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When Students Become “Prisoners”: A Game Theory Analysis of Internship by Beijing College Students

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Abstract

Purpose—The oversupply of college graduates and increasing competition in the Chinese urban labor market have forced college students to undertake internships much earlier and to a greater intensity in the hope of boosting their employment prospects. It may be argued that the considerable time and energy thus spent on internships is deleterious to their university studies. The paper considers the factors that determine the intensity of an internship experience.

Design/Approach/Methods—Building on a Cobb-Douglas utility function, the paper constructs a Prisoners’ Dilemma game to model the internship behavior of Chinese college students, and then examines the determinants of internship using data from a 2011 survey of approximately 10,000 Chinese college students from 47 higher education institutions in the Beijing metropolitan area and multivariate regression analysis.

Findings—Empirical results confirm three key hypotheses derived from our model: first, students’ perceptions of higher differentials across available jobs in the labor market entice them to intern excessively; second, the improving quality of college teaching and the consequent benefit for knowledge acquisition mitigates the need for excessive internship; third, student preferences for fundamental knowledge acquisition also tilts the balance towards more study and less internship.

Originality/Value—These findings suggest that in the context of a tight graduate labor market, improving the quality of college teaching provides a viable alternative to excessive internship by students.

Keywords

Prisoners’ dilemma;
game theory;
Cobb-Douglas utility
function; college
student internship

1. Introduction

The number of college graduates in China expanded six-fold between 1999 and 2010 from one million to six million, which has far exceeded employment demand even for such a fast-growing economy. Pressure to secure a well-paid job or in some cases a job at all, has encouraged many students to take up an internship while still studying for their degree and to undertake such a placement with greater intensity. Anecdotal evidence suggests that college students may be so distracted from their studies by undertaking such internships that absenteeism from college programs has become common (Chen, 2008; Ding & Yu, 2011). Consequently, some students neglect their graduation thesis or research project. This has led some university presidents to ask the Ministry of Education to ban internships altogether. The problem is also debated on social media and there is, as yet, no consensus about whether banning internships is the correct policy.

Human capital theory argues that students defer employment to invest in education in the expectation of higher lifetime earnings from improved job prospects and increased productivity. However, it has long been accepted that work experience and schooling should not be regarded as an either/or relationship. It is not uncommon that work experience, often described as an “internship”, is integral to the curriculum in providing students with practical experience in a work setting, thus supplementing and informing their learning at college and university (Thilakerathne & Madurapperuma, 2014). Given students’ limited time, such internships or work experience should complement rather than compete with formal education.

Student internships or apprenticeships have long been integrated into courses in post-secondary institutions internationally (see Yang, Wang, Chen, & Zhan, 2012 for a comprehensive review). For example, in the United Kingdom work placement programs are categorized as occasional full-time (thick-sandwich) or regular part-time (thin-sandwich) experiences according to the intensity and length of the internship required (Blackwell, Bowes, Harvey, Hesketh, & Knight, 2001; Little & Harvey, 2007). In the United States internships feature prominently in various academic programs including Accounting, Finance, Marketing, Human Resource Management, Medicine, Engineering, Nursing and Journalism (Thilakerathne & Madurapperuma, 2014). Such an emphasis on internships or work experience dates from the 1990s when higher education institutions internationally were required

increasingly to make teaching and curriculum more relevant to the needs of the wider economy (Blackwell et al., 2001; Calvo, 2011). In 1994, the United States passed the School-to-Work Opportunities Act intended to match the performance of Germany through improving the transition from school to work for secondary school students (Hughes, Bailey, & Karp, 2002). This was followed in the United Kingdom by the Report of a National Committee of Inquiry into Higher Education (NCIHE) in 1997 that emphasized the role of work experience in enhancing the benefits of higher education (Morgan, 1996; Blackwell et al., 2001).¹ This reflected international concern about the employment capacity of highly qualified labor, stimulated by the entry into the global labor market of graduates from China, India, and from the former Soviet bloc (Freeman, 2008).

As we have noted, anecdotal evidence indicates that pressure to find appropriate employment can play a critical role in the dynamics of internship. For example, recent news articles in the United States allege that the financial crisis of 2008 and double-digit unemployment rates have obliged college students to take unpaid internships in the hope of improving their prospects in the labor market; and this makes them vulnerable to exploitation by employers who want to use cheap labor to cut costs (Steinberg, 2010; Perlin, 2011; Greenhouse, 2012). Nevertheless, although researchers have paid increasing attention to the impact of internships on students' academic achievement and on their later career prospects, no consensus has been reached (Riggert, Boyle, Petrosko, Ash, & Rude-Parkins, 2006).

There are both methodological and theoretical problems to be resolved (Blackwell et al., 2001). Consequently, more attention should be given to modelling student decision making in undertaking internships with the aim of answering the following questions: Why do students choose to intern at all; how do they decide on the length and intensity of the internship they undertake; has the market led students to choose the right balance between studying and internship; what are the key drivers behind students' choices; how can socially suboptimal outcomes be discouraged; and finally, what are the risks in letting the market rule the game?

Ding and Yu (2011) constructed a game theoretical model to model the key factors influencing the students' time allocation to internship: the quality of college teaching a student received; the job aspiration a student has; the relative importance a student attaches to study vis-à-vis jobs (see Section Three for a detailed discussion). Further to this, Ding and Wang (2012) provided an empirical test of the first hypothesis derived from the game

theoretical model using data from the 2011 Beijing College Student Development Survey in a multinomial procedure. They found that the amount of time a student allocated to internship is correlated inversely with students' subjective evaluation of the teaching quality, except by those who spent only a few hours per week on internship or by those who spent more than 26 hours.

This paper develops the previous study by Ding and Wang (2012) in four important ways: first, it examines two other hypotheses derived from the game theory model jointly with the first hypothesis; secondly, it employs ordered logit as opposed to the multinomial logit model in the former, given that the dependent variable has an inherent order; thirdly, the sample is limited to four-year degree students as associate degree students have a mandatory requirement to undertake internship for half a year; finally, further tests are made for robustness and falsification to validate the findings. The paper is organized as follows. Following this Introduction, Section Two describes the evolution of internship practices in China within the context of an ongoing expansion of the higher education system. Section Three constructs a game theory model and derives three hypotheses while Section Four describes the data and the methodology used to test empirically three hypotheses. Section Five provides the results of our empirical analyses; and the paper ends with a short set of conclusions.

2. The Evolution of College Student Internships in the Chinese Higher Education System

In the four decades following the foundation of the People's Republic of China, only a fortunate minority managed to gain access to higher education and these were regarded as a future elite. Higher education was provided without cost and all were assigned jobs upon graduation under the planned economy (Tan, 1995). Internship opportunities were arranged by universities in a paternalistic fashion while the student role remained essentially passive. Students were supervised by a teacher as they undertook work in a state-owned enterprise, a government entity or in agriculture. This experience was designed to link their academic learning in the classroom to realities of the workplace environment and to prepare the students for their future place within the planned economy (Cao & Hu, 2010; Zhang, 2011; Zhang &

Wang, 2011).

Since the beginning of the economic reform in China in 1985, an urban labor market has emerged. It became increasingly clear that the old higher education system, itself damaged severely during the period of the Cultural Revolution (1965–1969) could no longer meet the manpower demands accompanying economic reform (Tan, 1995; Wei, Li, & Chen, 1997). The government has therefore experimented with several initiatives promulgated under the *Decision to Reform the Education System* as declared by the Central Committee of the Chinese Communist Party in 1985. First, a small number of students could enter the higher education system laterally if they themselves or their expectant employers were able to cover the cost. In addition, students from a few selected universities could choose their preferred employer upon graduation. In 1993, the Educational Reform and Development Program went a step further allowing higher education institutions to charge tuition fees to recover the cost of students' education. These reforms proved successful and were introduced to the entire higher education system in China in 1997 (Wei et al., 1997; see also Cai & Yan, 2017). Until this time, college graduates in China had been in a seller's market. However, when students were obliged to find their prospective employers, they gradually took more responsibility for finding internship opportunities, although both the scale and intensity of these internships remained rather limited. This situation was to change drastically in subsequent years.

In response to the 1997/98 East Asian financial crisis, the Chinese government decided to expand the system of senior middle schools and the tertiary education system significantly. As a result, the annual supply of college graduates increased almost six-fold from approximately one million in 2000 to six million in 2010. It is estimated that by 2015 some 34.6 million students were receiving higher education of all types and that the gross enrollment rate was 34.5% (Morgan & Li, 2015). This massive expansion in the supply of college graduates has far outpaced the growth of demand for skilled labor because of the Chinese economy's overdependence on low value-added industries such as manufacturing and construction (Ding, Yang, & Wei, 2013). By the mid-2000s, the proportion of students who had not secured a job upon graduation exceeded 20% and this problem has persisted (Yue, 2012). Graduates from third-tier provincial universities usually fare the worst, followed by second-tier national universities that place a strong emphasis on teaching, while graduates from top-tier national research

universities and vocational colleges did best. However, those fortunate enough to find a job found that the ratio of their starting salary relative to the salary of an average urban worker fell from 1.35 in 2003 to 0.68 in 2011 (Yue, 2012). This gave more leverage to employers wanting to cherry-pick the best college graduates through observing on-the-job performance over an extended period during placement on an internship. At times, this practice became openly exploitive as employers replaced entry-level workers with cheap interns to cut operating costs.

The labor market for college graduates has swung in favor of the employers and college students choose increasingly to intern earlier and with greater intensity to maximize their chances of securing a decent job. Although research on this topic has been limited by the lack of trend data on college internships, some researchers have been able to form a broad picture. For example, while internship was ranked number six among factors determining job search success in 2003, it has been rated as the second-most important factor since 2005, according to data from five cross-sectional surveys of Chinese college graduates (Yue, 2012). College students in Beijing spent 40 days on internship in 2011 compared with 25 days in 2010, a dramatic sixty percent increase.

However, students have limited time to divide between internship and formal study. Although some internship experience is beneficial to the overall learning process, too much internship may reduce the potential for further knowledge acquisition and human capital formation. Anecdotal evidence suggests that students can become so distracted from their studies that course absenteeism has become a serious problem, with some students neglecting their graduation thesis or research project. Short-sighted firms may benefit from excessive internship through lower labor costs in the short term. In the long run, they will suffer from lower labor productivity as a generation of students invests in human capital at a suboptimal level.

3. Our Analytical Framework: The Cobb-Douglas Utility Function and Prisoners' Dilemma Game

We use the model developed by Ding and Yu (2011) which assumes that students form a homogenous group and have a Cobb-Douglas utility function. The students derive utilities from two kinds of goods: knowledge

obtained from studying in college (K); and wages and privileges derived from their job upon graduation (P); each of which requires time to produce, m (n) for each unit of K (P). The symbols “ α ” and “ β ” then represent the elasticity of a student’s utility to access knowledge and a job. We assume $\alpha+\beta=1$ to indicate constant return to scale, i.e., a doubling of K and P translates into a doubling of utility.

The Cobb-Douglas utility function can be described as:

$$U=K^{\alpha}P^{\beta} \quad (1)$$

$$\alpha>0 \text{ and } \beta>0, \alpha+\beta=1$$

Alternatively, using monotonic transformation, the Cobb-Douglas utility function could also be represented as:

$$\ln(U)=\alpha\ln K+\beta\ln P \quad (2)$$

Students derive utility but with diminishing marginal returns from either K or P following a natural logarithm function. α and β can be thought as the weight that students place on knowledge and job amenities, respectively. As the value of “ α ” increases, knowledge carries more weight in students’ utility and vice versa.

Students maximize their utility subject to the time constraint, $mK+nP=T$. Setting the marginal rate of substitution $MRS_{KP}=-m/n$, gives us the optimal outcome:

$$mK^*=\alpha T/(\alpha+\beta) \quad (3)$$

$$nP^*=\beta T/(\alpha+\beta) \quad (4)$$

It seems that the higher the weight that students place on job amenities upon graduation, the more time they spend in securing jobs and vice versa. This derivation is rather straightforward as a simple comparative static analysis using the Cobb-Douglas utility function. But it falls short in linking students’ decisions to higher education institutions and labor market conditions. We therefore build a *prisoners’ dilemma* game to consider these factors when exploring how they impact on the role of internship.

We assume that there are only two types of job positions, one that is superior: “ P_h ” and another of less value: “ P_l ”. Subscripts h or l indicate the high or low desirability of job amenities in these positions. Internship increases the students’ likelihood of landing the more attractive job, but it leads to a low level of knowledge acquisition “ K_l ” due to the distraction it provides from studying, all else being equal.

Suppose that two students intern normally and search for a job at the same time. The likelihood of each of finding a good job is then 1/2 and each acquires “ K_h ” amount of knowledge. On the contrary, if both take part in excessive internship, the probability of getting good jobs remains at 1/2 for both but now they also both obtain a low level of knowledge at “ K_l ”. The intermediate case would be where one student chooses to intern excessively while the other student interns normally. The one who is engaged in excessive internship would then secure the more desirable job “ P_h ” at the expense of knowledge acquisition “ K_l ”. The second student would obtain a less desirable job but would be compensated by a higher level of knowledge “ K_h ”.

Based on the assumption above, we construct a two-by-two payoff matrix of students where students can choose to intern normally or excessively, i.e., to cooperate or defect in the sense of the prisoners’ dilemma game, as in Table 1:

Table 1. Students’ payoff matrix.

| Student | B | | |
|---------|------------|---|---|
| | Internship | Normal | Excessive |
| A | Normal | $0.5(\alpha \ln K_h + \beta \ln P_h) + 0.5(\alpha \ln K_h + \beta \ln P_l),$ $0.5(\alpha \ln K_h + \beta \ln P_h) + 0.5(\alpha \ln K_h + \beta \ln P_l)$ | $\alpha \ln K_h + \beta \ln P_l, \alpha \ln K_l + \beta \ln P_h$ |
| | Excessive | $\alpha \ln K_l + \beta \ln P_h, \alpha \ln K_h + \beta \ln P_l$ | $0.5(\alpha \ln K_l + \beta \ln P_h) + 0.5(\alpha \ln K_l + \beta \ln P_l),$ $0.5(\alpha \ln K_l + \beta \ln P_h) + 0.5(\alpha \ln K_l + \beta \ln P_l)$ |

The classical Prisoners’ Dilemma game arises when two conditions are met. First: $0.5(\alpha \ln K_h + \beta \ln P_h) + 0.5(\alpha \ln K_h + \beta \ln P_l) > 0.5(\alpha \ln K_l + \beta \ln P_h) + 0.5(\alpha \ln K_l + \beta \ln P_l)$, i.e., mutual cooperation provides higher payoff than mutual defection for both students. Secondly: $\alpha \ln K_l + \beta \ln P_h > 0.5(\alpha \ln K_h + \beta \ln P_h) + 0.5(\alpha \ln K_h + \beta \ln P_l)$ and $0.5(\alpha \ln K_l + \beta \ln P_h) + 0.5(\alpha \ln K_l + \beta \ln P_l) > \alpha \ln K_h + \beta \ln P_l$ which imply that defection is the dominant strategy for both students (Gibbons, 1992).

Simple algebraic calculation shows us that condition one holds non-categorically if $K_h > K_l$.

$$0.5(\alpha \ln K_h + \beta \ln P_h) + 0.5(\alpha \ln K_h + \beta \ln P_l) > 0.5(\alpha \ln K_l + \beta \ln P_h) + 0.5(\alpha \ln K_l + \beta \ln P_l)$$

$$\Rightarrow K_h > K_l$$

For condition two, it requires:

$$\begin{aligned} \alpha \ln K_i + \beta \ln P_h &> 0.5(\alpha \ln K_h + \beta \ln P_h) + 0.5(\alpha \ln K_h + \beta \ln P_i) \\ &\text{and} \\ 0.5(\alpha \ln K_i + \beta \ln P_h) + 0.5(\alpha \ln K_i + \beta \ln P_i) &> \alpha \ln K_h + \beta \ln P_i \end{aligned}$$

After some additional algebra, it is shown that $\ln(P_h/P_i)^{\beta/2} > \ln(K_h/K_i)^\alpha$ satisfies both inequality equations above for condition two.

$$\begin{aligned} \alpha \ln K_i + \beta \ln P_h &> 0.5(\alpha \ln K_h + \beta \ln P_h) + 0.5(\alpha \ln K_h + \beta \ln P_i) \\ \Rightarrow \ln(P_h/P_i)^{\beta/2} &> \ln(K_h/K_i)^\alpha \end{aligned}$$

Because the natural log function is monotonically increasing, we can further simplify the condition to:

$$(P_h/P_i)^{\beta/2} > (K_h/K_i)^\alpha$$

The entire prisoners' dilemma game thus is reduced to one inequality. Whether students would choose to intern excessively (defect) or to intern normally (cooperate to reach a socially optimal result) depends on the relative value of $(K_h/K_i)^\alpha$ and $(P_h/P_i)^{\beta/2}$. Since both terms are exponential functions with bases greater than 1, both are monotonically increasing functions.² Therefore, our model derives three parameters that influence students' decisions on internship intensity: the knowledge gained from spending more time on learning as opposed to internship (K_h/K_i), and the differential in job amenities resulting from spending more time on internship rather than studying (P_h/P_i), and the weight students give to learning relative to job experience ($\alpha/(\beta/2)$).

Three hypotheses can be derived from the discussion above:

1. Excessive internship ameliorates as the job differentials (P_h/P_i) narrow across the two types of jobs;
2. The rising quality of college teaching and the consequent benefit from studying (K_h/K_i) reins in excessive internship;
3. Weights given to education by students relative to job (α/β) also tilts the balance towards more studying and less internship.

4. Data and Methodology

4.1 Data and Summary Statistics

We use data from the 2011 Beijing College Student Development Survey (2011 BCSDS), conducted by the Beijing Municipal Education Work Committee and the Peking University's Graduate School of Education in metropolitan Beijing during May 2011. A representative sample of 31,890 post-secondary students from all 74 higher education institutions in Beijing was used according to a two-stage proportional to probability sampling method with a high response rate of 80 percent (Bao, 2014). The students were asked to provide information on family background, past and present academic performance, time use, evaluation of teaching, extracurricular activities and self-reported development since their higher education enrollment. Most questions were designed to capture student experience in the spring semester (February 2011–May 2011). Only in a few of cases were students asked to recall experience in the previous academic year, September 2010–May 2011.

We constructed our analytical sample by focusing on students from the 2011 BCSDS pursuing bachelor's degrees at four-year colleges and universities. This gave a sample of 16,679 undergraduates in four cohorts (2011, 2012, 2013, and 2014). We excluded 406 students who were reportedly younger than 18 years or older than 24 years, as well as students who indicated they belonged to the class of 2015, or who came from Taiwan, China, Hong Kong, China or Macau, China. In addition, 6,407 observations were also deleted from the sample because they were found to have missing values for at least one of the variables used in the multivariate analysis. 211 students who appeared to report unrealistic hours of activities per week were also deleted from the sample. The final analytical sample therefore consisted of 9,706 students across four cohorts attending 47 higher education institutions in Beijing.

We identified two outcome variables for this study: one is the average weekly hours a student spent on internship in their last semester, measured in eight categories. Students who did not allocate any time on internship in the semester were grouped in category one. Students in category two spent 1–5 hours a week while students in the next category spent 6–10 hours a week and so on until the final category, comprised of students who spent 21–25 hours per week on their internship. We further defined excessive internship either as more than 10 hours or 15 hours per week. In a separate question,

students were asked about the number of days they spent on internship in their last academic year since September 2010. In our sample, while only 6% students did not report the weekly hours spent on internship, twice that number of students had missing values in reporting on the number of days spent in their last academic year. This is consistent with the survey literature indicating that a long recall period often results in higher reporting bias (McKenzie & Rosenzweig, 2012). Therefore, the average weekly hours on internship is our preferred outcome variable and the number of days spent during the last year on internship was only used as a check for robustness.

The three key explanatory variables given in the three hypotheses also come directly from the 2011 BCSDS. Students were asked to rate ten study goals from “not important at all” to the “most important” on a five-point Likert scale (where 5 indicates the greatest importance). The ten study goals were: 1. expand the scope of knowledge; 2. obtain certain industrial qualifications or to pass the civil service examination; 3. adapt oneself to the wider society; 4. deepen knowledge in one’s own field; 5. improve social and interpersonal skills; 6. master the skills and knowledge critical in future careers; 7. pursue further studies; 8. know oneself better; 9. make friends and cultivate trust-worthy relationships; 10. identify one’s future direction. We divide the ratings on the three activities (1,4,7) most relevant to knowledge acquisition and learning by the ratings of three activities (2,3,5) most pertinent to employment and career development to create a composite index to gauge the weight of knowledge and learning in students’ utility function relative to their jobs, α/β . This ratio ranged from 0.231 to 5.000 with a mean of 1.063, indicating a log-normal distribution with a long tail as shown in Table 2.

The survey also asked how satisfied students were with the teaching they received. Again, this was done using a five-point Likert *scale* (where 5 indicates students were highly satisfied while 1 indicates students were highly dissatisfied with the teaching). Because only 155 students indicated that they were highly dissatisfied with the teaching, this group was merged with those who were somewhat unsatisfied. Further, four dummy variables were generated from this categorical variable and used as a proxy for the potential gains in learning if students spent more time in studying than they would have spent in internship, K_h/K_i . If students were not satisfied with their courses and felt there was little to learn at the university, they may divert more time to internship. In our sample, 8.2% of students were highly dissatisfied and 23.9% were not so satisfied with the teaching while more than two-thirds (68%) were fairly or highly satisfied.

The job differentials (P_h/P_l) between the two types of prospective jobs for undergraduates in Beijing was the most difficult factor to measure. One approach would be to run a fully saturated earnings model linking the full set of students' characteristics including internship with the starting salary of fresh entrants to the labor market. These estimates could then be plugged back into the formulae to calculate internship differentials for non-graduating students. However, only 29% of the graduating class in our sample provided a starting salary. This may be because they still had one month left before leaving the campus. Some may not even finalize their job hunt until they leave the campus. Alternatively, we can resort to another question in the questionnaire on the students' reservation wage, i.e., the minimum monthly salary that a student would accept if they were to start work. While we do not know the job differentials that the students may face in the labor market, we can calculate the perceived differentials measured as the difference between the students' own reservation wage and the median reservation wages of other students at his/her university undertaking the same major. Assuming the median reservation wage is close to the prevailing labor productivity in the labor market, the higher this perceived differential, the stronger the incentive for students to undertake internships. The distribution of the perceived wage differentials from -3,500 CNY to 47,000 CNY away from the median reservation wage are much more dispersed than the weight given to education relative to jobs, as gauged by the coefficient of variation.

To isolate confounding factors, we controlled for a large set of covariates that might simultaneously affect the key independent variables and the dependent variable. They can be grouped into three categories. First: the *student's individual characteristics*, including: gender; the level of prestige of the high school attended by the student; the student's major in college coded in four broad categories; whether this major was their first choice made during their college application; and the year in which the student will graduate. Secondly: the *student's family background*, including: whether their family resides in a metropolitan urban area, in a medium sized city or in a rural area; the father's education attainment coded in three categories; and the father's occupation coded in six categories. Thirdly: the *institutional characteristics of the students' college*, including: the tier it belongs to in the hierarchy of Chinese higher education institutions. Controlling for these covariates reduced the possibility of finding spurious correlations between our independent variables of interest and the outcome variables. For example, a student who entered the school through their less preferred major may

also be less satisfied with the teaching and inclined to spend more energy and time on an internship and eventual employment. Students from a disadvantaged background, e.g., students whose fathers only have primary school education, may be less inclined to continue their study and choose to spend more time on an internship. These covariates are by no means exhaustive. But if the correlation remains intact after controlling for them, it gives us more confidence in our results.

The sample was balanced with males comprising slightly less than half. Almost three quarters of the students indicated that they had graduated from a prestigious high school in their home province while slightly less than two-thirds of them were admitted to their first choice of major. Engineering majors accounted for almost 40% of the sample, followed closely by Social Science majors. Science and Arts and Humanities majors together made up the other 30% of the sample. The students were spread rather evenly across four graduating classes except for the class of 2011. This might be expected because students in their senior year were harder to reach and may have left the campus by May. In terms of family background, the students came from the more affluent part of Chinese society. Students whose fathers have tertiary education comprised the largest group, followed by students whose fathers had completed senior and junior high school. Few students (no more than 8%) had fathers with only primary schooling.

Table 2. Summary statistics for the population sample.

| VARIABLES | (1) N | (2) mean | (3) sd | (4) min | (5) max |
|---|----------|-------------|-----------|------------|------------|
| Excessive internship: >10 hours per week | 9,706 | 0.066 6 | 0.249 | 0 | 1 |
| Excessive internship: >15 hours per week | 9,706 | 0.033 7 | 0.180 | 0 | 1 |
| Total number of days on internship last year | 9,706 | 14.24 | 35.35 | 0 | 366 |
| Ave. weekly hours on internship last term | 9,706 | 1.566 | 1.028 | 1 | 6 |
| Weights to education relative to jobs | 9,706 | 1.063 | 0.249 | 0.231 | 5 |
| Unsatisf. with teaching | 9,706 | 0.082 4 | 0.275 | 0 | 1 |
| Neutral with teaching | 9,706 | 0.239 | 0.426 | 0 | 1 |
| Fairly satisf. with teaching | 9,706 | 0.409 | 0.492 | 0 | 1 |
| Highly satisf. with teaching | 9,706 | 0.270 | 0.444 | 0 | 1 |
| Deviation of own reservation salary from median | 9,706 | 0.433 | 2.682 | -3.500 | 47 |

Continued

| VARIABLES | (1) N | (2) mean | (3) sd | (4) min | (5) max |
|--------------------------------|----------|-------------|-----------|------------|------------|
| Male student=1 | 9,706 | 0.497 | 0.500 | 0 | 1 |
| Prestigious high school=1 | 9,706 | 0.722 | 0.448 | 0 | 1 |
| Major is first choice | 9,706 | 0.628 | 0.483 | 0 | 1 |
| Class of 2011=1 | 9,706 | 0.170 | 0.375 | 0 | 1 |
| Class of 2012=1 | 9,706 | 0.272 | 0.445 | 0 | 1 |
| Class of 2013=1 | 9,706 | 0.311 | 0.463 | 0 | 1 |
| Class of 2014=1 | 9,706 | 0.248 | 0.432 | 0 | 1 |
| Major=Arts & Humanities | 9,706 | 0.133 | 0.340 | 0 | 1 |
| Major=Social Sciences | 9,706 | 0.312 | 0.464 | 0 | 1 |
| Major=Sciences | 9,706 | 0.169 | 0.374 | 0 | 1 |
| Major=Engineering | 9,706 | 0.386 | 0.487 | 0 | 1 |
| Father primary edu. | 9,706 | 0.076 3 | 0.266 | 0 | 1 |
| Father junior secondary edu. | 9,706 | 0.227 | 0.419 | 0 | 1 |
| Father senior secondary edu. | 9,706 | 0.277 | 0.448 | 0 | 1 |
| Father higher edu. | 9,706 | 0.419 | 0.493 | 0 | 1 |
| Farmers and Migrants | 9,706 | 0.198 | 0.398 | 0 | 1 |
| Service and Industry | 9,706 | 0.127 | 0.333 | 0 | 1 |
| Technicians and Clerks | 9,706 | 0.246 | 0.431 | 0 | 1 |
| Business owners | 9,706 | 0.145 | 0.352 | 0 | 1 |
| Officials and Managers | 9,706 | 0.205 | 0.404 | 0 | 1 |
| Region of origin=Western China | 9,706 | 0.212 | 0.408 | 0 | 1 |
| Region of origin=Central China | 9,706 | 0.200 | 0.400 | 0 | 1 |
| Region of origin=Eastern China | 9,706 | 0.588 | 0.492 | 0 | 1 |
| Residence=Village/Town | 9,706 | 0.315 | 0.464 | 0 | 1 |
| Residence=County | 9,706 | 0.165 | 0.372 | 0 | 1 |
| Residence=Prefecture | 9,706 | 0.184 | 0.388 | 0 | 1 |
| Residence=Municipality | 9,706 | 0.336 | 0.472 | 0 | 1 |
| Third tier univ.=1 | 9,706 | 0.403 | 0.490 | 0 | 1 |
| Second tier univ.=1 | 9,706 | 0.369 | 0.482 | 0 | 1 |
| First tier univ.=1 | 9,706 | 0.229 | 0.420 | 0 | 1 |

4.2 Methodology

The dichotomous nature of the preferred outcome variable, excessive internship (>10/15 hours per week) suggested a logit model for analysis. The Bernoulli distribution is a probability function used to describe a trial which results in a dichotomous outcome, success or failure:

$$Y_i \sim Y_{Bern}(Y_i | \pi_i) = \pi_i^{y_i} (1 - \pi_i)^{1 - y_i} = \begin{cases} \pi & \text{for } y = 1 \\ 1 - \pi & \text{for } y = 0 \end{cases} \quad (1)$$

Where Y_i is the dependent variable indicating whether students intern more than 10 or 15 hours per week and π is the probability that the student is engaged in excessive internship. Equation 2 below allows us to capture variation across students in their probability of excessive internship based on a set of covariates X_i relating to an individual student and β a vector of parameters indicating the relative contribution of these individual characteristics on the probability of excessive internship. Here the cumulative standard logistic distribution is used to capture the nature that π is bounded between 0 and 1 and that it is positively monotonic. When cumulative standard normal distribution is used, we estimate the logit regression model.

$$\Pr(Y_i = 1 | \beta) \equiv E(Y_i) \equiv \pi_i = \frac{1}{1 + e^{-x_i \beta}} \quad (2)$$

Because the choice of cutoff for excessive internship involves judgement, there is some risk that applying these cutoffs may result in throwing away useful variation in the outcome variables. For this reason, we have also used the ordered logit model to analyze the weekly hours on internship in its original form of six categories.

In the sensitivity analysis section, we also employ the ordered logit model and Tobit models which are more suitable for the relevant outcome variables. These regression models can be found in standard econometric books. For an order logit model, we conducted Brant Tests to see if the usual Proportional Odds Model was sufficient for this data.³

5. What Are Our Findings?

5.1 Is Excessive Internship Prevalent?

At first glance, excessive internship seems to be a misnomer according to this sample. Figure 1 shows that almost two-thirds of the students reported that they did not intern at all during their final semester. Another twenty percent of students engaged in internships for between 1 and 5 hours per week. Only around seven percent of students were engaged in excessive internship, i.e., they interned for more than 10 hours per week (this reduces to 3.5 percent if we set the cutoff for excessive internship at 15 hours per week). However, this indicates substantial differences in the use of internships among the students.

Table 3 shows the same tabulation applied across the tier of their universities. The higher up the student's university in the higher education pyramid, the fewer hours per week the student spends on internship. Around 8 percent of students in third-tier universities engaged in excessive internships (defined as interning for >10 hours per week) whereas only 6 percent of students at top-tier universities engaged in the same amount of

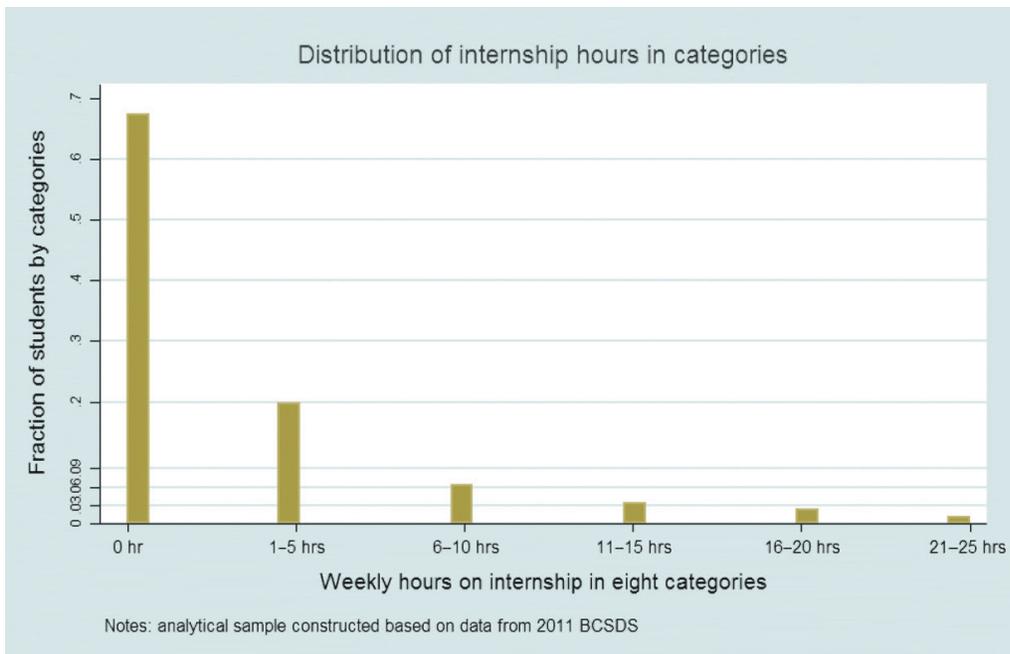


Figure 1. Distribution of the weekly hours spent by students on internship.

Table 3. Tabulation of internship hours by the tier of the university the student enrolled in.

| | 3rd-tier | 2nd-tier | 1st-tier | Total |
|-------------|----------|----------|----------|-------|
| 0 hours | 2,450 | 2,394 | 1,695 | 6,539 |
| | 62.71 | 66.89 | 76.35 | 67.37 |
| 1–5 hours | 868 | 729 | 314 | 1,911 |
| | 22.22 | 20.37 | 14.14 | 19.69 |
| 6–10 hours | 290 | 218 | 102 | 610 |
| | 7.42 | 6.09 | 4.59 | 6.28 |
| 11–15 hours | 150 | 119 | 50 | 319 |
| | 3.84 | 3.32 | 2.25 | 3.29 |
| 16–20 hours | 100 | 87 | 38 | 225 |
| | 2.56 | 2.43 | 1.71 | 2.32 |
| 21–25 hours | 49 | 32 | 21 | 102 |
| | 1.25 | 0.89 | 0.95 | 1.05 |
| Total | 3,907 | 3,579 | 2,220 | 9,706 |
| | 100 | 100 | 100 | 100 |

Pearson $\chi^2(10)=124.0231$ Pr=0.000

activity. The difference may reflect the fact that graduates from third-tier universities have poorer job prospects. Students in these institutions go out of their way to accumulate internships, hoping that their experience will mitigate the disadvantage brought by their less prestigious credentials upon graduation.

Table 4 tabulates internship hours by graduating class. It is evident that excessive internship was a much more prevalent phenomenon for the graduating class of 2011 than for other classes. 18 percent of those graduating in 2011 spent more than 10 hours per week on internship while only slightly more than eight percent of the junior students did so. Excessive internship as we define it was almost nonexistent for the freshman class at a level of only three percent. This is expected because freshmen and sophomores tend to have more coursework and the need to job hunt is not as urgent as it is for the others who are closer to graduation.

Table 4. Tabulation of internship hours by students' graduating class.

| | 2011 | 2012 | 2013 | 2014 | Total |
|-------------|-------|-------|-------|-------|-------|
| 0 hours | 731 | 1,714 | 2,142 | 1,952 | 6,539 |
| | 44.41 | 64.97 | 71.04 | 81.10 | 67.37 |
| 1–5 hours | 430 | 555 | 593 | 333 | 1,911 |
| | 26.12 | 21.04 | 19.67 | 13.83 | 19.69 |
| 6–10 hours | 202 | 190 | 160 | 58 | 610 |
| | 12.27 | 7.20 | 5.31 | 2.41 | 6.28 |
| 11–15 hours | 123 | 86 | 71 | 39 | 319 |
| | 7.47 | 3.26 | 2.35 | 1.62 | 3.29 |
| 16–20 hours | 110 | 61 | 38 | 16 | 225 |
| | 6.68 | 2.31 | 1.26 | 0.66 | 2.32 |
| 21–25 hours | 50 | 32 | 11 | 9 | 102 |
| | 3.04 | 1.21 | 0.36 | 0.37 | 1.05 |
| Total | 1,646 | 2,638 | 3,015 | 2,407 | 9,706 |
| | 100 | 100 | 100 | 100 | 100 |

Pearson $\chi^2(15)=823.6$ Pr=0.000

5.2 What Drives Excessive Internship?

Table 5 presents the main empirical findings. Column (1) and (2) report the marginal effects at mean in a logit regression when the binary outcome variable is whether students intern for more than 10 hours per week. In Column (1), only three key independent variables corresponding to the three hypotheses are included in the estimation without any control variables. Empirical findings confirm the prediction of our model in that a one standard deviation decrease in students' disposition to study increases the probability of engaging in excessive internship by 1.3 percentage points; a one standard deviation in the differentials of reservation salary increases the risk of excessive internship by 0.54 percentage points; and students who were highly or fairly satisfied with teaching at their department were 3 percentage points less likely to intern excessively.

When a full set of controls are included in the estimation as in Column (2), the findings still hold albeit at somewhat smaller levels for two of the independent variables. Here the coefficient estimates on control variables help us to contextualize the effects of the key independent variables. The effect of a one standard deviation increase in disposition to study relative to jobs is one-third of the difference between students in first-tier universities vis-à-vis those in third-tier universities. The effects of teaching satisfaction (fairly or highly satisfied) on excessive internship is larger than the effects of being in a second-tier university vis-à-vis in a third-tier university. In Column (3) and (4), the bar for excessive internship is raised to 15 hours per week. Coefficient estimates still point in the right direction but are now much smaller in size.

In Column (5) and (6), we relax the assumption about the cutoff for excessive internship. In fact, excessive internship may mean different things for different students. For example, a fourth-year college student who has a low workload for coursework will have ample free time to engage in internship whereas a couple of hours spent on internship for a freshman might be considered as excessive. We are no longer concerned only about excessive internship *per se* but take advantage of the more refined variation across all six categories using an ordered logit model. We report the coefficient estimates from the ordered logit model.⁴ The effect of a one standard deviation rise in salary differentials on excessive internship is slightly more than one-third of the difference between students in second-tier universities vis-à-vis those in third-tier universities. The effect of a one standard deviation increase in disposition to study relative to jobs is slightly larger than the half of the difference between students in second-tier universities vis-à-vis those in third-tier universities. The effects of teaching satisfaction (fairly or highly satisfied) on excessive internship is 60% or 80% of the effects of being in a first-tier university vis-à-vis in a third-tier university, respectively.

Table 5. Main regression results.

| VARIABLES | (1) Logit Regression: Excessive internship more than 10 hours per week (without controls) | (2) Logit Regression: Excessive internship more than 10 hours per week (with controls) | (3) Logit Regression: Excessive internship more than 15 hours per week (without controls) | (4) Logit Regression: Excessive internship more than 15 hours per week (with controls) | (5) Ologit Regression: Weekly hours on internship (without controls) | (6) Ologit Regression: Weekly hours on internship (with controls) |
|--|---|--|---|--|--|--|
| Weights to education relative to jobs | -0.052*** [0.013] | -0.047*** [0.012] | -0.022** [0.010] | -0.020** [0.010] | -0.625*** [0.107] | -0.548*** [0.108] |
| Neutral with teaching | -0.008 [0.009] | -0.006 [0.008] | -0.004 [0.007] | -0.003 [0.007] | -0.215*** [0.081] | -0.199** [0.084] |
| Fairly satisf. with teaching | -0.035*** [0.008] | -0.029*** [0.008] | -0.018*** [0.006] | -0.015*** [0.006] | -0.504*** [0.081] | -0.421*** [0.081] |
| Highly satisf. with teaching | -0.034*** [0.009] | -0.027*** [0.009] | -0.014** [0.006] | -0.011* [0.006] | -0.656*** [0.096] | -0.540*** [0.096] |
| Deviation of own reservation salary from median | 0.002*** [0.001] | 0.002*** [0.001] | 0.001*** [0.000] | 0.002*** [0.000] | 0.024*** [0.008] | 0.035*** [0.008] |
| Male student=1 | | 0.005 [0.005] | | -0.000 [0.004] | | 0.130** [0.057] |
| Prestigious high school=1 | | -0.003 [0.006] | | -0.002 [0.005] | | -0.091* [0.052] |
| Major=Social Sciences | | -0.015 [0.010] | | -0.004 [0.007] | | -0.267** [0.111] |
| Major=Sciences | | -0.025** [0.013] | | -0.018** [0.009] | | -0.118 [0.137] |
| Major=Engineering | | -0.033*** [0.011] | | -0.019*** [0.007] | | -0.245** [0.121] |
| Major is first choice | | 0.006 [0.006] | | 0.009** [0.004] | | 0.157*** [0.053] |

Continued

| VARIABLES | (1) Logit Regression: Excessive internship more than 10 hours per week (without controls) | (2) Logit Regression: Excessive internship more than 10 hours per week (with controls) | (3) Logit Regression: Excessive internship more than 15 hours per week (without controls) | (4) Logit Regression: Excessive internship more than 15 hours per week (with controls) | (5) Ologit Regression: Weekly hours on internship (without controls) | (6) Ologit Regression: Weekly hours on internship (with controls) |
|------------------------------|---|--|---|--|--|--|
| Second tier univ.=1 | | -0.011 [0.008] | | -0.008 [0.005] | | -0.267*** [0.089] |
| First tier univ.=1 | | -0.026*** [0.010] | | -0.012* [0.006] | | -0.684*** [0.112] |
| Class of 2012=1 | | -0.064*** [0.008] | | -0.035*** [0.006] | | -0.938*** [0.116] |
| Class of 2013=1 | | -0.098*** [0.009] | | -0.061*** [0.007] | | -1.243*** [0.113] |
| Class of 2014=1 | | -0.123*** [0.011] | | -0.075*** [0.009] | | -1.805*** [0.122] |
| Father junior secondary edu. | | -0.011 [0.010] | | -0.009 [0.007] | | -0.096 [0.088] |
| Father senior secondary edu. | | -0.012 [0.012] | | -0.005 [0.008] | | -0.068 [0.093] |
| Father higher edu. | | -0.012 [0.013] | | -0.008 [0.009] | | -0.186* [0.108] |
| Service and Industry | | 0.002 [0.010] | | -0.001 [0.008] | | 0.052 [0.108] |
| Technicians and Clerks | | -0.008 [0.010] | | -0.006 [0.007] | | 0.020 [0.103] |
| Business owners | | -0.003 [0.010] | | 0.005 [0.008] | | 0.006 [0.101] |

Continued

| VARIABLES | (1) Logit Regression: Excessive internship more than 10 hours per week (without controls) | (2) Logit Regression: Excessive internship more than 10 hours per week (with controls) | (3) Logit Regression: Excessive internship more than 15 hours per week (without controls) | (4) Logit Regression: Excessive internship more than 15 hours per week (with controls) | (5) Ologit Regression: Weekly hours on internship (without controls) | (6) Ologit Regression: Weekly hours on internship (with controls) |
|--------------------------------|---|--|---|--|--|--|
| Officials and Managers | | -0.004 [0.011] | | 0.004 [0.009] | | 0.130 [0.115] |
| Region of origin=Central China | | -0.003 [0.008] | | -0.003 [0.006] | | -0.081 [0.074] |
| Region of origin=Eastern China | | 0.002 [0.007] | | -0.005 [0.005] | | 0.005 [0.061] |
| Residence=County | | -0.019** [0.010] | | -0.015** [0.007] | | -0.161** [0.077] |
| Residence=Prefecture | | -0.007 [0.009] | | -0.006 [0.006] | | -0.211*** [0.078] |
| Residence=Municipality | | -0.013* [0.007] | | -0.008 [0.005] | | -0.172** [0.074] |
| LR test statistics | 60.01 | 436.4 | 27.64 | 274.14 | 157.27 | 1,073.50 |
| Prob > chi2 | 0.000 0 | 0.000 0 | 0.000 0 | 0.000 0 | 0.000 0 | 0.000 0 |
| Pseudo R2 | 0.012 6 | 0.091 9 | 0.009 7 | 0.105 5 | 0.008 0 | 0.054 9 |
| Observations | 9,706 | 9,706 | 9,706 | 9,706 | 9,706 | 9,706 |

Notes: Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The first four columns report marginal effects from logit regression models. Column (5) and (6) show the regression results from ordered logit models. As marginal effects from ordered logit model are complicated to present, we only present the raw coefficient estimates here. In both cases, Brant tests does not reject the null hypothesis of the parallel assumptions.

5.3 Sensitivity Analysis and Falsification Tests

Table 6 shows the results of sensitivity analysis by using alternative outcome variables and placebo tests. Column (1) repeats the results of Column (6) from Table 5 as a reference. Column (2) uses the number of days spent on internship during the last year as the outcome variable. Results from the Tobit model provide strong support for the two hypotheses on salary differentials and weights to education relative to job while there is weak support for the hypothesis as they are not statistically significant.

The next three columns (3–5) present the results of three falsification tests using self-reported weekly hours spent on student association, physical exercise and leisure. The logic is that if the correlations we find in Table 5 reflect the true relationship between independent variables and outcome variables, they should disappear when we use other variables as outcome variables. Indeed, in no case do we find consistent significant results across the three hypotheses. For time on student association and physical exercise, disposition to education negatively correlates while salary differentials go together. But students' satisfaction about teaching shows no consistent pattern in relation to them. As for weekly time spent on leisure, only teaching satisfaction seems to correlate positively with it. These results can give us more confidence that the relationships we find in Table 5 do not occur simply by chance.

To further test the refutability of our model, we run the same regression but with students' weekly hours spent on homework and self-study as dependent variables. Should our model capture the causal relationship between internship hours and our three key predicting factors, we would expect the opposite relationship between them and the weekly hours spent on homework and self-study. We did indeed find exactly opposite effects for the two variables of interest, i.e., disposition to study and teaching satisfaction. Salary differentials, however, were still significantly and positively correlated with the number of hours spent on study. This presumably points to a limitation of our model in that it does not consider the cross-fertilization effects of time spent on study and time spent on internship. It may well be that time spent on study improves students' academic performance which in turn improves employment prospects in the future.

Table 6. Sensitivity analysis and falsification tests.

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) |
|---|--|--|--|--|--|--|
| | Ordered Logit Regression: weekly hours on internship in categories | Tobit Regression: Number of days spent on internship last year | Ologit Regression: weekly hours on student association in categories | Ologit Regression: weekly hours on physical exercise in categories | Ologit Regression: weekly hours on entertainment in categories | Ologit Regression: weekly hours on homework and self-study in categories |
| Weights to education relative to jobs | -0.548*** [0.108] | -9.366*** [2.993] | -0.599*** [0.088] | -0.364*** [0.085] | -0.074 [0.075] | 0.541*** [0.083] |
| Neutral with teaching | -0.199** [0.084] | -4.970* [2.859] | 0.061 [0.087] | 0.067 [0.095] | 0.159** [0.079] | 0.236** [0.096] |
| Fairly satisf. with teaching | -0.421*** [0.081] | -5.991** [2.778] | 0.107 [0.084] | -0.005 [0.090] | 0.192*** [0.074] | 0.572*** [0.095] |
| Highly satisf. with teaching | -0.540*** [0.096] | -6.901** [3.341] | 0.036 [0.090] | 0.059 [0.094] | 0.158** [0.078] | 0.770*** [0.099] |
| Deviation of own reservation salary from median | 0.035*** [0.008] | 0.249 [0.251] | 0.021** [0.008] | 0.022** [0.009] | -0.005 [0.007] | 0.016** [0.008] |
| LR test statistics | 1,073.50 | 2,104.81 | 542.71 | 566.17 | 160.20 | 662.68 |
| Prob > chi2 | 0.000 0 | 0.000 0 | 0.000 0 | 0.000 0 | 0.000 0 | 0.000 0 |
| Pseudo R2 | 0.054 9 | 0.043 8 | 0.021 4 | 0.023 7 | 0.005 1 | 0.020 5 |
| Observations | 9,706 | 9,706 | 9,706 | 9,706 | 9,706 | 9,706 |

Notes: Column (1) in Table 6 repeats the results from the last column in Table 5. Column (2)–(6) control for all individual, family and school covariates. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Column (2) reports the marginal effect from Tobit model with number of days interned by a student in the past year as the outcome variables. Column (3–6) report regression results using other variables in the time use component of the survey as falsification tests.

6. Conclusion

Driven by an oversupply of college students and fierce competition in the labor market, educators and policy makers have been alerted to the intensity and scale of internships undertaken by college students in China. They are concerned that students may be held captive in internships by employers at the expense of academic study, personal development, and the longer-term growth interests of the economy. But little is known regarding the determining factors behind excessive internships taken by college students in China. The paper constructed a Prisoners' Dilemma game to model the internship behavior of Chinese college students, using data from a survey of approximately 10,000 Chinese college students from 47 higher education institutions in the Beijing metropolitan area in 2011. The empirical results confirmed the three key hypotheses derived from the model: first, higher differentials across available jobs in the labor market perceived by the students enticed college students to intern excessively; secondly, the rising quality of college teaching and the consequent benefits of knowledge acquisition mitigate excessive internship; thirdly, the weights to education relative to work experience given by students also tilted the balance towards more studying and less internship.

Our findings show the need for specific policy measures to rein in excessive internship before it gets out of control. Otherwise, students will be caught in a socially suboptimal race to the top in terms of internship. The most effective policy lever open to higher education institutions is the improvement of teaching quality with its consequences for student satisfaction. In recent years there has been a trend in China to emphasize the importance of teaching and the cultivation of talents. For example, 22 senior university administrators and well-known scholars made a collective call for a return to teaching as fundamental to the core mission of a university (Huang et al., 2015). This echoes the concern of some researchers that universities globally are caught in a race to the top that is: "... biased in favor of research (especially in the natural and medical sciences) with little (or no) guidance on the quality of teaching" (van der Wende, 2008, p. 56). Higher education institutions should provide internship guidance sessions in career planning courses so that students become aware of the advantages and disadvantages of internship and the risks associated with undertaking it excessively.

The possibilities of the Prisoners' Dilemma game in analyzing choice in

social and public policy are well known.⁵ This article is an example of its use in considering student decision making regarding internship, an important aspect of higher education and graduate employment in contemporary Beijing. There are, however, a few limitations that should be noted.

First, it provides only an imperfect measurement of students' perceptions of wage differentials between the more desirable and the less desirable job. Further research should gather more comprehensive labor market statistics that would allow us to test the linkage between wage differentials and intensity of internship directly.

Secondly, universities cannot reduce the wage differentials in the labor market, but existing government measures to reduce income inequalities may smooth graduate transition to employment. Another limitation has to do with causality. Although the three main hypotheses derived from our Prisoners' Dilemma game theory are confirmed by empirical findings, they should not be interpreted as causal but as correlational. Researchers should look for more exogenous variations in each of the key independent variables to see if the causality holds true.

Finally, the article provides a model of internship from the students' perspectives only. It does not consider parents, who are exceptionally important in the Chinese context, nor employers who again are obviously essential stakeholders. An example that involves both, and which should be considered in further research, is the relationship between internship and the Chinese use of *guanxi* as a means of securing employment. However, the findings presented in article are valuable as a starting point for such further research.

Notes

- 1 Also known as the Dearing Report after the Committee's Chairman, the well-known civil servant, Sir Ron Dearing (later Lord Dearing).
- 2 K_h is greater than K_l and P_h is greater than P_l by definition.
- 3 We thank one anonymous referee for the useful comments.
- 4 Results of Brant test on key independent variables accept the null hypothesis of parallel assumption. In fact, none of the p values is smaller than 0.3.
- 5 See for instance R. Axelrod (2006), *The Evolution of Co-operation*.

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References

- Axelrod, R. M. (2006). *The evolution of cooperation* (Revised edition). New York, NY: Basic Books.
- Bao, W. (2014). *Unfinished transition—Higher education and student development*.

- Beijing: Education Science Publishing House. (in Chinese)
- Blackwell, A., Bowes, L., Harvey, L., Hesketh, A. J., & Knight, P. T. (2001). Transforming work experience in higher education. *British Educational Research Journal*, 27(3), 269–285.
- Cai, Y., & Yan, F. (2017). Universities and higher education. In W. J. Morgan, Q. Gu, & F. Li (Eds.), *Handbook of education in China* (pp. 169–193). Cheltenham, UK & Northampton, USA: Edward Elgar Publishing.
- Calvo, J. (2011). *Internships between higher education and work: Theoretical considerations and analysis for reflection*. Retrieved from http://www.ocides.org/wp-content/uploads/2011/09/Internships-higher-education_OCIDES.pdf.
- Cao, Y., & Hu, S. (2010). Retrospect and prospects of college student internship since the foundation of the People's Republic of China. *Journal of Ideological & Theoretical Education*, (5), 84–88. (in Chinese)
- Chen, Q. (2008). Regulation of graduation internship schedule for college student. *Education and Career*, (19), 6. (in Chinese)
- Ding, X., & Wang, J. (2012). An empirical study of quality of higher education and internship by college students. *Higher Education Research*, (10), 61–66. (in Chinese)
- Ding, X., Yang, S., & Ha, W. (2013). Trends in the Mincerian rates of return to education in urban china: 1989–2009. *Frontiers of Education in China*, 8(3), 378–397.
- Ding, X., & Yu, H. (2011). Prisoners' dilemma and student internship of Chinese college. *Chinese Vocational and Technical Education*, (11), 13–16. (in Chinese)
- Freeman, R. B. (2008). The new global labor market. *Focus*, 26(1), 1–6.
- Gibbons, R. (1992). *A primer in game theory*. New York, NY: Harvester Wheatsheaf.
- Gleeson, D., & Keep, E. (2004). Voice without accountability: The changing relationship between employers, the state and education in England. *Oxford Review of Education*, 30(1), 37–63.
- Greenhouse, S. (2012, May 5). Jobs few, grads flock to unpaid internships. *New York Times*. Retrieved from <https://www.nytimes.com/2012/05/06/business/unpaid-internships-dont-always-deliver.html>.
- Huang, D. et al. (2015). *The core of the mission of a university*. Beijing: The Commercial Press. (in Chinese)
- Hughes, K. L., Bailey, T. R., & Karp, M. M. (2002). School-to-work: Making a difference in education. *Phi Delta Kappan*, 84(4), 272–279.

- Little, B., & Harvey, L. (2007). UK work placements: A choice too far? *Tertiary Education and Management*, 13(3), 227–245.
- Mckenzie, D., & Rosenzweig, M. (2012). Preface for symposium on measurement and survey design. *Journal of Development Economics*, 98(1), 1–2.
- Morgan, W. J. (1996). Educational policy making in Britain: An interview with Sir Ron Dearing. *International Journal of Lifelong Education*, 15(5), 311–324.
- Morgan, W. J., & Li, F. (2015). Education: From egalitarian ideology to public policy. In S. G. Goodman (Ed.), *Handbook of the politics of China* (pp. 217–237). Cheltenham, UK & Northampton, USA: Edward Elgar Publishing.
- Perlin, R. (2011, April 2). Unpaid interns, complicit colleges. *New York Times*. Retrieved from <https://www.nytimes.com/2011/04/03/opinion/03perlin.html?pagewanted=all.%20April%2024,%202011>.
- Riggert, S. C., Boyle, M., Petrosko, J. M., Ash, D., & Rude-Parkins, C. (2006). Student employment and higher education: Empiricism and contradiction. *Review of Educational Research*, 76(1), 63–92.
- Steinberg, S. (2010, July 26). Unpaid internships can cost—or pay off for—college students. *USA Today*. Retrieved from http://usatoday30.usatoday.com/news/education/2010-07-27-internship27_ST_N.htm.
- Tan, S. (1995). Operation Mode of Higher Education and Reform of Job Placement Mechanism of College Graduates. *Shanghai Higher Education Research*, (1), 14–17. (in Chinese)
- Thilakerathne, P. M. C., & Madurapperuma, M. W. (2014). An examination of accounting internship on subsequent academic performance. *International Journal of Economics, Finance and Management Sciences*, 2(1), 8–15.
- Wei, X., Li, W., & Chen D. (1997). Exploratory analysis of current job placement mechanism of college graduates in China. *Higher Education Research*, (1), 30–37. (in Chinese)
- van der Wende, M. (2008). Rankings and classifications in higher education: A European perspective. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 49–71). Dordrecht, Netherlands: Springer.
- Yang, G., Wang, R., Chen, Y., & Zhan, S. (2012). *Survey and analysis of student internship around the world*. Retrieved from <https://ws.moe.edu.tw/001/Upload/4/RelFile/7840/40212/2012%20%E5%90%84%E5%9C%8B%E5%A4%A7%E5%AD%B8%E5%AF%A6%E7%BF%92%E5%88%B6%E5%BA%A6%E8%AA%BF%E6%9F%A5%E5%88%86%E6%9E%90%20%E6%9C%9F%E6%9C%AB%E5%A0%B1%E5%91%8A>

(Final).pdf. (in Chinese)

- Yue, C. (2012). A comparative study on graduates employment surveys: 2003–2011. *Peking University Education Review*, 10(1), 21–47. (in Chinese)
- Zhang, L., & Wang, X. (2011). Policy choices of college student internship in China. *China Higher Education Research*, (8), 57–59. (in Chinese)
- Zhang, Y. (2011). Historical development of the internship of college students since the foundation of the People's Republic of China. *China Youth Study*, (6), 81–85. (in Chinese)