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Factors Affecting Employment and Unemployment for Fresh Graduates in China

Kong Jun

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Abstract

The factors such as college reputation, major, and gender, which affect job search prospects of graduates from Shandong Province in China, are studied. A duration model including parametric, semiparametric, and nonparametric approaches is used and yielded several important findings. First, graduates find jobs faster if they come from the research universities. The study shows that economics and management, and engineering graduates find jobs more easily. Other major graduates have no significant difference although they are not more likely to find jobs than the former. Moreover, there is no remarkable gap between female and male graduates.

Keywords: factor, employment, university graduates, major, gender, job search

1. Introduction

As new entrants enter labor market, large numbers of university graduates have been unemployed or underemployed for many years. This problem of unemployed university graduates has been exacerbated in China since the expansion of the higher education system in 1999. Most fresh graduates would like to pursue high wage jobs with a desirable working environment. This is critical for them to be successful further in their career development along the social ladder. There are many factors, such as college prestige, professional fields, and individual one or entire economic elements, which can influence job search, and students' starting wages. This chapter divides the factors affecting the young Chinese graduates into two separate categories. One category studies the effect of the reputation of college and the second category delves into two individual factors that are gender and the majors studied at college. This chapter aims to analyze the length of fresh graduates' unemployment spell

by a duration model including parametric survival approaches, semiparametric survival approaches, and nonparametric survival approaches. Meanwhile, factors' marginal effects are denoted through the base variables that defined in the two categories. The marginal effect analysis shows that reputation of college and majors such as economics and management, and engineering have significant effects on job search except for some majors. Meanwhile, gender has no significant effects on job search. The further test reveals that these factors' marginal effects are significantly different on university reputation and some majors.

There are different conclusions about these factors affecting job search in different countries. One paper about the graduates in England suggests that the reputation of a college has a significant effect on the graduates' job search [1]. As far as gender is concerned, Bratberg and Nilsen [2] present a logistic model that shows female graduates in Norway entering the labor market ahead of males. On the contrary, a similar study in China suggests that reputation has a slight effect on job search using logistic model [3]. Meanwhile, the graduates of certain majors such as law, computer science, and English education found it more difficult to secure jobs in China in 2008. Furthermore, the studies [3–5] indicate a different trend in China with the female graduates finding it more difficult to secure jobs. Kong and Fan [5] use a data from different regions where fresh graduates graduated from Beijing in 2007. We conduct a similar research but emphasize different aspects on fresh graduates' behavior on job search. First, the data are different. This study uses a Shandong data, and the previous study uses a Beijing data. We aim to find the different result regarding reputation, professional majors, and gender affecting job search. However, we apply the same methodology and modeling to cope with this issue. Second, the variables, for example, types of major fields, are different according to the regulation from Chinese Educational Ministry. We classify it into nine types of majors instead of previous eight. Finally, the result is different such as gender disparity shown significantly in previous study but no in the current study. It is shown that there is obviously a different conclusion.

In this chapter a duration model, which focuses on survival analysis has been applied to the factors that affect new graduate job search. Zhou [3] and Min et al. [4] have studied graduates' job search in China. These studies applied dispersed and nonrandom data of colleges. Hence, it is hard to predict the characteristics of whole regions precisely. On the contrary, this chapter uses random samples of universities from Shangdong province. Meanwhile, some different econometric techniques, for example, marginal analysis, are used to show the deep relations among the factors.

We obtain some interesting findings. First, research university students acquire job position more quickly than the other types of university, which is the same as predicted. Second, the majors of engineering and economics and management dominate initial labor market over other types of majors. The graduates from majors of engineering, economics and management find jobs most easily. Other majors have no significant effects on job search with each other, and there is no difference between engineering, and economics and management. Moreover, the female graduates have no significant difference from the males. Therefore, the conclusion is that the graduates from research universities with professional fields of engineering, and economics and management are given the more job chances.

Next section reviews the existing literature. The main factors involved in job search and wages are depicted in Section 3. Sections 4 and 5 offer data descriptions and summary statistics mainly on variables, respectively. Furthermore, the empirical econometric model is used, and estimation is shown in Section 6. The final section is the conclusion and discussion.

2. Literature review

This chapter reviews previous literature regarding factors that affect graduates' job search including prestige of school, professional major fields, gender, and some relevant elements, which are student's performance, internship, education level, etc., which are not crucial explained variables studied in the chapter because of inadequate sample observations. However, these old studies are still reviewed to understand the current study comprehensively. Meanwhile, a comparison from different countries is introduced to show the different conclusions.

Bradley and Nguyen [1] point out that the index of school quality has much larger effect than academic performance on the transition of school-to-labor in England. Li et al. [6] estimate that the gross return to attending elite colleges is as high as 10.7% once controlling for student ability, major, college location, individual characteristics, and family background in China. Macleod et al. [7] examine Colombian samples and found out that the college reputation, unlike years of schooling, is correlated with graduates' earnings growth because a college's reputation may denote the higher ability of its student body and the value added. However, Zhou [3] uses a sample involving thirty universities dispersed in different areas in China and presents that the prestige and quality of universities have only a small influence on graduates' job search. Barón [8] also believe that there are sizable differences in the probability of finding a formal job by area of knowledge and region, which can be as large as 20%, and no differences by university type and sex in the probability of finding a formal job in Colombian labor market.

Second, for major, the data from the online consulting firm MyCos demonstrates that it was very difficult for the graduates with bachelor degrees in law, computer science, and English education to find jobs in China in 2008. Freeman and Hirsch [9] demonstrate that the choice of college major is responsive to changes in the knowledge composition of jobs. Robst and VanGilder [10] find that economics majors earned higher wages, and mismatch had a smaller effect on wages for economics majors than business majors. Furthermore, for gender, Bratberg and Nilsen [2] use Norwegian data and find that females have lower reservation wages when entering the labor market (shorter search time and lower wages). Bradley and Nguyen [1] point out the males from high quality schools are less likely to enter the labor market and get jobs compared to the females in England. They are more likely to stay unemployed. Kunze and Troske [11] use survival functions show that displaced women take longer to find a new job than comparable men. Ng and Leung [12] reveal that women are likely to be hired because of linguistic advantages. Conversely, Zhou [3] reveals that male graduates find jobs more easily than female graduates in China. Min et al. [4] also show the percentage of male graduates signing job contracts is 77.1% as opposed to the female's figure of 71.2%. Other recent studies present the gender wage gap in China and find that there existed different reasons such as productivity, social customs,

paternalism, and discrimination [13, 14]. Moreover, Azmat et al. [15] find that gender gaps in unemployment rates have risen in the past 20 years in many European countries. In addition, career discontinuity such as rearing children in woman's working period causes a gender wage gap [16]. Finally, discrimination causes gender wage disparity in Refs. [17, 18].

In the United States, Sum et al. [19] attribute the higher unemployment rate to be due to inadequate educational attainment. Freeberg [20] reveals that the American high school graduates in the late 1960s were 30% more likely to be employed than dropouts. Wolpin [21] demonstrates a different result in America and argues that the higher reservation wage may lead to a longer time of job search. This result implies that the graduates may have a longer job-search time if they are from better reputation colleges, or they own higher education levels because they have a higher expectation for wages. Stern [22] shows that the college graduates accepted larger mean offers than that of dropouts during the same period. Dustmann [23] finds that class size of high school has a positive effect on employee's future wages. Jefferson [24] reveals that the lower the level of educational attainment, the more volatile the employment ratio.

Eckstein and Wolpin [25] find that differences in unemployment duration by race and schooling in United States are primarily due to differential rates at which job offers are accepted rather than to differential job offer probabilities. Bjorklund and Eriksson [26] study the case of the Nordic countries and indicate a lower unemployment rate for workers with high education than for those with low education. Bratberg and Nilsen [2] reveal that education has a positive effect on wages in Norway. Moreover, individuals have the longer first job-search time if they have a higher level of education. They also find that internships seem to decrease job-search time compared to the individuals at the same educational level but no internships.

Zhou [3] finds that it was easier for graduates with master degree to find job than for those with bachelor and doctor degree in China. Fang et al. [27] find that MIS (Master of Information System) students in America have adopted aggressive approaches such as double majors to secure employment. This shows more education and more training to enhance the success of employment. Spitz-Oener [28] demonstrates the more workers held a college degree from 8% in 1979 to 16% in 1999, whereas there is a significant decline in the proportion of employees without formal diploma in Germany. It is shown that more and more enterprises require employee who should have higher education attainments.

Finally, regarding the effect of graduates' college achievement on job finding, Jensen and Westergard-Nielsen [29] use the data collected in Denmark to indicate that the average grades have positive effect on the job search. Conversely, having had too many part-time jobs has negative effects. Bertschy et al. [30] illustrate that the compulsory education performances have no significant impact on the labor market transition. However, the students with the higher scores seem to need more vocational training and eventually become better job prospects in Switzerland.

The contribution of this study focuses on modeling and specific data. One the one hand, a survival model has been applied to the factors affecting graduate's job search. On the other hand, the sample data from whole region of Shangdong province is used to avoid the incorrect

prediction [2–4]. Second, this chapter adopts a data set, which covers all colleges in Beijing area in order to acquire an accurate regional trend that Refs. [3, 4] could not predict. Finally, this chapter also demonstrates the marginal effects of each factor disregarded in their studies.

3. The factors affecting the job search

Many factors affect how college graduates find jobs. First is the reputation of the college. Others include college's geographic position, and the assistance offered by the college career center. The higher the reputation of the college the higher is the possibility of a graduate finding a job. The process for such graduates is both easier and speedier because, the employers regard them as employees with greater potentials.

The geographic position also plays an important role in the job search. The graduates from metropolitan areas have many more opportunities to participate in job fairs to network and develop connections. According to the theory of job search in labor economics, one of characteristics of labor market is information asymmetry, namely, the employers do not know about the potential employees and the job searchers do not know who is recruiting. The advantages of living in big cities are that graduates have more chances to search for jobs through job fairs. These advantages overcome the disadvantage of information asymmetry of the labor market. Moreover, big firms need many new recruits when they expand through subsidiaries in big cities. Therefore, the graduates may have more opportunities than their counterparts from the hinterland. The third and final factor is college's career center. The career centers in the countryside may not be as efficient in helping students as the ones in big cities. Good career consulting includes résumé tips, interview tips, salary negotiation, internship, and so on. Such services are far more efficient in big urban centers.

Furthermore, individual factors such as the discipline of study, grade average, and gender also affect graduates' jobs hunting. About college, academic achievements the employer may regard the graduates with high scores as diligent and smart people who can perform better at work. As for the area of study, there are different employment success rates for different majors of study. The graduates from finance, engineering, and foreign languages secure offers very easily in China because of the rapid economic growth particularly in financial services and trade. As for the education level, there is no guarantee that possessing a higher degree will translate to a good job or a smoother search. Zhou [3] indicates that the graduates with master degree find jobs more easily than those with doctoral degree in China. For gender, there exists gender discrimination toward young female graduates in some firms in China. The thinking might be that young females marry and on pregnancy have maternity leaves of up to 3 months without any wage loss by law. Hence, these firms make many lame excuses to refuse young female graduates.

In addition, the employers often like to hire experienced graduates. They think of the graduate's internship as an important step in their training. Many may be hired simply because they have completed their internship successfully. Noncognitive skills too may help graduates find jobs. The rationale is that such graduates can integrate harmoniously with their job partners

because of their leadership skills. As to family background, no one can doubt its importance in China. The higher rank of an employee's family may represent the rich social resources conducive to business. Many firms make full use of *Guanxi*, a reciprocal relationship customary in China to deal with business. Finally, abilities such as driving a car, knowing a foreign language or mastery of programming software may play an important role in the job search.

4. Data description

The data provides information about college graduates' employment status including job search, wage, type of job and enterprise, personal background, and occupational skills in Shandong province in 2007. This chapter mainly analyzes college prestige, professional major field, and gender. The other factors, such as the cost of job search, reservation wage, internship, search time, and other personal status quo, have to be ignored because of inadequate sample observations. The original sample data needs to be adjusted and specialized to fit with the requirements of the survival model. Therefore, the data set has to be screened without any missing data, and left the available observations of 8938 for regression in **Table 2**. In addition, professional major fields can be compressed into nine categories from original different types in **Table 1** according to the classification of university majors that the Chinese Ministry of Education set up. We define the main variables as dummy variables.

Different types of colleges are used for analysis on the effect of prestige. This chapter classifies the types of colleges into research university, university, and colleges.

Second, **Table 1** shows that nine main types of majors cover economics and management, law, education, literature and arts, sociology, science, engineering, agriculture, and medicine. The major of economics and management includes economics, management, business, finance, etc. The major of law includes law, public security, jurisprudence, etc. The major of education includes education, physical education, etc. The major of literature and arts includes literature,

Major	Classification
Economics and Management	Economics, management, business, finance, etc.
Law	Law, public security, jurisprudence, etc.
Education	Education, physical education, etc.
Literature and Arts	Literature, arts, communication, etc.
Sociology	Philosophy, history, sociology, etc.
Science	Mathematics, physics, chemistry, biology, etc.
Engineering	Engineering in different fields, etc.
Agriculture	Agronomy, forestry, fishery, etc.
Medicine	Medical science, biochemistry and medicine, hygiene, etc.

Table 1. Major field classifications.

arts, communication, etc. The major of sociology includes philosophy, history, sociology, etc. The major of science includes mathematics, physics, chemistry, biology, etc. The major of engineering includes engineering in different fields such as electricity, transportation, civil engineering, and water conservancy. The major of agriculture includes agronomy, forestry, fishery, etc. The major of medicine includes medical science, biochemistry and medicine, hygiene, etc.

5. Summary statistics

Table 2 provides descriptive statistics on college type, major, gender, and average duration of unemployment. Regarding college type, employment level of research university reaches 84.56% of total figure of their graduates. The employment rates of other two types of universities are 86.17 and 86.77%, respectively. Furthermore, the major fields have to be combined into

College type	Numbers of the employed	Numbers of the unemployed and nonemployed	Total	Average duration
Research University	1068	195	1263	7.63 (3.58)
University	3415	548	3963	8.40 (3.88)
College	3221	491	3712	8.82 (4.22)
Total	7704	1234	8938	8.47 (4.01)
Major field				
Economics and Management	2430	362	2792	8.03 (3.99)
Law	261	54	315	9.32 (3.74)
Education	277	66	343	9.79 (4.35)
Literature and Arts	777	156	933	9.25 (3.93)
Sociology	30	14	44	9.94 (3.83)
Science	672	160	832	9.56 (3.71)
Engineering	2786	342	3128	8.35 (3.54)
Agriculture	191	27	218	9.33 (3.98)
Medicine	280	53	333	9.68 (3.75)
Total	7704	1234	8938	8.47 (4.01)
Gender				
Male	4730	668	5398	8.75 (3.73)
Female	2974	566	3540	8.79 (3.79)
Total	7704	1234	8938	8.47 (4.01)

Note: 8938 is the number of regression in duration model. The figures in parentheses refer to standard error.

Table 2. Numbers of observations and average duration of unemployment.

nine categories so as to, visualize simply and regress appropriately. Most employed graduates come from the majors of engineering, economics and management, literature and arts, and science. These figures are 2786, 2430, 777, and 672, respectively, of total employment figures at 7704. Mainly because there are many students graduating from these professional major fields each year. Moreover, the figure of employed female graduates is just 2974, which is greatly less than that of male graduates at 4730. The total unemployment figure for males is 668 compared to the figure for females at 566.

Further, the graduates from research university and university have a shorter average spell of unemployment, which are 7.63 and 8.40 months, compared to the figure of college, which is 8.82 months. From the view of professional major fields, the graduates from majors of economics and management, and engineering obtain shorter average duration of unemployment, which are 8.03 and 8.35 months, versus 9.94 and 9.79 months, respectively, from sociology and education. And then, the average spell of unemployment from medicine, science, agriculture, law, and literature and arts are in middle place. In addition, male graduates have a significant shorter average spell of unemployment, which is 8.75 months, compared to female's 8.79 months. Average spell of unemployment reflects average job-search time. It does not demonstrate marginal hazard rate of unemployment.

In addition, **Table 3** shows the percentage of the employed, the unemployed and the nonemployed. Among the figures, 86.19% of graduates obtain jobs covering all types of college, and 8.65% of graduates still searching for jobs. Others are preparing for graduate school tests and for overseas study, and have no immediate plans to search jobs. The number of percentage reaches 5.16%. **Table 4** demonstrates the figures and percentage of the employed, and the unemployed and nonemployed during the discrete unemployment duration. Most examples for employment take place during the 6, 7, and 8 months of the duration. The base time of survival model is at 6 months before graduation in the study mainly for convenience of calculation in software because some students have acquired jobs before graduation and worked for over 4 h each day according to definition of full-time job in the survey.

Type	Observations	Percentage (%)
Employment	7704	86.19
Unemployed, still looking for a job	773	8.65
Nonemployed, full time preparing for graduate school test	123	1.38
Nonemployed, preparing for oversea study	20	0.22
Nonemployed, no job search and no plan for graduate study	318	3.56
Total	8938	100%

Table 3. Numbers and percentage of employment, unemployment, and nonemployment.

Unemployment Spell (month)	Employment	Unemployment and nonemployment	Percentage (%) of employment
0	0	8938	0
1	62	8876	0.69
2	275	8601	3.08
3	256	8345	2.86
4	284	8061	3.18
5	318	7743	3.56
6	782	6961	8.75
7	1453	5508	16.26
8	1127	4381	12.61
9	615	3766	6.88
10	433	3333	4.84
11	391	2942	4.37
12	227	2715	3.66
13	217	2498	2.54
14	306	2192	3.42
15	602	1590	6.74
16	325	1265	3.64
17	31	1234	0.35
Total	7704		86.19%

Table 4. Numbers and percentage of employment, unemployment, and nonemployment in unemployment duration.

6. Empirical modeling and estimating

6.1. The empirical modeling

A survival model is designed to analyze the factors affecting the duration of the unemployment. The chapter uses three models, namely, parametric survival approaches (PSA), semiparametric survival approaches (SPSA), and nonparametric survival approaches (NPSA). PSA requires the unemployment duration with a standard distribution. PSA with a standard distribution is given as Eq. (1):

$$Ln(t) = \alpha + \beta_i X_i + \sigma \varepsilon_i \tag{1}$$

The unemployment duration, namely, t starts since 6 months before graduation. Some students have found jobs and worked for several months before graduation. The earliest time that graduates find jobs is 5 months before graduation in the data. This is similar to the previous

research with different data [5]. We set time 6 months before graduation as base time in order to run it in software that have mentioned the reasons.

Tables 3 and **4** reveal the maximum of unemployment duration is 17 months demonstrating that graduates find jobs within 11 months after graduation and the minimum is 1 month suggesting that the graduates find jobs at 5 months before graduation. Most graduates find jobs within 1 and 2 months after graduation or immediately after graduation with total percentage of 37.62%.

Moreover, SPSA and NSA are used to verify the result of the PSA because SPSA and NSA do not require a theoretical standard distribution of t. SPSA is the proportional hazard model (Cox regression) and NSA refers to the Kaplan-Meier survival function. The Cox regression is defined as following Eq. (2):

$$Ln\big[h(t)\big] \ = \ Ln\big[h_0(t)\big] + \beta_i X_i + \varepsilon_i \tag{2}$$

$h(t)$ is the hazard rate for failure (being employed is failure of unemployment) and $h_0(t)$ is base hazard rate. NSA is given as Eq. (3):

$$S(t) = \prod_{j=t_0}^{t}\Big\{(n_j - d_j)/n_j\Big\} \tag{3}$$

$S(t)$ is the survival function at time t, n_j is a total observation of graduates at time j, and d_j is the number of failures, namely, the employment numbers at time j. NSA is mainly used for an analysis of survival probability by visual diagram. This approach's advantage lies in that it does not require a standard distribution when it process data.

This chapter uses dummy variables dealing with the explanatory variables: for reputation, research university (best university registered by Ministry of Education, China), university, and college. Research university is taken as comparison variables, respectively, in the regression. Majors also are dummy variables. Engineering is regarded as comparison variables because of the most samples. Gender is also a dummy variable and male is comparison variable. Other variables are ignored to regress and put into error term. This chapter aims to analyze the main factors affecting graduates' job search. This cannot affect the unbiased results in regression.

6.2. Estimation results

PSA is used to analyze the factors that affect the duration of unemployment for the graduates. We confirm that Weibull regression is used to analyze what factors affecting unemployment duration by test.

Moreover, SPSA is used to analyze hazard rate to verify the result of PSA. The model does not require a standard distribution of unemployment duration. Through test, hazard rates of university prestige, major, and gender are not proportional in SPSA. The estimation is consistent with that of PSA. In addition, NPSA does not need a requirement of standard distribution for analysis of the unemployment duration or hazard rates of main factors.

This chapter applies diagram of the relative equation for showing the true hazard rates of main factors compared to the results from PSA and SPSA. **Diagrams 1–3** of NPSA reveal hazard rates of university prestige, major field, and gender are not proportional, respectively. It demonstrates that graduates from different types of college, or different majors, or different genders have different hazard rates. This result is consistent with that from PSA and SPSA.

The outcome of Weibull distribution from the parametric survival model shows the reputation of college, and some of majors except for economics and management, have a significant effect on unemployment spell at 1 or 5% level considering research university, engineering, and male as base variables in **Table 5**. However, gender has no significant effects between male and female. First, the universities will decrease the unemployment spell greatly. The hazard rate of university is 0.72, compared to 1, which is base figure for research university. This result shows the graduates from the type of university will find jobs slower than the research university graduates. The marginal analysis of effects in **Table 6** reveals that the figure for research university is about −1.04 based on college, which means that the graduates' unemployment spell will decrease 104% compared to that of the college. Meanwhile, the hazard rate of university is 0.82. This reveals the graduates from these universities will find jobs slower than the graduates from research universities. The marginal effect analysis indicates that the number of university is about −0.467, which means that the graduates' unemployment spell will decrease 46.7% compared to that of research university.
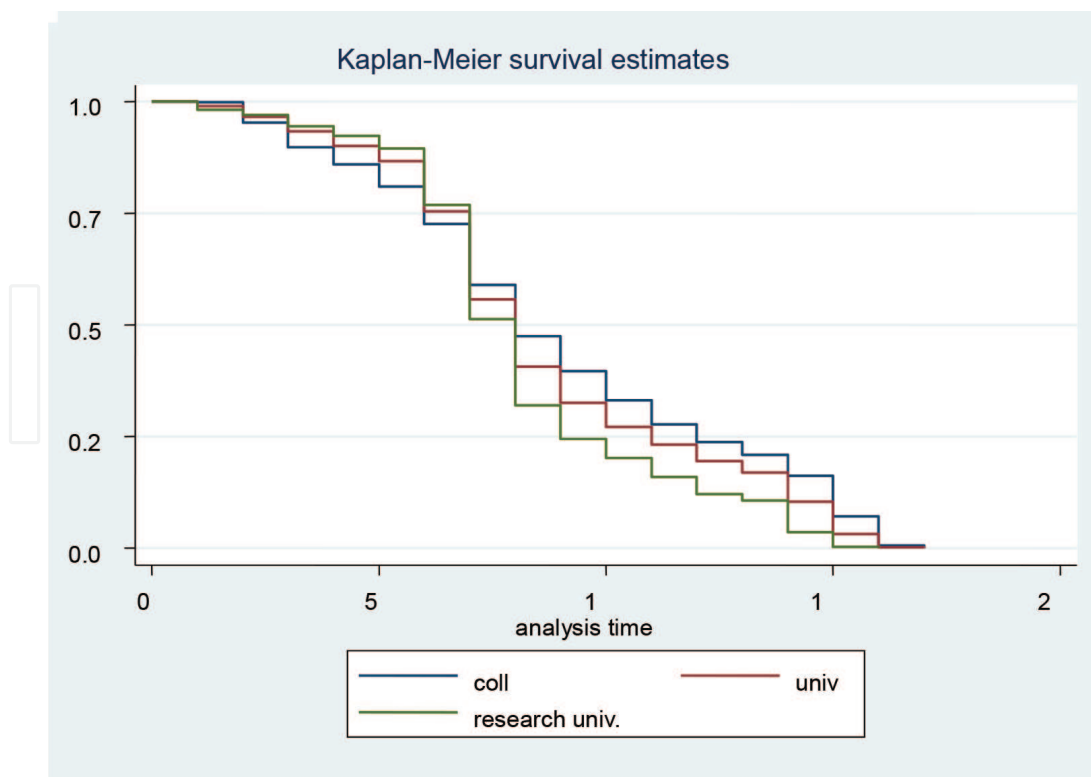

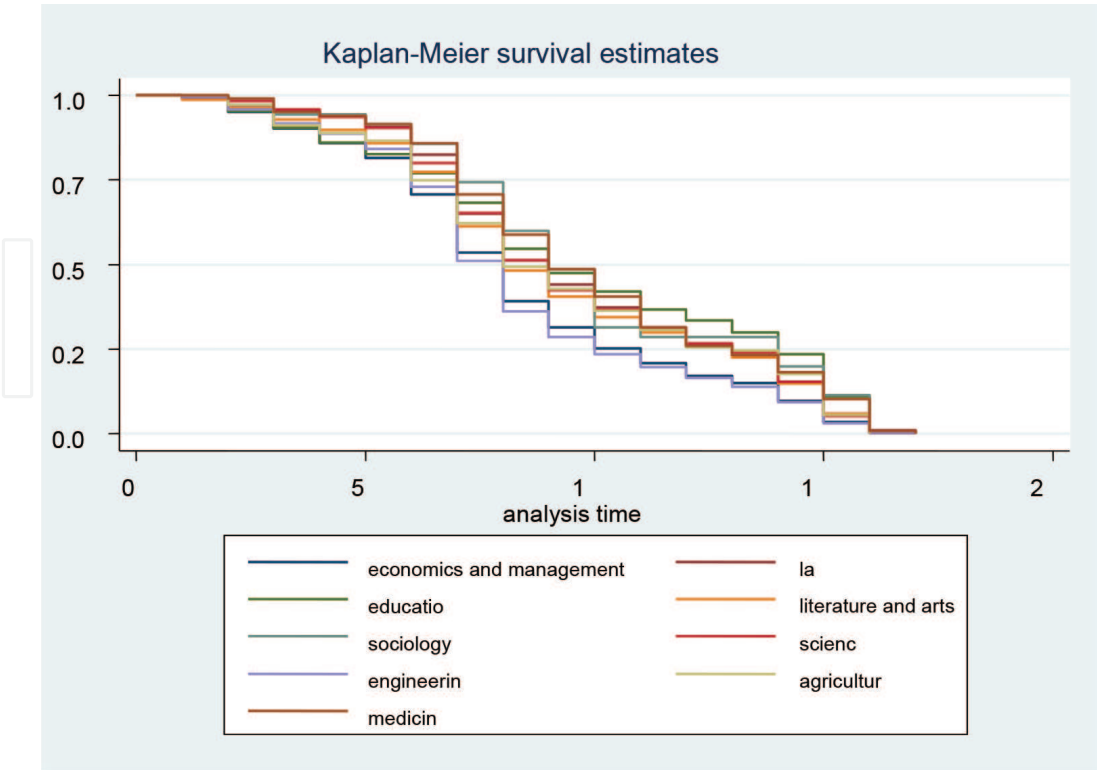**Diagram 1.** Kaplan-Meier survival estimates by college type.
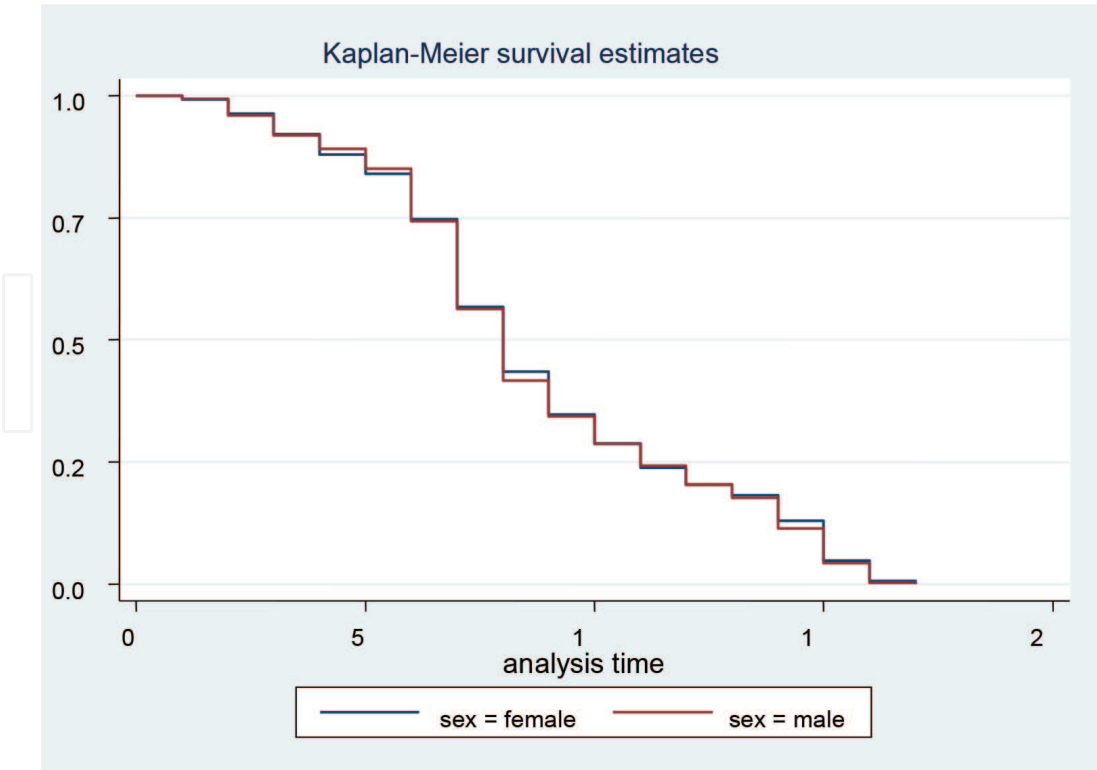
Diagram 2. Kaplan-Meier survival estimates by major.

Diagram 3. Kaplan-Meier survival estimates by gender.

Variables of unemployment spell	Haz. ratio	Std. err.	z	$P > |z|$	95% conf. interval	
College	.7218346	.0246061	−9.56	0.000	.6751834	.7717092
University	.8139593	.0272578	−6.15	0.000	.7622505	.8691759
Economics and management	.9736215	.02636	−0.99	0.323	.9233036	1.026682
Law	.7283889	.043767	−5.27	0.000	.6474657	.8194262
Education	.6977535	.0406666	−6.17	0.000	.6224323	.7821894
Literature and arts	.7687868	.0298767	−6.77	0.000	.7124041	.8296319
Sociology	.7096174	.1207914	−2.02	0.044	.5083144	.9906406
Science	.7280883	.0289676	−7.98	0.000	.6734701	.7871361
Agriculture	.7701218	.0544677	−3.69	0.000	.6704359	.8846298
Medicine	.7176544	.0419419	−5.68	0.000	.6399833	.8047521
Female graduates	.9831529	.0224904	−0.74	0.458	.9400462	1.028236
P	2.551769	.0215605			2.509859	2.594379

Note: comparison variables are research university, engineering, and male.

Table 5. Outcome of Weibull regression.

Second, the regression outcome for majors indicates that graduates will find jobs more easily if they come from majors of economics and management, and engineering, than the graduates from other majors at 1, 5, or 10% significant level. **Table 5** indicates the hazard rates for law, education, literature and arts, sociology, science, agriculture, and medicine are about 0.73, 0.70, 0.77, 0.71, 0.73, 0.77, and 0.72, respectively, compared to 1 for engineering graduates. The marginal effects of hazard rate in **Table 6** indicate that the unemployment spells will increase 112, 128, 91.6, 123, 112, 91.7, and 118%, respectively, for these graduates compared to graduates from engineering. If economics and management is regarded as the comparison variable, the graduates' unemployment spells for law, education, literature and arts, sociology, science, agriculture, and medicine will increase 103, 118, 81.9, 112, 102, 81.9, and 108%, on the contrary, engineering graduates have no significant difference from economics and management graduates, meanwhile, there are no significant difference among the graduates from law, education, literature and arts, sociology, science, agriculture, and medicine. Moreover, the female graduates have no significant difference from the males not only from the outcome of Weibull regression but also from marginal analysis.

From the analysis of SPSA in **Table 7**, the outcome is consistent with the one using the PSA. The hazard rates for university and college are 0.74 and 0.84, respectively, compared to 1, which is the number for the research university. This outcome shows the graduates find job faster if they are from research universities. The hazard rate for engineering graduates is

Base variable	Research university	University	College	Economics and management	Law	Education	Literature and arts	Sociology	Science	Engineering	Agriculture	Medicine	Male
Research university	–	.691*** (.113)	1.101*** (.116)	–	–	–	–	–	–	–	–	–	–
University	−668*** (.105)	–	.403*** (.079)	–	–	–	–	–	–	–	–	–	–
College	−1.04*** (.104)	−.467*** (.078)	–	–	–	–	–	–	–	–	–	–	–
Economics and management	–	–	–	–	1.03*** (.225)	1.18*** (.220)	.819*** (.139)	1.12* (.643)	1.02*** (.149)	–	.819*** (.259)	1.08*** (.218)	–
Law	–	–	–	−.950*** (.196)	–	–	–	–	–	−1.04*** (.196)	–	–	–
Education	–	–	–	−1.09*** (.186)	–	–	–	–	–	−1.18*** (.187)	–	–	–
Literature and arts	–	–	–	−.776*** (.125)	–	–	–	–	–	−.866*** (.126)	–	–	–
Sociology	–	–	–	−1.03*** (.544)	–	–	–	–	–	−1.12**(.545)	–	–	–
Science	–	–	–	−.951*** (.131)	–	–	–	–	–	−1.04*** (.129)	–	–	--
Engineering	–	–	–	–	1.12*** (.225)	1.28*** (.222)	.916*** (.141)	1.23* (.650)	1.12*** (.147)	–	.917*** (.260)	1.18*** (.220)	–
Agriculture	–	–	–	−.770*** (.229)	–	–	–	–	–	−.860*** (.230)	–	–	–
Medicine	–	–	–	−.997*** (.187)	–	–	–	–	–	−1.09*** (.188)	–	–	–
Female	–	–	–	–	–	–	–	–	–	–	–	–	.057 (.076)

Note: the numbers in parenthesis show standard error. * indicates 10% significant level, ** indicates 5% significant level, and *** indicates 1% significant level.

Table 6. Marginal effects of Weibull regression.

Variables of unemployment spell	Haz. ratio	Std. err.	z	$P > |z|$	95% conf. interval	
University	.7425758	.0254641	−8.68	0.000	.6943073	.7942
College	.8353303	.0280095	−5.37	0.000	.7821978	.892072
Economics and management	.9865729	.0267251	−0.50	0.618	.9355589	1.040368
Law	.7541106	.0453264	−4.70	0.000	.6703056	.8483933
Education	.719056	.0419562	−5.65	0.000	.6413513	.8061752
Literature and arts	.7975465	.031032	−5.81	0.000	.7389862	.8607473
Sociology	.7081013	.1205544	−2.03	0.043	.5071987	.9885818
Science	.7597542	.0302303	−6.91	0.000	.7027553	.8213762
Agriculture	.8000877	.0566046	−3.15	0.002	.6964931	.9190907
Medicine	.7249684	.0424137	−5.50	0.000	.6464282	.8130512
Female	1.007141	.0230615	0.31	0.756	.9629408	1.053371

Table 7. Outcome of regression by Cox proportional hazard model.

greater than most of majors at 1 or 5% except for economics and management. There are no different effects between engineering, and economics and management. The female graduates' hazard rate has no significant difference from the males.

Moreover, **Diagram 1** indicates the hazard rates for colleges with different types of college to be different from NPSA. If hazard rates are proportional to the one of, the different lines of hazard rate should be parallel one another. Obviously, these hazard rates are not proportional to the baseline hazard rate visually, namely, their hazard rates are different in each discrete unemployment duration. This implies that some graduates find jobs more quickly and some of them find jobs slower when they come from different types of college. Meanwhile, it is shown that the hazard rates for research university graduates are lower than the other colleges 0–4 months prior to graduation. However, the research university graduates are more successful in finding jobs after graduation.

In addition, **Diagram 2** indicates that the graduates with economics and management, and engineering degrees find jobs more quickly than the graduates from other majors in the all periods of job search. They find jobs faster after graduation particularly. It is difficult to distinguish other major graduates because some of them find jobs more quickly before graduation, and more slower after graduation. The line superimposes together. This results support the conclusion from Weibull regression and Cox proportional hazard model. Their hazard rates are also not proportional to the baseline hazard rate.

Finally, **Diagram 3** also shows that the hazard rates for different genders are not proportional to the baseline hazard rate. It is shown that female and male graduates have no significant difference.

7. Conclusion

This chapter tries to outline the factors affecting graduate unemployment spell. The research shows that graduates find jobs faster if they come from the research universities, because they have higher reputations compared to the universities and the colleges. The graduates of research university are more confident to their job searches. They may search jobs lately but more successful after graduation. Other graduates have to start searching jobs earlier and find jobs before graduation as far as possible. About major fields, the graduates with economics and management, and engineering degrees find jobs most easily. Other majors have no significant effects on hazard rates. In addition, the female and male graduates have no significant difference on job search.

It is therefore concluded that first, reputed university graduates begin to work earlier. This result is consistent to previous researches that the higher reputation denotes the higher human capitals, but is different from Zhou [3] studies that indicate that reputation only has slight effect on job search in China. Second, economics and management, and engineering graduates find jobs more easily, and this reflects the prosperity in labor market in China with the development of urban and economics. Finally, female and male are treated equally in the process of job search. This is different from previous researches that mention female suffers discrimination in China.

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