

China's National Vocational Qualification Certificates and Their Impact
on Technical Workers' Skill Level, Job Performance and Earnings:
Evidence from Six Enterprises in the Manufacturing Industry

(draft)

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Abstract

China's Vocational Qualification and Certification System is an essential part of Chinese labor employment system, and has important influence in advancing workers' skills, promoting employment and deepening the market economic reforms. However, no empirical research has focused on this field yet. This is the first empirical study on the effects of China's Vocational Qualification and Certification System. Using the micro data from six manufacturing enterprises, we test the impact of different levels of national vocational qualification certificates on technical workers' skill level, job performance and earnings. The results show that national vocational qualification certificates are positively correlated with the skill level and job performance of technical workers, and the higher levels of the certificates are, the greater correlation coefficients are. We also found a significant positive relationship between vocational qualification certificates and the earnings of technical workers. The intermediate worker or lower level (Level4 and Level5) and the senior worker level (Level3) certificates can bring about 11% wage premium compared with those without a certificate, while which of the technician or higher level certificates (Level2 and Level1) improved significantly to 25%.

Key words

National vocational qualification certificates; technical workers; skill level; job performance; earnings

1. Introduction

Since 1993 when it was first introduced, after more than 10 years development, the vocational qualification certificate system has gained significant attentions in China. In the past years, the number of people participating in the certificates assessment increased rapidly. In year 2005, more than 10 million people participated in the vocational certificate assessment in China, of which 8.3 million got the vocational qualification certificates. By the end of year 2008, over 80 million people in China have got the vocational qualification certificates accumulatively, accounted for 1/3 of the total urban employment population. Therefore, vocational qualification certificates system are playing more and more important roles in China's economic development, labor market development and labor force skill development.

The national vocational qualification certificate system is an important mean to implement the strategy of "invigorating the country through science and education", but also a strategy for human resource development initiatives. The national vocational qualification certificate system will help to solve the problem of skilled worker shortage, accelerate industry upgrading and promote economic development in China.

From the view of labor market and employment enlargement, the core of the unemployment problem in China is the structural unemployment, rooted in the mismatching between job-seekers' skills and employers' demands. Different from academic certificates, vocational qualification certificates are designed based on skill units required by specific occupations. In recent years, the employment rate of Chinese university graduates has been decreasing, but the problem of skilled worker shortage still remains strong. Hence the vocational qualification certificates system can play an important role in structural unemployment problems.

Vocational qualification certificate has also been an important mean of human capital

investment that will bring substantial impact on the employability and earnings of individuals. In China, not only students in vocational schools, but also the unemployed and surplus rural labor force can participate in the skill assessments and get vocational qualification certificates after they receive corresponding training courses. In this sense, the vocational qualification certificate system has been an approach to improve the work quality of the labor force in China.

However, there is a surprising lack of empirical studies on China's national vocational qualification certificate system. No study has evaluated the effectiveness of this policy and its impact on labor market. In view of this, this study tries to answer three questions: (1) Can technical workers who own national vocational qualification certificates show higher level skills and better job performance than workers without a certificate? (2) Can national vocational qualification certificates influence the annual income of technical workers? (3) How national vocational qualification certificates influence workers' employability? At a micro level, these three questions are the premises of effective utilization of the national vocational qualification certificate system. If workers who own certificates cannot show higher skill and better performance in practice, the signal function of vocational qualification certificates would not be accepted by employers, and it will be impossible to improve the income and market position for the certificates owners. This may lead to failures in the promotion of the national vocational qualification certificate system.

The structure of this paper is arranged as follows. First, we introduce the general situation of China's national vocational qualification certificate system, and then a literature review on the studies of vocational education and qualification system. Secondly, we examined the relationships between different levels of vocational qualification certificates and the skill levels and job performance of technical workers. The results show that, compared with workers without professional qualification certificates, vocational certificates owners show higher skill levels and better job performance in workplace. The higher level the certificate is, the higher skill and better performance is. Thirdly, we examined the impact of different levels of certificates on earnings and employability of technical workers. Results show significant positive relationships between vocational qualification certificates and the earnings and employability of technical workers.

2. The development of national vocational qualifications in China

China's vocational qualification and certification system is an essential part of Chinese labor employment system, and also a special form of national examination system. It refers to fair, objective, scientific evaluation and assessment of workers' skill levels or vocational qualifications, and issues the qualified people corresponding national vocational certificates according to the vocational skill standards or qualification requirements established by the government. It is based on the vocational classification and standards, and conducted by assessment agencies approved by the government. Vocational qualifications and certificates manifest that the person has the abilities and knowledge needed to engage in corresponding vocations. It is one's warrants of applying, holding a post, and operating; critical reference for companies and other organizations to employ; and also valid certificates for overseas employments and external work—collaborating skill levels.

As early as the 1950s, China began to implement the worker skill level assessment system, known as "Eight Level Worker Skill System", which had run in state-owned enterprises for a long time. In 1990, Ministry of Labor published the *Worker Appraisal Regulation*. With the development of market economy reform, the original regulation could not meet the new requirements. During this time, vocational qualification system in other countries, especially

Britain's National Vocational Qualification (NVQ), were beginning to have an important impact on China, and relevant departments began to consider establishing China's national vocational qualification system.

In 1994, the Central Committee of CPC pointed out in the document, "decision on the issues of establish socialist market economic system", that to develop a variety of vocational qualification standards and hiring criteria, and implement two kinds of certificate systems, namely education diploma and vocational qualification. Subsequently, the Ministry of Labor constituted the corresponding *Vocational Skill Assessment Regulation* and *National Occupational Standards*, and the Ministry of Personnel constituted the *Provisional Means of Vocational Qualification and Certification System*, both of which were based on the *Vocational Qualification and Certification Regulation*. In 1999, the Occupational Classification Code promulgated 1838 kinds of occupations, which lay the foundation for the implementation of the vocational qualification certificate system in China.

China's vocational qualifications and certification institution stipulates: training and assessment take apart, and people can take part in the vocational qualification assessment voluntarily. Vocational skills assessment institutions are approved to establish by the labor security administrative department, which is a place of implementing the vocational skills assessment. These vocational skill assessment institutions include industry vocational skills assessment institutions, the large and medium-sized enterprises vocational skills assessment institutions, the technical school vocational skills assessment institutions, the local labor bureau vocational skills assessment institutions, and private training vocational skills assessment institutions.

China's vocational qualification training system is still in progressing. At present, a junior vocational qualification education network has shaped, which includes technique colleges (senior vestibule school), vestibule school, occupational training center, companies' worker training center and vocational training agencies held by community.

1) The junior vocational qualification training is mostly assumed by occupational training centers, middle professional schools, occupational high schools and some vocational training agencies approved by county's labor and social security administrative departments.

2) The intermediate vocational qualification training is mostly provided by occupational training centers, vestibule schools and such agencies approved by the provincial labor and social security administrative departments as middle professional schools, occupational high schools, occupational training centers, worker training centers in enterprise and some vocational training institutes held by community.

3) The senior vocational qualification training is provided by the technique colleges (senior vestibule school) and senior technical workers training centers approved by the provincial labor and social security administrative departments.

4) The technician and senior technicians' training are provided by technician schools or enterprise through on-the-job training.

In China, the way to get vocational qualification certificates is diverse. Students in technical secondary school, vocational school could participate in vocational skills assessment and get primary or intermediate vocational qualification certificates before graduation. The trainees of some government-funded skill training projects for unemployment urban people or surplus rural labor force can take part in vocational skills assessment and obtain the corresponding certificates after training. Some companies also organize their on-job workers to receive vocational

qualifications trainings and obtain corresponding qualification certificates. Workers themselves can also volunteer to take relevant training courses and participate in vocational skills assessment.

As NVQ system in Britain, China's vocational qualification certificates include five levels: primary worker certificate (National Vocational Qualifications Level 5), intermediate worker certificate (National Vocational Qualifications Level 4), advanced worker certificate (National Vocational Qualifications Level 3), technician certificate (National Vocational Qualifications Level 2) and senior technician certificate (National Vocational Qualifications Level 1). Vocational qualification identification includes knowledge examination and operational skills assessment. The knowledge examination generally uses the form of written examination, while the skill assessment generally uses on-site operation or simulation operation.

After more than ten years development, China's national vocational qualification certificate system has made significant achievements. In the "Tenth Five-Year" period, the annual average growth rate of people participating in the vocational qualification assessment was more than 10%. Since 2005, there have been more than 10 million people each year participating in the vocational qualification assessment. In 2006, there were 11.82 million people participating in vocational skills identification, of which 9.25 million people have obtained the corresponding vocational qualification certificates. By the November of year 2008, over 80 million people in China have got the vocational qualification certificates accumulatively, accounted for 1/3 of the total urban employees.

Table1 shows the number of people participating in the vocational qualification identification and the number of obtaining vocational qualification certificates from 1996 to 2008.

Table 1 the number of people participating in vocational qualification certificate from 1996 to 2003

Year	1996	1997	1998	1999	2000	2001	2002	2003
Participating number	2.69	3.14	3.19	3.8	4.42	5.35	6.62	6.88
Qualified number	2.15	2.79	2.6	3.14	3.73	4.57	5.56	5.84
Year	2004	2005	2006	2007	2008			
Participating number	8.80	10.00	11.82	12.23	13.37			
Qualified number	7.36	8.30	9.25	9.96	11.32			

(Unit: million people)

3. Literature Review

Most studies about vocational education and vocational qualification were conducted in developed countries such as America, Britain, Australia and the like. In these countries, vocational education and vocational qualification system is more complete.

Kang and Bishop (1989) find that vocational courses increase wages for men, through their research done in America. On the other hand, Mane (1999) compares the short- and medium-run returns to vocational course taking for students who graduated from high school in 1972, 1980, and 1992, and finds that these returns grew much higher after the 1970s. Bishop and Mane (2004) examine literature on the effects of secondary vocational education and find evidence that this return has been growing, possibly because "the skill needs of business were growing and shifting very rapidly during the 1980s and 1990s," and because this type of education has become more effective.

Ryan and Chris (2002) examined the individual results to vocational education and training qualifications (VET) and the implications for lifelong learning by analyzing data from Australia's 1997 Survey of Education and Training. The following were some key conclusions: individuals who complete VET qualifications generally receive higher wages than similar individuals who do not complete VET; the wage effects of completing VET qualifications are higher for males than for females; wages vary by VET qualification level; VET qualifications provide continuing benefit to individuals throughout their careers; VET study that does not lead to a qualification may have little effect on wages; returns to VET qualifications are highest for those who work full time and study part time, while undertaking their course; and lifelong learners who work full time and study part time enjoy modest, positive returns for further VET qualifications.

British scholars have conducted some studies on National Vocational Qualification (NVQ), finding that there was a positive correlation between vocational qualifications and employee self-perception skill levels. But they did not find some correlations between vocational qualification and employees' wages levels. Robinson (1997) has compared the returns of academic education and vocational education. Using data on individuals' highest qualifications, the research found that the returns to academic qualifications are significantly higher than the returns to vocational qualifications at an "equivalent" NVQ level. For example, the earnings of men whose highest qualification is an "other" HE degree qualification are on average 16% higher than the earning of men with notionally equivalent qualifications at HND/HNC standard, though both of these are assigned the same level in the National Qualifications framework. For females the corresponding difference is 23%.

Neuman and Ziderman (1999) used data from Israel in their research, and stated that in general vocational education does not lead to higher wages compared to academic education. However, in some countries where labor markets are characterized by employment growth, skill shortages and a good match between vocational skills and available jobs, the record of vocational schooling has been more positive. However, Dearden (1999) suggests that ability or family background may have some influences over getting some academic qualifications. And while there are generally well-established qualification routes to most academic qualifications, this is much less so for vocational qualifications.

Lorraine Dearden, Steven McIntosh, Michal Myck and Anna Vignoles (2000) have assessed the influences of different vocational qualifications to the returns. At "equivalent" levels, the returns to academic qualifications are higher than vocational qualifications. With respect to academic qualifications, women tend to earn a higher return than men do, particularly to degrees. For vocational qualifications, men and women earn their highest returns with different types of qualifications. The vocational qualifications with the highest returns for men are HNC/HNDs, ONC/ONDs and higher level City and Guilds qualifications. For women, the vocational qualifications with the highest returns are teaching and nursing qualifications.

Joshua D. Hawley (2003) also points out, in his report, that the private returns to both vocational and academic secondary educational credentials fluctuate over time, suggesting that the benefits of completing a vocational credential depend on the economic conditions present at the time. This finding suggests that individuals might profit from both academic and vocational training, giving them the skills to succeed in employment that requires specific skills as well as jobs that requires specific skills as well as jobs that include general skills taught most often in academic programs.

To conclude the study abroad, there are some basic conclusions as following. Both vocational qualification and academic qualification can bring benefits to employees' wages and career developments. There are obvious differences between men and women about the returns of vocational education and vocational qualification. When compared to academic education, there is no certain conclusion about whose return is much higher, but generally speaking, most scholars argue that the return of academic education is higher than that of vocational education at equivalent level. And at last, the returns of vocational education and qualification are decided by the economic environment and labor market condition.

Most Chinese domestic literatures are introductory and giving a qualitative analysis, what's more, they focus on summarizing the problems of vocational qualification system, and making some suggestions. However, we don't have empirical research on the impact of vocational qualification to employees' practical work skills, wages, career developments and other aspects. Therefore, there is an emergency to have some empirical findings to support the conclusion.

4. Data and Methodology

4.1 Description of data and sample

Since there is no nationwide survey data available, we conducted the survey in six manufacturing enterprises during April to May 2009, of which, one locates in Henan Province, others locate in Beijing. The reason why we choose manufacturing enterprises is that manufacturing industry plays a decisive role in Chinese economic development and absorbed a majority of China's labor force. Another reason is that the vocational qualification certificates in manufacturing industry are relatively concentrated and stable. In this research, the vocational qualification certificates obtained by sample workers mainly concentrate on locksmith, lathe worker, grinder, miller, heat treatment operator, electrician, and other few types.

The survey is conducted in 22 production workshops of the six enterprises, involving 1211 workers. With the help of human resources departments of the six enterprises, we firstly obtain the related information of sample workers from the employees muster rolls and the personnel information systems, including gender, age, work experience, Hukou, the latest performance evaluation results, annual total cash income (including wages, allowances, bonuses and other monetary remuneration), and so on. In the second step, the sample workers fill out our questionnaire. The questionnaire includes items on vocational qualification certificates, for example, whether they have job related vocational qualification certificates, the highest level of their vocational qualification certificates, the perception of their employability and career development opportunities, etc.. In the third step, the supervisors of each workshop evaluate the actual skill levels of these workers in a five grade measure.

Through the above steps, there were 1007 workers with the basic complete information. The average age is 33.5 years with the youngest 19-year-old and the oldest 59-year-old. The average work experience is 13.9 years with the minimum length 1 year and the maximum length 42 years. With regard to gender, men accounted for 76%, women accounted for 24%. About the degree education, junior middle school or lower accounted for 13.6% (only one worker is primary school education), general high school, vocational high school, secondary and technical schools accounted for 64.5%, junior college degree accounted for 19.9%, university degree accounted for 1.9%. About the national vocational qualification certificates, 15.9% without a vocational qualification certificate, 14.7% with primary worker certificate (National Vocational Qualifications

Level 5) as the highest level, 26.5% with intermediate worker certificate(National Vocational Qualifications Level 4) as the highest level, 31.4% with the advanced worker certificate(National Vocational Qualifications Level 3) as the highest level, 9.5% with the technician certificate(National Vocational Qualifications Level 2) as the highest level, 1.9% with the senior technician certificate(National Vocational Qualifications Level 1) as the highest level.

However, only four enterprises are willing to provide us all the compensation data of the sample workers. Therefore, there are 694 observations with annual income data.

4.2 Variables selected

In this study, independent variables are different levels of national vocational qualification certificates. Due to the small size of our sample, we recode the five level certificates into three levels using three dummy variables: intermediate worker certificate or lower, advanced worker certificate, technician certificate or higher. The outcome variables of vocational qualification certificates include skill levels, job performance and the the nature logarithm of annual earnings.

Because worker samples are from six enterprises, the different characteristics of the six enterprises, such as location, human resources policies, may affect the predict variables as well as the outcome variables. Therefore, we use dummy variables to represent different enterprises as control variables. Gender may affect the possibility for workers to get certain certificates as well as their skill level, job performance and incomes, so gender is used as a control variable. Education degree may also affect the dependent and independent variables, therefore, we use dummy variable to control different education degrees. Many studies have revealed that work experience is an important variable that will affect the workers getting vocational qualification certificates, and will also affect the skill level, job performance and wage of workers. Studies also show that the income of workers increased with work experience first and then a downward trend, thus we put the square of work experience as a control variable too. In addition, the China-specific variable “Hukou” was taken as a control variable. Table 2 shows the names, definitions and descriptive statistics of all variables.

Table 2 description of variables

Variable name	Definition	Mean	S. D.	N
Skill levels	Evaluated by workshop supervisor, from lowest 1 to highest 5	3.950	.853	1007
Job performance	=1, unqualified; =2, qualified; =3, good; =4, outstanding	2.952	.797	962
Annual earnings	The total cash income, including wage, allowance, and bonus	27669.897	8377.768	694
Ln (earnings)	The nature logarithm of annual earnings	10.180	.307	694
Firm1	=1, enterprise A; =0, others	.108	.311	1007
Firm2	=1, enterprise B; =0, others	.194	.395	1007
Firm3	=1, enterprise C; =0, others	.194	.395	1007
Firm4	=1, enterprise D; =0, others	.126	.332	1007
Firm5	=1, enterprise E; =0, others	.085	.280	1007
Firm6	=1, enterprise F; =0, others	.293	.455	1007

Gender	=1, Male; =0, Female	.767	.423	969
Expe	The year of work experience	13.860	9.741	981
Expe ²	The square of work experience	286.899	334.344	981
Hukou	=1, Local; =0, Immigrant	.829	.376	955
Edu1	=1, junior middle school or lower; =0, others	.137	.344	956
Edu2	=1, general high school, professional high school, secondary and technical schools or other similar education; =0, others	.647	.478	956
Edu3	=1, junior college or higher degree; =0, others	.215	.411	956
L0	=1, without a certificate; =0, others	.159	.366	922
L5/4	=1, secondary or primary worker certificates; =0, others	.413	.493	922
L3	=1, advance worker certificate; =0, others	.312	.464	922
L2/1	=1, technician or senior technician; =0, others	.115	.319	922

4.3 Estimation model

The most commonly used empirical estimation for the human capital model is based on the functional form of the Mincer (1974) earnings equation: $\log W_i = \alpha + \beta \text{edu}_i + \gamma X_i + \varepsilon_i$

Where:

W_i is a measure of hourly wages for an individual i , edu_i represents the measure of individual i 's schooling or educational attainment, X_i is a vector of other variables such as gender, marital status, work experience and its square items, location, industry, training and other personal characteristics that are assumed to affect earnings, and ε_i is a disturbance term which is assumed to be independent of edu_i and X_i .

In our study, the main purpose is to analyze the outcomes of vocational qualification certificates, therefore, the estimation equation can be changed into the below one:

$$\log W_i = \alpha + \beta_1 \text{AQ}_i + \beta_2 \text{VQ}_i + \gamma X_i + \varepsilon_i$$

Where, AQ is a vector of dummy variables identifying academic qualifications, VQ is a vector of dummy variables identifying vocational qualification certificates, and other variables have the same definitions as those in Mincer (1974) earnings equation.

Although this the original purpose of this equation is to estimate the economic returns to education, we argue that this model can also be used to test the impact of vocational qualification certificates on workers' skill levels and job performance. From a micro perspective, the reason why an individual obtain a higher return from the employer is because of his higher level of skills and job performance. Therefore, we also do regressions of the skill levels and job performance based on this model.

5. Results

We first test the relationships between different levels of certificates and workers' skill levels in Model 1. Results show that dummy variable Male was positively correlated with skill level significantly, indicating that men are more likely to have higher skill levels than women in the manufacturing industry. Work experience was significantly positively correlated to skill levels while the square of work experience was significantly negatively correlated to skill levels, indicating that skill levels of workers increase first with the length of work experience and then showed a downward trend. This trend is consistent with the assumed trends in workers' personal income. Dummy variables Edu2 and Edu3 were not significantly correlated with skill levels, indicating that compared with junior middle school education, further education did not contribute to improve skill levels for technical workers. There are strong positive relationships between different levels of vocational qualification certificates and skill levels. Compared with workers without vocational certificates, intermediate worker certificate or lower (National Vocational Qualifications Level 4 and 5), advance worker certificates (National Vocational Qualifications Level 3), and technician certificate or higher (National Vocational Qualifications Level 2 and 1) contribute to improve the skill levels of workers significantly, with the coefficient 0.263 ($p < 0.01$), 0.466 ($p < 0.01$), 0.663 ($p < 0.01$) respectively.

Table 3 Regression on skill levels and job performance

	Model1: Skill level		Model2: Job performance	
	Coeff.	(S. E.)	Coeff.	(S. E.)
常数	3.156***	.132	2.950***	.128
Firm2	-.385***	.103	-.643***	.094
Firm3	.538***	.105	-.792***	.096
Firm4	.393***	.107	.391***	.099
Firm5	.138	.126	.214	.137
Firm6	.197**	.097	.197**	.089
Male	.119*	.062	-.096	.058
Work expe	.051***	.011	.025**	.010
(Work expe) ²	-.001***	.000	-.001***	.000
Local Hukou	-.096	.077	-.041	.074
Edu2	-.041	.083	-.091	.078
Edu3	-.024	.097	-.133	.090
L5/4	.263***	.075	.106	.070
L3	.466***	.086	.405***	.080
L2/1	.663***	.109	.581***	.102
F	30.853		39.256	
R2	0.343		0.409	
N	843		809	

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; the omitted benchmark firm is Firm1; the omitted benchmark education is edu1, the omitted benchmark certificate is L0.

In model 2, we tested the relationships between vocational qualification certificates and workers' job performance. Results show there is no significant correlation between gender and job performance. The work experience is positively correlated with job performance, while the square of work experience has a significant negative relationship with job performance. Dummy variables Edu2 and Edu3 do not have significant impact on job performance, indicating that compared with junior middle school education, further education did not contribute to improve job performance for technical workers. There are strong positive relationships between different levels of vocational qualification certificates and workers' job performance. Compared with workers without vocational certificates, advance worker certificate (National Vocational Qualifications Level 3), and technician or higher certificate (National Vocational Qualifications Level 2 and 1) contribute to enhance workers' job performance significantly, with the coefficient 0.405($p < 0.01$), 0.581($p < 0.01$) respectively. However, there is no significant relationship between intermediate worker or lower certificate (National Vocational Qualifications Level 4 and 5) and job performance. This shows that the national vocational qualification certificates can effectively predict workers' job performance, especially for high level certificates.

In model 3, we test the impact of vocational qualification certificates on workers' earnings. The dummy variable Male has a significant positive effect on earnings of workers, indicating that men worker's wage is generally higher than women worker's wage. Workers' earnings has a positive relationship with work experience while a negative relationship with the square of work experience, which means that the earnings increased first and then decreased with the rise of work experience. Hukou also has some effect on the earnings. Compared with immigrant workers, local workers would have higher wage, the gap is about 7%. Compare with Edu1, Edu2 and Edu3 do not have significant effect on the earnings of technical workers. However, results show vocational certificates have significant effects on the earning of workers. The estimated wage premium to the intermediate worker or lower level certificate is 11.8%, to the advance worker certificate is 11.7%, to the technician or senior technician certificate significantly rises to 25.0%.

The results show that on the whole, the vocational qualification certificates can bring significant return for technical workers. However, the effects by intermediate worker or lower certificates (National Vocational Qualifications Level 4 and 5) and advance worker certificates (National Vocational Qualifications Level 3) are almost the same, but the effects by technician or higher certificates (National Vocational Qualifications Level 2 and 1) increased significantly. Results show there is significant income difference between the male and the female, therefore it seems necessary to separate the male and female observations and do further analysis. However, the female sample is not large enough to support the further analysis.

Table 4 Regression on earnings and employability

	Model 3: log(Earnings)		Model 4: Employability	
	Coeff.	Coeff.	Coeff.	Coeff.
常数	9.563***	.058	2.722***	.161
Fi rm2			.114	.125
Fi rm3	.211***	.026	-.417***	.128
Fi rm4	.176***	.030	-.003	.130
Fi rm5	.055	.043	.297*	.154
Fi rm6			-.098	.118

Male	.196***	.025	.168**	.075
Work expe	.022***	.005	.022*	.013
(Work expe) ²	.000***	.000	-.001*	.000
Local Hukou	.071*	.037	-.181*	.093
Edu2	.002	.034	.110	.100
Edu3	-.010	.040	.211*	.118
L5/4	.118***	.038	.061	.091
L3	.117***	.040	.163	.105
L2/1	.250***	.047	.261**	.132
F	31.026		3.803	
R2	0.398		0.061	
N	576		841	

*p<0.1, **p<0.05, *** p<0.01; the omitted benchmark firm is Firm1; the omitted benchmark education is edu1, the omitted benchmark certificate is L0; in Model 4, because the compensation information is unavailable in Firm1 and Firm2, Firm 6 is the omitted benchmark firm.

In Model 4, we test the impact of vocational qualification certificates on workers perceived employability. There is a positive relationship between male and workers' perceived employability, indicating that male workers are more likely to find jobs in the labor market compared with female workers. Employability also has a significantly positive relationship with work experience and a negative relationship with the square of work experience, indicating that workers' employability increase first and then decrease with the rise of work experience. Edu2 does not have significant effect on employability, while Edu3 has a positive effect on employability. Intermediate worker or lower certificates (National Vocational Qualifications Level 4 and 5) do not have significant effect on employability, while advance worker certificates (National Vocational Qualifications Level 3) have a positive effect on employability ($\beta=0.163$, $p=0.12$), and the technician or higher certificates (National Vocational Qualifications Level 2 and 1) have very significant positive effect on workers' employability ($\beta=0.261$, $p<0.05$).

5. Conclusions

Using the micro data from 6 manufacturing enterprises, this paper analyze the impact of different levels of national vocational qualification certificates on technical workers' skill level, job performance and earnings. The results show that national vocational qualification certificates are positively correlated with the skill levels and job performance of technical workers, and the higher level of the certificates are, the greater correlation coefficients are. We also found significant positive relationships between vocational qualification certificates and the earnings of technical workers. The intermediate worker or lower certificates (Level4 and Level5) and advance worker certificates (Level3) can bring about 11% wage premium compared with those without a certificate, while the wage premium of the technician level (Level2) or senior technician level (Level1) improved significantly to 25%.

Therefore, we can get conclusion that in China's manufacturing industry, the national vocational qualification certificates can effectively predict the skills and performance of workers and thus increase the employability and return for them. China is a big manufacturing country with a strong demand for skilled workers. Therefore, the vocational qualifications system would

play more important role in the labor market. China should continue to firmly push the building of national vocational qualification certificate system, which will help improve the skill, productivity and wages for Chinese labor force, and promote the labor market development and national economic development. The national vocational qualification system will also help guide the individual's human capital investment decisions and provide implication on China's youth employment and structural unemployment issues.

This research also provides some other interesting results. For example, the effects of Gender and Hukou on the wage of workers, the similar wage effects among low level certificates, the curve effects on skill and performance produced by work experience, etc. All these phenomena in Chinese labor market need further research

Finally, it must be noted that, due to data limitations, the conclusion in this study may not represent the validity of Chinese national vocational qualification certificate system as a whole. The final conclusion needs to be tested in a nation wide data set. However, our study does offer some insight on the effects of China's national vocational qualification certificates in the manufacturing industry and will be beneficial for other empirical studies.

Reference

(To be continued).....