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An Empirical Study on the Influencing Factors of Industry Income

-Simultaneous Study of Personal Characteristics and Industry Characteristics

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***Abstract*—Based on the 2003 and 2009 Urban Household Survey micro data as the research sample, this paper used the two-stage regression method to examine the influence of personal factors and industry factors on the industry income. The study shows that the personal characteristics and industry characteristics are the important influence factors that affect the industry income; the external spillover effect of human capital is increasing year by year; the income gap of the industry caused by the monopoly still exists; the administrative intervention of the government will enlarge the industry income gap.**

Keywords—Industry income; personal characteristics; industry characteristics; two-stage regression

I. INTRODUCTION

In theory, the study on the causes of the industry income gap can be summarized as the study of personal characteristics and industry characteristics. From the perspective of personal characteristics, in different industries, the personal characteristics such as the human capital stock and work experience are different, which leads to significant differences of wage returns among industries. Brown and Medoff (1989) found that, even if a series of narrowly personal characteristics variables were controlled, the industry income gap still exists [1]. Lucas (1988) proposed the human capital externality theory, believed that the human capital gathered in the way of industry, region or enterprise increased the industry (region or enterprise) productivity because of the "learning effect" of each other, its wage returns may differ from the simple addition of individual human capital returns. On the other hand, scholars try to explain the existence of industry income gap from the perspective of industry characteristics. Among them, the representative views are post wage setting, rent sharing model and efficiency wage theory [2]. Rothchild and Dtigler (1976) believed that, similar to the laborers job-searching, employers tend to consider information costs when setting wage standards, therefore they refer to more job characteristics rather than personal characteristics, which resulted in the continuing industry income gap [3]. In addition, the rent-sharing model argues that industry forces such as trade unions will affect the number of profits that manufacturers and workers share, resulting in the industry wage differences (Freeman and Medoff, 1984) [4]. The efficiency wage theory argues that firms with market monopoly will receive high profits and have greater wage-making capacity, often paying higher wages for laborers in the industry (Peng Wu, 2011) [5].

Throughout the study of the causes of industry income gap in China, more study examined the administrative monopoly privileges of monopoly industry, through free or low-cost natural resources, to take up and seize consumer welfare, access to public subsidies to obtain the industry wage returns , and then widen the income gap with other industries. Therefore, scholars got the general conclusion: in order to narrow the current industry income gap, we must eliminate or limit the monopoly or intervention of the administrative privileges to the industry. However, the existing research is less concerned about the industry characteristics other than the ownership, and some emerging industries are in the period of strong growth, its industry income is higher than the evaluation level, which is the manifestation of the market efficiency (Wenjing Wang, Kangyin Lv, Li Zhang, 2011) [6]. At the same time, some of the high human capital stock industry should be based on the number of human capital investment to pay a higher reward (Xi Ming Yue, Shi Li, Taili Shi, 2010) [7]. Therefore, if the causes of the industry income gap are simply

classified as personal characteristics or industry characteristics, it will lead to analysis of distortion, and be unable to clearly explain the main factors affecting the industry income gap and the contribution of various factors.

II. DATA, METHODS AND MODELS

On the basis of urban household survey micro data by the National Bureau of Statistics, this paper used the cross-sectional data of UHS2003 and UHS2009 to compare the industry income gap in China in different period, and described dynamically its evolution characteristics. UHS data is a micro-survey organized regularly by the National Bureau of Statistics Urban Socio-Economic Survey Corps. After China joined the WTO in 2001, China enterprises are facing more international opportunities and challenges, and in 2002, China's industry standards have been adjusted, but UHS2003 followed the original standard (16 Industry Classification). The 2008 financial crisis has created a new round of challenges for manufacturing and emerging industries, so UHS2003 and UHS2009 can represent the key nodes in the development of China's industry.

In order to combine the personal characteristics with the industry characteristics, and make a depth analysis of the causes of the industry income gap in China, this paper referenced the two-stage approach, and analyzed the influence of human capital characteristics on industry income gap by using micro-samples in the first stage regression, and referenced the method of industry segmentation by Yuan Zhang and Jianqi Chen (2008), used the "industry-ownership'' dummy variable to obtain the first stage industry wage return coefficient [8]. The first stage model is:

$$ln\,wage = C + \alpha_{ij} I_j + \alpha'_{ij} I'_j + \alpha''_{ij} I''_j + \beta_{ij} X_{ij} + \varepsilon \qquad (1)$$

Among them, lnwage is the logarithm value of the individual wage; I_j , I'_j , I''_j denote, respectively, state ownership, collective ownership and other ownership; Xij are personal characteristics: education level; work experience; quadratic term of work experience; gender.

The second stage of regression regarded wage coefficient α at the first step as dependent variable, and introduced the industry variable as the independent variable. In the actual processing, the state-owned residential services industry was regarded as the industry reference group, the second stage model is:

$$\alpha_j = c + \gamma_i AX_i + \mu \qquad (2)$$

Among them, AXi are industry characteristics, annual average education level in the industry, annual average work experience in the industry, the proportion of female employment in the industry, the proportion of the professional technical personnel in the industry, the proportion of state-owned units employment in the industry, the proportion of state-owned large-medium units in the industry, the proportion of non-enterprise units in the industry.

III. INDUSTRY INCOME REGRESSION RESULT BASED ON GENERALIZED LEAST SQUARE METHOD

Because the wage equation was added in the industry-ownership dummy variable, the independent variables of equation increased, in order to overcome the heteroscedastic problem brought by too many independent variables, this paper used the generalized least squares (FGLS) regression for equation (2), and used the estimated residual $\hat{\mu}$ to structure weight $w = 1/e^{\hat{\mu}}$.

In the first regression stage, as is shown in table 1, it can be found that the coefficient of education return increased from 0.191 to 0.239. And the coefficient of work experience was decreasing, which shows that with the development of information economy, using working years to represent work experience was inappropriate. In addition, men was more likely to receive higher wages than women; rural laborers was less likely to receive higher wages than urban, and the gap from household registration has worse tendency with the passage of time; laborers at technical positions was easy to obtain higher wage returns, and this trend is gradually increasing.

From the regression results of the "industry-ownership" dummy variable, it can be found that most of the coefficient was significant, and after excluding the agricultural industry, the average coefficient of industry wage return ranked the top5 was 0.434 in 2003, but for the industry at the last5 including the wholesale retail trade and manufacturing, the coefficient was -0.775, and the coefficient difference between them was 1.209, and it slightly increased to 0.931 in 2009. It means that compared to the state-owned service industries, there are greater difference of wage income return among industries in China. And the ownership type of industries which have the highest annual wage income return were all other ownership, but for the industries ranked the top 50%, more than 70% of industries were state-owned nature, which shows that the traditional "ownership monopoly theory" can only partly explain the industry wage income gap in China.

In the second regression stage, in order to examine the characteristics of the industry human capital and other industry characteristics other than ownership, to ensure the effectiveness of the regression results, the ownership coefficient of the second stage is selected to satisfy that t test is standard at the level of 10% in the first stage of regression. The regression results are shown in table 2.

First, the coefficient of annual industry average education was significantly, which indicates that the industry human capital has brought positive spillover effect on the industry wage income returns, and this effect is increasing. Second, the coefficient of the industry average work experience was significantly negative, which means that the increase in the industry average work experience will reduce the wage income return. However, from the reality situation of China, the majority of the industry which average wage at the forefront of are the emerging industries, the laborers' working time in these industries must be very short.

TABLE I. SUMMARY OF THE RESULTS OF THE FIRST STAGE OF THE PERSONAL WAGE INCOME REGRESSION EQUATION

	Coefficient β		**SOE / INDU**	**SOE1（state ownership）**		**SOE2（collective ownership）**		**SOE3（other ownership）**	
	2003	***2009***		***2003***	***2009***	***2003***	***2009***	***2003***	***2009***
Edu	0.191[a]	0.239[a]	Indu1	0.002	0.271[a]	-0.305[a]	-0.279	-0.288	-0.240[b]
edu=1			Indu 2	0.044	0.530[a]	-0.693[a]	0.148	0.972[a]	0.250[b]
edu=2			Indu 3	-0.144[a]	0.216[a]	-0.362[a]	0.092	0.083[c]	0.105[b]
edu=3			Indu 4	0.293[a]	0.455[a]	-0.041	0.206	0.202	0.186[b]
edu=4			Indu 5	-0.004	0.239[a]	-0.265[a]	0.108	-0.115	0.101[c]
Exp	0.042[a]	0.037[a]	Indu 6	0.142[c]	0.324[a]	-0.069	0.188[c]	-0.056	-0.001
Exp2	-0.0007[a]	-0.0007[a]	Indu 7	0.180[a]	0.277[a]	-0.204[c]	0.249	-0.184[a]	0.256[a]
Gender（male=1）	0.186[a]	0.208[a]	Indu 8	-0.142[a]	0.132[b]	-0.385[a]	-0.111	-0.590[a]	-0.143[a]
Hukou(rural=1)	0.070	-0.068[b]	Indu 9	0.190[a]	0.143	0.219	-0.235	0.077	-0.239[a]
occu1(tech=1)	0.143[a]	0.199[a]	Indu 10	0.234[b]	0.460[a]	0.426	0.221	0.299[b]	0.475[a]
R^2	0.260	0.268	Indu 11	control	0.440[a]	-0.325[a]	0.634[a]	-0.638[a]	0.371[a]
			Indu 12	0.219[a]	0.278[b]	0.032	0.267	-1.179[a]	0.136[b]
Ajust R^2	0.258	0.264	Indu 13	0.204[a]	0.216[a]	0.123	0.080	-0.458[a]	0.346[b]
N	14464	12773	Indu 14	0.370[a]	0.329[a]	0.228	0.427[c]	0.272	0.196
			Indu 15	0.187[a]	control	-0.049	0.045	-0.529[a]	-0.290[a]
			Indu 16	-0.185[b]	0.458[a]	-0.151	0.196	-0.467[a]	0.061
			Indu 17	——	0.410[a]	——	0.219[c]	——	0.084
			Indu 18	——	0.285[a]	——	0.270	——	0.034
			Indu 19	——	0.342[a]	——	0.101	——	-0.201[a]
			Indu 20	——	0.405[a]	——	0	——	1.444[b]

Note: a, b, c respectively represent the critical value of Mackinnon significantly at the 10%, 5% and 1% level.

Third, the proportion of professional and technical personnel in various industries coefficient was not significant in 2003, but was significantly positive at the 10% level in 2009, indicating that the concentration of professional technicians will increase the industry income return, and the added value brought by agglomeration is increasing. Fourth, the regression coefficient of the proportion of state-owned employment in the industry (SOE) was significantly positive at the level of 5% in 2003, but was not significant in 2009. In order to overcome the problem that the ownership variables' explanatory decrease caused by the two-stage regression equation, the paper chose an alternative indicator: the proportion of the state-owned

large-medium enterprises (SOE1). The result was significantly positive and the value increased every year, which indicating that the industry income gap phenomenon caused by ownership monopoly still exists in China. Finally, the regression coefficient of the proportion of non-enterprise employment in the industry (Occu2) was negative, but not significant in 2003, while it was significantly positive in 2009, which reflects the development process of China's non-enterprise units during this period. The proportion of non-enterprise has a significant positive impact on the industry wage income return. At present, China's non-enterprise unit types include schools, hospitals and other organization forms are almost national public institutions, the national finance budget is the main source of the laborers' wages, which is the marketization wage-pricing mode from the enterprise

TABLE II. SUMMARY OF THE RESULTS OF THE SECOND STAGE OF THE INDUSTRY INCOME EQUATION REGRESSION

	2003	**2009**
Edu	0.216* （1.88）	0.287*(1.93)
Exp	-0.293***(-3.06)	-0.218***(-5.41)
Occu1	0.147(0.49)	0.258***(2.36)
SOE	0.175**(2.09)	0.005(1.40)
SOE1	0.243**(2.77)	0.314***(3.89)
Occu2	-0.161(-1.07)	0.205**(2.02)
C	0.097(0.64)	0.687***(5.23)
R2	0.445	0.747

Note: Respectively represent the critical value of Mackinnon significantly at the 10%, 5% and 1% level Conclusion

IV. CONCLUSION

Based on the empirical analysis of the micro-survey data of urban household survey (UHS), this paper finds that the personal characteristics and industry characteristics are the two key factors influencing the industry wage income gap in China. Through the two-stage regression, it is found that the externalities of human capital will continue to increase with the development of time, and the industry income gap phenomenon caused by ownership monopoly still exists in China. The influence of state administrative power on the return of industry income is not only in the state-owned enterprises, namely by the monopoly of ownership to achieve, but also through the administrative institutions at all levels or the main body of the market management to play a role in the market, both of which is directly related to the government using administrative power income to intervene the market resource. Therefore, if we want to reduce the industry income gap, it is an important measure to reduce the government's administrative intervention.

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