

*JCER Working Paper*  
*AEPR series*  
No. 2022-2-6

This is the pre-peer-reviewed version of the following article:  
“What Can Students Gain from China’s Higher Education?”, *Asian Economic Policy Review*, vol. 18, issue 2, which has been published in final form at <https://onlinelibrary.wiley.com/doi/10.1111/aepr.12426> and DOI: 10.1111/aepr.12426.

## What Can Students Gain from China’s Higher Education?

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This paper was prepared for the Thirty Sixth Asian Economic Policy Review (AEPR) Conference “Higher Education” on September 30, 2022 via zoom.

July 2023

Asian Economic Policy Review  
Japan Center for Economic Research



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# What Can Students Gain from China's Higher Education?

September 2022

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## *1. Introduction*

In the past two decades, China's higher education system has undergone rapid expansion, creating more opportunities for students to access tertiary education today than ever before (Jia et al., 2022; Jia & Li, 2021). In 1999, with the promulgation of the Action Plan of Education Promotion for the 21st Century, China began to shift from an "elite" higher education system to a "mass" higher education system (Li et al., 2017). In roughly a decade, from 1998 to 2009, the number of newly admitted college students in China increased by 480%, from 1.1 million to 6.4 million (Li et al., 2017). Since 2008, this number has only continued to increase: as of 2020, there were 41.8 million students enrolled in China's higher education system (Ministry of Education, 2021b). Today, China produces roughly one in every five of the world's college graduates (Jia & Li, 2021).

The rapid expansion of China's higher education system has raised a number of interesting research and policy questions. First, what are the sources of funding to support such expansion? Second, what do students do after college? Given the large enrollment, can they find a job right away? Or do they go to graduate school? Third, given the flush of college students in the labor market, does attending college pay? In other words, what is the return to college education in China? And finally, what do China's college students do in college? Do they study? Do they get internships? Do they join the Chinese Communist Party? More importantly, are these rewarded in the labor market? Our paper aims to answer these questions by drawing on own hand-collected data, as well as by reviewing the literature. We have a number of interesting findings.

First, to keep up with the last two decades of rapid higher education expansion, China's government has significantly increased funding to higher education, from 58.7 billion yuan in

1998 to 1399.9 billion yuan in 2020 (Liu et al., 2020; Ministry of Education, 2021c). Channels of university funding have also evolved over the last two decades. While the government has made efforts to diversify its funding sources, the vast majority – 67.6%, as of 2016 versus 90% in the late 1980s – is still owed to government funds. However, such funds are not distributed equally across all of China’s universities, as elite universities often receive priority in receiving government funds (Liu et al., 2020).

Second, students typically take one of two paths following graduation: they either choose to join the labor force (65%) or attend graduate school (26%). Of the students who indicated their plans to join the labor force, 25% remained unemployed by the time they graduated. For those who did secure a job, the largest employer is the state sector (45%), followed by the private sector (37%). Students who chose to attend graduate school were typically better students, were more likely to be a member of the Chinese Communist Party (CCP) and participate in student unions, were from families of higher socio-economic status, and were more likely to attend an elite college. Meanwhile, students who chose to enter the job market opted to acquire practical experience during college (internships and technical skills) and were more likely to major in the social science track.

Third, returns to education have experienced a dramatic rise since the 1980s, from 4.0% per year of schooling in 1988 to 10.2% in 2001 (Zhang et al., 2005), which economists attribute to the extended period of economic reforms. More updated estimates find a wage premium for a four-year college degree increased to 44.1% as of 2009, which implies that a college degree holds a significant wage premium on the labor market and confirms that its value has increased significantly since the 1980s (Li et al., 2022). Such estimates have largely remained stable since 2005 and are similar to global estimated averages of returns to education (Psacharopoulos &

Patrinos, 2018). However, wage premiums are not equal across all universities, as research indicates that an elite college degree was associated with a wage premium of about 40% higher than that of a non-elite college degree (Li et al., 2012b; Jia & Li, 2021). Nonetheless, in terms of market value, college education has reached a return similar to that of other countries, but there is a significant difference in the wage premium between elite and non-elite college degrees.

Finally, we attempt to determine which mechanism(s) explain the returns to education in China. Economists typically posit three different theories that explain the value of higher education on the labor market: human capital, social networks, and signaling. The human capital hypothesis is the most tested among the three, asserting that college could be important to developing human capital by equipping students with the knowledge, competencies, and skills to succeed on the labor market (Becker, 1962; Rosen, 1976). Other than developing human capital, college could also provide students with the opportunities to develop social networks and status, which has been associated with wage premiums and other non-material benefits (Li et al., 2007; Li et al., 2008; Li et al., 2012a). In addition, a college education could serve as a signaling mechanism by allowing students to send a signal to their employer about their capabilities (Spence, 1973).

Like all economists, we are unable to causally identify any of the three mechanisms, though we can present descriptive findings using our hand-collected data. To explore which mechanism(s) explains the returns to educations in China, we measured the wage premium associated with specific activities, grouping our variables by mechanism – human capital, social network, and signaling. Human capital variables are those measuring skills that students acquired during college, including GPA, whether students obtained a technical certificate, internship experience during college, and English test scores. Social network variables are those measuring

a students' social networks that could help them in the labor market, including party membership, students' participation in a student union, parental income, and parental education levels.<sup>1</sup> Signaling variables are those measuring students' skill levels prior to their college matriculation. In other words, colleges would have selected the students who already possessed these abilities rather than producing them. These include students' college entrance exam scores, the type of college (non-elite four-year college or elite college) they matriculated to, and social science versus science track.

At least in the context of China's higher education system, our results seem to suggest that human capital is the least useful mechanism in raising a college graduate's starting salary. Meanwhile, both social network and signaling matter significantly. More specifically, our regression results suggest that except for English skills, human capital measures cannot explain the return associated with a college degree, as students' first job earnings are generally not significantly associated with human capital accumulated in college. In contrast, the social network students acquire during college or from their family connections seems to have a positive relation with student first job earnings, as party membership and parental socio-economist status are associated with a wage premium. Moreover, signaling also seems to matter for first job earnings, as we find a significant positive correlation between student college entrance exam scores, college prestige, and students' first job earnings.

Students' behavior and time allocation in college are justifiable based on the returns to the three mechanisms. For example, only 19% of students take on an internship or part-time job, which seems to be much lower than the percentage of graduating students who are on the job market. This could be the case because, according to our findings, student internships or part-

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<sup>1</sup> Parent's income and education levels are useful measures for family connections (Li et al., 2012c).

time jobs do not raise a student's wages. Interestingly, in terms of developing a social network, 60.7% of sampled college students indicated their desire to join the Chinese Communist Party (CCP), while 19% become members in college, which also could be due to the fact that a CCP membership pays in terms of students' starting salaries. Students' time allocation also reflects rational behavior. In their junior year, students spend about 24 hours per week attending classes and 12 hours outside of class per week studying. Out of the 12 hours studying, students spent about 9 hours learning English. Students likely spend so much more time studying English over other subjects because in the labor market, English skills pay, while overall GPA does not.

Our paper has certain policy implications. By boosting the human capital of labor forces, higher education has been associated with labor productivity improvements that drive innovation and long-term economic growth (Li et al., 2017). Recognizing this, countries around the world have devoted funds to improving higher education systems that both boost the skills of the labor force and elevate overall levels of human capital (Hanushek, 2016). However, our paper suggests that while China's college education has a high return, this return is not attributed to human capital students acquire during college. These findings corroborate the results of Loyalka et al. (2021), who found that the skill levels of China's students declined during college. Thus, it is not clear whether China's current higher education system is adequately equipping its students with the skills valued in the labor market that are necessary to maintain this economic growth.

This paper is organized as follows. In section 2, we provide an overview of our data; in section 3, we examine higher education funding structures; in section 4, we examine student's post-graduation plans; in section 5, we summarize the trends in economic returns to higher education in China; in section 6, we explore what students do during college and estimate the wage premium associated with different activities; and we conclude in section 7.



## 2. *Data and Variables*

Our data is derived from the Chinese College Students Survey (CCSS) conducted by the China Data Center of Tsinghua University and directed by Hongbin Li (prior to 2016). We collected the data in May and June 2010-2015, by which time most college graduates who were in the job market would have received a job offer.

### 2.1. *The Survey*

The survey was designed collaboratively with experts in other disciplines, such as sociology and education. The sample includes 90 colleges randomly drawn from China's 2,305 colleges. The sampling method used is stratified random sampling, with locations (Beijing, Shanghai, Tianjin, Northeastern China, Eastern China, Central China, and Western China) and type of college as stratifying variables. The 90 colleges sampled include 40 elite colleges in the 211 Project colleges,<sup>2</sup> 46 regular four-year colleges, and 8 community colleges. They are located in 26 provinces, covering all major geographical areas in China. To draw statistical inferences, we weighed all our statistical analyses by reassigning our sample colleges into eight categories according to two variables: elite colleges (the 211 colleges) and regions (Northeast, East, West, and Central). The weight of each college is the number of that category of college in the population represented by the number of the same category in our sample.

In each college, approximately 500 students were randomly selected from the graduating class. A total of 40,916 students from the graduating classes were selected: 17,085 (50.8%) from

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<sup>2</sup> The 211 Project – Top 100 in the 21<sup>st</sup> century – is a program created by the government to strengthen its most elite universities.

elite colleges, 21,187 (43.4%) from non-elite four-year colleges, and 2,644 (5.8%) from community colleges.

The survey work in each college was managed by one to three college administrators in charge of teaching or student activities. We intensively trained the survey administrators 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. The survey was conducted with considerable care, with our survey team closely monitoring the survey in each college during the data entry process.

## *2.2. Variables*

We grouped our data according to the three mechanisms described above: human capital, social networks, and signaling. Human capital variables are those measuring skills that students acquired during college, including GPA, whether students obtained a technical certificate, internship experience during college, and English test scores. Social network variables are those measuring a students' social networks that could help them in the labor market, including party membership, students' participation in a student union, parental income, and parental education levels. Signaling variables are those measuring students' skill levels prior to their college matriculation. In other words, colleges would have selected the students who already possessed these abilities rather than producing them. These include students' college entrance exam scores, the type of college (non-elite four-year college or elite college) they matriculated to, and social science versus science track.

In Table 1, we report student activities and student time allocation. Among the human capital variables, the average GPA of our sample students is 3.1 (out of 4). About 37% of sample students obtain technical certificates during college, and about 19% of them take on an internship or part-time job in college. On average, sample students score 434 out of 710 points on their college English exam. Generally speaking, students need to score higher than 425 to pass the English test.

Among the social network variables (Table 1), 24% of students report participation in college student union, the average parental income is roughly 68,000 RMB, with about 16% of parents holding a college degree. Among the signaling variables (Table 1), 50% of our sample students are enrolled in four-year non-elite college, 43% of them attend elite colleges and the rest are from community colleges. About 57% of our sample students pursue sciences as their study track.

One of the key indicators of the social network students acquire during college is Chinese Communist Party membership (CCP), as previous research has found that Party membership has had positive value for personal income during China's economic transition (Li et al., 2007). In our sample, 60.7% of sampled college students indicated their desire to join the Chinese Communist Party and 19% joined the Party in college. Given the social status and associated returns that past research has established with CCP membership (Li et al., 2007; Li et al., 2012c), we explored in more detail CCP membership by subgroup in Table 2. In examining CCP membership by gender, we find that 21% of female students hold CCP membership, which is a significantly higher share than their male peers (17%). The share of CCP membership also differs across college tiers. Community college students have the lowest share of CCP membership (10%). Meanwhile, the share of CCP members among non-elite four-year colleges

is 28%, which is almost three times as high as students attending community colleges. This share is even higher among elite colleges, with 35% of students holding CCP membership, which suggests that education credentials play an important role in attaining CCP membership. Notably, the share of CCP membership among students with parents who hold a college degree (21%) is similar to the students whose parents who never went to college (19%).

Table 1 also reports student time allocation in college. On average, sample students in their senior year spend about 35 minutes per day studying. In their junior year, students spend about 24 hours per week attending classes, 12 hours per week studying, and about 9 hours learning English. Students also spend their free time participating in other activities, including sports and exercise (about 6 hours per week), online (about 11 hours per week), entertainment (8.6 hours per week), and part-time jobs (about 9 hours per week).

### *3. College Funding*

To keep up with the last two decades of rapid higher education expansion, China's government has significantly increased funding to higher education. In 1998, the government allocated 58.7 billion yuan to higher education, while in 2020, this grew by 24 times to 1399.9 billion yuan. As of 2016, China contributed roughly 26% of its entire education budget to higher education (Liu et al., 2020; Ministry of Education, 2021c). As a share of its GDP, the government's investment in higher education accounted for an average of 0.7%, which stands in contrast to the OECD countries and 22 European Union governments that typically invest 1.1% of their GDPs in higher education (Liu et al., 2020).

Channels of university funding have also evolved over the last two decades (Liu et al., 2020). In the late 1980s, government funding made up over 90% of university revenue.

However, while the government has made efforts to diversify sources of university funding, the vast majority – 67.6%, as of 2016 – is still owed to government funds. Funding has also become increasingly decentralized. The proportion that the central government devotes to its education budget has decreased from 59.8% in 1998 to 33.6% in 2016, while local governments' share has increased from 40.2% to 66.4% over the same period. Notably, not all government funds are distributed equally across all of China's universities. For example, a large share (64%) of the government's research budget goes to top elite universities (Ministry of Education, 2021a).

After government funding, student tuition accounts for the largest share of university revenue (Liu et al., 2020). From 1998 to 2005, the proportion of university revenue owed to student tuition nearly doubled from 14.6% to 34.3% but has since declined to 15.7% in 2016 due to government-directed policies that cap student tuition fees in an effort to foster equitable access to higher education. Together, government funding and student tuition are the largest sources of revenue for China's higher education system.

In addition to government funds and student tuition, another small but rising source of university revenue – the only one that involves institutional self-financing – is university entrepreneurial funding and activities, which typically takes two forms: i) income from industries affiliated to higher education institutions and social services; and ii) teaching and research activities (Liu et al., 2020). As of 2016, 10.9% of total education revenues were acquired by entrepreneurial funding and activities. In contrast, United States' colleges acquire on average 20% or more of their funding from such activities, which suggests that there is limited incentive for China's universities to raise funds due to intensive government support. Finally, philanthropy accounts for the smallest share of overall institutional revenue, accounting for 0.5% as of 2016. However, a large proportion of such funds are donated to China's most prestigious universities,

like Tsinghua University, Peking University, Shantou University, Zhejiang University and West Lake University (Liu et al., 2020).

#### *4. Post-graduation Plans*

Once students pass the highly competitive college entrance exam and enroll in college, they are almost guaranteed a college degree – this is known as the “strict entry, easy out” college education system in China. College students are rarely forced out of courses or programs for poor performance, as data from the Ministry of Education suggests that less than 1% of college students fail to complete their degrees (Jia & Li, 2021). With a nearly guaranteed graduation, students may therefore be less motivated to study in college (Loyalka et al., 2014). However, by senior year, students still face the challenge of choosing postgraduation paths.

Our data indicates that upon graduating, students will typically take one of two paths (Figure 1). The first path is to join the job market: 65% of students reported they planned to work after graduation. However, only 49% of the sample students had secured a job offer during their senior year, while 16% of the sample students who indicated plans to work did not secure an offer. This means that 25% of job-seeking college graduates remained unemployed by the time they graduated.

The second postgraduation path is to attend graduate school (Figure 1). Within our sample, 26% of students reported their plans to pursue a higher level of education. Of these students, 84% planned to apply for programs in China, while 16% planned to apply overseas. A small share of our sample (9%) reported that they had not yet decided on postgraduation plans.

Because most college graduates chose to join the job market, we further examined what sector of the job market students joined (Figure 2). We find that China’s state sector is still a

major employer of college graduates. A total of 45% of our sample students received job offers within the state sector, of which 34% were state-owned enterprises and 11% were civil servants. The second largest employer is the private sector: a total of 37% of college graduates took offers from private companies in China. In addition, 11% reported that they would be employed by foreign companies. Meanwhile, 6% of college graduates chose to start their own business.

Our data also show that there are significant differences between the two groups of students: job market versus graduate school (Table 3). First, students who planned to attend graduate schools had significantly better academic performances than their peers who chose to join the job market. Specifically, students who applied for graduate schools scored 0.21 standard deviations higher on their college GPA and scored 0.86 standard deviations higher on their college English test scores than their peers who planned to join the job market. Meanwhile, students who joined the job market earned more work-related skills during college. A higher share of them obtained technical certificates (38.9% vs. 23.7%) and secured internships (20% vs. 18%) than those who planned to attend graduate school.

Second, students who planned to attend graduate school and students who planned to join the job market also varied significantly along the social network variables. Students who planned to go to graduate school were much more likely to hold CCP membership (37% vs, 17%) and participate in student unions (35% vs 23%) than students who planned to work. They also were from families with higher socio-economic statuses, as their parents were more likely to have a higher level of both income and education.

Third, comparison along the signaling variables suggest that the two groups of students might exhibit differences even prior to attending college. Students who planned to go to graduate school scored significantly higher on their college entrance exam scores (by 0.47 standard

deviations) than students who planned to work after graduation. The share of students who planned to attend graduate school was much higher among those who attended elite colleges (66%) and non-elite four-year colleges (21%) than community colleges (12%). Students who planned to go to graduate school were also more likely to major in the science track (77%) than students who planned to work (55%). There was no significant difference between students who planned to attend graduate school and students who planned to work in terms of their gender, age, and ethnicity.

##### *5. Returns to education*

Economists evaluate the effectiveness of education by estimating the returns to education. Such research has been underway since the seminal work of Mincer (1974), but only later did economists begin to estimate it using data from China. Several studies that drew on data from urban China found low returns in the 1980s and 1990s. In a small-scale survey of state industrial workers in 1986, Byron and Manaloto (1990) estimated a low rate of return of 1.4% for each year of schooling. Similarly, using state-sector data from the 1980s, Meng and Kidd (1997) found slightly larger but still low returns to education of 2.5% in 1981 and 2.7% in 1987.

However, returns to college education in urban China have seen a dramatic increase since the 1980s, which economists attribute to the extended period of economic reforms. Along with the remarkable increase in student enrollment, the overall returns to college education in urban China increased from 4.0% per year of schooling in 1988 to 10.2% in 2001 (Zhang et al., 2005). Most of the rise in returns reflects an increase in the wage premium for higher education.

Returns to college education in China have since reached a level similar to those estimated using data from other countries. Including data representative of all of China, Li et al.



(2022) expanded on Zhang et al.'s (2005) estimates of returns in urban China and found a significant increase in the college wage premium from 1990 to 2009. The wage premium for a four-year college degree increased to 44.1% in 2009, which implies that a college degree holds a significant wage premium on the labor market and confirms that its value has increased significantly since the 1980s. These estimates have largely remained stable since 2005 and are similar to global estimated averages of returns to education.<sup>3</sup>

To further confirm these findings, economists also have attempted to estimate the causal return to education by using data on twins (Ashenfelter & Krueger, 1994). Following this methodology, Li et al. (2012a) established causality between higher education and a wage premium in China. The study found that twins with a college degree exhibited about 40.0% higher wage premium than twins who did not have a college degree.

While overall rates of return to education have stabilized, further research has found that there is a stark contrast between returns to elite and non-elite education in China. Li et al. (2012b) and Jia and Li (2021) estimated the wage premium of an elite college degree by examining the impact of scoring above the elite-tier cutoff on student's wage outcomes after graduation. Indeed, an elite college degree was associated with a wage premium of about 40% higher than that of a non-elite college degree, which indicates that there is a substantial return for an elite college degree, larger than the return for any college degree.

Overall, the literature seems to suggest that in terms of market value, college education has reached a return similar to that of other countries, but that there is a significant difference in the wage premium between and elite and non-elite college degrees.

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<sup>3</sup> Psacharopoulos and Patrinos (2018) reviewed trends across 139 countries from 1950 to 2014 and found that the private average global return to a year of schooling is 9% a year.

## 6. *What can explain the returns?*

Economists posit three explanations as to why college education pays in the labor market. First, past studies point to the importance of a college education in developing human capital by building students' academic knowledge, competencies, and skills, all of which could help them succeed on the labor market (Becker, 1962; Rosen, 1976). Indeed, higher levels of human capital have been found to promote innovation and countries' economic growth (Li et al., 2017). Second, existing research finds higher returns for those with status and connections (Li et al., 2007; Li et al., 2008; Li et al., 2012b). As such, it could be the case that a college education may help students acquire and develop the status and social network necessary to succeed on the labor market after graduation. Finally, a college education could serve as a signaling mechanism: because employers are initially uncertain about prospective employees' capabilities, a college degree allows students to send a signal to their employer about their capabilities (Spence, 1973). In this section, we will examine which of the three mechanisms matters for the return to college education with our own data.

### 6.1. *Empirical specification*

In this section, we use the Ordinary Least Squares (OLS) econometric model to examine the impact of the three mechanisms on the earnings of fresh college graduates. We attempt to identify which of the three mechanisms matters for the return to college education by taking advantage of the rich information in the survey. Specifically, the earnings of fresh college graduates are determined by the following equation:

$$\ln W = \alpha + \beta M + \gamma X + \theta_{p,y} + \varepsilon, (1)$$

where  $W$  refers to college graduates first job earnings.  $M$  is an indicator for the three mechanisms: human capital, social networks, and signaling. Human capital variables are those measuring students' skills acquired in college. Social network variables are those measuring students' networks that may help them in the labor market. Signaling variables are those measuring students' ability level that had been determined before they went to college.  $X$  represents other covariates affecting earnings, such as student gender, age, and ethnicity. We also control for province-year fixed effects where  $\theta_{p,y}$ .  $\varepsilon$  is the error term. To ensure our survey sample represents the population, we report weighted results (each student in our survey carries the same weight that he or she should have in the population). All standard errors are clustered at the college level.

## *6.2. Student activities and earnings*

Regression results reported in Table 4 suggest that human capital measures cannot explain the return associated with a college degree, as students' first job earnings are generally not significantly associated with human capital accumulated in college (Column 1). The only exception is students' college English test scores, as a one standard deviation increase in English test scores correlates with a 15.4% wage premium, significant at the 1% level. The high return to English skills explains why students spend much of their time outside of class studying English. Our results are also consistent with prior research by Loyalka et al. (2020) that found that China's college students' math, physics and computer science skills did not improve – and in some cases, declined – throughout their four years in college.

Second, our results indicate that the social network students acquire during college or from their family connections seems to have a positive relation with student first job earnings

(Column 2). Specifically, Party membership is associated with a wage premium of 7.5%, significant at the 1% level. Participation in a student union also is positively correlated with student first job earnings, though it is not statistically significant. Parental income also has a significant positive association with student first job earnings. For every additional 1% increase in parental income, students receive a 4.9% wage premium, significant at the 1% level. There is a 7.5% wage premium associated with students whose parents hold a college degree, significant at the 5% level.

Third, our results indicate that signaling matters for the first job earnings. Specifically, we find that there is a significant positive correlation between student college entrance exam scores and students first job earnings (Column 3). A one standard deviation increase in college entrance exam score is associated with a 5.4% increase in students' first job earnings, significant at the 1% level. Employers might value degrees at elite colleges as signals of students' intelligence, diligence, and other possibly favorable qualities in an employee (Jia & Li, 2021). Our results show that the returns of attending non-community college are significant, with larger magnitudes of return for those attending more elite schools. With community college as reference, non-elite four-year college graduates earn a 14.2% wage premium, while elite college graduates earn a 30.1% wage premium, significant at the 1% level. It is possible that students' study track could affect first job wages because firms may offer jobs depending on students' chosen track. However, our results show that chosen track is not to be significant in determining first job wages.

Students' behavior and time allocation in college are justifiable based on the returns to the three mechanisms. For example, only 19% of students take on an internship or part-time job, which seems to be much lower than the percentage of graduating students who are on the job

market. This could be the case because, according to our findings, student internships or part-time jobs do not raise a student's wages. Interestingly, in terms of developing a social network, 60.7% of sampled college students indicated their desire to join the Chinese Communist Party (CCP), while 19% become members in college, which also could be due to the fact that a CCP membership pays in terms of students' starting salaries. Students' time allocation also reflects rational behavior. In their junior year, students spend about 24 hours per week attending classes and 12 hours outside of class per week studying. Out of the 12 hours studying, students spent about 9 hours learning English. Students likely spend so much more time studying English over other subjects because in the labor market, English skills pay, while overall GPA does not.

## *7. Conclusion*

In this paper, we have presented the following results. First, we reviewed the funding structure of China's higher education system and found that to keep up with rapid expansion, China's government significantly increased its funding to higher education. However, despite government efforts to diversify funding sources, the majority of university funding is still owed to government funds (67.6%), and elite universities often receive priority in receiving such funds (Liu et al., 2020). Second, in examining students' post-graduate plans, we found that most students either choose to join the labor force (65%) or attend graduate school (26%). The largest employer of college graduates on the labor market was the state sector (45%), followed by the private sector (37%). Third, we reviewed the literature and found a rise and stabilization in the rates of return to education at around 44.1% for a four-year college degree as of 2009 (Li et al., 2022). However, the literature also shows that wage premiums are not equal across all universities, as an elite college degree was associated with a wage premium of 40% higher than

that of a non-elite college degree (Li et al., 2012b; Jia and Li, 2021). Finally, in attempting to determine which mechanisms explain the returns to education in China, we reviewed three different theories that often explain the value of higher education on the labor market: human capital, social networks, and signaling. By reviewing student activities and time allocation, and measuring the wage premium associated with specific activities, our results suggest that in the context of China's higher education system, human capital is the least useful mechanism in raising a college graduate's starting salary, while both social network and signaling matter significantly. Indeed, student time allocation and behavior during college accurately reflect their understanding of "what pays" on the job market.

Our results raise important policy implications. Despite the rapid expansion of China's higher education system, the return to a four-year college degree has remained at the relatively high level of 10% per year college. These findings suggest that there is an even larger demand for high-skilled labor in China than the supply of recent college graduates. However, by measuring the wage premiums associated with our sample students' characteristics, college activities, and time allocation, we find troubling results. Apart from developing English skills, human capital attributes do not seem to contribute to higher wages in the labor market. Rather, it is connections and signaling that are most significantly associated with higher wages. This seems to indicate that in China, connections are crucial for student success in the labor market, while the higher education system itself is more a system for selecting talented individuals than it is for educating them.

Given the established importance of higher education in developing human capital that drives countries' innovation and long-term economic growth, the lack of human capital accumulation occurring during college is troubling. Indeed, despite increasing funding efforts,

our findings suggest that China's higher education system is failing to adequately equip its students with the skills valued in the labor market that are so necessary to maintaining China's rapid economic growth. As such, instituting reforms aimed at improving the quality of China's higher education system, and in turn, developing the human capital of its students, are critical to maintaining China's economic trajectory.

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Table 1. Summary statistics of sample college students.

Variables	Mean (SD)
College GPA, Standardized	3.134 (0.007)
Obtained technical certificate	0.367 (0.008)
Internship in college	0.193 (0.006)
College English test score	434.853 (0.896)
Party membership applicants	0.607 (0.007)
Party membership	0.192 (0.005)
Participant in student union	0.241 (0.006)
Parental income (RMB)	68,894 (1982)
At least one parent has college degree	0.159 (0.005)
College entrance exam, score, standardized	-0.001 (0.013)
Community college	0.058 (0.001)
Non-elite four-year college	0.508 (0.007)
Elite college	0.434 (0.006)
Science (vs. social sciences/arts)	0.574 (0.007)
Male student	0.515 (0.007)
Age, years	22.516 (0.015)
Ethnic Minority	0.042 (0.002)
<i>Time allocation</i>	
Time spent on studying per day, mins	35.949 (0.671)
Junior year time allocation, hours/week	
- Attending class	24.297 (0.228)
- Studying	12.216 (0.155)
- Learning English	6.917 (0.114)
- Sports and exercise	6.069 (0.101)
- Online	11.219 (0.142)
- Entertainment activities	8.639 (0.128)
- Part time jobs	9.091 (0.215)

Table 2. Characteristics of college students who join Communist Party by subgroup.

	Communist Party	Difference	
Total sample	0.192 [0.002]		
<i>By Gender</i>			
Male	0.171 [0.006]		
Female	0.214 [0.007]	0.043***	Male students as reference
<i>By college type</i>			
Community college	0.102 [0.008]		
Non-elite four-year college	0.278 [0.004]	0.176***	Community college as reference
Elite college	0.350 [0.006]	0.249***	Community college as reference
<i>By parental education level</i>			
No parent has college degree	0.191 [0.005]		
At least one parent has college degree	0.209 [0.010]	0.018	No parent has college degree as reference

*N=40,916*

Table 3. Differences between students' post-grad plans by student characteristics: attending graduate school vs. joining the labor market.

Variable	Graduate school (1) Mean/SE	Work (2) Mean/SE	Difference t-test (1)-(2)
<i>Human Capital</i>			
GPA, Standardized	0.339 [0.023]	0.124 [0.016]	0.215***
Obtained technical certificate	0.237 [0.015]	0.389 [0.009]	-0.152***
Internship in college	0.178 [0.010]	0.201 [0.007]	-0.023*
English test score, Standardized	0.309 [0.025]	-0.559 [0.016]	0.868***
<i>Social Network</i>			
Party membership	0.370 [0.012]	0.179 [0.005]	0.191***
Participant in student union	0.358 [0.013]	0.234 [0.007]	0.124***
Parental income (RMB)	84104 [954]	66166 [204]	1793.8*
At least one parent has college degree	0.297 [0.012]	0.139 [0.005]	0.158***
<i>Signaling</i>			
College entrance exam, total score, standardized	0.429 [0.032]	-0.045 [0.016]	0.474***
Community college	0.119 [0.018]	0.551 [0.007]	-0.432***
Elite College	0.664 [0.015]	0.410 [0.007]	0.254***
Non-elite four-year college	0.217 [0.007]	0.039 [0.001]	0.178***
Science (vs. social sciences/arts)	0.755 [0.012]	0.559 [0.008]	0.197***
Male student	0.514 [0.013]	0.503 [0.008]	0.011
Age, years	22.607 [0.032]	22.505 [0.016]	0.102***
Ethnic Minority	0.043 [0.003]	0.043 [0.003]	0.000

$N=36,103$

Table 4. OLS regressions of college student characteristics on the wage of first job offers of college graduates.

VARIABLES	(1)	(2)	(3)
	Dependent variable: Log (Wage)		
<i>Human Capital</i>			
GPA, Standardized	0.001 (0.015)	0.001 (0.014)	0.011 (0.015)
Obtained technical certificate	0.015 (0.026)	0.015 (0.026)	0.039 (0.026)
Internship in college	-0.024 (0.042)	-0.010 (0.043)	-0.011 (0.042)
English test score in college, Standardized	0.154*** (0.011)	0.145*** (0.010)	0.107*** (0.007)
<i>Social Network</i>			
Party membership		0.075*** (0.020)	0.059** (0.024)
Participant in student union		0.012 (0.036)	0.012 (0.035)
Parental income (Log)		0.049*** (0.011)	0.048*** (0.012)
At least one parent has college degree		0.075*** (0.020)	0.059** (0.024)
<i>Signaling</i>			
College entrance exam, standardized total score			0.054*** (0.013)
Community college as reference			
Non-elite four-year college			0.142*** (0.039)
Elite college			0.301*** (0.049)
Science (vs. social science) = 1			0.032 (0.031)
<i>Individual and Family Background</i>			
Male student	0.125*** (0.021)	0.132*** (0.021)	0.113*** (0.022)
Age, years	0.016*** (0.006)	0.020*** (0.006)	0.010 (0.006)
Ethnic Minority	0.037 (0.054)	0.036 (0.052)	0.033 (0.052)
Constant	7.216*** (0.145)	6.908*** (0.155)	6.914*** (0.141)
Observations	17,683	17,617	17,512
R-squared	0.294	0.305	0.319

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses, allowing cluster at school level. All regressions are weighted so that the results represent the population. Survey cohort fixed effect and province fixed effect are controlled.

Figure 1. College students' postgraduation plan.  
N=33,422

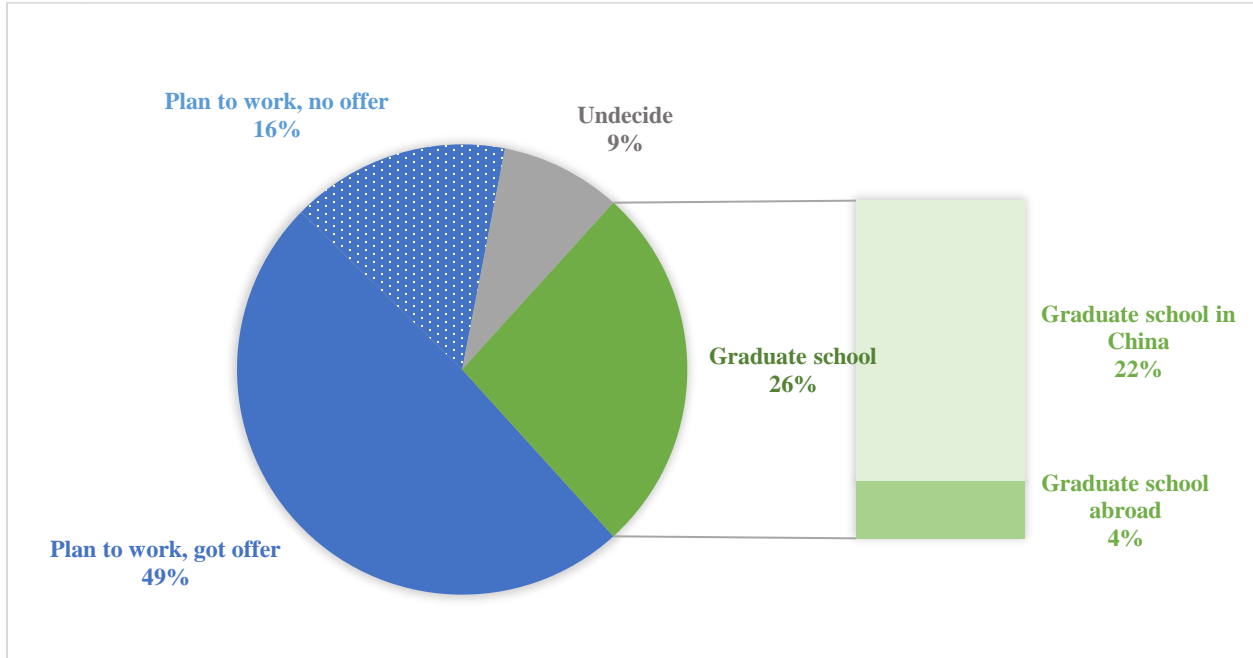




Figure 2. College graduate students' first job offers, by job types.

