Journal of
Applied Sciences

College Reputation, Major and Gender in Job Search: Employment and Wages of Graduates in China

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Abstract: The way by which college reputation, major and gender affect job search prospects of Beijing graduates, along with their starting wages was studied in this study. A duration model and a Heckman selection model were used and yielded several important findings. First, graduates find jobs faster if they come from reputed colleges. The study shows that engineering and business graduates find jobs more easily, whereas law and science graduates have more difficulty finding jobs. Moreover, female graduates find jobs more easily than male graduates, particularly before the date of graduation and 1 to 2 months after graduation. Second, because university graduates have better reputation, they receive a higher initial wage than other types of college graduates, with graduates of liberal arts and social science receiving higher wages than others graduates. In addition, female graduates earn less than male graduates.

Key words: College reputation, gender, major, job search, employment, wage

INTRODUCTION

Many factors affect the job search prospects of graduates and their initial wages. This study divides these factors into two separate categories: the effect of the reputation of the college and the factors that involve the individual, including gender and the majors completed in college. For the purpose of this study, a duration model featuring parametric survival and nonparametric survival approaches is used to analyze the length of time an individual spent unemployed. The Mincer wage equation and the Heckman selection model are also used to investigate the factors that affect wages. These approaches reveal the marginal effects of abovementioned factors.

This study finds that graduates from colleges with good reputation have better job opportunities, with the female graduates entering the labor market first. Moreover, the effects of engineering, business, liberal arts and social sciences, law and science majors on job search in the duration model are significant. The engineering and business graduates find jobs most easily, followed by liberal arts and social sciences. In addition, female graduates are more successful in finding jobs than male graduates. The test shows that a sample selection bias does exist and is a significant factor in this case. Hence, an inverse Mills ratio is used to redress the bias in the wage equation. Meanwhile, this study finds that students from a university with a high reputation have higher initial wages than other types of university graduates. Second, business as well as liberal arts and social sciences graduates have higher wages than other graduates, although women graduates earn less than their male counterparts. However, these factors have different impacts. The high prestige universities and the arts and social sciences majors have greater impact on initial wages.

The rest of the study is organized into sections. Section 2 presents the literature review, Section 3 presents data descriptions and summary statistics are discussed in Section 4, Section 5 presents the empirical econometric model and estimation and the final section presents the conclusion.

LITERATURE REVIEW

Bradley and Nguyen (2004) point out that the index of school quality has a much larger effect than academic performance on the school-to-labor transition in England. However, Zhou (2003) uses a survey that covers 30 colleges in six provinces, including an available college sample of 18722 graduates in China and finds that the reputation and quality of the colleges have only a small effect on whether the graduates actually find jobs.

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Bratberg and Nilsen (1998) use Norwegian data and find that females have lower reservation wages when entering the labor market. Bradley and Nguyen (2004) report that, in England, the males from high quality schools are less likely to enter the labor market and acquire jobs compared with females; furthermore, males are more likely to remain unemployed. Conversely, Zhou (2003) reveals that, in China, male graduates find jobs more easily than female graduates. In fact, according to Min *et al.* (2006), the percentage of male graduates who sign job contracts is 77.1% as opposed to 71.2% for females. Graham and Smith (2005) consider gender difference in education, work experience and occupational characteristics and report that women with a college education are less than half as likely as men to be employed in the fields of engineering in the US.

Zhou (2003) reports that graduate with master's degree in China find it easier to find a job than for those with a bachelor's or doctorate degree. Bertschy *et al.* (2008) analyze PISA 2000 data from Switzerland and report that compulsory school achievements measured by individual PISA results have no direct effect on labor market transition. However, the graduates with higher PISA scores seem to have more vocational training and eventually have better job prospects.

Strayer (2002) suggest that the reputation of a school influences earnings by affecting college choice behavior. Broecke (2012) show that college selectivity has significant effects on earnings, suggesting that any work that does not include college performance overstates the effect of college selectivity for Whites and understates it for Blacks. Long (2008) reports solid evidence that support the positive effects of college quality on college graduation and household income regardless of the estimation methods used.

However, Dale and Krueger (1998) used the College and Beyond Survey database in America to show that no significant returns exist for attending a selected college if unobservable ability is controlled. Meanwhile, Furthermore, Black *et al.* (2005) report that the effects of college quality on wages remain roughly constant from 1970s to 1980s in the US and an important component of the effect of college quality on wages results from its effect on years of schooling. Murtin (2007) notes that unobserved skills, which are called the ability premium, represents about 30% of the total college premium by computing the cross-sectional return to schooling with the correlation between a college dummy and estimated unobserved skills. Finnie and Frenette (2003) show the differences in earnings according to discipline among Canadian college graduates. The fields with the highest

earnings are health, engineering and computer science, commerce and mathematics/physics; those with the lowest earnings are liberal arts and humanities, agricultural/biological sciences and other social sciences; and education and economics are generally in the middle of the earnings distribution. Walker and Zhu (2011) show that high average returns for women do not differ by major. For men, they find very large returns for law, economics and management but not for other subjects.

In addition, gender has an impact on initial wages. Finnie and Frenette (2003) show that significant gender differences remain in the distribution of graduates by discipline. Bradley and Nguyen (2004) find that when women enter the labor market, they expect lower wages than men even though they can find work more quickly. Min *et al.* (2006) find that initial wages of Chinese male graduates are higher than those of female graduates with an average monthly wage gap of 124. Moreover, Joy (2003) reports that in the US, the impact of gender on the wage differential is also larger than those of majors, academic performance, or university attended. Napari (2006) points out that about 27% of wage differentials among Finnish university graduates are due to gender, however, the single most important factor in the wage gap between men and women is family type, because women marry and raise children and thus suffer large wage loss. In Greece, Pouliakas and Livanos (2008) find that many female graduates chose to major in education or in the humanities; hence, competition between these women drives down wage levels in these fields. Oaxaca-Blinder decomposition indicates that educational attainment can explain an additional 8.4% of the wage gap between men and women. Finally, women seek low-risk occupations. Thus, their wages tend to be lower in the job market.

The contribution of the current study lies in its usage of a duration model to focus on survival analysis applied to the factors that affect the job-search of graduate. Previous studies often use a logistic model to analyze job search such as those of Bratberg and Nilsen (1998) and Min *et al.* (2006). The present study adopts a dataset that covers all colleges in the Beijing area in order to obtain accurate regional trends that Zhou (2003) and Min *et al.* (2006) failed to predict. In addition, this study also demonstrates the marginal effects of each factor disregarded in abovementioned studies. Finally, this study uses the Mincer wage equation to analyze the impacts of the reputation of a university, undergraduate major and gender on initial wages. Moreover, a Heckman selection procedure is used to test whether a selection-bias problem exists.

DATA DESCRIPTION AND SUMMARY STATISTICS

Regarding college type, Table 1 shows the percentage of employment from reputed universities reaches 92.62% of the total number of their graduates. Most employed graduates have majors of liberal arts and social sciences (2034), engineering (2206) and business (2052), with a total employment of 7619. Furthermore, the number of employed female graduates reaches 3899, which is slightly more than the number of male graduates at 3720. The total unemployment figure for females is 284, while that for males at 309. In addition, the graduates from reputed universities and universities have a shorter average duration of unemployment, which are 7.22 and 7.10 months, respectively. Graduates with manufacturing and business majors have shorter average duration of unemployment, which are 6.64 and 6.97 months, compared with law and engineering majors, which are 7.31 and 7.33 months, respectively. Meanwhile, the average durations of unemployment for liberal arts and social sciences, science, agriculture and medicine majors are in the middle. Moreover, female graduates have a significant shorter average duration of unemployment, which is 7.14 months, compared with 7.26 months in males. The average duration of unemployment reflects the average time one spends while searching for a job.

Furthermore, Table 2 shows the numbers and percentages of the employed, the unemployed and the non-employed during the discrete unemployment spell. Most cases for employment occur during the 6th, 7th and 8th months of the spell. The base time of the duration model of the research is 6 months before graduation. There are cases wherein some students enter the labor market before graduation. According to MyCos's standard, if students work for 4 h each day, they are considered fully employed. In China, obtaining a bachelor's degree usually takes four years and students complete all courses in the first three years, go through internship for one semester and finally, prepare a thesis during the last semester. Hence, they enjoy a more flexible schedule in their final year and as such, some students find jobs and work even before they have graduated.

Table 3 indicates the average starting wage regarding different college types, majors and genders. These starting wages reflect full time job wages according to the explanations provided in the questionnaire. Graduates of reputed universities have higher average starting wages (3244). A university is considered a reputed university if it has been designated by the Ministry of Education in China. Beijing has many reputable universities, because it is the capital and because the central government invests large amounts of money in higher education.

Table 1: No. of observations and average duration of unemployment

	No. of the employed	No. of the unemployed and non-employed	Total	Average duration
Reputed university	4406	351	4757	7.22 (0.036)
University	2763	189	2952	7.10 (0.058)
College	450	53	503	7.56 (0.152)
Liberal arts and social sciences	2034	154	2188	7.25 (0.064)
Law	562	81	643	7.31 (0.119)
Science	586	82	668	7.23 (0.107)
Engineering	2206	130	2336	7.33 (0.052)
Agriculture	93	7	100	7 (0.266)
Medicine	72	8	80	7.19 (0.284)
Business	2052	130	2182	6.97 (0.062)
Manufacturing	14	1	15	6.64 (1.161)
Female	3899	284	4183	7.14 (0.045)
Male	3720	309	4029	7.26 (0.042)
Total	7619	593	8212	7.20 (0.031)

Here, 8212 is the no. of regression in duration model, The figures in parentheses refer to standard error

Table 2: No. and percentages of employment, unemployment and non-employment in unemployment spell

		Unemployment and	
Month unemployed	Employment	non-employment	Employment (%)
0	0	8212	0.00
1-5	1409	6803	17.15
6	1223	5580	14.89
7	1950	3630	23.75
8	1323	2307	16.11
9-16	1714	593	0.08
Total	7619		92.78

Table 3: Average starting wage by reputation, major and gender

	Employment	Monthly wage	Log wage	Non-employment	Total
Reputed university	2914	3244	7.97	302	3216
University	1703	2802	7.84	204	1907
College	267	2526	7.74	63	330
Liberal arts and social sciences	1292	3349	7.98	151	1443
Law	374	2965	7.88	69	443
Science	366	2777	7.82	65	431
Engineering	1436	2954	7.89	125	1561
Agriculture	61	2349	7.69	9	70
Medicine	44	2507	7.67	8	52
Business	1300	3023	7.91	139	1439
Manufacturing	11	2068	7.57	3	14
Female	2376	2883	7.87	298	2674
Male	2508	3228	7.96	271	2779
Total	4884	3051	7.91	569	5453

Here, 5453 is the number of regression in Heckman selection procedures, currency is Chinese Yuan

Hence, the highly reputed universities comprise more than half in samples, followed by the university graduate wage (2802); college graduates have the lowest wage (2526).

Meanwhile, Table 3 shows that liberal arts and social sciences graduates have higher starting wages (3349) compared with graduates of other majors. One reason is that liberal arts and social science covers economics, arts and tourism, hence, graduates from these majors can command high wages in China. Another reason is that graduates of these majors can find jobs in other high-wage industries such as finance. Business graduates

also have high wages (3023). Manufacturing (2068), agriculture (2349) and medicine (2507) graduates have relatively low wages. Law (2965) and engineering (2954) graduates have similar starting salaries, while science graduates have an average wage of 2777. In addition, the average wage of female graduates (2883) is significantly lower than that of male graduates (3228).

EMPIRICAL MODEL AND ESTIMATION

The Empirical model: This study uses a duration model to analyze the factors that affect the length of unemployment that the parametric and the nonparametric survival approaches used. First, the Parametric Survival Model (PSM) requires the unemployment spell with standard distributions such as normal, log normal, exponential, Weibull and logistic distribution, etc. The PSM with a standard distribution is given by:

$$Ln(t) = \alpha + \beta_i X_i + \sigma \varepsilon_i \qquad (1)$$

the unemployment spell, t, starts at 6 months before graduation. The earliest time that graduates find jobs is 5 months before graduation. The figure of the unemployment spell may be negative if graduation time is set as the base time. However, statistical software does not allow the use of negative numbers; hence, in this study, the base time is set to 6 months before graduation in order to run it in the software. In addition, α is constant, β_i are coefficients of explanatory variables that affect t, ε_i is a random variable with a standard distribution, σ is the coefficient of variation and X_i stands for explanatory variables including college reputation, major and gender.

Second, the Nonparametric Survival Model (NSM) is used to verify the results of the PSM because NSMs do not require a theoretical distribution of t. The Kaplan-Meier survival function is given by:

$$S(t) = \prod_{j=t_0}^{t} \{(n_j - d_j)/n_j\} \qquad (2)$$

where, S(t) is the survival function at time t, n_j is the total observation of graduates at time j and d_j is the number of failures, namely, the employment numbers at time j. The Kaplan-Meier survival function is mainly used for an analysis of survival probability by visual diagram. The advantage of using this model is in that it does not require a standard distribution when processing data.

Regarding the explanatory variables, this study uses dummy variables for reputation. Majors cover liberal arts and social sciences, law, science, engineering, agriculture, medicine, business and manufacturing as the dummy variables. Liberal arts and social sciences, engineering and business are regarded as comparison variables. Gender is a dummy variable and the male is comparison variable. The OLS model is used to analyze the factors affecting graduates' starting wages as expressed by:

$$Ln(W) = \alpha + \beta_i X_i + \varepsilon_i \qquad (3)$$

where, LnW refers to the starting log wages of the graduates, α is constant, X_i stands for explanatory variables (i.e. college reputation, major and gender) and β_i are coefficients of explanatory variables. The sample has two parts. One part consists of the samples from the graduates who find jobs and the other part comprises samples from the graduates who do not find jobs. The OLS regression model only uses the former part. Therefore, the expected value of ε_i is not zero when only part of the sample is used and leads to selection bias. In order to solve the selection bias problem, the two-step procedure is used to eliminate the specification errors of the data.

Estimation for job search: This study indicates that the log of the Weibull hazard is a linear function of the log unemployment time. Hence, the Weibull regression can be used to analyze the factors that affect the unemployment spell. The Kaplan-Meier Function, which does not need a standard distribution, is used to analyze the unemployment spells or hazard rates of the reputation of universities, major and gender. The diagram of this function shows true hazard rates of the reputation of universities, major and gender in order to verify the results from the Weibull regression. Fig. 1, 2 and 3 of the Kaplan-Meier Function indicate that the hazard rates of the reputation of universities, major and gender are not proportional. It also indicates that graduates from different types of colleges, majors, or genders have varying hazard rates.

The outcome of the Weibull distribution from the PSM shows that the reputation of a college, some majors and gender all have a significant effect on the unemployment spell at a 1 or 5% level considering college, engineering and male as base variables (Table 4). First, the reputed university decreases the unemployment spell greatly. The hazard rate of the reputed university is 1.368. The graduates from these universities find jobs faster
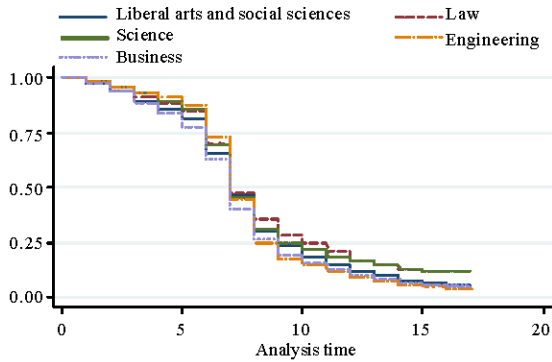
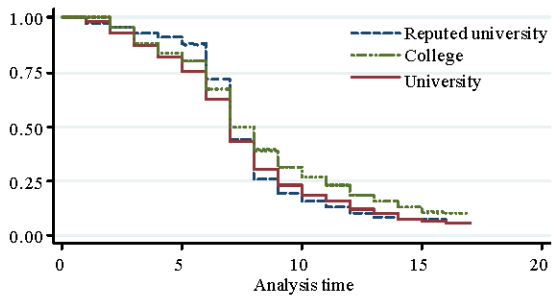Fig. 1: Kaplan-Meier survival estimates by college type
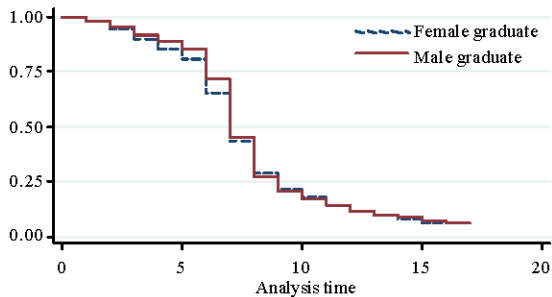

Fig. 2: Kaplan-Meier survival estimates by majors

Fig. 3: Kaplan-Meier survival estimates by gender

Table 4: Outcome of weibull regression

	Hazard ratio	Std err.	z	p>|z|
Reputed university	1.3680	0.0685	6.25	0.000
University	1.3051	0.0673	5.16	0.000
College (omitted)*				
Liberal arts and social sciences	0.9010	0.0292	-3.21	0.001
Law	0.7308	0.0351	-6.53	0.000
Science	0.7929	0.0369	-4.97	0.000
Engineering (omitted)*				
Agriculture	0.9780	0.1037	-0.21	0.835
Medicine	0.8744	0.1049	-1.12	0.263
Business	1.0219	0.0324	0.68	0.494
Manufacturing	1.0266	0.2763	0.10	0.922
Female	1.0500	0.0253	2.02	0.043
Male (omitted)*				
P	2.3269	0.0209		

Refers to comparison variables including college, engineering and male

Further testing of the hypothesis (i.e., hazard rate of the reputed universities equals that of universities) shows that, with a number of 6.29%, we cannot reject the equality hypothesis at the 5% level; however, the equality hypothesis can be rejected at the 10% level. Therefore, regression for marginal effects is redone based on the variable of university. The marginal effect for the hazard rate of reputed universities decrease by 15.33% compared with that of university at a 10% significance level, though its average unemployment spell is longer than the latter. At a 1% significance level, the hazard rate of reputed universities increases by 91.15% if graduates came from the college. Thus, graduates from reputed universities find jobs more easily than those from other types of colleges and graduates from colleges have the most difficulty in finding jobs.

Second, the regression outcome at a 1% significance level for majors indicates that graduates find jobs more easily if they have majors of engineering and business majors instead of those in the fields of liberal arts and social sciences, law, or science. The hazard rates for liberal arts and social sciences, law and science are about 0.90, 0.73 and 0.79, respectively. The marginal effects of hazard rate indicate that the unemployment spells can increase to 34.26, 108 and 78.70% for graduates from the liberal arts and social sciences, law and science, respectively (Table 4). If liberal arts and social sciences comprise the comparison variable, the unemployment spells of graduates for law and science can increase 70.79 and 42.53%, respectively, in comparison, unemployment spells for engineering and business can decrease by 33.57 and 40.45%, respectively. If business is the comparison variable, the unemployment spells of the graduates for liberal arts and social sciences, law and science can increase by 41.49, 116 and 86.42%, respectively. If agriculture is the comparison variable, the graduates' unemployment spells for law and science increase by 100 and 70.90%. However, its spell has no significant difference with those of liberal arts and social sciences,

than the graduates from colleges. The marginal effect analysis shown in Table 5 indicates that the number for the reputed university is about -1.03 based on colleges, which means that the unemployment spell decreases by 103% compared with that of colleges. Meanwhile, the hazard rate of universities is 1.305. This reveals the graduates from these universities can find jobs faster than the graduates from the colleges. The marginal effect analysis indicates that the number of universities is about -0.85, which means that the unemployment spell of the graduates can decrease by 85% compared with that of colleges.

Table 5: Marginal effects of weibull regression

	Reputed university	University	College	Liberal arts and social sciences	Law	Science	Engineering	Agriculture	Business	Female
Reputed university	-	0.1535*	1.082*** (0.0827)	(0.1834)	-	-	-	-	-	-
University	-0.1533* (0.0825)	-	0.911*** (0.1857)	-	-	-	-	-	-	-
College	-1.031*** (0.1668)	-0.853*** (0.1628)	-	-	-	-	-	-	-	-
Liberal arts and social sciences	-	-	-	-	0.7079*** (0.1687)	0.425*** (0.1631)	-0.3357*** (0.1035)	-	-0.4045*** (0.0999)	-
Law	-	-	-	-0.6673*** (0.1500)	-	-	-0.9918*** (0.1477)	-0.8925*** (0.3229)	-1.056*** (0.1466)	-
Science	-	-	-	-0.4103*** (0.1518)	-	-	-0.7388*** (0.1455)	-0.6533** (0.3332)	-0.8048*** (0.1467)	-
Engineering	-	-	-	0.3426*** (0.1077)	1.081*** (0.1751)	0.787*** (0.165)	-	-	-	-
Agriculture	-	-	-	-	1.000** (0.4056)	0.709*** (0.3925)	-	-	-	-
Business	-	-	-	0.4149*** (0.1051)	1.160*** (0.1768)	0.864*** (0.1690)	-	-	-	-
Male	-	-	-	-	-	-	-	-	-	-.1590** (0.0787)

No. in parenthesis show standard error, *, **, *** indicate 10, 5 and 1% significant levels, respectively

engineering, or business. There are also no significant differences in unemployment spell between engineering and business and between law and science. Therefore, the graduates with engineering, business, or agriculture majors find jobs most easily followed by graduates of liberal arts and social sciences or agriculture majors. In comparison, gradates from law and science majors encounter the most difficulty in finding jobs. Other majors have no significant effects on hazard rates. Moreover, the female graduates find jobs faster because their hazard rate is 1.05 more than that of male graduates, furthermore, their unemployment time decrease by 15.91%. In addition, the parameter P is greater than 1, indicating that the likelihood of graduates finding a job becomes larger with time.

Figure 1 reveals that the hazard rates for colleges with different reputations are different from the Kaplan-Meier Function. The horizontal axis stands for unemployment spell and the vertical axis stands for hazard rate. If hazard rates are proportional to the baseline hazard rate, the lines of hazard rate should be parallel. As can be seen, however, their hazard rates are not proportional to the baseline hazard rate, more specifically; their hazard rates are different in each discrete unemployment spell, thus implying that some graduates find jobs more easily and that some of them have a more difficult time finding jobs when they come from different types of colleges. The hazard rates for the reputed university graduates are lower than other colleges from 0 to 4 months before graduation. However, the reputed university graduates are more successful in finding jobs after graduation.

Figure 2 indicates that the graduates with engineering degrees take longer finding jobs than the graduates from other majors before graduation; this explains why engineering graduates have a longer average unemployment spell. However, they find jobs faster after graduation. Business graduates find jobs faster not only before graduation but also after graduation. Engineering graduates take longer finding jobs than business graduates before graduation, but they find jobs more easily than business graduates after graduation. Those from liberal arts and social sciences major find jobs more slowly than those from engineering and business, but they find jobs faster than graduates from law and science majors. The hazard rate lines of law and science graduates are kinked together. As supported by Weibull regression, determining which graduates find jobs more easily is difficult. Their hazard rates are also not proportional to the baseline hazard rate. Finally, Fig. 3 shows that the hazard rates for different genders are not proportional to the baseline hazard rate. Female graduates search for jobs actively, thus, they find jobs faster before graduation. Male graduates catch up with female graduates in employment rate after graduation.

Estimation results for starting wage: Table 6 indicates different OLS and the Heckman selection models. The OLS values in columns 1 and 2 are processed with observations of 7466 and 4884, respectively, in order to compare the variation of their coefficients with those of the Heckman selection model. The total observation of wages in the dataset is 7466. However, the observations of instrumental variables reach 5453, comprising 4884 wage observations and 569 non-wage observations. The Heckman selection model is estimated in column 3 using the instrumental variables, help and no help. Furthermore, the Heckman selection model is processed in column 4 using five instrumental variables, namely, resume help, method help, interview help, job fair help and no help.

Table 6: OLS and Heckman selection model procedure

	OLS (1)	OLS (2)	Heckman (3)	Heckman (4)	OLS (5)	OLS (6)
Wage						
Reputed university	0.211***	0.226***	0.273***	0.273***	0.228***	0.229***
	(0.023)	(0.029)	(0.030)	(0.030)	(0.029)	(0.029)
University	0.081***	0.079***	0.117***	0.118***	0.079***	0.083***
	(0.023)	(0.0298)	(0.031)	(0.031)	(0.030)	(0.030)
Liberal arts and social sciences	0.140***	0.155***	0.138***	0.137***	0.152***	0.151***
	(0.015)	(0.018)	(0.019)	(0.019)	(0.018)	(0.018)
Law	-0.007	0.013	-0.0310	-0.031	-0.066	0.012
	(0.022)	(0.026)	(0.028)	(0.028)	(0.026)	(0.026)
Science	-0.064***	-0.064**	-0.098	-0.099***	-0.066**	-0.066**
	(0.021)	(0.026)	(0.028)	(0.028)	(0.026)	(0.026)
Agriculture	-0.252***	-0.209***	-0.234***	-0.2342***	-0.207***	-0.204***
	(0.049)	(0.058)	(0.061)	(0.061)	(0.058)	(0.058)
Medicine	-0.259***	-0.252***	-0.294***	-0.293***	-0.259***	-0.253***
	(0.055)	(0.068)	(0.071)	(0.071)	(0.068)	(0.068)
Business	0.067***	0.078***	0.070***	0.070***	0.079***	0.078***
	(0.014)	(0.018)	(0.019)	(0.019)	(0.018)	(0.018)
Manufacturing	-0.171***	-0.145	-0.174	-0.173	-0.147	-0.136
	(0.121)	(0.136)	(0.141)	(0.141)	(0.136)	(0.136)
Female	-0.105***	-0.108***	-0.096***	-0.096***	-0.107***	-0.107***
	(0.011)	(0.013)	(0.014)	(0.014)	(0.014)	(0.013)
Job help	-	-	-	-	-0.024	
(OLS(6))					(0.015)	-
Help-resume	-	-	-	-	-	-0.016
						(0.018)
Help-method	-	-	-	-	-	-0.016
						(0.018)
Help-interview	-	-	-	-	-	-0.025
						(0.019)
Help-job fair	-	-	-	-	-	0.007
						(0.014)
Constant	7.767***	7.751***	7.658***	7.658***	7.768***	7.759***
	(0.023)	(0.029)	(0.032)	(0.032)	(0.031)	(0.030)
Select						
Reputed universities	-	-	0.434***	0.422***	-	-
			(0.088)	(0.088)		
University	-	-	0.318***	0.304***	-	-
			(0.091)	(0.091)		
Law	-	-	-0.383***	-0.377***	-	-
			(0.087)	(0.087)		
Science	-	-	-0.315***	-0.322***	-	-
			(0.088)	(0.088)		
Agriculture	-	-	-0.332*	-0.346	-	-
			(0.192)	(0.193)		
Medicine, Business, Manufacturing, Liberal arts and social sciences	-	-	Not significant	Not significant	-	-
Female	-	-	-0.057	0.062***	-	-
			(0.049)	(0.049)	-	-
Job help	-	-	0.200***	-	-	-
			(0.048)			
Help-resume	-	-	-	-0.015	-	-
				(0.065)		
Help-method	-	-	-	0.114	-	-
				(0.065)		
Help-interview	-	-	-	0.160**	-	-
				(0.070)		
Help-job fair	-	-	-	0.126***	-	-
				(0.046)		
Constant	-	-	-	0.852***	-	-
				(0.096)		
λ (inverse mills ratio)	-	-	0.300997	0.301183	-	-
			(0.029849)	(0.029550)		
R-squared	0.0543	0.0606	-	-	0.0611	-
LR test (ρ = 0)	-	-	Chi2(1)=10.26 Prob.=0.0014	Chi2(1)=12.01 Prob.=0.0005	-	-
Observations	7466	4884	5453	5453	4884	4884

No. in parenthesis show standard error, **, ***Indicate 5 and 1% significance level, respectively, Observations = 5453 (the Heckman selection model), censored obs. = 569, uncensored obs. = 4884

Finally, OLS values in columns 5 and 6 use different instrumental variables as ordinary variables to show whether these variables have significant impacts on wages. If these variables have no significant impacts on wages but have significant impacts on the selection equation, they are suitable as instrumental variables and an inverse Mills ratio is identified to overcome selection bias.

From the Heckman selection procedure in column 3 using one instrumental variable, the instrumental variable of help shows a significant effect on the selection equation, but no significant effect on wages in OLS of column 5 if no help is the omitted variable. The probability of $\rho = 0$ is 0.14%, which indicates that the selection equation can be considered a working equation. The Heckman selection procedure in column 4 shows that two instrumental variables, interview help and job fair help, have significant impacts on the selection equation. The coefficients of interview help and job fair help in the selection equation are 16.03 at 5% significance level and 12.57 at 1% significance level. Hence, interview help has the highest effect on employment. Meanwhile, resume help and method help have no significant impacts on the selection equation. However, resume help, method help, interview help and job fair help have no significant impacts on wages in the OLS of column 6 if no help is the omitted variable and the probability of $\rho = 0$ is 0.05%. These results reveal that there is a selection bias problem in the dataset. Furthermore, the probability of equality for coefficients in OLS (1), OLS (2), OLS (5) and OLS (6) is over 90% as revealed by the F-test. Given that instrumental variables do not affect wages significantly, they can be considered suitable additional variables in the Heckman selection procedure. Therefore, this study uses the Heckman selection procedure (4) with an inverse Mills ratio as a redressed wage equation, because version one has the lowest probability with 0.05% if testing $\rho = 0$.

Second, Heckman (4) shows that the reputed universities and regular university have more significant impacts on starting wage than the college. The starting wages of reputed university graduates are higher than those of university and the college. The university graduates' starting wages are more than those of the college graduates. Heckman (4) also indicates that if students graduate as liberal arts and social sciences majors, they will earn more than graduates of law, science, engineering, agriculture, medicine, business and manufacturing. Moreover, business graduates' first wages are higher than the graduates from science, engineering, agriculture, medicine, law and manufacturing majors. Engineering graduates earn more than the agriculture, medicine and science graduates. There are no

significant differences between the starting wages of the engineering and law graduates as well as starting wages between engineering and manufacturing graduates. Wages of science graduates are still higher than the earnings of agriculture and medicine graduates. Between agriculture and medicine graduates, there is no significant difference in wages. Therefore, the first wages of graduates in descending order can be presented as follows: liberal arts and social sciences>business> engineering or law>science>agriculture or medicine. The starting wages of manufacturing graduates have no significant difference from those of other major graduates except for business and liberal arts and social sciences. Finally, the male graduates earn more than female graduates and the wage gap is about 10%.

CONCLUSION

This study outlines the factors affecting unemployment spells experienced by graduates. We conclude that first, female graduates begin to work earlier, which is contrary to claims previous studies that male graduates find jobs more successfully in China. Second, graduates from colleges with better reputations are more successful in their job searches, particularly after graduation, which contradicts the finding of Zhou (2003) indicating that reputation only has a slight effect on searching for a job in China. Our finding, however, is consistent with the findings of studies conducted in other countries (Bradley and Nguyen, 2004). Finally, engineering and business graduates find jobs more easily and law and science graduates have more difficulties finding jobs. The regression outcome shows that reputation of universities, major and genders have significant impacts on the first starting wages of graduates. Graduates from universities with better reputations have the higher first wages, which supports not only Chinese research findings but also the opinions of majority of Western academics. The result does not support the claim that quality of college cannot lead to great payoffs, particularly initial wages. Second, the liberal arts and social sciences graduates have higher starting wages than other graduates. The amounts of first wages, arranged in descending order, are as following: liberal arts and social sciences>business>engineering or law> science>agriculture or medicine. The starting wages of manufacturing graduates have no significant differences compared with the starting wages of other graduates except for those of business and liberal arts and social sciences graduates. This conclusion is similar to previous studies in China but different from studies in Western countries, which indicate that engineering graduates have

the highest wages and the liberal arts and social sciences graduates have lower starting wages. In addition, female graduates earn less than male graduates, a result that is consistent to previous studies. Most female graduates study liberal arts and social sciences in universities, not because majors they choose belong to low-wage industries but because of gender discrimination in the labor market in China. Bad job expectations lead to females signing job contracts quickly; moreover, some have to change original majors to perform some low-wage jobs such as secretarial work. Finally, the reputation of universities, major and gender have different degrees of influence on starting wages. Coming from a college with a low reputation and being a graduate of certain majors, such as agriculture or medicine, have a greater negative impact on first job wage than other factors.

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