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Factors influencing promotion speed in young instructors' professional titles in Chinese universities: Case study of C University

Liu Xiaoyue * and Li Feiyu

Personnel Division, Central University of Finance and Economics, 100081, China.

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Abstract

The study examines professional title evaluation data from C University in China beginning with the reform of the academic representative work system. It uses logistic regression analysis to examine three factors for academic representative work and six factors for individual characteristics affecting how rapidly young instructors are promoted to vice-senior titles. We measure the degree of influence that these factors have on young instructors' receipt of promotion over the course of 3 years using model regression analysis. This study found that gender, age, and quality of academic works produced, as measured by the publishing journal's impact factor, are the key factors determining the promotion speed of young instructors. The higher the quality of the academic work is, the higher the promotion speed is. However, the influence of the academic representative work system is limited, and gender and age play a more significant role. Regression shows that male instructors exhibit higher promotion speed. Promotion speed decreases with age. In addition, increased teaching workload can slow promotion speed to a certain extent, while certain factors such as the level of internationalization and the form of academic work are not significant.

Keywords: Young Instructors; Promotion Speed; Influencing Factors; Academic Representative Works

1. Introduction

At present, the establishment of a scientific, fair, competitive, and merit-based instructor title promotion system having talent training as its core is a key element in the exploration of education reform in Chinese universities. In the assessment of outstanding instructors, we should not only pay attention to more than their introduction but also to their training. Their promotion to higher professional titles has always been part of the core system of evaluating and measuring the growth and development level of college instructors. For college instructors, whether they are able to accelerate the improvement of their academic ability and achieve promotion in their professional titles in a timely fashion not only affirms their professional ability but is also an important symbol of their career development. Here, the key question is "What factors affect the promotion speed of college instructors' with reference to their professional titles?"

Many studies have verified the influencing factors in academic promotions, including the number of published papers, the purpose of the promotion, gender, discipline, academic background, educational background, degree, and other directly observable externalities. For example, Graber M, Walde K, and Launov A [**Error! Reference source not found.**] performed a regression analysis on the promotion data for universities in Germany, Austria, and Switzerland in 1970–2006, finding that tenure depended on the professional age and published results of instructors. Glover [**Error! Reference source not found.**] conducted a study of the number of papers published by American university instructors promoted to senior titles from 1995 to 2003 and found a correlation between scientific research achievements and promotion. Gardner and Blackstone [**Error! Reference source not found.**] conducted a qualitative analysis of the promotion of 10 college instructors' professional titles at an American university and found a clear correlation between

* Corresponding author: Liu Xiaoyue

the timing of the promotion and its purpose. Box-Steffensmeier and Cunha [**Error! Reference source not found.**] examined gender differences relating to the promotion of social science instructors and pointed out that male college instructors were more likely to obtain tenure than their female counterparts. Relative to international studies, work done in China has tended to analyze the factors of human capital and social capital. For example, Zhong Yunhua [**Error! Reference source not found.**] investigated the importance and impact of social capital on the career development of college instructors relative to the perspective of learning relationships. Wang Chuanmin and Sun Yu [**Error! Reference source not found.**] studied the influence on the promotion time of professional titles of factors such as the level of the academic background, the level of the graduating institution, and whether the subject field is the dominant field of the institution. A review of the literature reveals that, while numerous scholars, both domestically and internationally, have conducted relevant research, only a handful have delved deeply into the factors influencing the promotion of professional titles among young instructors. This study, therefore, conducts a comprehensive review of the time and influencing factors necessary for young instructors to achieve the first step of promotion, taking the evaluation of vice-senior titles in Chinese universities as a starting point.

Beginning in 2017, according to the guidance of national policies such as "Streamline the government, delegate power, and improve government services" and "Breaking Five Only," a guiding policy for academic evaluation in Chinese universities that classifies the evaluation criteria to only papers, only hats, only titles, only academic qualifications, and only awards, Chinese universities have successively implemented reform of their professional title evaluation system, among which the most important measure is the academic representative work system; that is, in the evaluation of professional titles, the published high-level results can be combined with the characteristics of the discipline in relation to academic works published in establishing the scientific research ability of instructors. This system was implemented to reduce the long-term problem of simple quantitative academic evaluation, quantity over quality, and other reforms that have an important impact on the healthy development of the academic ecology in colleges and universities. However, through this process, there is also no shortage of doubt that it could bring back the "relationalism" and "special" problems in the evaluation of professional titles, along with concern that it will lead to new unfairness. However, at present, due to institutional differences, few relevant studies have been published outside of China, and those inside it have mainly been carried out using theoretical analysis. This is the reason that adding the factors affecting the academic representative work system to real-world tests of what causes instructors to get promoted is a useful research approach that can help standardize the use of academic representative work indicators. Likewise, it can enrich empirical data on the growth law of young instructors and deepen our understanding of the connotation of professional development for college instructors.

2. Research hypothesis

The representative work system is a specific series of rules, according to which instructors who independently participate in professional title evaluation provide a certain number of results of scientific research that can represent their own academic level and evaluate current achievements and academic contributions of an instructor mainly through peer review and on-campus expert review. This system no longer imposes rigid requirements on the quantity of scientific research results and tends to emphasize the quality and systematic nature of the results. Therefore, this study will be based on other scholars' related research with respect to the factors that affect the promotion of the professional titles of college instructors, combined with an analysis of the reform of the representative work system for the professional title review of University C to break down the main factors affecting whether young instructors can be promoted to vice-senior titles in a timely manner.

Before the implementation of the representative work system, the core indicator for the evaluation of professional titles at University C was quantitative scores for scientific research, involving assignments in multiple categories, such as books, papers, projects, awards, and authorships. Instructors lacked any opportunity for independent evaluation. Following the introduction of the masterpiece system, the quantitative requirements for scientific research results in professional title evaluations were greatly simplified, which liberated instructors from being hampered by quantitative indicators, allowing them to focus on teaching and research activities that will have long-term value. With the evaluation of professional titles, instructors will be more inclined to choose works of the highest quality and that are best representative of their academic level. However, because masterpieces are highly individualized, and quality evaluation cannot be standardized, the problem of value preferences remains. Thus, out of consideration for the objectivity, stability, cognitive bias, and workload of review experts in the evaluation of masterpieces, only a small number of representative works are allowed to be selected for review at this stage. Taking University C as an example, its instructors are required to select three to five published results as masterpieces, and the first three are sent for peer review, such that only the core masterpieces play a role in the review of professional titles. At the same time, as a complement, the professional title review committee, which is composed of experts working at the school, makes the final judgment on the results of the professional title review, based on the external characteristics of the masterpieces

and the needs of subject construction, talent echelon construction, and young instructor training orientation. The external characteristics of representative works include the academic status of the publishing medium, its academic professionalism, its citation index, its inclusion of professionals, etc. Generally speaking, the more prestigious a journal is, the more likely it is that the academic papers published in it will be of a higher academic level, such as in domestic and foreign journals with high impact factors, e.g., CSSCI, SCI, and EI. While many have made the criticism that this makes for a kind of blind journal worship, objectively speaking, it is more probable that a paper published in one of these journals is of higher quality than one published in an unknown journal [**Error! Reference source not found.**].

Thus, this study posits that the highest-quality masterpiece will contribute significantly more to the advancement of young instructors to vice-senior titles than a lower-quality one. The external characteristics of the masterpiece, specifically the journal's impact factor, are benchmarks for evaluating its quality. On the whole, universities and instructors value the ability to publish high-quality papers internationally, and most of the world's top journals that have significant international influence are based outside of China. Consequently, we propose the following two hypotheses:

Hypothesis 1: For vice-senior titles, the higher the quality of the instructor's core representative works, the faster the promotion of titles.

Hypothesis 2: Greater internationalization of an instructor's representative works is increases the promotion speed of professional titles.

Peer review is completed by experts who have attained a high academic level and a good reputation in their field. As disciplinary gatekeepers, using standardized working methods, they are entrusted with making correct judgments on various forms of scientific research. This is not necessarily objective, but this type of unstructured review is closer to the real state of scientific development. Therefore, peer review, as a core part of the work system of academia, effectively reflects the professionalism and fairness of academic evaluation and reflects the internal law of academic activities, adapting to different forms of scientific research; it has the tendency of openness and diversification. From these considerations, this study proposes another representative hypothesis:

Hypothesis 3: The form of an instructor's representative work has no effect on the promotion speed of professional titles.

3. Materials and Methods

3.1. Framework and model

Drawing on a literature review and inferred hypotheses, combined with C University's assessment regulations on instructors' teaching and research workload, the setting of their employment contract period, and the design of the professional title review system, this study summarized the factors that affected the promotion speed of young instructors' vice-senior titles into two types: the individual characteristics and the school system. These individual characteristics include gender, age, study abroad experience, party and government work, number of scientific research achievements, and teaching activity. All six factors have been found to be significant influencing factors in domestic and foreign research on the scientific research output and promotion time of university instructors [**Error! Reference source not found.**][**Error! Reference source not found.**][9][**Error! Reference source not found.**][**Error! Reference source not found.**][**Error! Reference source not found.**]. Therefore, in the model design, these individual characteristic influencing factors will be used as control variables. The influencing of the type of school system includes the representative quality factor, the representative internationalization-level factor, and the representative form factor, which constitute the core factors of the econometric model according to the hypothesis of this study. Figure 1 presents the analytical framework of the study.

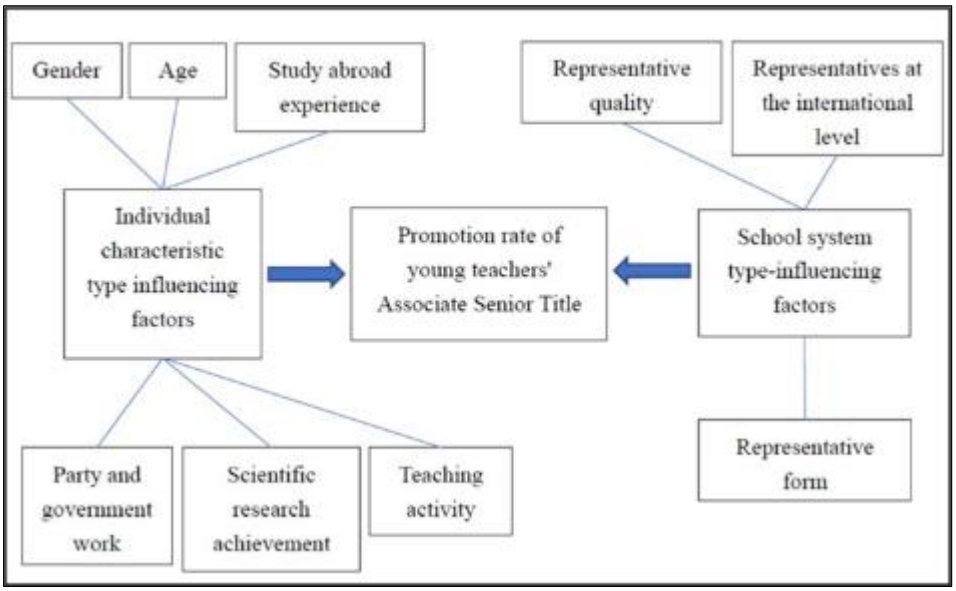

Figure 1 Analytical framework

Finally, drawing on the analytical framework and taking into account the setting of the employment period and the assessment period in the universities of the sample instructors, as well as the mitigation of endogeneity, this study constructs the explained variable as a binary virtual variable indicating whether the instructor obtains vice-senior titles within 3 years of entry into service and selects the logistic regression model with the expression as follows:

$$logit(P_i) = ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \sum_{i=1}^{9} \beta_i X_i + \mu \qquad \text{.....(1)}$$

where P_i is the probability that an instructor obtains a vice-senior title within 3 years after entry into service; $(P_i/1 - P_i)$ represents the odds, and $logit(P_i)$ gives the log-odds after taking the logarithm, for the logit conversion. In addition to the constant term β_0, the variables on the right side of the middle sign of the formula are three factors for school system and six factors for individual characteristics. β_i refers to the coefficient of the explanatory variables, meaning the contribution of the corresponding explanatory variables to the change in ratio, explained in detail in the variable design section given below.

3.2. Data specification

The data for this study are drawn from the job title evaluation materials of C University, a research university located in Beijing that focuses on economics and management. As of the end of December 2021, C University had 1,125 full-time instructors, of whom 359 had senior titles and 474 had vice-senior titles.

Following the 2017 reform of the professional title review with the representative work system as its main content, taking into account the inertia of the original system of the quantitative evaluation of scientific research, only the professional title review data from 2018 to 2021 are used here. To better investigate the influence of the representative work system on the promotion of young instructors' associate senior titles, interference factors, such as transfer from other universities, post-doctoral experience, subject differences, and academic background were excluded from consideration in the sample selection process. Therefore, of the instructors who were successfully promoted to associate senior titles in 2018–2021, 93 samples were selected for analysis according to the entry criteria for economics and management disciplines, teaching and research positions, lack of post-doctoral experience, and recent doctoral awardees.

This study adopts independent mixed cross-section data to increase its sample size, as each college and research institute independently completes the main aspects for the evaluation of vice-senior titles at C University over a period of 4 years. We assume that there will be no systematic difference in time and structure between 2018 and 2021, based on our investigation of changes in C University's personnel system, recruitment policy, orientation toward national policy over the past 4 years, uniform control over each college and research institute's evaluation rules, and mutual

reference among colleges and research institutes within the disciplines of economics and management. Simultaneously, no participant in the study intends to be promoted to a vice-senior title, which eliminates any self-selection bias.

3.3. Variable design

As noted earlier, a logistic regression model is used in this study to test the hypotheses. Thus, we set the explained variable to Promotion_3, which measures a young instructor's promotion to a vice-senior title within 3 years, using a binary dummy variable. If a promotion occurs within 3 years, we code it as 1, otherwise as 0. To measure the influence that the representative works of young instructors have on their promotion, variables that are related to the quality of representative works, the level of internationalization of these representative works, and the form of representative works were set according to the data of the representative works in the evaluation of professional titles at C University. We selected CRW_IF, the representative work with the highest impact factor in the publication carrier, as the core representative work for gauging the quality of young instructors' representative works. ARW_FP represents the proportion of representative works that have been published in international journals, measuring the level of the internationalization of the representative works. Investigation of peer-reviewed representative works submitted in the evaluation for vice-senior professional titles at C University, it was found that, with the exception of journal papers, most selected published books. The Therefore, we set the dummy variable PRW_T to test the influence of the form of the representative works: 1 indicates the presence of published books in the peer-reviewed representative works, and 0 indicates that all works are journal articles.

In addition, this study establishes individual characteristics type factors as control variables, specifically in gender, where male is coded 1 and female is coded 0; age (age), calculated based on the year of the instructor's successful promotion to a vice-senior title; overseas, where if a doctoral degree was earned overseas is 1 and 0 otherwise; PBS (branch secretary)—because young instructors are relatively inexperienced, they often serve as party secretary in the unit in many cases, and having served as the party secretary is indicated as 1, while not having served is marked as 0; P_amount, that is, the total number of published papers since the instructor obtained his or her intermediate title is used to measure the scientific research achievements; and T_amount (teaching workload), that is, the average teaching workload in the 3 years before the instructor participated in the evaluation of the vice-senior titles, is used to measure the input in teaching activities. Table 1 presents the measurement methods for the variables used in this study.

Table 1 Variables and measurement methods

Variable name	**Implication**	**Measurement method**
Explained variable		
Promotion_3	Achieve vice-senior title promotion within 3 years.	If promotion occurs within 3 years, the variable is coded 1 and 0 otherwise.
Core explanatory variable		
CRW_IF	Core representative published journal impact factor.	CNKI and Web of Science were used to query the impact factors of journals, and only the article having the highest impact factor of the publication venue was selected for testing.
ARW_FP	The proportion of representative works published in international journals.	Calculate the proportion of all entries published in international journals.
PRW_T	Selected published books for peer review.	If selected publications include a book, this variable is coded 1 and 0 otherwise,
Control variable		
Gender		Male are coded 1 and females 0
Age		The age when successfully promoted to vice-senior title
Overseas	Study abroad experience	Overseas doctoral degree is coded as "1"; otherwise, it is "0."
PBS	Experience as party branch secretary	Having served as party branch secretary after joining the company is encoded as 1 and 0 otherwise.

P_amount	Number of published papers	The total number of papers published since obtaining the intermediate title.
T_amount	Teaching workload	The average teaching workload of the 3 years before participating in the evaluation of vice-senior titles.

4. Results

4.1. Descriptive statistics

In the 93 samples obtained, the most rapid promotion to a vice-senior title was in 2 years, and 9 years was the longest period; on average, it took 4.3 years. Table 2 reports the descriptive statistical results for all explanatory variables in this study, where the explained variable Promotion_3 was divided into two groups with regard to whether the vice-senior titles were promoted within 3 years for comparison. The results indicate that 36 instructors in Group 2 were promoted within 3 years, while 57 instructors in Group 1 failed to be promoted. By comparison, the mean value and minimum value for the impact factors of the publications of the core representative works of instructors successfully promoted in the previous 3 years are higher, indicating that the higher-quality core representative works, led to faster the promotion of the professional titles. However, the two groups did not differ in their overall level of internationalization or in terms of the proportion of representative forms, with the exception that the instructors who received promotions more rapidly had a slightly greater likelihood of publishing papers in domestic journals.

Furthermore, according to the control variables, while the overall sample had a more balanced gender distribution ratio (44% male), in Group 2, more than 55% of male instructors were promoted within three years, compared with 36.8% in Group 1. However, the average age of instructors in Group 2 was also lower. The proportion of instructors with overseas study experience in Group was greater than that in Group 2, indicating that there was no obvious advantage to overseas returnees. The number of instructors serving who had served as secretary of the party organization department was very small, indicating that the influence obtained by this may be small. At the same time, it is worth noting that Group 2 had fewer total numbers of papers published by instructors, which may indicate that is not always the case that the more publications the better, being put aside in favor of and fewer better publications; Finally, relative to the perspective of investment in teaching activities, it can be seen that for the evaluation of vice-senior titles, the teaching workloads are probably only enough, and the average teaching workload for instructors is lower for those who have been promoted in the past 3 years.

Table 2 Main statistics for explanatory variables

Variable name	Sample size	Mean value	Standard deviation	Minimum value	Maximum value
Group one: *Promotion_3* = 0					
CRW_IF	57	6.557	4.344	0.686	20.79
ARW_FP	57	0.563	0.378	0	1
PRW_T	57	0.140	0.350	0	1
Gender	57	0.368	0.487	0	1
Age	57	34.84	2.827	31	43
Overseas	57	0.491	0.504	0	1
PBS	57	0.0877	0.285	0	1
P_amount	57	8.439	5.913	2	31
T_amount	57	82.79	21.56	34	125.5
Group two: *Promotion_3* = 1					
CRW_IF	36	10.25	5.527	2.009	20.79
ARW_FP	36	0.458	0.418	0	1
PRW_T	36	0.111	0.319	0	1

Gender	36	0.556	0.504	0	1
Age	36	32.06	2.151	28	37
Overseas	36	0.333	0.478	0	1
PBS	36	0.111	0.319	0	1
P_amount	36	7.250	3.636	3	17
T_amount	36	75.62	20.16	32	125

4.2. Regression analysis

Drawing on the preliminary discussion of the descriptive statistical results, all core explanatory variables and control variables must be included in the regression model to further systematically test the independent influence and contribution degree of various explanatory variables for the explained variables in the control conditions.

The regression results of a logistic model with 3 core explanatory variables were examined first. The results and effects of this regression are reported in Table 3, and it can be observed that CRW_IF, indicating the quality of representative works, is significant at the 1% level. In logistic regression, the specific meaning for the explanatory variable coefficient is the odds ratio of the prediction probability. Bearing this in mind, the coefficient shows that the odds ratio for young instructors' being promoted to vice-senior in 3 years increases by 1.164 for every 1 unit increase in the influence factor of the representative publication. This means that the occurrence ratio increases by 16.4%. At the same time, Table 3 also shows that ARW_FP and PRW_T were not significant, indicating that in the representative title system, the quality factor significantly affects the promotion speed of young instructors to vice-senior titles, and the number and form of representative titles that are published in international journals may simply increase the richness and flexibility of the representative titles.

However, Table 3 shows that relying solely on the core explanatory variables, following the research hypothesis, results in a poor fit for the model. The pseudo-r-squared (pseudo-coefficient of determination) is only 0.094, a low value for logistic model regression. This suggests that the model could lack explanatory variables, prompting this study to incorporate six control variables into the regression model.

Table 3 Logistic regression analysis without adding control variables

Promotion_3	**Coef.**	**St.Err**	**t-value**	**p-value**	**Sig.**
CRW_IF	1.164	0.061	2.89	0.004	***
ARW_FP	1.071	0.698	0.11	0.916	
PRW_T	0.965	0.676	−0.05	0.959	
_cons	0.177	0.126	−2.43	0.015	**
Mean dependent var	0.387	SD dependent var	0.490		
Pseudo r-squared	0.094	Number of obs	93.000		
Chi-square	11.695	Prob > chi2	0.009		
Akaike crit. (AIC)	120.447	Bayesian crit. (BIC)	130.578		
*** p < 0.01, ** p < 0.05, * p < 0.1					

Table 4 presents the results for the logistic regression analysis that examined the promotion of young instructors to vice-senior titles within 3 years, following the addition of control variables. The complete logistic model regression resulted in a pseudo-r-squared (pseudo determination coefficient) of 0.323, which significantly improved the goodness of fit. The likelihood ratio test results significantly improved the explanatory power of the model, demonstrating a strong statistical significance.

Table 4 Logistic regression analysis for adding control variables

Promotion_3	**Coef.**	**St.Err**	**t-value**	**p-value**	**Sig.**
CRW_IF	1.133	0.069	2.04	0.042	**
ARW_FP	1.659	1.571	0.54	0.593	
PRW_T	1.196	1.018	0.21	0.833	
Gender	3.660	2.163	2.19	0.028	**
Age	0.553	0.095	−3.46	0.001	***
Overseas	1.404	1.075	0.44	0.658	
PBS	1.149	1.046	0.15	0.879	
P_amount	0.964	0.061	−0.58	0.565	
T_amount	0.972	0.014	−1.93	0.053	*
_cons	3.80e+08	2.25e+09	3.33	0.001	***
Mean dependent var	0.387	SD dependent var	0.490		
Pseudo r-squared	0.323	Number of obs	93.000		
Chi-square	40.048	Prob > chi2	0.000		
Akaike crit. (AIC)	104.095	Bayesian crit. (BIC)	129.421		
*** p < 0.01, ** p < 0.05, * p < 0.1					

The results of the regression and influence effects for the explanatory variables that are reported in Table 4 show that the quality factor continues to play a significant role in time to promotion: At the 5% level, the CRW_IF, which indicates the quality of representative works, is significant, while the other two variables were nonsignificant. However, the significance of CRW_IF decreased, and the promotion occurrence ratio within 3 years also decreased, from 16.4% to 13.3%.

The results of the regression of the six newly added control variables are in alignment with the previously described descriptive statistical analysis. Gender and age had relatively high significance, at the 5% and 1% levels, respectively, and the teaching activity factor is also significant at the 10% level. The variable coefficient reveals that male young instructors have a greater advantage in promoting to vice-senior titles, resulting in a 266% higher promotion ratio in 3 years relative to female young instructors. Increasing age had a negative correlation with promotion speed. With each increase of 1 year in age, the ratio of promotion occurrence in the following 3 years decreases by 44.7%. Finally, there is a negative correlation between e speed of promotion and increase in teaching activities. This means that, for every unit increase in teaching workload, the occurrence of promotion in 3 years decreases by 2.8%, although this trend is not always evident.

With the above regression results, we can judge that the logistic regression model constructed in this study can better reflect the impact of the representative work system on the speed of young instructors' promotion to vice-senior titles as part of a reform of the title system. While the contribution degree of representative institutional factors to the probability of young instructors' promotion to vice-senior titles across the whole model is actually lower than that for individual characteristics, it also shows an interaction mechanism between the orientation of institutions and policies, individual efforts, and choice of strategy in the career development of young instructors.

5. Conclusion

For young instructors, timely promotion to vice-senior titles forms a new stage of career development, and the efficiency of academic resource acquisition and personal sense of value acquisition is greatly improved. The results of descriptive statistics and model regression indicate that this study has basically successfully verified the influence of the

representative work system and tested the influence of typical personal characteristics, according to which we can identify the following points.

5.1. Reform of the representative work system has had a significant impact on the time in which young instructors are promoted to vice-senior titles

To measure the relative quality of representative work, this study selected journals' impact factors as a measurement tool. The regression results validate hypothesis 1: for vice-senior titles, higher-quality core representative work leads to a more rapid promotion of professional titles. At C University, the decision-making power for professional title promotion lies with the professional title review committees at both the college and university levels. These committees found their decisions on the level of quality control of peer review. Therefore, for the competition for promotion competition process, the external quality characteristics of the representative work play a more significant role, inevitably influencing outcomes of the evaluation. This shows that the impact factor for published journals continues to have important reference value, especially in the process of horizontal comparison, and its objectivity makes it a good complement to the peer review system.

At first, the use of the journal impact factor was only an assessment of the influence of the journal, and the original intention was to use objective data, such as citation frequency, to better serve academic and practical goals, such as analyzing the law of dissemination of scientific research knowledge, while it was later directly used as a tool for the evaluation of scientific research. However, if we can reasonably apply this type of objective evaluation, it can serve as a crucial measurement index and, when combined with peer review, can enhance the effectiveness of the management decision making with respect to scientific research. We establish a comprehensive evaluation system for instructors by using both quality and quantity measures to identify the laws and characteristics of research activities while keeping scientificity and fairness in mind.

5.2. The representative work system has a limited effect on the speed and timing of promotion

The regression results for the model do not support hypothesis 2, which posits that an increase in the proportion of instructors' representative works published in international journals accelerates the promotion in professional titles. Hypothesis 3 is supported: that is, the form of instructors' representative work has no influence on the speed of promotion of professional titles, and the two judgments of one opposite and one positive also indicate that the influencing factors of the representative work system exhibit a limited contribution to the occurrence ratio of promotion of vice-senior titles within 3 years. The corresponding practical situation is as follows: national policies have abolished the quantitative research classification system, removed restrictive conditions on study abroad, and eliminated the mandatory requirement for internationalization. Meanwhile, academic policies strengthen guidance of the study of China issues, so the impact of the internationalization level of the representative works is not significant. While the professional title evaluation system provides a broad definition for the types and standards of representative work, this ambiguity could lead instructors to rely more on the general form of representative works, a practice that could potentially spark controversy. Between papers and published books, it is inevitable that papers make it easier to draw horizontal comparisons and evaluate them. For this reason, it is reasonable to assume that the representative form's influence factor is not significant.

From another perspective, the high-level pursuit of young instructors for the representative all-round is not necessarily the optimal solution for the evaluation for the vice-senior title level. While promotion to a vice-senior title is a significant step, it is only the beginning of a lengthy academic journey. To participate in the evaluation of senior titles over a few years, we need to accumulate more systematic and high-quality results. Thus, in promoting vice-senior titles, it is also necessary to consider the cost-effectiveness ratio for the writing, publication, and selection of representative works and to achieve a relatively high level of representative works so as to achieve the promotion of professional titles with relatively less time investment. Therefore, in terms of professional title evaluation strategy, the quantity, quality, internationalization level, and form of representative works of young instructors need to be systematically planned in combination with career development needs.

5.3. Attention should be paid to the influence of gender, age, and teaching activities on the promotion speed of young instructors

While the influence factors of personal characteristics are only adopted here as control variables, their significance cannot be ignored in the results of the regression analysis. Regarding the P-value, the significance is greater than the core explanatory variable, so it must be significant in reality. At the same time, while the factor of teaching activities was only significant at the 10% level, according to the reform orientation of the present title evaluation system, the state and the Ministry of Education has repeatedly stressed that all colleges and universities should strengthen their

evaluations of teaching quality, assess the teaching workload strictly, and improve the role of teaching performance in title evaluation. Further analysis of the effect of teaching workload on the promotion of young instructors to vice-senior titles has strong practical value and can also help to enhance our understanding of the shortcomings of the reform of the title evaluation system reform.

It is generally considered that male instructors are promoted more rapidly. Many studies have found that physiological conditions and the traditional division of social roles have an impact on academic career development. Due to their tendency to take responsibility for family life and raising children, female instructors tend to spend more time and energy in this sphere [**Error! Reference source not found.**]. Adaptability, flexibility, and work energy are all negatively affected by aging, so instructors who enter the profession at an older age tend to need more time to adapt to the new evaluation conditions. We found that the investment in teaching work can slow down the speed of promotion [**Error! Reference source not found.**]. This may be due to the fact that young instructors must manage numerous work and life responsibilities, which in turn influence the relationship between the energy input in teaching activities and scientific research. In the evaluation of professional titles, the output income of scientific research is indeed higher than the output income of teaching, so it is not surprising that this phenomenon will appear in the natural state [**Error! Reference source not found.**].

Overall, gender and age are classic and significant variables for studying the influencing factors of title promotions in instructors. Many scholars, both at home and abroad, have conducted a considerable degree of analysis on this and put forward several policy suggestions. The balance between teaching work and scientific research work is also a classic issue in higher education, so the results of this study have strong significance for C University, at least; that is, further institutional reform is needed to highlight the teaching ability and teaching performance of young instructors and, at the same time, make overall plans for the career development of instructors in combination with factors such as gender and age.

However, because the data analysis conducted in this study is based on the professional title evaluation materials from a single university, the study is limited by the size of the university, the level of research questions, the observability of the data, and the year of the system reform. In addition, only a small sample database of 93 instructors was selected, which indicates significant limitations in terms of sample size. At the same time, this does not exclude the unique influence of C University's disciplined construction system design. In addition, to increase the sample size, this study assumes that there are no systematic time and structure differences with respect to the evaluation of professional titles at C University in 2018–2021, but the truth of this supposition continues to need further data collection and testing. All of the index data that are used in this study are relatively open and objective. For the non-objective factors affecting the promotion of young instructors' vice-senior titles, such as the consideration of which year they chose to participate in the evaluation—these personalized factors could not be included in the model, affecting the goodness of fit of the model to some extent. Future research should focus on improving these areas.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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