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PERCEIVED CHANGE OF LABOR COST IN MANUFACTURING INDUSTRIES OF CHINA: EVIDENCE FROM HEBEI PROVINCE

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ABSTRACT

Rich labor resources and relatively low labor cost are the main contributors to the competitive advantages of China, but in recent years, labor costs of China continue to increase. Aiming at systematically study the perceptions of the manufacturing enterprises on the change of labor cost, a questionnaire undertaken in 200 manufacturing enterprises in Hebei province was used in this research to collect data. And descriptive analysis and one-way ANOVA were applied to analyze the perceived change of labor cost and to compare the differences among enterprises. The results show that among the four major components of labor cost, the perceived change of social insurance cost is greatest, and followed by wage, job training cost and welfare cost. We also found that there are significant differences in the perceived change of wage, social insurance cost and job training cost among different sized enterprises. As for enterprises with different ownerships, significant differences only exist in wage, social insurance cost and welfare cost.

Keywords: Change of labor cost, Perception, Manufacturing industries, Comparative study, Hebei province

INTRODUCTION

Rich labor resources and relatively low labor cost are the main contributors to the competitive advantages of China, and for a long time, the relatively low labor cost is a notable characteristic for China labor market. But in recent years, labor costs of China continue to increase, since 2005, labor costs in China have increased, on average, over 10% annually (Sodhi and Tang, 2012).Issues related to the rising labor costs in China are hotly discussed in academic circles both in China and abroad. For example, factors such as government's macro-control, economic globalization, currency exchange rate and urbanization are studied as the driving forces for the increase of labor cost in China (Liao, 2008; Zhang, 2008; Banister and Cook, 2011;Chen and Yang, 2013).The consequences of the rising labor cost, which lead to the heated discussion on whether China has lost its global labor advantage, have also attracted the scholars' attentions(Zhang, 2009; Yang et al., 2010; Ceglowski and Golub, 2012).However, most of the studies evaluated and estimated the change of labor cost using quantifiable data of wage or compensation, other important components of labor costs like job training costs and welfare costs have been ignored more or less.

Therefore, this paper seeks to fill this gap by studying the perceived change of four major components of labor cost and by comparing the differences in the perceptions among enterprises of different size and ownership. To obtain more focused data, Hebei province was chosen as the research objective.

WHY HEBEI PROVINCE

China is a country with vast land, and there are 34 provincial level regions. Because of complicated reasons, such as natural resources, geographical environments and population,

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there are distinct regional differences in social and economic development. Therefore, choosing a right province to study the change of labor cost and hopefully to reflect the conditions in the whole nation is a difficult and challenging work. Synthesizing complex factors, Hebei province is chosen as the research objective.

Table 1. Overview of Hebei Province in 2011

	Hebei Province	*Whole Nation**	*Rank in Whole Nation**
GDP (100 million RMB)	24,515	472,881	6
Per Capita GDP (RMB)	33,858	35,097	14
Number of Industrial Enterprises above Designated Size**	11,570	325,609	11
Gross Output Value of Industrial Enterprises above Designated Size** (100 million RMB)	39,699	844,268	7
Population	72,405,100	1,347,350,000	6
Household Consumption Expenditure (RMB)	9,551	12,272	21
Average Wage of Manufacturing Industry (RMB)	22,159	24,138	15
Urbanization Rate (%)	45.6	51.27	21

Source: China Statistical Yearbook, 2012

* Data of Mainland (31 provinces), not including Hong Kong, Macao and Taiwan.

** Industrial enterprises include mining, manufacturing and production and supply of electricity, gas and water. Designated Size refers to enterprises with an annual sales over 20 million RMB.

With reference to Table 1, in 2011, GDP of Hebei province was about 2.451 trillion RMB (US$379 billion), an increase of 11.3% over the previous year and ranked 6th in the whole nation. The primary, secondary, and tertiary sectors of industry contributed 11.9%, 53.5% and 34.6% respectively (Hebei Economic Statistic Yearbook, 2012), which means secondary industries (including mining, manufacturing, production and supply of electricity, gas and water, and construction) are the major driven forces for the economic growth in Hebei province. And it also can be proved by the number of industrial enterprises and gross output value of industrial enterprises, both of which were higher than the national average level, ranked 11 and 7 separately. In the yearend of 2011, Hebei province has a population of 72.4 million and 45.6% are urban residents which provide abundant labor force for the labor market.

Overall, no matter on the economic development level or on the social development level, Hebei province is in the medium position of 31 provincial regions and close to the national average level. The large number of secondary industries also provides sufficient information for the studies on labor cost changing. Moreover, the urbanization process in Hebei province is found slightly lags behind economic growth which shares the same condition with the urbanization development on the national level (Chen et al., 2010). Therefore, choosing Hebei province as the research objective may not completely reflect or explain what China is experiencing, but it's a good option.

METHODS

In this paper, survey questionnaire is used to collect data. There are two sections in the questionnaire. First section is background information of the enterprises, namely size and ownership. Peng (2006) studied the relationship between the size of enterprise and wage of

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employees in manufacturing industries of China, and found that there was positive correlation between enterprise size and wage, therefore the size of enterprise is an important demographic variable in studying the change of labor cost. The ownership types of enterprise in China is various and different from other countries, it always attract researcher's attention when studying the economic growth or enterprise reform in China (Bolton, 1995; Jefferson and Singh, 1999), and it is also an important factor in enterprise studying. Consequently, ownership of enterprise is taken into consideration in this study. The ownership types of Chinese enterprises are sorted into five categories: state owned enterprise, collective owned enterprise, foreign invested enterprise, private owned enterprise and others in this study. The second section of the questionnaire is information of the change of the components of labor cost. According to the No. [1997] 261 paper of Ministry of Human Resources and Social Security of China, the content of labor cost includes employees' total wage, social insurance, welfare, education cost, labor protection cost, housing cost and other labor cost. To better systematically analyze the change of labor cost and with reference to the study of Zhang (2009), four major components are summarized: wage, social insurance cost, welfare cost, and job training cost. The respondents are asked to score the four components of labor cost using five-point scales, 1 refers to no change, and 5 refers to changed greatly. The questionnaires were then randomly sent to 200 HR department of the manufacturing enterprises in Hebei provinces.

To analyze data, descriptive analysis and one-way Analysis of Variance (ANOVA) are conducted using SPSS. Mann (1995) stated that descriptive statistics quantitatively describe the main features of a collection of data. Thus, descriptive analysis is used to give descriptions on the scores of the labor cost components. And then differences of change of labor cost are compared among three different enterprises sizes and five different ownerships, and as the data are normally distributed, the use of one way ANOVA is appropriate. In ANOVA, the total variation is subdivided into variation that is due to differences among the groups and variation that is due to differences within the groups. If p-value of one way ANOVA is less than 0.05, meaning that there is significant difference in enterprises of different size or ownership, post-hoc tests will be used. The question of interest in the post-hoc test is which groups significantly differ from others.

RESULTS

Descriptive analysis was used to analyze how the labor costs change in manufacturing industries of China, and the results are shown in Table 2.

Table 2. Descriptive Analysis for the Perceived Change of Labor Cost

Components of Labor Cost	*N*	*Mean*		*Std. Deviation*
	Statistic	*Statistic*	*Std. Error*	*Statistic*
Wage	136	3.29	.095	1.103
Social Insurance	136	3.43	.091	1.059
Welfare	136	3.18	.086	1.005
Job Training	136	3.19	.092	1.072

In Table 2, social insurance has the highest mean value of 3.43 followed by wage with a mean value of 3.29, and the mean value of job training and welfare are close to each other

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with a mean value of 3.19 and 3.18 respectively. It indicates that social insurance changed most greatly based on the questionnaire of this study and the change of welfare was least obvious.

Then, to compare the differences of perceived labor cost change in enterprises with different sizes (large, medium and small) and ownerships (state owned, collective owned, foreign invested, private and others), one-way ANOVA test was performed.

Size of the Enterprise

To compare perceived labor cost change in terms of three size categories in this research, one-way ANOVA was performed through SPSS. The result is presented in Table 3.

Table 3. Differences of Perceived Labor Cost Change in Terms of Different Enterprise Sizes by ANOVA

Components of Labor Cost	*F*	*P-value*
Wage	8.892	0.000
Social Insurance	6.474	0.002
Welfare	2.047	0.133
Job Training	3.786	0.025

According to Table 3, only the p-value of welfare is greater than 0.05, meaning that there is no significant difference in welfare cost among different sized enterprises. On the contrary, the other three components of labor cost are changing differently among different sized enterprises. To further explain the relationship between size of the enterprise and the change of wage, social insurance cost and job training cost, descriptive analysis and Post Hoc Test are introduced. Table 4 represents the descriptive analysis results of differences in terms of enterprise size.

Table 4. Descriptive Specifications of Differences in Terms of Enterprise Size

	Size of the Enterprises	*N*	*Mean*	*Std. Deviation*	*Std. Error*
Wage	Large	40	3.85	1.027	.162
	Medium	39	3.23	.872	.140
	Small	57	2.95	1.156	.153
	Total	136	3.29	1.103	.095
Social Insurance	Large	40	3.90	1.150	.182
	Medium	39	3.33	.806	.129
	Small	57	3.16	1.049	.139
	Total	136	3.43	1.059	.091
Job Training	Large	40	3.58	1.238	.196
	Medium	39	3.03	.986	.158
	Small	57	3.04	.944	.125
	Total	136	3.19	1.072	.092

As can be seen in Table 4, the scores of wage, social insurance and job training for large enterprises are obvious higher than the medium and small sized enterprises; and medium

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sized enterprises have higher scores than the small enterprise in wage and social insurance; but the scores of job training are 3.03 and 3.04 respectively for medium and small sized enterprise which are almost equal.

The Post Hoc Test is used to determine if the mean difference between populations or treatments is statistically significant. The results of Post Hoc Test in terms of enterprise size are shown in Table 5.

Table 5. Results of Post Hoc Test in Terms of Enterprise Size

Multiple Comparisons					
LSD / *Dependent Variable*	*(I) Enterprise size***	*(J) Enterprise size***	*Mean Difference (I-J)*	*Std. Error*	*Sig.*
Wage	1	2	.619*	.235	.009
		3	.903*	.215	.000
	2	1	-.619*	.235	.009
		3	.283	.217	.194
	3	1	-.903*	.215	.000
		2	-.283	.217	.194
Social Insurance	1	2	.567*	.229	.015
		3	.742*	.210	.001
	2	1	-.567*	.229	.015
		3	.175	.212	.408
	3	1	-.742*	.210	.001
		2	-.175	.212	.408
Job Training	1	2	.549*	.236	.022
		3	.540*	.217	.014
	2	1	-.549*	.236	.022
		3	-.009	.218	.966
	3	1	-.540*	.217	.014
		2	.009	.218	.966

*. The mean difference is significant at the 0.05 level.
**. 1 Large size; 2 Medium size; 3 Small size

LSD (Least-Significant Difference) was used to compare the mean difference. As the p-value lower than 0.05 indicate that there is significant difference, therefore, with reference to Table 5, there are significant differences between the large sized enterprises and medium sized enterprises, and large sized enterprises and small sized enterprises for wage, social insurance and job training cost. But no significant differences exist between medium and small sized enterprises for all the three factors.

Ownership of the Enterprise

To compare perceived labor cost change in terms of five ownership categories in this research, one-way ANOVA was performed. The result is presented in Table 6.

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Table 6. Differences of Perceived Labor Cost Change in Terms of Different Enterprise Ownerships by ANOVA

Components of Labor Cost	*F*	*P-value*
Wage	9.029	0.000
Social Insurance	6.399	0.000
Welfare	3.473	0.010
Job Training	2.314	0.061

With reference to Table 6, the p-values of wage, social insurance and welfare are all less than 0.05, only job training has a p-value of 0.061, meaning that there are significant differences in the perceived change of wage, social insurance and welfare, but not in the job training. Further descriptive analysis is performed and the results are shown in Table 7.

Table 7. Descriptive Specifications of Differences in Terms of Enterprise Ownership

	Size of the Enterprises	*N*	*Mean*	*Std. Deviation*	*Std. Error*
Wage	State Owned	36	3.81	1.117	.186
	Collective Owned	9	2.00	.707	.236
	Foreign Invested	20	3.70	.923	.206
	Private	57	3.21	.901	.119
	Other	14	2.57	1.222	.327
	Total	136	3.29	1.103	.095
Social Insurance	State Owned	36	3.97	1.055	.176
	Collective Owned	9	2.33	1.000	.333
	Foreign Invested	20	3.60	1.046	.234
	Private	57	3.26	.897	.119
	Other	14	3.14	1.027	.275
	Total	136	3.43	1.059	.091
Welfare	State Owned	36	3.61	1.128	.188
	Collective Owned	9	2.56	.726	.242
	Foreign Invested	20	3.35	1.040	.233
	Private	57	3.00	.886	.117
	Other	14	3.00	.877	.234
	Total	136	3.18	1.005	.086

Based on Table 7, in terms of wage, the highest mean score comes from state owned enterprises, followed by foreign invested enterprises, private enterprises, other enterprises, and the collective owned enterprises, indicating the state owned enterprises have the highest perceived change of wage and collective owned enterprises have the lowest perceived change of wage. In terms of social insurance cost, the highest mean score comes from state owned enterprises while the lowest mean score comes from collective owned enterprises. In terms of welfare, state owned enterprises have the greatest perceived change with a mean score of 3.61, and collective owned enterprises have the least perceived change in welfare.

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Table 8. Results of Post Hoc Test in Terms of Enterprise Ownership**

Multiple Comparisons

LSD Dependent Variable	*(I) Ownership***	*(J) Ownership***	*Mean Difference (I-J)*	*Std. Error*	*Sig.*
Wage	1	2	1.806*	.369	.000
		3	.106	.276	.703
		4	.595*	.211	.006
		5	1.234*	.312	.000
	2	3	-1.700*	.398	.000
		4	-1.211*	.356	.001
		5	-.571	.424	.180
	3	4	.489	.258	.060
		5	1.129*	.345	.001
	4	5	.639*	.296	.032
Social insurance	1	2	1.639*	.366	.000
		3	.372	.274	.177
		4	.709*	.209	.001
		5	.829*	.310	.008
	2	3	-1.267*	.394	.002
		4	-.930*	.353	.009
		5	-.810	.420	.056
	3	4	.337	.255	.190
		5	.457	.342	.184
	4	5	.120	.293	.682
Welfare	1	2	1.056*	.362	.004
		3	.261	.271	.336
		4	.611*	.207	.004
		5	.611*	.306	.048
	2	3	-.794*	.389	.043
		4	-.444	.348	.204
		5	-.444	.415	.286
	3	4	.350	.252	.168
		5	.350	.338	.302
	4	5	.000	.289	1.000

* The mean difference is significant at the 0.05 level.

** 1 state owned enterprises; 2 collective owned enterprises; 3 foreign invested enterprises; 4 private enterprises; 5 other kinds of enterprises.

The results of Post Hoc test in terms of enterprise ownership are shown in Table 8. If the p-value is lower than 0.05, means that there is significant difference between the two groups.

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Therefore, significant differences exist between the following groups according to the results in Table 8: for wage, there are significant differences between groups 1-2, 1-4, 1-5, 2-3, 2-4, 3-5, and 4-5; for social insurance, there are significant differences between groups 1-2, 1-4, 1-5, 2-3, and 2-4; and for welfare, significant differences exist between groups 1-2, 1-4, 1-5, and 2-3 (1 state owned enterprises; 2 collective owned enterprises; 3 foreign invested enterprises; 4 private enterprises; 5 other kinds of enterprises).

In brief, there are some similarities in the comparison results of wage, social insurance and welfare: significant differences exist between state owned enterprises-collective owned enterprises, state owned enterprises-private enterprises, state owned enterprises-other enterprises, and collective owned enterprises-foreign invest enterprises; and there are no significant differences between state owned enterprises- foreign invest enterprises, collective owned enterprises-other enterprises, and foreign invest enterprises-private enterprises.

CONCLUSIONS

According to the descriptive analysis presented in the previous section, among the four components of labor cost, social insurance has changed most greatly followed by wage, job training and welfare. The mean scores for the four labor costs were 3.43, 3.29, 3.19 and 3.18 respectively (1 refers to no change, 5 refers to great change). It indicates that there are few gaps among the perceived changes of each labor cost. The findings of wage and social insurance changed greatly are consistent with the studies of Fang and Qian (2008), Yin and Zhang (2010). But no research is found empirically studied the perceived change of welfare and job training cost, however, according to the findings of this research, the mean scores for perceived changes of welfare and job training are nearly equal to each other and close to the mean score of wage. It can be conclude that although welfare and job training account for a small part of the total labor cost (Zhang, 2009), the change of welfare and job training cost are still very noticeable.

One-way ANOVA was performed to examine whether there were significant difference among enterprises of different sizes and ownerships. For the size of enterprise, the results show that there are significant differences in wage, social insurance and job training, but not in welfare. And according to the results of Post Hoc Test, there are significant differences between the large sized enterprises and medium sized enterprises, and large sized enterprises and small sized enterprises for wage, social insurance and job training cost. But no significant differences exist between medium and small sized enterprises for all the three factors.

The results indicate that the size of enterprise is closely related to the change of wage, social insurance and job training cost, larger sized enterprises are tending to increase employees wage, contribute more on employees' social insurance schemes and spend more on job training. Moreover, the labor cost changing conditions of medium sized enterprises and small sized enterprises are alike, as there is no significant difference in the change of wage, social insurance and job training costs.

For the ownership of enterprises, it can be concluded that there are significant differences in the perceived change of wage, social insurance and welfare among enterprises of different ownerships. Stated owned enterprises are making more efforts in improving employees' wage level, social security and welfare benefits. Possible reasons for the differences may be: first, the different wage determination mechanism (Hou, 2006), the wage determination of stated owned enterprise is not completely marketized and government plays an important role of controlling the change of wage of stated owned enterprise; second, foreign invested enterprises usually have learnt foreign countries' relatively advanced wage and salary system, and the wage levels of foreign invested enterprises are generally higher than domestic

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enterprises but the wage growth rates are lower than domestic enterprises (Han and Yin, 2006; Zhai, 2011); and for the collective owned enterprises and private enterprises, most of them are newly developing small sized manufacturing enterprises, due to the capital limitation and incomplete of wage system and welfare system, the perceived changes of wage, social insurance and welfare are relatively low.

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