The 2022 International Conference on Financial Technology and Business Analysis
DOI: 10.54254/2754-1169/5/20220110

Whether the Mismatch between College Students' Employment Positions and Majors in Banking will Affect the Quality of Employment and the Salary Level

Xintong Tian[1,a,*]

[1]*Nanjing Foreign Language School, Nanjing, China, 210008*
a. gloriat0421@126.com
**corresponding author*

Abstract: This paper takes the two-way selection process of campus recruitment in commercial banks as the research object, using the Gale-Shapley algorithm, referred to as the "GS algorithm", to study whether the adaptation of college students' employment position and major will affect the employment quality and salary level. The conclusions are as follows: 1. The best job seekers are not necessarily in the highest-paid positions, and the worst-matched job seekers are not necessarily unable to find a job; 2. High-cost jobs are often difficult to match with the most qualified employees, and similarly if the medium-performance job seekers have higher requirements for the job, it is very difficult to find a suitable job; 3. Professional mismatch does not affect employment quality and salary level, but also depends on other factors such as job cost, the job seeker's personal utility preference, personal qualification, and so on.

Keywords: Gail-Shapley Algorithm, Quality of Employment, Salary Level, Major Mismatch

1. Introduction

According to data from the Ministry of Education, the number of graduates from ordinary colleges and universities has reached 10.76 million in 2022 [1], which is bound to increase the supply of the labor market. On the one hand, the employment pressure of college graduates comes from the gap between supply and demand, on the other hand, graduates are unable to find high-quality jobs that match their majors. For example, the results of the National Employment Survey of College graduates from the School of Education of Peking University show that about 1/3 of graduates did not match their jobs with their majors between 2005 and 2015 [2]. The proportions of 2017 junior college, undergraduate, and graduates of ordinary colleges and universities in Jiangsu Province engaged in jobs that are not related to their majors were 38.1%, 29.1% and 15.8%, respectively [3]. Domestic and foreign studies on the impact of major matching degree on employment quality and salary level present different views. A small number of scholars believe that major mismatches will not have a significant impact on starting salary [4], while most scholars believe that mismatch will lead to certain salary loss [5] [6] [7] [8]. This paper will study this issue from the perspective of supply and demand matching. The research conclusion has certain theoretical and practical significance: on the one hand, the paper combines the "GS algorithm" [9] with human capital demand model and the labor supply model [10] to find out how to achieve the optimal solution in the matching

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process, which provides a new idea for the study of professional matching degree affecting employment quality and wage level. On the other hand, the paper extends the "GS algorithm" to the analysis of the suitability of college students' employment posts and majors in the banking field. Because the model is set up in accordance with the actual situation of commercial bank recruitment, it can also provide a reasonable explanation for the employment mismatch in banking and other popular financial industries.

2. Model Setting

This paper will set up the human capital demand model from the recruiter's point of view, the labor supply model from the candidate's point of view, and the matching model between the two (the improved "GS" model), and follow the actual situation of commercial bank recruitment and set some recruitment restrictions.

2.1. Human Capital Demand Model

First, it is assumed that with the gradual refinement of the division of labor among departments and posts within the banking industry, commercial banks are more likely to recruit specialized talents rather than comprehensive talents, so banks will choose and recruit according to the candidates' various competences, rather than according to the comprehensive ability ranking.

Under the framework of human capital theory, education improves people's knowledge and skills, and learning a major increases people's professional knowledge and skills in this area. Therefore, the level of education and the degree of professional matching are the primary factors for enterprises to consider when recruiting, but they are not the only ones. In the case of the same level of education and professional matching, the applicant's professional qualifications (such as professional certificates, internship experience, etc.), as well as other personal abilities (such as teamwork and communication skills), will also be considered. The order of importance found in this paper is as follows:

Professional matching degree (including education level) > personal professional qualification ability > personal other abilities.

2.2. Labor Supply Model

The paper assumes that job seekers will maximize their personal utility by choosing reasonable salary levels and labor costs. Therefore, when choosing a job, the salary level is only one of the factors that determine the choice, and job seekers will also comprehensively consider the cost factors of the post, such as overtime, frequency of travel, technical difficulty of the post, and so on (all are called the cost of giving up leisure, referred to as "leisure cost"). As a result, according to the theory of the "backward bending labor supply curve" [11], when wages are low, job seekers are willing to pay more costs for higher-paying jobs, but when costs reach a certain level, no matter how high the wages are, they are unwilling to provide labor; that is, there is a maximum cost threshold for each labor force, which depends on the suppliers' preferences. In the follow-up model analysis, the representative job seekers will be given different preferences, and these preferences are ordinal.

2.3. Position Parameters

Combined with the above two models, this paper sets two important parameters for the position. One is the salary level. In commercial banks, there is a big gap in the salary level of different positions. According to the salary scale, from high to low there are a total of 6 positions for job seekers to choose from; each position employs 1 person; the second is the cost level. Generally speaking, the higher the salary, the more "leisure cost" needs to be invested, but this paper will set a special case

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and analyze the impact of this special case, which will test the labor supply function of job seekers. Finally, it is assumed that each job seeker can only choose two of the six positions for delivery, and if neither of the two positions is employed, the commercial bank will adjust the position and choose the most suitable vacancy to fill.

2.4. Matching Model

Follow the classic "GS algorithm", assuming that the satisfactory invitation will not be accepted immediately, but only temporarily retained and not rejected, that is, "delayed acceptance", which is consistent with the current campus recruitment model of most commercial banks. If the invitation must be decided immediately without delay, it is similar to the "social recruitment model". Finally, it is assumed that the labor matching market is a supply-side market, that is, the number of job seekers is greater than the number of posts, and the commercial banks will match and screen the job seekers for the first time after submitting their resumes.

3. Data Setting

This paper uses representative samples from the two dimensions of positions and job seekers to simplify the analysis process while also grasping the key characteristics of the problem. The basic settings are as follows:

$$S(A)> S(B)> S(C)> S(D)> S(E)>S(F)$$

3.1. Position Setting

Suppose a commercial bank recruits a total of 6 positions A, B, C, D, E and F on campus, and the Salary (referred to as“ S( )”) decreases in turn, namely:

$$S(A)> S(B)> S(C)> S(D)> S(E)>S(F)$$

In fact, these positions represent different links in the operation of commercial banks, and the ability of the post to create profits determines the size of the post salary.

$$C(A)> C(C)> C(B)> C(D)> C(E)>C(F)$$

At the same time, consider a nonlinear cost function, that is, the Cost (referred to as "C ( )") satisfies the following relationship (reasonable statement):

$$C(A)> C(C)> C(B)> C(D)> C(E)>C(F)$$

The nonlinear cost function means that some posts have a high cost but not necessarily the highest income. These posts (such as position C) have certain requirements for the utility function of job seekers, and they are not suitable for everyone.

3.2. Setting for Job Seekers

Suppose there are 8 job seekers (a, b, c, d, e, f, g, h), their professional matching (including education), personal professional qualifications, and other personal abilities meet the relationships shown in the following table:

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Table 1: Hypothetical conditions of posts and job seekers.

Post	Professional matching (including education)	Personal professional qualifications	Other personal abilities	Labor cost and personal affordability threshold
A	a=b>c>d>e>f>g>h	(a>b)>(c>d >e>f)>(h>g)	(a>b)>(c>d >e>f)>(h>g)	C(A)>C(a)>C(C) C(b)，C(d)> C(A) C(C)>C(c)>C(B) {C(e),C(f),C(g),C(h)} > C(A)
B	b=c>a>h>g>f>e>d			
C	c=d>b>a>h>g>f>e			
D	d=e>c>b>a>h>g>f			
E	e=f>d>c>b>a>h>g			
F	g=h>f>e>d>c>b>a			

The following instructions are made according to Table 1: 1. Assuming that the job seekers with a high correlation with high-paid jobs are high-performance job seekers, then an and b are high-performance job seekers; c, d, e, f are medium-performance job seekers; g, h are average-performance job seekers, and medium-performance job seekers account for the majority, which is in line with the actual situation. 2. In practice, there is no strict comparability between job seekers, so there are a lot of "=" relationships, but job seekers with equal professional matching may have a reversal in personal qualifications and other abilities. 3. High-performance job seekers pay more attention to the impact of job costs on personal utility, on the contrary, general or medium-performance job seekers will pay more attention to salary or job opportunities in order to obtain job opportunities. Therefore, generally speaking, the threshold of job cost of high-performance job seekers is lower than that of general or medium-performance job seekers. 4. Job seekers do not know the selection criteria of commercial banks, but understand the degree of match between themselves and the position, and it is impractical to choose too ambitious or significantly mismatched choices. So they only choose the two positions that are most suitable for them (for example, the top two in terms of matching), and there is no game between job seekers.

4. Matching and Result Analysis

According to the assumptions and the matching criteria of the GS algorithm, the following matching process takes place: in the first round, job seekers fill in two choices according to the position and their utility preferences, and the selection results are shown in Table 2; in the second round, after receiving all the choices, the commercial bank chooses one person for each position according to the factors of job seekers. In the third round, the position where no one is admitted is transferred according to the transfer list, and the job seeker decides whether to obey the transfer or not.

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Table 2: Delivery of voluntary submissions by job seekers.

Job seekers	Voluntary submissions	Interpretation
a	B>C	The cost of post A exceeds the threshold of a
b	A>B	
c	B>D	
d	C>D	d has a higher threshold
e	D>E	
f	E>F	
g	F>D	
h	F>D	

According to the analysis of the results in Table 2: the cost of post A exceeds the threshold of a, so a chooses B and C, and b chooses A and B.

Position C exceeds the threshold of c, and c is a medium-performance candidate, so c chooses B and D. d has a higher threshold, and d chooses C and D. e selected D and E. f selected E and F. g and h chose F and D according to relevant majors.

Table 3: Final selection results of the bank.

Posts	Selection results	Interpretation
A	b	
B	a	
C	d	d has a higher threshold
D	e	
E	f	
F	h	Other abilities of h are better than those of g

Table 3 shows the final selection results of the bank based on the delivery results in Table 2. According to the results of the simulation, it can be concluded that:

(1). The best job seeker may not be in the highest-paid position, which is the result of his personal choice, because the highest-paid job tends to pay higher "leisure costs", and he will choose the second highest-paid job. Job seekers with the worst matching are not necessarily unable to find a job, and job seekers may improve their personal qualifications because of poor matching, thus gaining opportunities for themselves, such as job seeker h.

(2). Some posts whose income is not the highest, but the post cost is very high. These posts are often difficult to recruit the most qualified employees through the degree of job matching, but are more likely to absorb people who are willing to bear the corresponding post costs. such as position C and job seeker d.

(3). Some job seekers fail to complete the match because although they have a high degree of matching with the position, they are eliminated from the corresponding position because of their poor

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personal qualifications and abilities, such as job seeker g; others because although the degree of job matching is high, they cannot afford the cost of the job, and cannot compete with other job seekers, such as job seeker c. Therefore, if the medium-performance job seekers have higher requirements for the job, it is very difficult to find a suitable job.

5. Conclusion

By setting the human capital demand model, the labor supply model, and the matching model between them (the improved "GS" model), and following the actual situation of commercial bank recruitment, this paper sets the restrictions of recruitment, and draws a conclusion: professional mismatch will not affect the employment quality and salary level, and the job seekers with the most matching positions may not be able to find a job, and instead of the most matching job seekers will get the corresponding job. On the one hand, because employees will consider the cost of labor and refuse to deliver the most matching positions, on the other hand, when selecting employees, banks will also consider other factors besides the degree of job matching.

In this paper, a relatively simple model is used to simulate the matching process of job search and employment. The model setting has some limitations, so it is impossible to make an accurate judgment on the more complex employment matching process. In the follow-up, the conditions of the model can be appropriately improved and relaxed. For example, the number of people recruited for each position on campus can be more than one, or some students can be hired on an exceptional basis due to their previous internship experience, etc. These factors can be used to extend the model in order to make the model's conclusions more realistic.

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