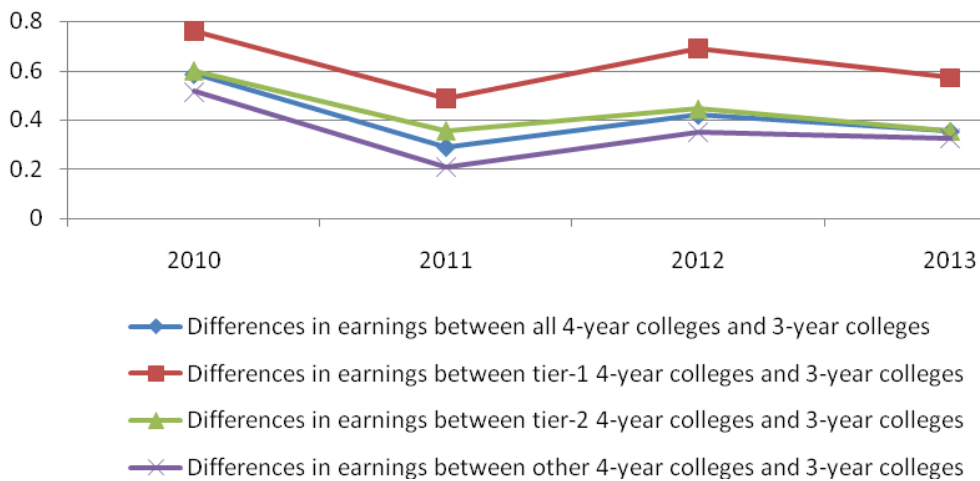
Figure 2: Differences in mean ln earnings by education levels, 1992-2009



Source: NBS urban household survey data, author’s calculation

Note: separate categories for 3-year and 4-year college education were reported from 1992.

Figure 2b: Differences in mean ln starting salary by education levels, 2010-2013

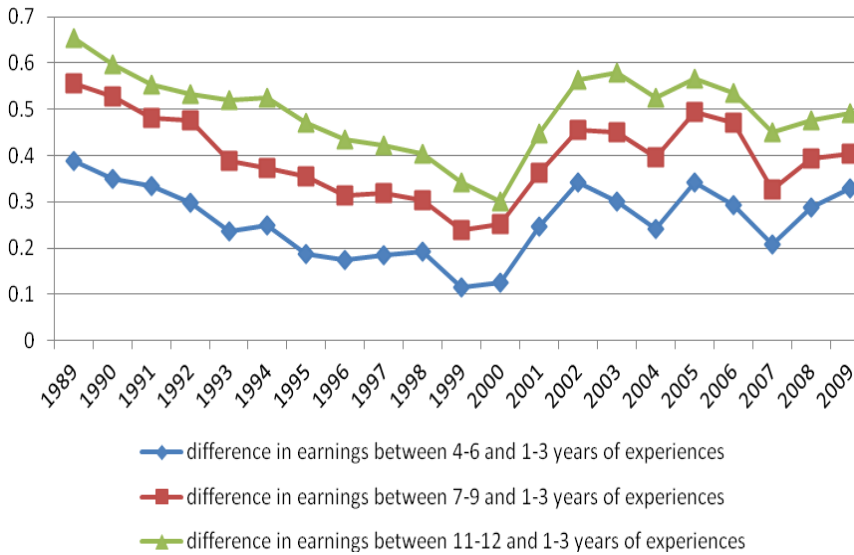


Source: China College Student Survey (CCSS) survey data, author’s calculation

Note:

1. Starting salary is the monthly salary reported by graduating seniors who received a job offer at the time of survey. The survey was conducted in May and June right before graduation in July. Offered salary is adjusted by CPI and expressed in the 1987 Yuan. Logarithm is taken.
2. Four-year universities are divided into three tiers based on their ranking. Tier 1 refers to “985” universities in China. In May of 1998, following former chairman Jiang Zemin’s speech of developing a group of world-class universities in China, 39 best universities was selected and received generous financial support from government to become world-class universities. Tier 2 refers to “211” university, who are another 100 top universities selected by Ministry of Education to receive funding to develop into top universities in the 21th century in China. The rest non-985 or 211 universities formed tier-3. This is a typical ranking of Chinese universities in China.

Figure 3: Gap in mean ln earnings between those with 1-3 years of experience and those with more years of experience, 1989-2009



Source: NBS urban household survey data, author's calculation

Figure 4: Variances of ln earnings by experience group, 1989-2009

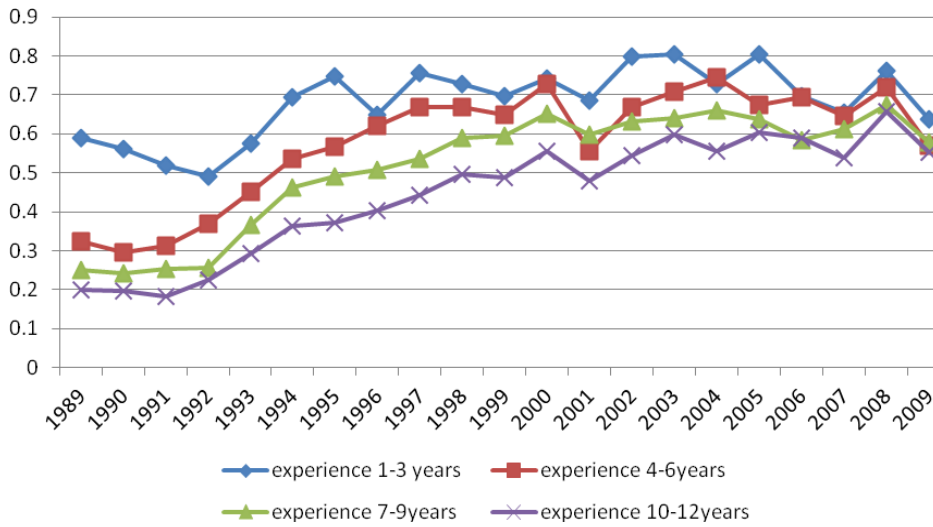
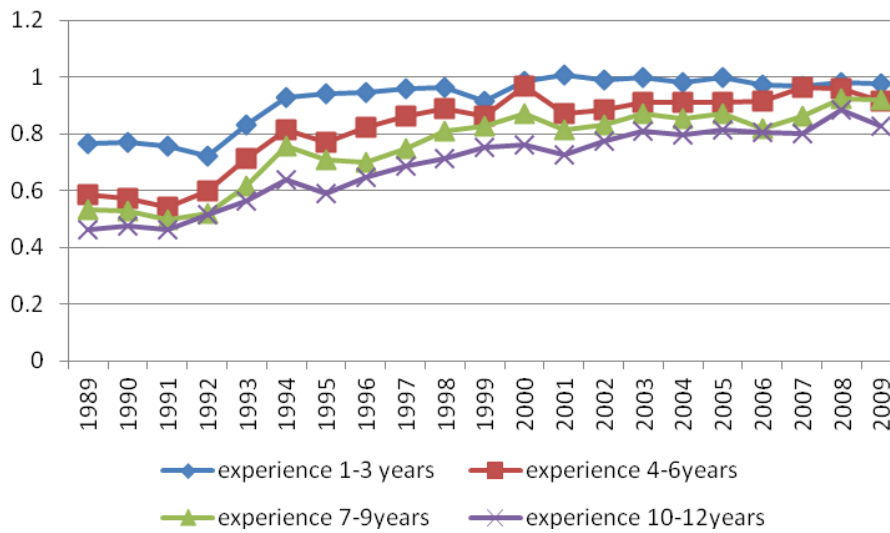
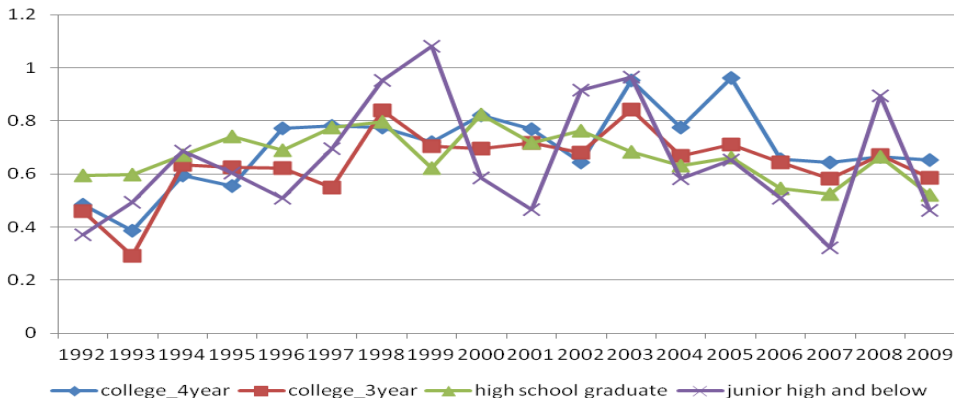


Figure 4b: Ratio of earnings at 75th percentile to 25th percentile by experience group, 1989-2009



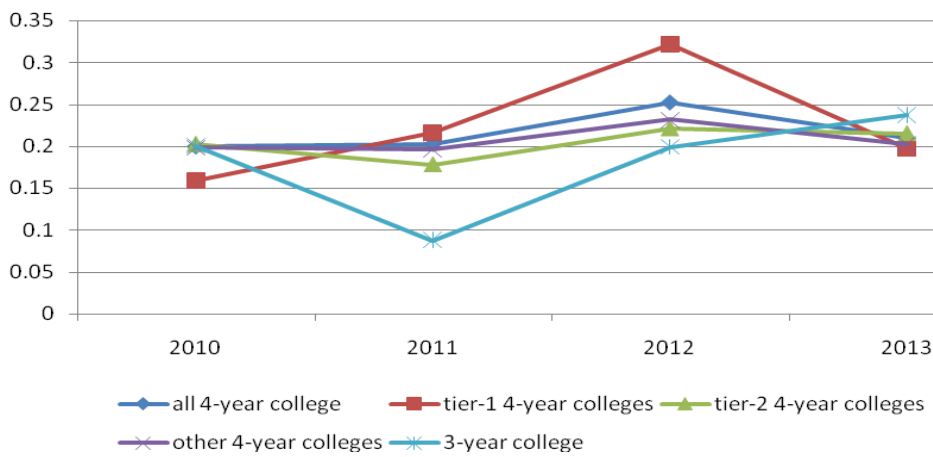
Source: NBS urban household survey data, author's calculation

Figure 5: Variances of ln earnings by education for 1-3 year experience, 1992-2009



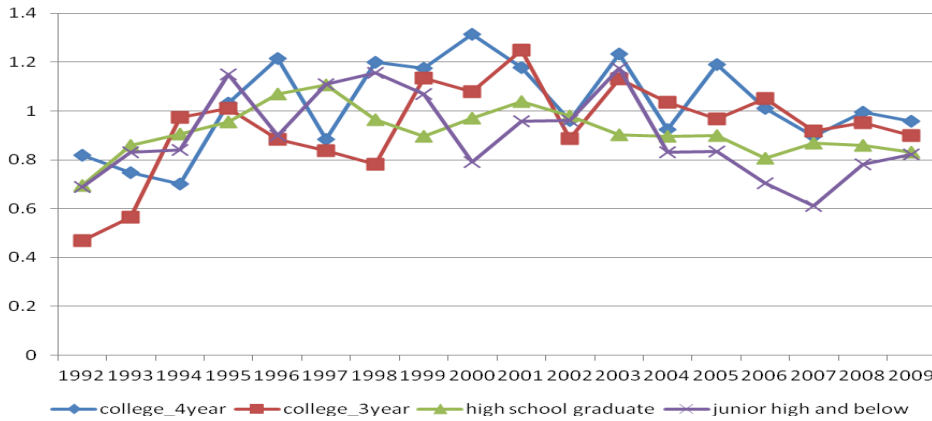
Source: NBS urban household survey data, author's calculation

Figure 5b: Variances of ln starting salaries by education, 2010-2013



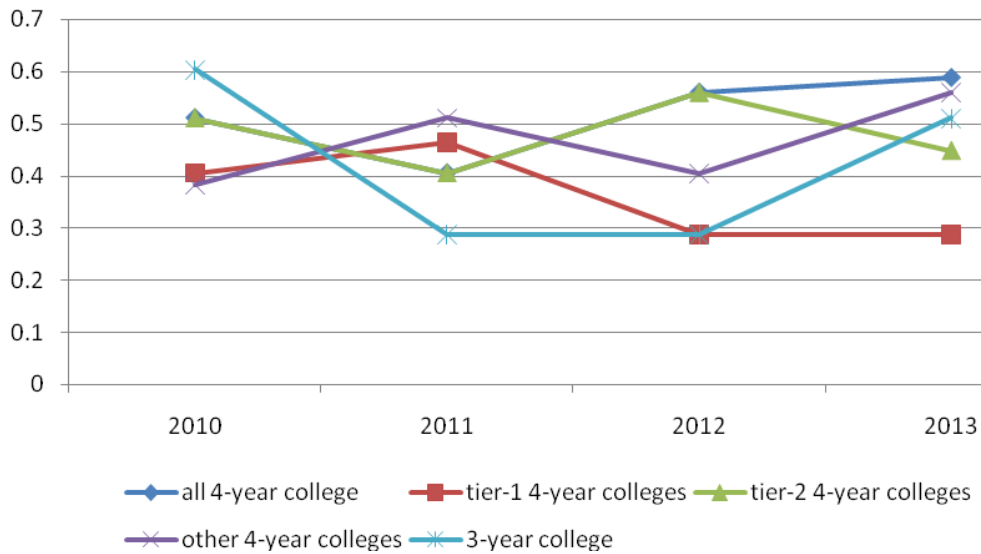
Source: China College Student Survey (CCSS) survey data, author's calculation

Figure 6: Ratio of earnings at 75th percentile to 25th percentile by education for 1-3 years experience, 1992-2009



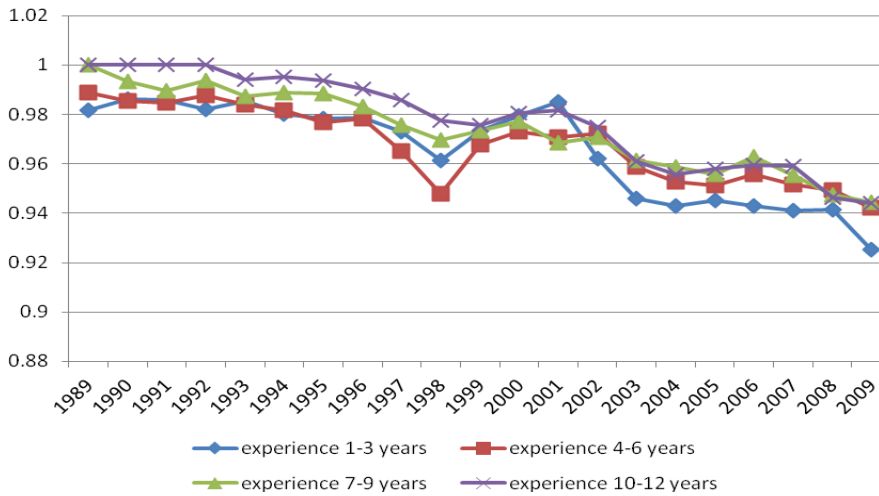
Source: NBS urban household survey data, author's calculation

Figure 6b: Ratio of starting earnings at 75th percentile to 25th percentile by education, 2010-2013



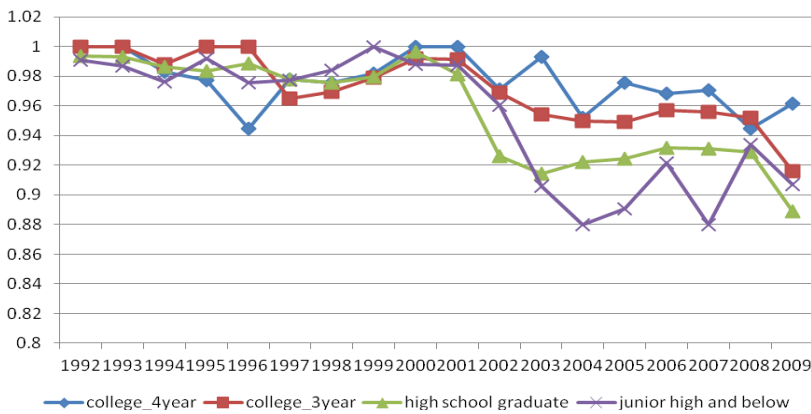
Source: China College Student Survey (CCSS) survey data, author's calculation

Figure7: Employment rates by experience group, by survey year, 1989-2009



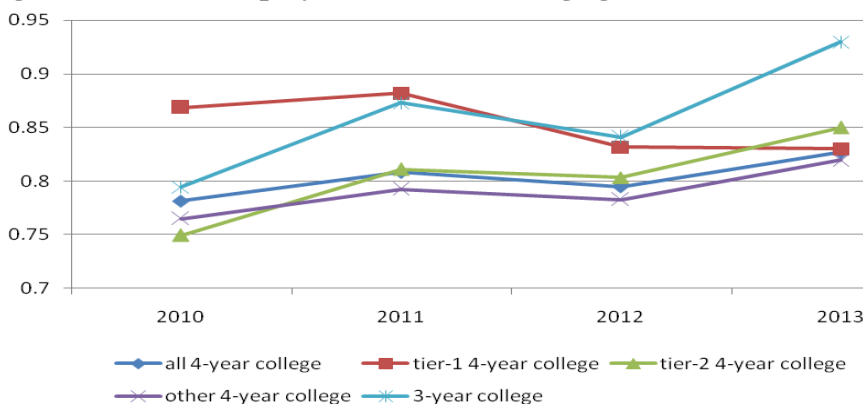
Source: NBS urban household survey data, author's calculation

Figure 8: Employment rates by education group for 1-3 years experience, 1992-2009



Source: NBS urban household survey data, author's calculation

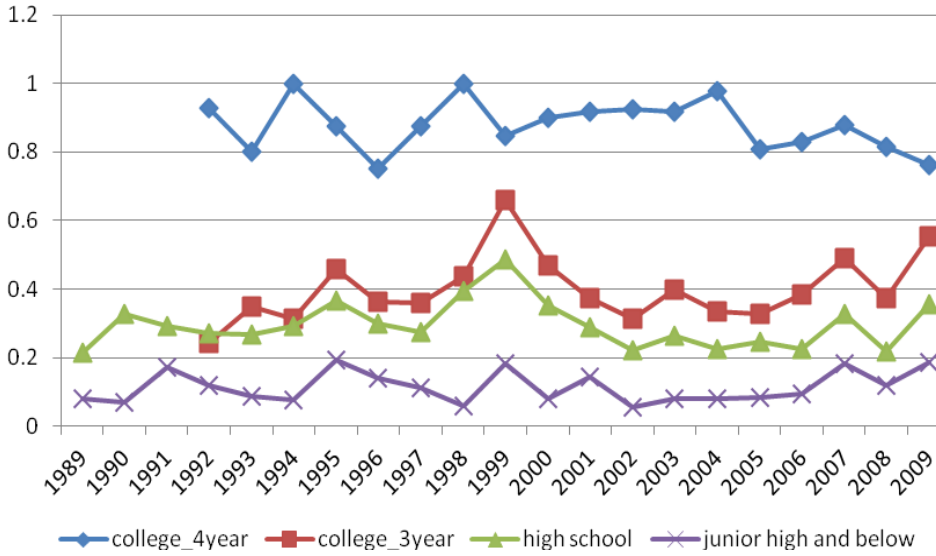
Figure 8b: Initial employment rates of college graduates, 2010-2013



Source: China College Student Survey (CCSS) survey data, author's calculation

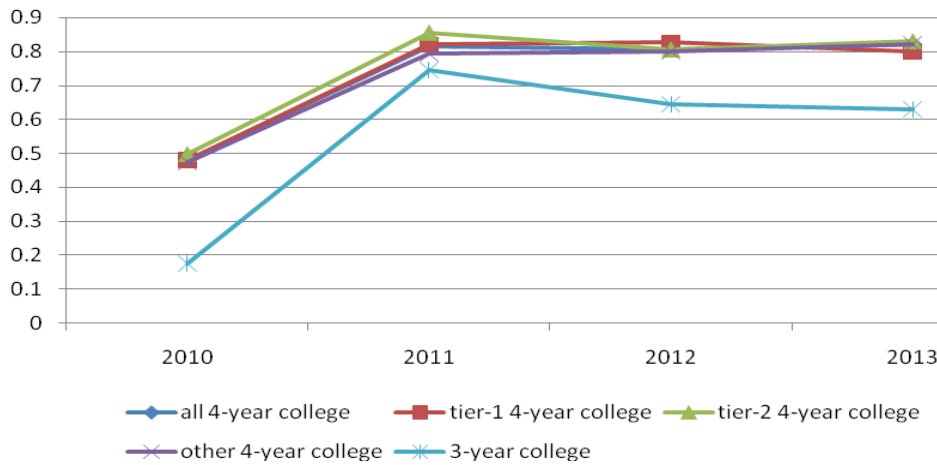
Note: Initial employment rate is calculated as the percentage of graduating seniors who received at least one job offer at the time of survey of the total number of surveyed graduating seniors.

Figure 9: Proportion of workers starting in managerial, professional, technical, or clerical jobs, by education levels, 1989-2009



Source: NBS urban household survey data; author's calculation

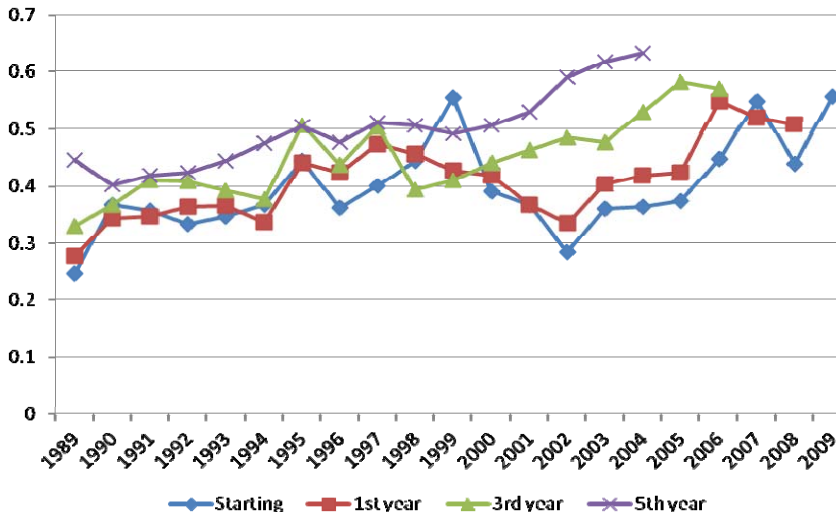
Figure 9b: Proportion of college graduates starting in managerial, professional, technical, or clerical jobs, 2010-2013



Source: China College Student Survey (CCSS) survey data, author's calculation

Note: Proportion of college graduates starting a managerial, professional, technical, or clerical job is calculated as the percentage of graduating seniors who reported a job offer that falls into these occupations as of the total number of graduating seniors who received at least one job offer. Occupation classification in CCSS is the same as NBS survey.

Figure 10: Proportion of workers in given cohorts in managerial, professional, technical, or clerical jobs, 1989-2009



Source: NBS urban household survey data; author's calculation

Appendix A: Entry year effect of earnings with control variables

Entry year	Log starting	Log 1 st year	Log 3 rd year	Log 5th year
1984				-0.374***
1985				-0.271***
1986			-0.190***	-0.196***
1987			-0.167***	-0.104**
1988		0.058	-0.202***	-0.049
1989	-	-	-	-
1990	-0.021	0.071	0.054	-0.018
1991	0.228**	0.414***	0.03	-0.058
1992	0.350***	0.524***	0.174***	-0.002
1993	0.565***	0.584***	0.196***	0.109**
1994	0.455***	0.668***	0.181***	0.201***
1995	0.645***	0.700***	0.232***	0.229***
1996	0.802***	0.738***	0.339***	0.375***
1997	0.843***	0.737***	0.534***	0.519***
1998	0.805***	0.948***	0.642***	0.456***
1999	0.972***	0.983***	0.570***	0.556***
2000	0.972***	1.088***	0.620***	0.710***
2001	1.163***	1.076***	0.766***	0.778***
2002	0.973***	1.108***	0.868***	0.852***
2003	1.089***	1.269***	0.967***	0.966***
2004	1.287***	1.287***	1.024***	1.127***
2005	1.268***	1.424***	1.135***	
2006	1.445***	1.511***	1.300***	
2007	1.590***	1.603***		
2008	1.592***	1.736***		
2009	1.662***			
male	0.045*	0.067***	0.115***	0.115***
College grad.	0.068**	0.234***	0.242***	0.250***
Junior high & below	-0.088***	-0.145***	-0.175***	-0.135***
Privately owned	0.022	-0.098***	-0.111***	-0.081***
Collectively owned	0.009	-0.103***	-0.139***	-0.120***
Manufacturing	-0.05	0.008	0.034	-0.033
Construction	-0.019	-0.02	0.005	-0.044
Transportation	0.014	0.051	0.131***	0.080**
Commerce	-0.047	0.012	0.017	-0.091***
Social service	-0.01	-0.039	-0.012	-0.074**
Education, health, sports	-0.142**	-0.027	0.004	-0.04
Science	0.013	0.086*	0.103**	-0.014
finance	0.022	0.044	0.090**	0.021
Other	-0.044	0.043	0.074*	0.033
Professional occ.	0.127***	0.163***	0.180***	0.232***
Managerial occ.	0.347*	0.166*	0.064	0.338***
Clerical	0.125***	0.104***	0.112***	0.146***
Commercial & service	-0.052	-0.089***	-0.115***	-0.084***
Province dummies	yes	yes	yes	yes
Constant	6.852***	6.458***	7.236***	7.510***
Number of obs.	8788	17284	18877	17891
Adj. R ²	0.331	0.477	0.498	0.475

Source: NBS urban household survey. *, **, *** indicate statistical significance at 10, 5, and 1% level.

Appendix B: Entry year effect on occupation with control variables

	Log starting	Log 1 st year	Log 3 rd year	Log 5 th year
Entry year				
1984				-0.083***
1985				-0.054*
1986			-0.072***	-0.031
1987			-0.034	-0.015
1988		0.026	-0.042*	-0.037
1989	-	-	-	-
1990	0.078*	0.052	0.0003	-0.015
1991	0.051	0.056*	0.024	-0.010
1992	0.049	0.072**	0.031	-0.020
1993	0.058	0.078**	0.006	-0.029
1994	0.062	0.045	-0.013	-0.023
1995	0.149***	0.114***	0.034	0.010
1996	0.063	0.100***	-0.0002	0.003
1997	0.103**	0.099***	0.011	0.039*
1998	0.116***	0.092***	-0.012	0.045*
1999	0.213***	0.075**	0.027	-0.019
2000	0.112**	0.078**	0.027	0.007
2001	0.081*	0.091***	0.014	-0.008
2002	0.078**	0.049*	0.011	0.031
2003	0.117***	0.067**	0.003	0.060***
2004	0.093***	0.086***	0.043*	0.059**
2005	0.092***	0.069***	0.073***	
2006	0.105***	0.131***	0.073***	
2007	0.166***	0.134***		
2008	0.121***	0.107***		
2009	0.170***			
male	-0.018*	-0.019**	-0.015**	-0.028***
College grad.	0.334***	0.349***	0.334***	0.316***
Junior high & below	-0.119***	-0.134***	-0.152***	-0.195***
Privately owned	-0.131***	-0.121***	-0.119***	-0.124***
Collectively owned	-0.089***	-0.090***	-0.088***	-0.067***
Industry dummies	yes	yes	yes	yes
Province dummies	yes	yes	yes	yes
Constant	0.654*	0.341***	0.255***	0.226**
Number of obs.	8788	17284	18877	17891
Adj. R ²	0.406	0.413	0.412	0.422

Source: NBS urban household survey data

Note: the base groups are: female; high school graduates; state-owned companies; and government. Dependent variables are indicators of good occupation (i.e. professional, managerial, technical and clerical jobs) in the starting, 1st, 3rd, and 5th year. *, **, *** indicate statistical significance at the 10, 5, and 1% level.

References:

- Appleton, S., Song, L. N., Xia, Q. J., 2005. Has China crossed the river? the evolution of wage structure in urban china during reform and retrenchment. *Journal of Comparative Economics* 33, 644-663.
- Autor, David H., Katz, Lawrence F., and Kearney, Melissa S. 2008. Trends in U.S. Wage Inequality: Revision the Revisionists. *Review of Economics and Statistics* 90(2):300-323.
- Autor, David H., Katz, Lawrence F., and Kearney, Melissa S. 2005. Rising wage inequality: the role of composition and prices. NBER working paper 11628.
- Baker, George, Gibbs, Michael, Holmstrom, Bengt, 1994. The wage policy of a firm. *Quarterly Journal of Economics*, 109(4): 921-55.
- Bian, Yanjie. 1994. Guanxi and the Allocation of Urban Jobs in China. *The China Quarterly*, 140: 971-999.
- Beaudry, Paul and John DiNardo, 1991. The effect of implicit contracts on the movement of wages over the business cycle: Evidence from micro data. *Journal of Political Economy*, 99(4): 665-688.
- Fan, E., Meng, Xin, Wei, Z., and Zhao, G., 2010 Rates of return to university education: regression discontinuity design, IZA DP no. 4749.
- Freeman, Richard B. 1981. Career patterns of college graduates in declining job markets, NBER Working Papers W0750.
- Gao, X. 2007. Business cycle accounting for the Chinese economy. IDEAS working paper. <http://ideas.repec.org/p/pram/prapa/7050.html>.
- Gong, G., Lin, Justin Yifu, 2008. Deflationary expansion: An overshooting perspective to the recent business cycle in China. *China Economic Review*, 19:1-17.
- Hilmer, M.J. 2000. Does the return to quality differ for transfer students and direct attendees? *Economics of Education Review*, 19(1), 47-61.
- Imai, Hiroyuki, 1996. Explaining China's business cycles. *The Developing Economies*, XXXIV-2: 154-185.
- Kahn, Lisa B., 2006. The Long-Term Labor Market Consequences of Graduating from College in a Bad Economy (September 12, 2006). Available at SSRN: <http://ssrn.com/abstract=702463>
- Kane, T., and Rouse, C. 1995. Labor Market Returns to two- and four-year college. *American Economic Review*, 85(3), 600-614.
- Knight, John, and Lina Song. 2003. Increasing Urban Wage Inequality in China: Extent, Elements and Evaluation. *Economics of Transition*, 11(4):597-619.
- Li, S, Whalley, John, Xing, C., 2014. China's higher education expansion and unemployment of college graduates, *China Economic Review*, 30, 567-582.

Meng, Xin, Shen, K. & Xue, S. 2013. Economic reform, education expansion, and earnings inequality for urban males in China, 1988-2009, *Journal of Comparative Economics*, 41(1),227-244.

Oreopoulos, Phil, till von Wachter, Andrew Heisz, 2006. The short-and long-term career effects of graduating in a recession: hysteresis and heterogeneity in the market for college graduates, NBER Working papers W12159.

Oyer, Paul, 2006. Initial Labor market conditions and long term occupation for economists. *Journal of Economic Perspectives*, 20(3): 143-160.

Rauum, Oddbjorn and Knut RØed, 2006. Do business cycle conditions at the time of labor market entry affect future employment prospects? *The Review of Economics and Statistics*, 88(2):193-210.

Wei, X., Li, W.L., Chen, D.F., 1997. Research on the current job allocation mechanism of college graduates. *Journal of Higher Education*, 1997(1): 31-37. (Chinese)

Zhang, Junsen; Zhao, Yaohui; Park, Albert; Song, Xiaoqing, 2005. Economic Returns to Schooling in Urban China, 1988 to 2001. *Journal of Comparative Economics*. 33,730–752.