# Employer Learning and the Dynamics of Returns to Universities: Evidence from Chinese Elite Education during University Expansion

Sylvie Démurger
CNRS

Eric A. Hanushek
Stanford University

Lei Zhang[1]
Shanghai Jiao Tong University

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Abstract

Understanding the impact of university quality on student labor market outcomes has proved to be a challenging empirical task. This paper estimates the return to Chinese elite university education over a college graduate's career using the CHIP 2013 data. We find a substantial premium for graduating from an elite university at job entry, but it declines quickly with labor market experience. This pattern is entirely driven by the young cohorts who enter college after the higher education expansion that started in 1999 and is more pronounced in the dynamic labor markets of coastal provinces and economically more developed regions. The initial elite premium and its subsequent decline is only for males; individual skills are much more consistently rewarded for females than males. The results are consistent with the hypothesis of employer learning, where employers tend to pay workers based on more easily observable group characteristics at job entry but rely less on these over time when more accurate information about individual productivity becomes available.

[1] The authors' emails are: Sylvie.demurger@cnrs.fr; hanushek@stanford.edu; zlei89@gmail.com

## 1 Introduction

While no one doubts that colleges and universities differ in quality, somehow defined, there is less understanding of the implications of any quality differentials for students. Understanding differential returns to college quality proves to be a difficult research question. Nonetheless, limited information does not seem to stop strong behavioral reactions of students: as college attendance expands, competition to get into the elite universities also intensifies. A particularly attractive laboratory for understanding the college quality-student outcome nexus is modern China that combines a dramatic expansion of universities with both a well-recognized identification of which are elite universities and a responsive labor market. Investigation of the impact of China elite universities provides insight not only about the operation of its dynamic labor market but also about the role of aggregate university information in determining labor market outcomes.

A central problem in understanding the role of elite universities is separating the impact of the universities on the students from the selection of students into these universities. A second frequent problem is the difficulty of obtaining career information for a representative sample of graduates from different universities. And a third issue is that college attendance and graduation have been changing rapidly in many countries of the world, and this alters the labor market for college graduates. This research addresses each of these challenges.

We evaluate the return to attending an elite university as measured by the wage premium in the contemporary Chinese labor market. We focus particularly on the dynamics of this college quality premium; i.e., how it changes with one's labor market experience (the experience profile) and how it varies over time for different cohorts (the intertemporal profile).

Much of the attention to the economy of China focuses on the huge shift of industries with substantial changes in technologies. In the background, however, the labor market in China has undergone a tremendous transformation following the massive higher education expansion since the late 1990s. The surge in the supply of the college-educated labor force is likely to influence greatly the dynamics of return to college tiers both over one's career and over time.

Using the 2013 urban sample from the Chinese Household Income Project (CHIP) survey data and constructing a panel of fulltime workers, we find a significant premium for graduating from an elite university at job entry, but this premium declines quickly with labor market experience and employer learning. This dynamic is entirely driven by the young cohorts of graduates who enter college under the regime of higher education expansion, suggesting the increasing importance of college tier when there is a surge in the supply of college graduates. This pattern is more pronounced in coastal provinces and in economically more developed regions. Meanwhile, cognitive skills have a strong positive impact on wages of both the old and young cohorts, but a much larger impacts for the young cohorts. This impact appears to come completely from more developed regions.

Focusing on the young cohorts, we also find substantial differences between male and female college graduates. While the elite-university premium is large at job entry and declines over time for males, it is flat for females. Cognitive skills have a much larger impact on wages of females than males; thus skills play a critical role in narrowing the gender wage gap. These gender differences cannot be explained by differences in the industry, occupation, or sector of employment (government, institutions, SOEs, etc.) of male and female college graduates.

This research contributes to the burgeoning literature on the return to college quality. The majority of this literature focuses on the U.S. and considers the average return for the individuals

under study. Dale and Krueger (2002, 2014), Black and Smith (2004), Zhang (2009), and Hoekstra (2009), to name just a few, find significant wage premiums associated with attending an elite U.S. university relative to other universities. Anelli (2016) finds similar results using Italian data. Using Chilean data and considering non-labor market returns, Kaufmann, Messner, and Solis (2015) find significant and positive impacts on the marital outcome of women attending an elite university and on the academic performance of children whose parents have attended an elite university. Studies in the Chinese context are rare. Li, Meng, Shi, Wu (2012) and Jia and Li (2017) show that graduates of elite universities experience a substantial wage premium at entry into the labor market. Their analysis is based on wage information from job offers of college students just prior to graduation for the 2010-2015 graduate cohorts. This restricts their focus to the wage premium at the job entry and to only the post-higher education expansion cohorts. Kang, Peng, and Zhu (2018) look at wage patterns for graduates of different tiers of schools in China, although they have limited samples and cannot look at the changing labor market for graduates.

Here we study not only the average premium of graduating from an elite university but also how this premium evolves over one's career and varies for cohorts educated under different higher education systems. We are able to investigate the wage premium beyond the job entry stage and are able to compare differences in the wage setting between pre- and post-higher education expansion eras.

A crucial element in studying the return to elite education is ascertaining how employers use information about university quality. Admission to an elite university provides a coarse signal of the average cognitive skills of a graduate, but one would expect employers to refine their views of individual productivity over time. Altonji and Pierret (2001) provide a theoretical

model of statistical discrimination in the labor market and propose an empirical framework to estimate the wage dynamics. Using U.S. data, they find that the return to each year of education decreases over one's career but that the return to cognitive skills increases over one's career, a finding consistent with the employer learning hypothesis. Castex and Dechter (2014) and Mansour (2012) are more recent studies using U.S. data; they find that the wage dynamics have changed over time in the U.S. labor market and differ substantially by occupation. Arcidiacono, Bayer, and Hizmo (2010) and Mansour (2012) find differences in learning for high school graduates and college graduates. Our research shares the same theoretical underpinning as these papers and permits extending these ideas to an important special case – the operation of the labor market in a rapidly changing developing country.

Our labor market data also allow investigation of the returns to cognitive skills – a topic that has not been extensively studied in developing countries where data limitations have been severe. International comparisons have recently been possible for OECD countries (Hanushek et al., 2015), but comparable general labor market surveys with information about the cognitive skills of workers have not been available for developing countries. This aspect of the current work is especially interesting because of the suggestion that returns to cognitive skills are high when the economy is undergoing rapid change (Hanushek et al., 2017).

## 2 Analytical Structure and Data

### 2.1 Conceptual Framework

In the employer learning and statistical discrimination model of Altonji and Pierret (2001), at the labor market entry employers have only limited information about workers' productivity. Thus in a competitive economy where individuals are paid according to their productivity, employers use easily observable characteristics that are also correlated with productivity such as the education

level to proxy for potential productivity. Over time, employers accumulate more information about workers' true productivity and rely less on these proxies for setting wages. For college graduates, the tier of college they graduate from forms one such characteristic; graduates of elite universities are deemed to either have higher innate ability or have acquired more human capital in the richer learning environment of the elite universities and hence are better rewarded at job entry.[2] Similarly, when more information about true productivity is revealed by actual performance in the firm, the premium associated with the college tier decreases. This the experience profile of the college quality premium.

This pattern may be attenuated for college graduates as they generally are able to reveal more information about their quality on their resumes when applying for a job. Further, employers tend to spend more time screening their applications, especially when college graduates are a relatively small fraction of the labor force.[3] However, when higher education becomes mass education, college graduates become less differentiable based on their resumes, and, as the quantity of applications from college graduates grows, employers come to rely more on the easily observable proxy for individual quality, i.e., the college tier. Thus, other things being equal, the dynamics of the elite university premium become more pronounced when the population of college graduates expands.

The above discussion suggests that the dynamics of college quality premium may be more salient in China for recent cohorts of college graduates who started to enter the labor

[2] Signaling models focus on selection of high skill individuals as the mechanism of higher cognitive skills of graduates, while human capital models focus on the production of skills by schools. Both models indicate higher skills of graduates, and the mechanism behind the higher skills of graduates is not identified from labor market data. For our purposes, however, the underlying mechanism does not matter. Our interest is how skills, both projected and actual, play out in the labor market.

[3] Arcidiacono, Bayer, and Hizmo (2010) use NLSY79 and show that ability is observed nearly perfectly at labor market entry for college graduates, but is revealed only gradually for high school graduates.

market in the early 2000s following the dramatic higher education expansion that started in 1999. Nationwide, the number of four-year college graduates doubled between 1999 and 2003 and quadrupled by 2007 (Figure 1). With this surge in the supply of college-educated workers, we expect a relatively larger role played by the college tier in signaling one's ability at the job entry but a steeper reduction in the college quality premium with the revelation of true productivity over one's career. This is the intertemporal profile of college quality premium.

Because the wage dynamics we describe above depend on the extent to which individuals are rewarded in the labor market according to their productivity, we also hypothesize that the experience-profile of the college tier premium is likely to vary with the strength of the market forces in the Chinese economy. Therefore, the dynamics may be more salient for individuals working in the private sector and working in regions experience more marketization than for those working in the public sector and working in the less market-oriented regions.

### 2.2 2013 Chinese Household Income Project (CHIP) Survey Data

Understanding how university quality interacts with the size of the sector and with the dynamics of the economy obviously place large demands on modeling and on the data. Fortunately, we have Chinese data that can support an analysis of quality premium dynamics.

The data used for the empirical analysis come primarily from the urban sample of the 2013 Chinese Household Income Project (CHIP) survey data, which are drawn from 14 provinces and are representative of the Chinese urban population. This high-quality dataset contains detailed information on basic individual characteristics including gender, age, education attainment, tier of college, year, province, subject of study, and score of college entrance exams. The labor market information includes current salary, working hours, industry, sector,

occupation, and starting year and salary at the current job. All monetary values are CPI-adjusted to be measured in constant 2013 Yuan.

An important advantage of the 2013 CHIP dataset is that it contains job history information that allows us to construct labor market histories with current and starting monthly wage at the current job. Monthly wage in 2013 is annual income divided by months worked during 2013, and the survey reports directly starting monthly salary.[4] Our sample for the main empirical analysis includes all individuals with a four-year college degree who work at least 6 hours per day and 20 days per month (full-time workers). We define individuals who are born in or after 1980 as the young cohorts. These individuals were admitted to college in or after 1999, when the higher education expansion policy started, and hence they graduated and entered the labor market along with a substantially larger number of college graduates.[5]

The 2013 CHIP survey elicits self-reported information on individuals' university type and college entrance exam (CEE) score. Elite universities are the 100 or so tier-1 universities designated by the Ministry of Education (MOE) of China (the Project-211 universities). Ordinary universities are the remaining more than 2000 regular universities. Elite universities are directly under the administration of the MOE, receive substantially more funding, and are able to hire higher-quality faculty than ordinary universities. They admit students with a CEE score above a threshold level, which is year-province-subject (sciences v. humanities) specific. Thus, graduates from elite universities are generally considered of higher quality than those from ordinary

[4] We also use hourly wage as an alternative wage measure; for 2013 it is defined as the annual income divided by hours worked in 2013, and for job starting year it is defined as monthly income divided by hours worked per month in 2013, assuming monthly hours worked is the same for the two years. The results are similar.

[5] The old cohorts are individuals born between 1954 and 1979. Results are not sensitive to using 1981 as the cutoff year for defining cohorts.

universities. We normalize individual CEE score by the total score of the test one took.[6] In the regression analyses we use the CEE score as a measure of individual cognitive skills.

Panel A of Table 1 reports the distribution of education attainment for the entire sample of full-time employees and for subsamples by cohort and gender separately. Although we are primarily interested in individuals with a 4-year college degree, we also report statistics for individuals of other education levels to demonstrate the trend in education achievement in China. Education attainment in China has increased significantly: full-time workers with less than a high school education in the young cohorts is about half that of the old cohorts (16.5 percent v 35.1 percent), while there are 40 percent more with at least a 3-year college education in the young cohorts than in the old cohorts. For the young cohorts, 33 percent have at least a 4-year college education, an 80 percent increase over the old cohorts. This is consistent with the higher education expansion started in 1999. Of those with at least a 4-year college education, the distribution between elite and ordinary universities is quite similar between cohorts, which however translates into a much larger quantity of graduates from the ordinary universities.

While fewer females of the old cohorts are college-educated, females of the young cohorts surpass males by more than 6 percentage points; nevertheless, fewer females graduate from an elite university than males, even though the gap has narrowed by half for the young cohorts.

Panel B reports the employment distribution between public and private sectors for individuals with at least a 4-year university education.[7] Almost 20 percentage points fewer

[6] The total score is year-province-subject specific and is obtained from various CEE-related websites such as http://edu.sina.com.cn/gaokao/.

[7] Public sector includes government agencies, all public schools/universities, hospitals, other public institutions, and state-owned enterprises (SOEs); private sector includes all other employers, i.e., firms of all ownerships except for SOEs and non-firm small businesses.

university graduates of the young cohorts are employed in the public sector than the old cohorts, consistent with the growth of the private sector over the past 20 years. Meanwhile, relatively more graduates of elite universities from the young cohorts work in the public sector. Part of this may be attributable to the relatively rigid credential requirements of the public sector in hiring and to the stability and amenities associated with a public-sector job, job components that have become more coveted in recent years. We find similar pattern for an alternative definition of employment sector, where we move the SOEs to the private sector, assuming SOEs are also subject to similar, albeit lesser, market forces than purely private firms.

### 2.3 Empirical Model

We employ an augmented Mincer equation to estimate the dynamic of college tier premium with experience:

$$\ln(wage_i) = \alpha + \gamma_1 PE_i + \gamma_2 PE_i^2 + \delta \cdot X_i + f_{PE}(elite_i) + \varepsilon_i \qquad (1)$$

In Equation (1), ln($wage_i$) is the natural logarithm of monthly wage of individual *i*; *elite* is an indicator equal to 1 for a graduate of an elite university and 0 otherwise. *PE* is years of potential experience in the labor market, *X* is a vector of control variables, and $\varepsilon$ is a stochastic error term.

We start with the experience profile of the premium for elite school graduation. We model the time path of the premium as an inverse quadratic as in Eq. 2. The coefficients $\beta_0$ in Equation (2) captures the wage premium at job entry. The coefficients $\beta_1$ and $\beta_2$ reflect how this premium varies over one's career and is our estimate of the experience profile. With an inverse function of experience, we expect $\beta_1$ to be positive.

$$f_{PE}(elite_i) = \beta_0(elite_i) + \beta_1(elite \times \left[\frac{1}{PE_i}\right]) + \beta_2(elite \times \left[\frac{1}{PE_i^2}\right]) \qquad (2)$$

For the estimation, we use the survey information to construct retrospective work histories for all individuals, which allows us to include observations for the starting year of employment with the current firm along with the current year (2013). We thus portray the dynamics of wages for each worker as they evolve across different phases of the education and economic development of China.

The main challenge in interpreting the experience profile estimated from Equation 1is the potential contamination from a secular change in the returns to an elite university education. Since calendar time is positively correlated with experience, people with longer experience are generally older and entered the labor market in earlier years. In a simple regression without controlling for secular changes, $\beta_1$ and $\beta_2$ may reflect the change in the return to an elite university education over time in addition to any change in the return over a worker's career.

Secular changes in the Chinese labor market is a distinct possibility. First, during the years of planned economy, wages were set by the central government, leading to a very compressed wage structure. With the progress of the market-oriented economic reform, wage setting became more decentralized and wages became more dispersed. Decreasing returns to an elite university education by experience could then simply reflect the more compressed wage distribution for older cohorts. Second, with the growth of the Chinese economy and the adoption of skill-biased technologies, returns to greater skills of elite university graduates may increase over time due to increasing demand for highly skilled workers. In this case, decreasing returns to an elite university education by experience may capture the lower relative demand for skills in

earlier years. This is of particularly concern in interpreting any differences between the pre- and post-college expansion cohorts.[8] Third, as discussed, the dramatic expansion of college graduates after 1999, could clearly alter the labor market for graduates dramatically. Fourth, China is a large and heterogeneous country, where both industry and universities can follow significantly different time patterns across cities and provinces.

To deal with these concerns, we do two things. First, we control for the educational distribution in employment (percent high school graduates and percent college graduates) in the relevant province and year for each individual's employment observation. Second, we interact these province-year educational measures with the elite college indicator to trace out their impact on the elite college premium. These latter terms describe the intertemporal profile of the elite premium.

We construct series of time-varying province-specific education distribution of employees as a measure of local demand for workers of different skill levels. We take a Bartik type approach and combine the nationwide industrial employment education distribution and province-specific industrial employment composition. Specifically, the fraction of employees with education level *k* in province *j* in year *t* is a weighted sum of nationwide fraction of employees with education level *k* in industry *i* in year *t* with the weights being the employment share in industry *i* in province *j* in year *t*:

$$Edu_{jt}^{k} = \sum_{i} edu_{it}^{k} \cdot emp_{ijt} \qquad (3)$$

The nationwide education composition by industry ( $edu_{it}^{k}$ ) captures both the changes in the supply of labor force with different education levels and changes in the demand for workers with

[8] For a discussion of changing returns over time in China, see Liu (1998) and Zhang et al. (2005).

different skills when industries adopt newer technologies. The province-industry employment share ( $emp_{ijt}$ ) largely reflects changes in the demand for different types of skills in a province when its industrial structure changes over time.

$edu_{it}^{k}$ is constructed from the Urban Household Survey (UHS) data conducted by the Statistic Bureau of China for 1988-2009. The survey data are representative of registered residents in the urban area, i.e., people with *Hukou*, and exclude migrants. Since migrant workers disproportionately work in the informal sector, our constructed industrial education composition is only for formal sector employees. We thus obtain $emp_{ijt}$ for formal sector employment only; the data are obtained from various issues of the China Statistic Yearbook and China Labor Statistic Yearbook. Since migrant workers in general have lower education levels, our constructed provincial education composition for formal sector employees is likely to overestimate the overall percentage of college-educated labor force and underestimate that of those with low education levels. Nevertheless, we believe that the education distribution of the formal sector employment may be more relevant for our study since college educated individuals tend to work in the formal sector. We extrapolate data for 1980-1987 and 2010-2013.

Figure 2 plots the time series of education attainment of formal sector employees nationwide. The fractions with a middle school education and less decrease over the entire period and become quite flat in the most recent years, while the fraction with a college education or above increases over time. Interestingly, the fraction with a high school education increases up to the late 1990s and then declines, concurrent to the implementation of the higher education expansion policy.

We estimate Equation (1) including a measure of individual ability and inspect how individuals are rewarded in the labor market by their directly measured skills. This allows us to

compare the difference in labor market responses to aggregate skill measures (proxied by college tier) and individual skills. We estimate Equations (1) for the overall sample and for different cohorts to compare how the dynamics of the college tier premium and returns to individual skills differ before and after the dramatic increase in the supply of college graduates due to the higher education expansion policy. In robustness analysis, we further estimate the model for individuals working in different regions and in different sectors and for males and females separately.

## 3 Empirical Results

This section first reports the estimates of average elite premium. We then focus on estimates of the dynamics of the premium to an elite university education with experience using the panel data for full-time employees. All regressions control for city fixed effects, a cubic time trend, and its interaction with the indicator for elite university. Robust standard errors are reported in the parentheses.

### 3.1 Average elite premium

We first estimate a simple Mincer regression of log monthly wage using the cross section data the 2013 CHIP. We focus on full-time employees in 2013. Columns 1-3 of Table 2 report results for the overall sample and for the young and old cohorts separately. All regressions control for city fixed effects. The estimates are broadly consistent with estimates of returns to schooling in the Chinese labor market in the literature. The return to each year of schooling is 7.7 percent for the overall sample, and is higher for the young cohorts (9.3 percent) than the old cohorts (6.9 percent). We next consider the return to each schooling level relative to a general high school education (columns 4-6). The return to a 4-year university education relative to a high school education is about 7 percentage points smaller for the young cohorts than the old cohort, consistent with the changes in the supply of workers of different education levels.

In the remaining columns of Table 2 we focus on individuals with a 4-year university education and report estimates of the return to an elite university education and the CEE score. The estimated average return to an elite university education is 10.6 percent for the old cohorts and 18.8 percent for the young cohorts; this tremendous increase suggests the much larger role played by college tier in the labor market and is the starting point of our empirical analyses in the next sections. Additionally, the return to the CEE score is large (1.42) and significant for the young cohorts, but much smaller and insignificant for the old cohorts (0.43). Once CEE score is controlled for, the return to an elite university becomes insignificant, whereas CEE score continues to be a significant determinant of wages; thus university tier becomes a less valuable proxy for true individual quality when the latter can be proxied by a more accurate, individual measure.

As a preliminary explanation for the finding of a much larger premium to an elite university education for the young cohorts, Figure 3 plots the density of the normalized CEE score by cohort and college tier. There is a much larger disparity in the CEE score between graduates of the elite and ordinary universities for the young cohorts; the means are 0.74 and 0.63 for the young cohorts and 0.71 and 0.66 for the old cohorts respectively. Since CEE is generally unobservable to the employers, college tier plays a more critical role in signaling ability for the young cohorts, but this role is likely to evolve over one's career when individual quality is better observed. In Figure 4, we plot the histogram of log monthly wage of those of the young cohorts graduating from an elite university by potential experience. More specifically, we compare the wage distribution of those with 0 to 5 years of potential experience by 2009 and that of individuals with 6 to 10 years of potential experience in 2013; these two groups belong to roughly the same age cohorts. For graduates of elite universities, the wage distribution becomes

more dispersed with the increase in experience; the standard deviation of log monthly wage increases from 0.65 to 0.80 when potential experience goes up from 0-5 years to 6-10 years. Thus, college tier becomes less important in wage determination over one's career; in particular, we observe a larger mass in the left tail when potential experience is in the 6-10 year range, suggesting the revelation of low quality among some of the elite university graduates.

### 3.2 Dynamics of elite premium and returns to individual skills

Table 3 reports the baseline estimates of how returns to an elite university education changes with labor market experience. Column 1 employs the entire sample of full-time employees with a 4-year college education. Because we control for time trend and its interaction with the elite university dummy, we are able to eliminate the economy-wide trend in wage setting and wage growth, and the estimates on the interactions between elite university dummy and the quadratic function of the inverse of experience capture the changes in the premium to an elite university with each year increase of potential experience. The estimates on the linear and quadratic term are 0.263 and -0.023 and significant at the 10 percent level. Thus, the premium to an elite university education declines rapidly at the early stage of career but much more slowly in later years of career. This is consistent with findings in the literature that much of the employer learning of worker productivity occurs in the first 10 years of labor market experience (Lange 2007). Estimates on the elite university dummy, cubic time trend, and interactions between them are insignificant. Holding other characteristics constant, males earn 14% more than females.

Columns 2 and 3 estimate the same model for the old cohorts and the young cohorts separately, where the young cohorts are those attending college under the HE expansion regime. The changes in elite premium over experience as estimated in column 1 is completely driven by the young cohorts: Estimates on the interactions between elite dummy and the function of

experience for the old cohorts (column 2) are insignificant and much smaller than those in column 1, whereas estimates are significant and larger for the young cohorts (column 3). Taking the point estimates at their face value, we plot the trajectories of the elite university premium for the old and young cohorts separately in Figure 5. The initial premium of the young cohorts is almost twice that of the old cohorts, and it also declines much faster than the old cohorts; the difference in the premium becomes quite negligible by 10 years of potential experience. This pattern is consistent with the hypothesis that for the old cohorts, with relatively small supply of college educated labor force, employers can perform more elaborate and accurate screening at hiring and hence rely less on university tier, while this becomes less plausible for the young cohorts when the number of college-educated job applicants rise substantially; however, in the long run, university type becomes inconsequential in wage determination presumably because more direct information about worker productivity become available.

The remaining three columns of Table 3 report results for the overall sample and the young and old cohorts separately when we further control for time-varying province-specific education distribution of employees in the formal sector. Since we control for the nationwide time trend, the variation in this distribution largely comes from within province variation in the industrial structure, and hence the fractions of labor force with a high school education and a college education or above capture changes in demand for workers of different skill levels in each province over time due to changes in the industrial structure. In provinces with larger demand for skilled labor, wages of college graduates are higher for the young cohorts, but are not affected for the old cohorts. Estimates on all other variables are almost identical to columns 1-3.

Employers may at hiring have access to information besides the college tier an applicant graduates from to determine her qualification and wage, which is not observed by economists;

this may include information listed on the resume such as courses taken, GPA, and professional certificates obtained or obtained during interviews. If this information is positively correlated with the elite type, then the estimated elite university premium at job entry and the later decline may in part be due to this unmeasured productivity, and we overestimate the role played by the university tier.

To alleviate this concern, we use the CEE score as a proxy for qualities employers may observe at hiring and control for it in the regressions. The results are reported in columns 1-3 of Table 4 for the entire sample and the old and young cohorts separately. The estimate on the CEE score in all three columns is significant both statistically and economically and is larger for the young cohorts than the old cohorts. On average, *ceteris paribus*, for a 10-point increase in the CEE score, wage increases by 9.5%, and this increase is almost identical for graduates from elite and ordinary universities. Once the CEE score is controlled for, estimate on the interaction between elite university dummy and the inverse of experience becomes smaller, but the reduction is modest for the young cohorts and the estimate remains marginally significant (close to the 10 percent level). Thus, while employers may partially set starting wage based on specific individual qualities, they rely heavily on college tier as a source of information for productivity in general. This may partly be attributable to the fact that some of the individual qualities listed on resumes are not comparable across universities; for example, the same courses and GPA may embody very different amount of human capital accumulated in elite versus ordinary universities, given the often enormous disparity in resources and teaching quality between different types of universities. We use the specification of these analyses and focus on the young cohorts for the rest of the paper.

In columns 4-7, we control for the sector, industry, and occupation of employment first individually and then jointly to investigate the potential channels through which the elite university status and CEE score may affect the wage dynamics.[9] With these controls individually, the estimated initial elite university premium becomes smaller and insignificant, and jointly they account for about one third of the premium. It also appears that the employment sector is the more important of the pathways. Nevertheless, the sample size is not large enough to support an definitive conclusion. Controlling for these factors has virtually no impact on the estimated returns to CEE score and on the influence of local demand for skilled labor.

### 3.3 Estimates by Regions of Marketization and Sector

The dynamic of the elite university premium reported in the previous section comes fundamentally from the fact the wages are determined by individual marginal productivity, while true productivity can only be revealed gradually over time. Given China's vast regional disparity in economic development and the work of market forces, we expect large heterogeneity in this dynamic, and in particular, we expect it to be more pronounced in more developed regions and stronger market forces.

To test this hypothesis, we estimate the same model as in column 3 of Table 4 for the young cohorts in different local labor markets. The results are reported in Table 5. We first use the most broad classification and compare the coastal and inland regions, where the coastal region is more economically developed and has more competitive markets.[10] In column 1, the estimate on the interaction between the elite university dummy and the inverse of experience for

[9] Sectors include government agencies, public institutions, state-owned enterprises (SOEs), and firms and small businesses of all other ownerships.

[10] The coastal region includes Beijing, Jiangsu, Shandong, and Guangdong provinces. The inland region includes the remaining 10 provinces in the sample: Shanxi, Liaoning, Anhui, Henan, Hubei, Hunan, Chongqing, Sichuan, Yunnan, and Gansu.

the coastal region is positive, significant, and larger than that for the overall sample of the young cohorts (0.442 v 0.287); in contrast the estimate for the inland region (column 2) is much smaller in magnitude and insignificant. Also consistent with our hypothesis that more competitive markets put more values on individual productivity, estimate on the CEE score is large (1.409) and significant at the 1 percent level for the coast region but modest (0.312) and insignificant for the inland region; similarly, local demand for highly skilled labor as measured by the percentage of college graduates employed in the formal sector has a large and significant impact on wage only in the coastal region. On the flip side, otherwise similar males earn 24% more than female in the inland region, but there is no gender wage gap in the coastal region.

In the remaining columns of Table 5, as robustness checks, we compare cities with an above- and below-median measure of economic development. These measures include per capita GDP, size of urban population, percentage of firms that are foreign-owned, share of the agricultural sector in city GDP, and share of the service sector in city GDP. Except for the value-added by the agricultural sector, we believe that cities with an above-median measure in all other dimensions are more open and market-oriented, and hence market competition is a more important factor in wage determination. Indeed, in most cases, in cities with an above-median (below-median for agricultural value-added) measure college tier has an stronger impact on wage at job entry; when cities are classified based on per capita GDP and urban population, estimate on the interaction term is similar for the two groups but is generally insignificant. However, for all definitions of economic development, the estimated return to CEE score is substantially higher and always significant for cities with an above-median measure, and demand for college-educated labor also has a significantly positive impact on wages. In cities with an above-median

measure of marketization, gender wage gap is substantially smaller and in most cases not significantly different from zero.

To summarize, estimates in Table 5 suggest that skills and hence proxies for skills are valued higher at locations with a more developed economy and market. It appears that in these places females are treated more equally as males, perhaps because employers may lose out in market competition if they discriminate against highly skilled females.

We next explore how the dynamic of elite university premium may differ between public and private sectors. We hypothesize that the private sector employers, under more competition pressure, may set wages based more on individual productivity, and hence the dynamic of elite university premium more pronounced. The public sector includes government agencies and public institutions (schools, universities, hospitals, and other institutions). The private sector in the broader definition includes SOEs and privately owned firms; we lump SOEs and other firms together because we believe that SOEs face may similar competition pressures as private firms, albeit to a lesser degree. We also consider private firms separately.

Table 6 reports the regression results. Estimate on the interaction between the elite university dummy and the inverse of experience is positive, of non-trivial magnitude, but insignificant for all sectors, so is the estimate on the CEE score. The insignificance is likely due to the small sample size. The non-trivial positive point estimates are consistent with the general observations that the public sector are also highly selective in hiring. For example, applicants need to pass a written exam and then rounds of interviews to be successfully hired as civil servants, and the competition has become more fierce over time since the HE expansion; schools, universities, and hospitals with better performance get better reputations and in turn receive more resources, from both the government and the private contributions, and they therefore have a

strong incentive to hire highly capable individuals. The gender wage gap is virtually zero in the public sector, but significant for firms. Stronger local demand for college-educated workers has a positive impact on individual wages in all sectors.

Findings in Table 5 and Table 6 combined suggest that regional variations in the stage of economic development and the strength of market forces are a more important factor in explaining variations in wage determination. The higher degree of meritocracy in the more developed regions is likely the most important reason why large cities are enormously appealing to college graduates despite the soaring cost of living.

## 4 Heterogeneity by Gender

The above analyses indicate significant gender wage gap for college graduates. This section explores to what extent this is related to differences in employer screening based on college tier and to observed individual skills. We focus on the young cohorts. Regression results are reported in Table 7.

Columns 1-4 report results from the cross-sectional data of wages in 2013 to set the stage. On average, the elite university premium is higher for males than for females, but the differences is not significant (columns 1-2). Once we control for CEE score and its interaction with college tier, the elite university premium reduces substantially, especially for females. Meanwhile, the return to CEE score is much larger for females than for males. These results suggest that college tier and skills play quite different roles in determining wages of males and females.

Columns 5-6 are the basic regression results of wage dynamics for males and females separately. At job entry, male graduates of elite universities receive substantial higher wages than those of ordinary universities; the estimate (0.541) is almost twice that for the entire young cohorts (column 3 of Table 4). This elite university premium declines with experience. In sharp

contrast, other things being equal, wages of female graduates of elite and ordinary universities are almost identical at job entry and over their careers. At the same time, CEE score has a large and significant impact on wages for females, but its impact on male wages is much smaller and insignificant. Given that the gender wage gap is about 13% for the young cohorts, the estimates of 1.67 and 0.73 on CEE score for females and males respectively means that, *ceteris paribus*, females with a 14-point higher ability than males on the CEE distribution will completely eliminate the gender wage difference. Moreover, demand for college-educated labor force in the local labor market has a larger impact on female than male wages, as captured by the larger estimates on the province-year percentages of high school and college graduate employees. Results reported in columns 7-14 indicate that the patterns found in columns 5-6 generally hold even after controlling for sector, industry, and occupation of employment.

One reason for the differences in wage dynamics between males and females may be that we focus on the intensive margin and the differences in wages. Perhaps it is the extensive margin decision of whether to hire a female college graduates that depends more on the college tier, and female graduates of ordinary universities that secure a job may have very strong abilities, so that once hired wages will be closely linked to skills. If this is the case, we are underestimating the impact of college tier on female labor market outcomes. More generally, if college tier is also an important determinant in the hiring of male graduates, then it will have an even larger impact on the labor market outcomes of males.

What are the policy implications for reducing gender wage gap?

## 5 Conclusion

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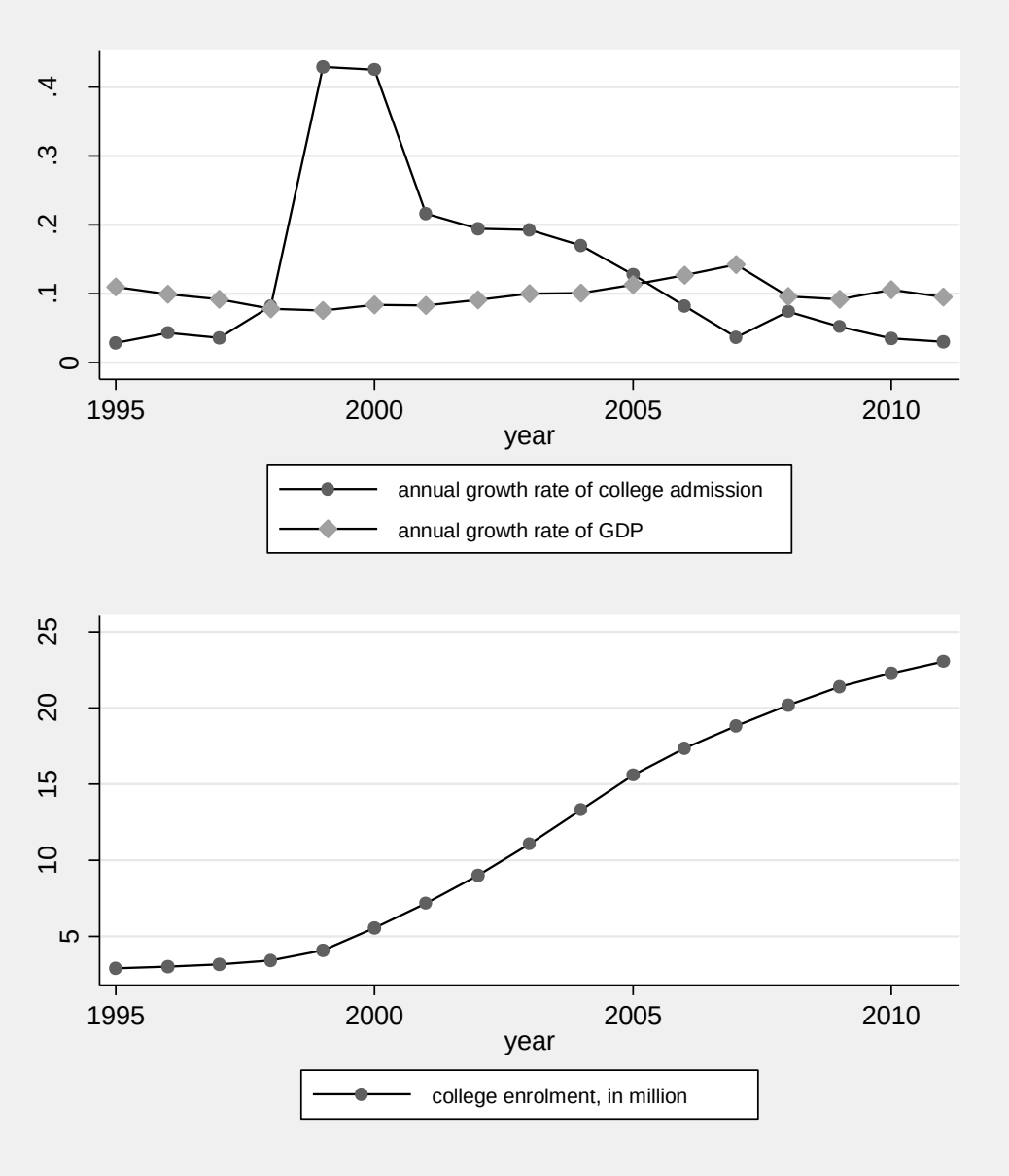
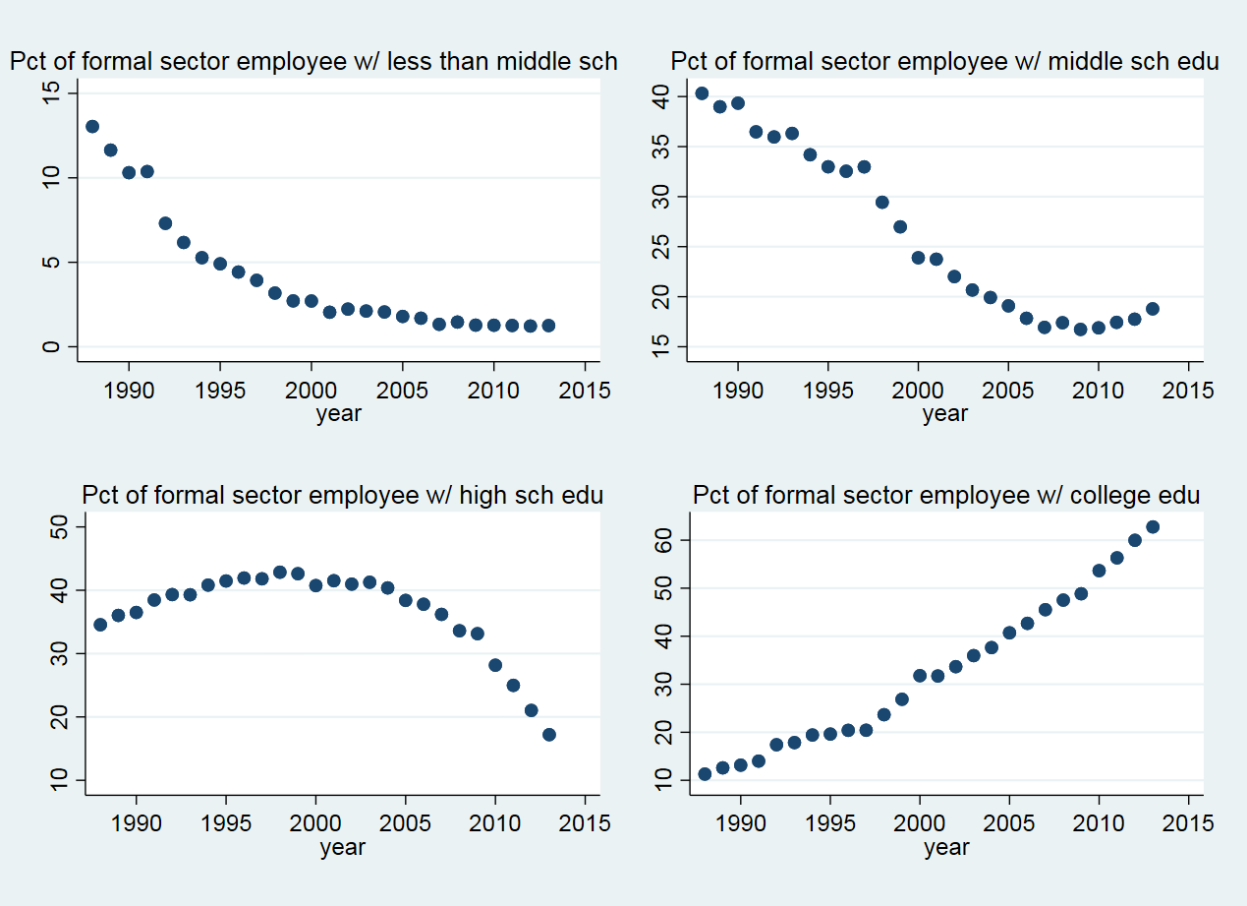
Figure 1: Annual Growth Rate of College Admission and Number of College Students Enrolled in Each Year




Notes: The top panel plots the annual growth rate of college admission, equal to the number of students admitted to 3- or 4-year regular colleges in current year divided by the number for the previous year minus 1, and the annual growth rate of GDP. The bottom panel depicts the total number of students (in millions) enrolled in regular colleges and universities, including both undergraduate and graduate students. Data are from various issues of China Statistics Yearbook.

Figure 2: Education Attainment of Formal Sector Employees in Urban China (Nationwide)




Note: The education attainment is calculated as a weighted sum of education distribution of formal sector employees of each industry nationwide, weighted by the share of formal sector employment in each industry of a province.

Figure 3: Distribution of College Entrance Exam Score Ranks

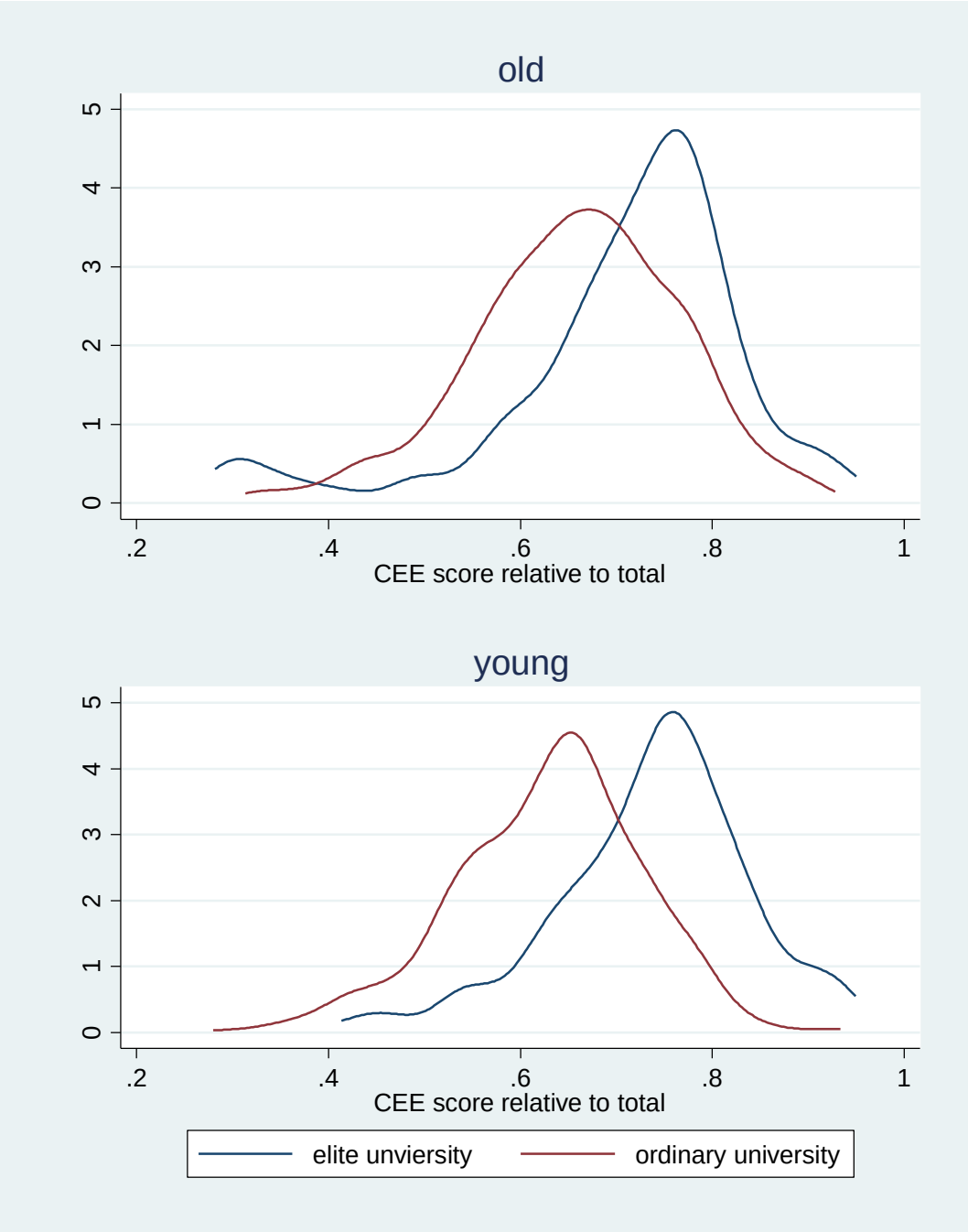
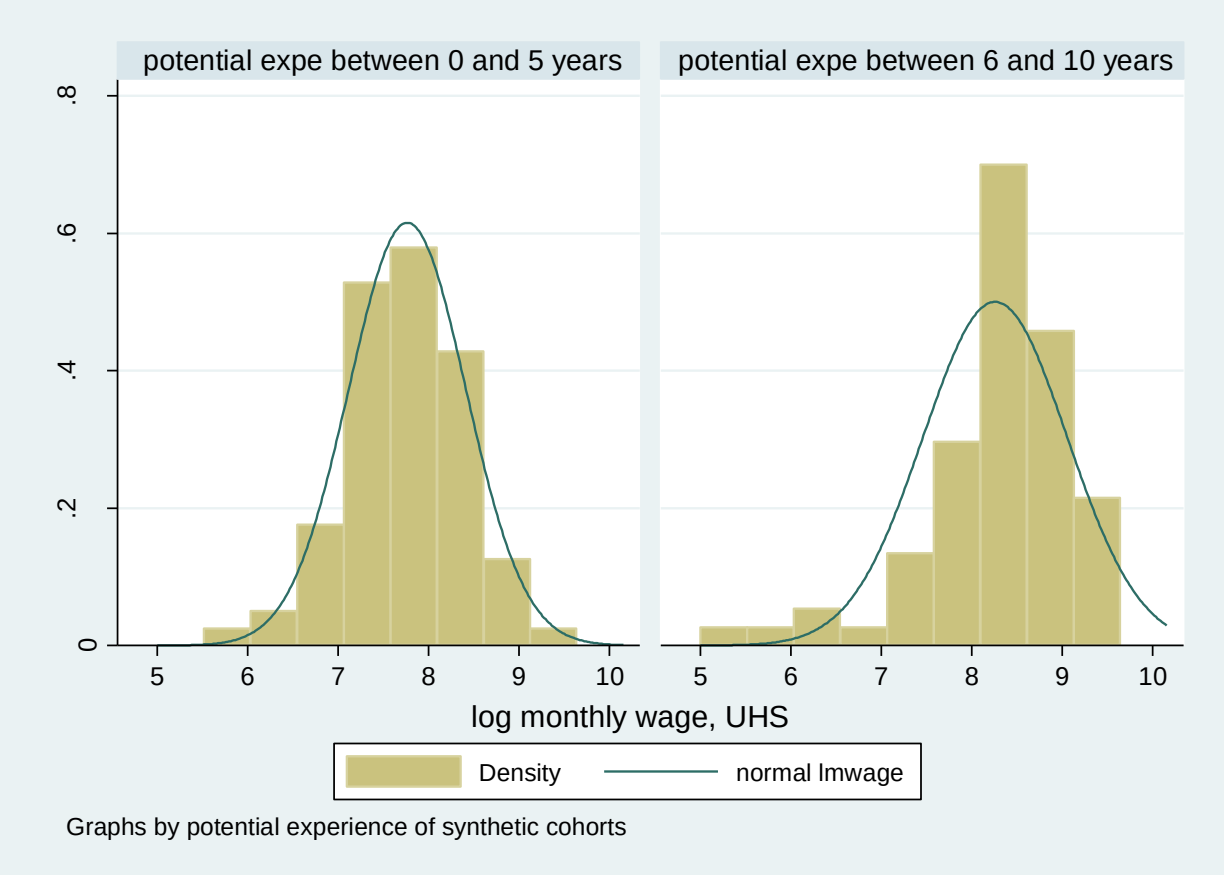
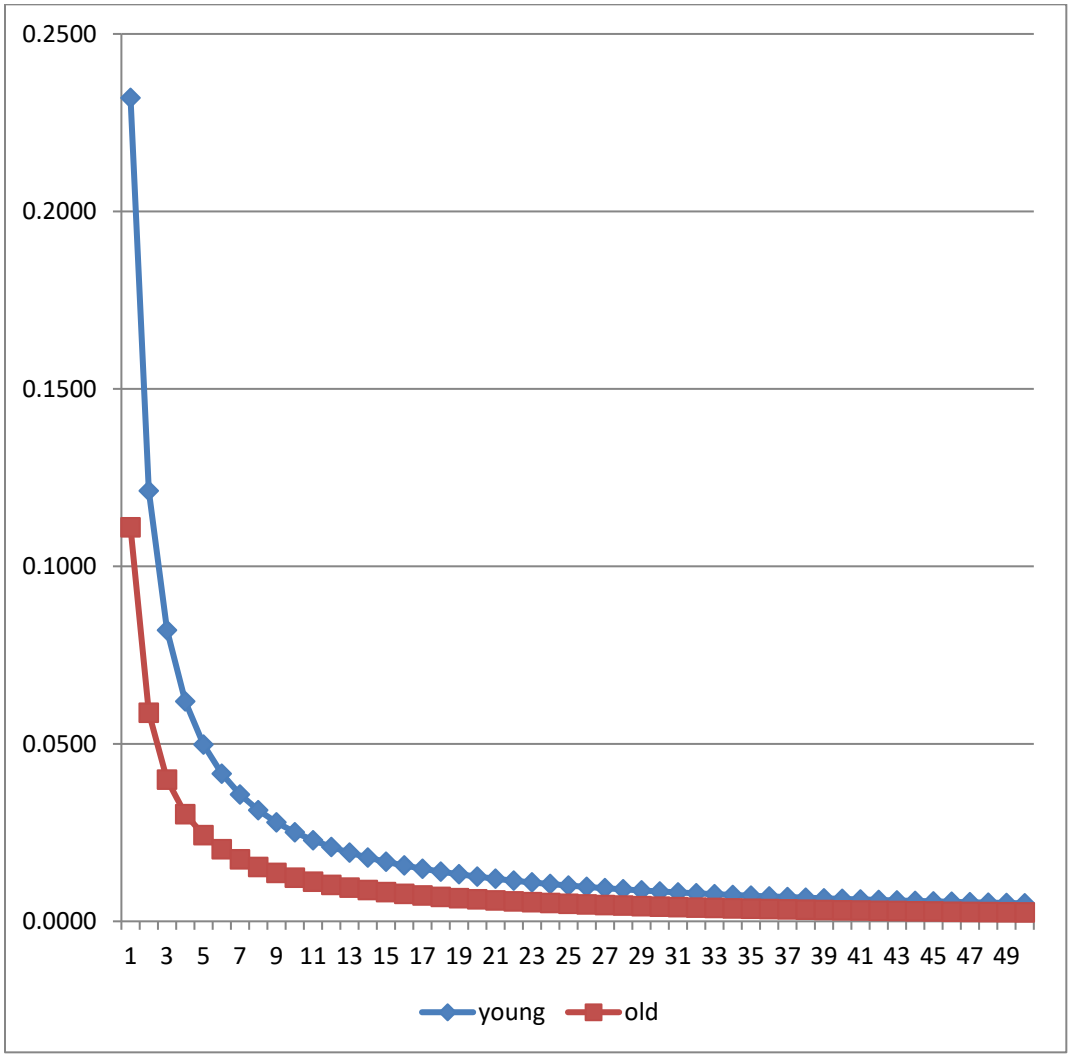


Figure 4: Wage Distribution of Elite College Graduates of the Younger Cohorts (born after 1979) by Potential Experience




Note: The left panel is for elite college graduates with 0 to 5 years of potential experience by 2009, and the right panel is for elite college graduates with 6 to 10 years of potential experience in 2013. These two groups come roughly from the same cohorts.

Figure 5: Predicted Elite University Premium over Potential Experience by Cohort




Note:

Table 1: Distribution of Eduacation Attainment and Employment Sector

Panel A:

| education | Total | old | young | | | | |
|---|---|---|---|---|---|---|---|
| | | | F | M | | F | M |
| <=ps | 4.59 | 5.95 | 7.09 | 5.12 | 1.18 | 1.41 | 0.97 |
| ms | 25.21 | 29.15 | 29.1 | 29.19 | 15.34 | 14.37 | 16.26 |
| hs | 18.17 | 20.47 | 20.25 | 20.63 | 12.41 | 11.95 | 12.84 |
| tech-hs | 11.72 | 10.53 | 11.65 | 9.71 | 14.69 | 12.73 | 16.56 |
| tech-col | 17.78 | 15.58 | 15.04 | 15.98 | 23.3 | 24.69 | 21.97 |
| univ | 22.52 | 18.32 | 16.87 | 19.37 | 33.08 | 34.84 | 31.4 |
| Top universities | 16.89 | 17.4 | 14.74 | 19.01 | 16.42 | 15.33 | 17.53 |
| Ordinary | 83.11 | 82.6 | 85.26 | 80.99 | 83.58 | 84.67 | 82.47 |

Panel B:

| education | Public sector | gov+inst | | | | |
|---|---|---|---|---|---|---|
| | | old | young | | old | young |
| <=ps | 13.03 | 12.79 | 16.13 | 5.21 | 5.63 | 0 |
| ms | 24.41 | 27.03 | 11.94 | 7.3 | 7.74 | 5.22 |
| hs | 37.84 | 41.86 | 21.23 | 13.77 | 15.54 | 6.46 |
| tech-hs | 47.58 | 56.07 | 32.29 | 22.12 | 26.59 | 14.06 |
| tech-col | 58.89 | 67.61 | 44.28 | 32.32 | 40.59 | 18.46 |
| univ | 73.34 | 80.83 | 62.95 | 52.8 | 61.91 | 40.16 |
| Top universities | 69.44 | 72.19 | 66.67 | 43.43 | 45.99 | 40.86 |
| Ordinary | 62.03 | 72.04 | 52.64 | 39.5 | 50.39 | 29.28 |

Note: Sample includes fulltime workers with hourly wage between 1 and 100 Yuan per hour. Full-time workers are those working at least 6 hours per day and 20 days per month. Old: born between 1954 and 1979; young: born after 1979. Public sector includes government agencies, instituions, and state-owned enterprises (SOEs); private sector includes all firms other than SOEs

Table 2: Average Elite Premium and Returns to Individual Skills

| | 1<br>all | 2<br>old | 3<br>young | 4<br>all | 5<br>old | 6<br>young |
|---|---|---|---|---|---|---|
| Male | 0.290*** | 0.348*** | 0.165*** | 0.298*** | 0.352*** | 0.167*** |
| | [0.013] | [0.015] | [0.023] | [0.013] | [0.015] | [0.023] |
| PE | 0.051*** | 0.023*** | 0.062*** | 0.054*** | 0.033*** | 0.066*** |
| | [0.003] | [0.006] | [0.012] | [0.003] | [0.006] | [0.012] |
| PE2 | -0.001*** | -0.000*** | -0.001 | -0.001*** | -0.001*** | -0.002*** |
| | [0.000] | [0.000] | [0.001] | [0.000] | [0.000] | [0.001] |
| Yrs of Schooling | **0.077*** ** | **0.069*** ** | **0.093*** ** | | | |
| | [0.003] | [0.003] | [0.006] | | | |
| prim | | | | **-0.189*** ** | **-0.183*** ** | **-0.244** ** |
| | | | | [0.039] | [0.042] | [0.115] |
| lowmid | | | | **-0.113*** ** | **-0.102*** ** | **-0.174*** ** |
| | | | | [0.021] | [0.023] | [0.050] |
| midprof | | | | **0.092*** ** | **0.140*** ** | **-0.045** |
| | | | | [0.024] | [0.028] | [0.047] |
| highprof | | | | **0.278*** ** | **0.298*** ** | **0.170*** ** |
| | | | | [0.021] | [0.026] | [0.041] |
| college | | | | **0.540*** ** | **0.525*** ** | **0.454*** ** |
| | | | | [0.022] | [0.026] | [0.043] |
| Constant | 6.369*** | 6.816*** | 6.195*** | 7.151*** | 7.385*** | 7.341*** |
| | [0.053] | [0.110] | [0.108] | [0.038] | [0.095] | [0.078] |
| Observations | 9,166 | 6,550 | 2,616 | 9,166 | 6,550 | 2,616 |
| R-squared | 0.273 | 0.295 | 0.27 | 0.284 | 0.312 | 0.265 |

Table 2: continued

| | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|
| | all | old | young | all | old | young | all | old | young |
| Male | 0.140*** | 0.189*** | 0.126*** | 0.152*** | 0.194*** | 0.147*** | 0.150*** | 0.192*** | 0.145*** |
| | [0.030] | [0.041] | [0.046] | [0.035] | [0.050] | [0.050] | [0.035] | [0.050] | [0.050] |
| PE | 0.071*** | 0.055** | 0.095*** | 0.078*** | 0.054* | 0.102*** | 0.077*** | 0.058** | 0.101*** |
| | [0.008] | [0.023] | [0.034] | [0.009] | [0.029] | [0.037] | [0.009] | [0.029] | [0.037] |
| PE2 | -0.001*** | -0.001** | -0.004** | -0.002*** | -0.001** | -0.004* | -0.002*** | -0.001** | -0.004* |
| | [0.000] | [0.001] | [0.002] | [0.000] | [0.001] | [0.002] | [0.000] | [0.001] | [0.002] |
| Elite | 0.142*** | 0.106** | 0.188*** | | | | 0.083* | 0.073 | 0.052 |
| | [0.040] | [0.052] | [0.066] | | | | [0.048] | [0.063] | [0.081] |
| CEE score | | | | 0.905*** | 0.434 | 1.420*** | 0.789*** | 0.389 | 1.309*** |
| | | | | [0.210] | [0.276] | [0.345] | [0.217] | [0.275] | [0.397] |
| Constant | 7.815*** | 7.977*** | 7.843*** | 7.209*** | 7.773*** | 6.865*** | 7.262*** | 7.729*** | 6.926*** |
| | [0.059] | [0.246] | [0.131] | [0.152] | [0.358] | [0.281] | [0.154] | [0.359] | [0.298] |
| Obs | 1,481 | 724 | 757 | 1,152 | 540 | 612 | 1,152 | 540 | 612 |
| R-squared | 0.361 | 0.335 | 0.362 | 0.396 | 0.364 | 0.436 | 0.398 | 0.366 | 0.437 |

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Dynamic Returns to Elite Universities

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| | all | all | all | old | old | young |
| sex | 0.040 | 0.138*** | 0.139*** | 0.186*** | 0.188*** | 0.129*** |
| | [0.030] | [0.026] | [0.026] | [0.038] | [0.038] | [0.035] |
| PE | 0.109*** | 0.057*** | 0.055*** | 0.027** | 0.024* | 0.064*** |
| | [0.005] | [0.006] | [0.006] | [0.013] | [0.014] | [0.015] |
| PE2 | -0.002*** | -0.001*** | -0.001*** | -0.001** | -0.001* | -0.002 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] |
| elite | 0.169*** | -0.959* | 0.919 | -1.046 | 1.019 | -0.663 |
| | [0.049] | [0.556] | [6.203] | [0.654] | [6.671] | [1.690] |
| elite*1/PE | 0.026 | 0.216 | 0.270** | 0.124 | 0.136 | 0.253* |
| | [0.127] | [0.133] | [0.136] | [0.319] | [0.324] | [0.153] |
| elite*1/PE2 | -0.001 | -0.019 | -0.024* | -0.013 | -0.013 | -0.021 |
| | [0.012] | [0.013] | [0.013] | [0.030] | [0.031] | [0.014] |
| eltie univ*% HS grad in urban emp yr-prov | | 0.012 | 0.057* | 0.018* | 0.056 | 0.003 |
| | | [0.009] | [0.033] | [0.010] | [0.058] | [0.023] |
| eltie univ*% col grad+ in urban emp yr-prov | | 0.014** | 0.018 | 0.013 | 0.010 | 0.012 |
| | | [0.007] | [0.018] | [0.008] | [0.026] | [0.020] |
| % HS grads in urban emp yr-prov | | 0.010*** | 0.022 | -0.000 | 0.004 | 0.003 |
| | | [0.004] | [0.020] | [0.005] | [0.032] | [0.013] |
| % col grads+ in urban emp yr-prov | | 0.026*** | 0.017 | 0.031*** | -0.001 | 0.014 |
| | | [0.003] | [0.014] | [0.004] | [0.017] | [0.012] |
| cubit time trend & interaction w/ elite dummy | | | Y | | Y | |
| Constant | 7.364*** | 5.954*** | 7.845*** | 6.250*** | 6.243** | 6.782*** |
| | [0.050] | [0.231] | [2.409] | [0.270] | [2.682] | [1.023] |
| Observations | 2,841 | 2,830 | 2,830 | 1,340 | 1,340 | 1,490 |
| Number of id | 1,501 | 1,501 | 1,501 | 729 | 729 | 772 |

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Dynamic returns to elite university and returns to skills

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | | | | industry | occup | sector | all three |
| | all | old | young | young | Young | young | young |
| male | 0.143*** | 0.184*** | 0.142*** | 0.135*** | 0.147*** | 0.133*** | 0.134*** |
| | [0.028] | [0.043] | [0.038] | [0.040] | [0.038] | [0.038] | [0.040] |
| PE | 0.055*** | 0.027* | 0.057*** | 0.057*** | 0.057*** | 0.057*** | 0.056*** |
| | [0.007] | [0.014] | [0.017] | [0.017] | [0.017] | [0.017] | [0.017] |
| PE2 | -0.001*** | -0.001** | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 |
| | [0.000] | [0.000] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| elite | -1.003 | -0.639 | -0.976 | -1.314 | -1.232 | -1.081 | -1.608 |
| | [0.641] | [0.776] | [1.961] | [1.948] | [1.909] | [1.953] | [1.910] |
| elite *1/PE | 0.151 | -0.046 | 0.253 | 0.230 | 0.240 | 0.244 | 0.217 |
| | [0.140] | [0.338] | [0.165] | [0.165] | [0.161] | [0.166] | [0.162] |
| elite *1/PE2 | -0.013 | 0.001 | -0.021 | -0.019 | -0.019 | -0.020 | -0.017 |
| | [0.013] | [0.032] | [0.015] | [0.015] | [0.015] | [0.016] | [0.015] |
| CEE score | 0.943*** | 0.727** | 1.095*** | 0.995*** | 1.068*** | 1.100*** | 1.021*** |
| | [0.213] | [0.314] | [0.333] | [0.338] | [0.343] | [0.336] | [0.351] |
| elite *CEE score | 0.148 | -0.076 | 0.374 | 0.510 | 0.227 | 0.372 | 0.379 |
| | [0.437] | [0.574] | [0.697] | [0.662] | [0.689] | [0.688] | [0.657] |
| eltie *% HS grad in urban emp yr-prov | 0.012 | 0.014 | 0.003 | 0.007 | 0.009 | 0.005 | 0.013 |
| | [0.010] | [0.011] | [0.025] | [0.025] | [0.024] | [0.025] | [0.025] |
| eltie *% col grad+ in urban emp yr-prov | 0.012 | 0.008 | 0.011 | 0.013 | 0.014 | 0.012 | 0.017 |
| | [0.008] | [0.009] | [0.022] | [0.022] | [0.022] | [0.022] | [0.022] |
| % HS grads in urban emp yr-prov | 0.011*** | 0.001 | -0.006 | -0.006 | -0.000 | -0.007 | -0.002 |
| | [0.004] | [0.005] | [0.014] | [0.015] | [0.014] | [0.014] | [0.014] |
| % col grads+ in urban emp yr-prov | 0.028*** | 0.033*** | 0.004 | 0.005 | 0.010 | 0.003 | 0.008 |
| | [0.003] | [0.004] | [0.014] | [0.014] | [0.013] | [0.014] | [0.013] |
| Constant | 5.215*** | 5.685*** | 6.881*** | 7.151*** | 6.295*** | 6.927*** | 6.705*** |
| | [0.267] | [0.319] | [1.174] | [1.202] | [1.127] | [1.173] | [1.160] |
| Observations | 2,225 | 1,012 | 1,213 | 1,211 | 1,189 | 1,213 | 1,187 |
| Number of ids | 1,168 | 543 | 625 | 624 | 611 | 625 | 610 |

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Returns to elite university and skills by region (young cohorts)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | coastal | inland | >=med pcgdp | <med pcgdp | >= med urban pop % | < med urban pop % | >= med FDI firm num % | <med FDI firm num % | < med agri gdp share | >= med agri gdp share | >= med service gdp share | <med service gdp share |
| male | 0.001 | 0.247*** | 0.073 | 0.221*** | 0.131*** | 0.157*** | 0.045 | 0.249*** | 0.132** | 0.154*** | 0.083* | 0.197*** |
| | [0.053] | [0.050] | [0.050] | [0.053] | [0.050] | [0.056] | [0.051] | [0.053] | [0.055] | [0.051] | [0.049] | [0.057] |
| Elite *1/PE | 0.449** | 0.142 | 0.245 | 0.304 | 0.244 | 0.297 | 0.307 | 0.244 | 0.449** | 0.069 | 0.477** | -0.104 |
| | [0.208] | [0.260] | [0.201] | [0.297] | [0.187] | [0.306] | [0.194] | [0.303] | [0.207] | [0.240] | [0.194] | [0.262] |
| Elite *1/PE2 | -0.038* | -0.012 | -0.019 | -0.026 | -0.020 | -0.025 | -0.025 | -0.021 | -0.038* | -0.005 | -0.041** | 0.010 |
| | [0.019] | [0.025] | [0.019] | [0.028] | [0.017] | [0.029] | [0.018] | [0.029] | [0.019] | [0.023] | [0.018] | [0.025] |
| CEE score | 1.569*** | 0.849** | 2.126*** | -0.055 | 1.727*** | 0.190 | 1.871*** | 0.306 | 1.931*** | 0.312 | 2.102*** | 0.197 |
| | [0.479] | [0.430] | [0.430] | [0.440] | [0.414] | [0.475] | [0.445] | [0.442] | [0.453] | [0.436] | [0.450] | [0.440] |
| Observations | 527 | 686 | 637 | 576 | 681 | 532 | 602 | 611 | 561 | 652 | 616 | 597 |
| Number of id | 267 | 358 | 324 | 301 | 351 | 274 | 306 | 319 | 287 | 338 | 315 | 310 |

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Returns to elite university and skills by job sector (young cohorts)

| | 1 | 2 | 3 |
|---|---|---|---|
| | gov, inst | priv firms, + SOE | priv firms |
| male | 0.047 | 0.187*** | 0.154** |
| | [0.066] | [0.049] | [0.068] |
| Elite *1/PE | 0.272 | 0.174 | 0.315 |
| | [0.289] | [0.202] | [0.302] |
| Elite *1/PE2 | -0.021 | -0.014 | -0.028 |
| | [0.027] | [0.019] | [0.028] |
| CEE score | 0.757 | 1.502*** | 1.032 |
| | [0.629] | [0.461] | [0.647] |
| Observations | 496 | 717 | 433 |
| Number of id | 255 | 370 | 223 |

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Heterogeneity by gender (young cohorts)

| | (1) | (2) | (3) | (4) | (7) | (8) | (9) | (10) | (5) | (6) | (11) | (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | female | male | female | male | female | male | female | male | female | male | female | male |
| | | | | | industry | | occupation | | sector | | all three | |
| Elite *1/PE | -0.017 | 0.475** | -0.024 | 0.502** | -0.005 | 0.446* | -0.032 | 0.463** | -0.031 | 0.475** | -0.008 | 0.391 |
| | [0.257] | [0.210] | [0.271] | [0.234] | [0.268] | [0.240] | [0.261] | [0.232] | [0.273] | [0.239] | [0.259] | [0.238] |
| Elite *1/PE2 | 0.004 | -0.042** | 0.005 | -0.044** | 0.003 | -0.039* | 0.005 | -0.040* | 0.006 | -0.041* | 0.003 | -0.033 |
| | [0.024] | [0.020] | [0.025] | [0.022] | [0.025] | [0.023] | [0.024] | [0.022] | [0.025] | [0.022] | [0.024] | [0.023] |
| CEE score | | | 1.664*** | 0.766 | 1.534*** | 0.590 | 1.752*** | 0.699 | 1.635*** | 0.760 | 1.589*** | 0.576 |
| | | | [0.538] | [0.501] | [0.535] | [0.527] | [0.547] | [0.505] | [0.537] | [0.527] | [0.558] | [0.550] |
| Observations | 753 | 737 | 624 | 589 | 622 | 589 | 611 | 578 | 624 | 589 | 609 | 578 |
| Number of id | 391 | 381 | 323 | 302 | 322 | 302 | 315 | 296 | 323 | 302 | 314 | 296 |

Notes: Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1