



## FIRM SIZE AND WAGES IN CHINA

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### ABSTRACT

While most studies find evidence of a wage-firm size premium, we find that larger firms in China actually pay lower wages. We also find that the most plausible explanation for this result is that larger firms in China employ a higher ratio of blue-collar workers.

*Keywords:* wages, firm size, China.

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## 1. INTRODUCTION

A number of studies have found that larger firms pay higher wages in both developed and developing countries (Oi & Idson, 1999). In this paper we examine whether a wage-size premium exists in the People's Republic of China (hereafter China) using a unique matched worker-firm data set from Shanghai. We find, contrary to existing studies for other countries, that larger firms pay lower wages and examine three possible explanations for this result.

## 2. DATA AND EMPIRICAL STRATEGY

We use a matched worker-firm data set from Minhang district in Shanghai collected by the Institute of Population and Labour Economics in the Chinese Academy of Social Sciences in 2007. The dataset, which contains information on 784 employees from 78 firms, was selected by Probability Proportion to Size sampling according to a list of all manufacturing firms in Minhang district whose annual sales were at least 5 million RMB. Tables 1 and 2 summarize some of the characteristics of the data in small and large firms (defined as less than or greater than 85 employees). Table 1 suggests that average wages are lower in larger firms

**Table 1: Summary characteristics of hourly wage rate by firm size (RMB/hour)**

	Small Firms (85 or Less Employees)	Large Firms (More Than 85 Employees)
Mean	10.52	9.75
Standard Deviation	3.49	4.19
5 <sup>th</sup> Percentile	4.43	4.84
10 <sup>th</sup> Percentile	5.23	5.35
25 Percentile	6.34	6.34
50 <sup>th</sup> Percentile	8.72	8.72
75 <sup>th</sup> Percentile	11.63	11.63
90 <sup>th</sup> Percentile	16.61	14.53
95 <sup>th</sup> Percentile	20.35	17.44

**Table 2: Summary characteristics of workers by firm size**

Sample	All	Small Firms	Large Firms
Large Firms (%)	50.35	-	-
Hourly Wage	10.14	10.52	9.75
Years of Schooling (years)	11.35	11.17	11.71
Potential Experience (years)	16.49	17.78	14.79
Male (%)	54.08	59.61	48.63
Married (%)	74.52	71.43	77.65
Speak Mandarin Well (%)	67.59	63.23	71.90
Good Health (%)	30.29	29.53	31.04
Urban Hukou (%)	58.67	59.38	57.97
Member of Communist Party (%)	10.71	10.70	10.71
Member of Trade Union (%)	37.39	30.61	43.94
Position (%)			
Ordinary Employee	65.51	64.80	66.21
Technical Employee	14.96	13.69	16.21
Middle/High Level Manager	19.53	21.51	17.58
Occupation (%)			
Professional/Technician	22.92	20.77	25.00

Producer/Transporter	23.80	19.29	28.16
Service Worker	15.62	15.43	15.80
Equipment Operator	37.66	44.51	31.03
Professional Certification (%)			
No Title	78.07	76.97	79.17
Elementary Certification	14.39	16.57	12.22
Junior/Senior Certification	7.54	6.46	8.61
Ownership Form of Firm (%)			
State/Collective Own Firms	8.16	8.08	8.24
Share-holding/Public Firms	34.44	35.93	32.97
Foreign/Taiwan/HK JV Firms	37.90	27.86	47.80
Private Firms	19.50	28.13	10.99

Our empirical strategy is based on the estimation of a standard Mincer wage equation. We regress log of individual gross hourly wages (including bonuses) on the log of firm size - number of workers in the firm - and variables to control for employee characteristics and to test alternative theoretical explanations. Regressions are estimated by OLS with White heteroskedasticity-consistent standard errors. To account for potential bias stemming from the use of aggregated firm variables in an individual wage equation, we applied the correction for common variance components within groups suggested by Moulton (1990).

### 3. RESULTS

Table 3 reports the elasticity between wages and firm size, controlling for various employee characteristics and ownership of the firm. In each case, the coefficient on firm size is negative and statistically significant at the 1 per cent. The results suggest that for each 10 per cent increase in the number of employees, the hourly wage rate (RMB/hour) is between 0.46 per cent and 0.57 per cent lower. In the full specification (specification V), for a 10 per cent increase in the number of employees working in the firm, the hourly wage is 0.55 per cent lower. The results for the control variables in specification V of Table 3 are also generally consistent with expectations based on previous studies of the Chinese labour market. For example, we find that males, the better educated, those with an urban *hukou*, Communist Party members and middle and senior level managers receive higher wages.

**Table 3: Determinants of hourly wages**

	I	II	III	IV	V
Ln (Number of Employees)	-0.0463*** (0.0159)	-0.0482*** (0.0159)	-0.0567*** (0.0169)	-0.0482*** (0.0169)	-0.0549*** (0.0171)
Years of Schooling	0.0890*** (0.0061)***	0.0877*** (0.0065)	0.0751*** (0.0081)	0.0608*** (0.0086)	0.0581*** (0.0087)
Experience	0.0189*** (0.0059)	0.0169*** (0.0060)	0.0122** (0.0063)	0.0106* (0.0062)	0.0106* (0.0062)
Experience <sup>2</sup>	-0.0004*** (0.0001)	-0.0003*** (0.0001)	-0.0003** (0.0001)	-0.0003* (0.0001)	-0.0003* (0.0001)
Male	0.1655*** (0.0336)	0.1701*** (0.0337)	0.1664*** (0.0354)	0.1241*** (0.0365)	0.1321*** (0.0365)
Married	0.0739 (0.0492)	0.0775 (0.0493)	0.0899* (0.0511)	0.0888*** (0.0503)	0.1017** (0.0503)
Good Health	No	-0.0684*	-0.0632	-0.0767***	-0.0862**

			(0.0417)	(0.0432)	(0.0430)	(0.0432)
Fluent Mandarin	No		0.0128 (0.0395)	0.0071 (0.0410)	0.0122 (0.0403)	0.0043 (0.0404)
Urban Hukou	No	No		0.0777** (0.0423)	0.1036** (0.0422)	0.1047** (0.0420)
Communist Party Member	No	No		0.1490*** (0.0577)	0.1246** (0.0585)	0.1303** (0.0587)
Trade Union Member	No	No		0.0417 (0.0375)	0.0144 (0.0381)	0.0323 (0.0392)
Position (Ordinary Employee= 1)						
Technical Employee	No	No	No		0.0409 (0.0511)	0.0436 (0.0510)
Middle/High Manager	No	No	No		0.3610*** (0.0498)	0.3728*** (0.0501)
Occupation (Professional/Technician=1)						
Producer/Transporter	No	No	No		-0.1108** (0.0516)	-0.1214** (0.0516)
Service Worker	No	No	No		-0.0693 (0.0573)	-0.0652 (0.0572)
Equipment Operators	No	No	No		-0.1005** (0.0492)	-0.0945* (0.0490)
Professional Certification (No title=1)						
Elementary Certification	No	No	No		-0.0499 (0.0498)	-0.0493 (0.0497)

We test three possible explanations for this result:

- Most large firms in China are state-owned enterprises or publically-listed firms with majority state control that provide more non-wage benefits (46.67 per cent of large firms in the sample fall into these categories). Compensating wage theory predicts that workers receiving more generous non-wage benefits will be paid a lower wage than workers who receive lower non-wage benefits (Rosen, 1986).
- An explanation given in previous studies for why larger firms pay higher wages is that they have a higher proportion of more mobile white collar workers than small firms and that faced with high labour turnover, larger firms have to pay their white collar workers a wage premium to retain their services (Belfield & Wei, 2004). In China, larger firms employ a higher ratio of blue collar workers than small firms. While Chinese workers now enjoy greater job mobility than before, few blue collar workers in large firms, in particular in state-owned enterprises or publically-listed firms with majority state control, are mobile and these workers are paid lower wages.
- There is some evidence that productivity in large state-owned enterprises or publically-listed firms with majority state control in China is lower than in smaller non-state firms. If productivity in these firms is lower, they may pay lower wages.

Table 4 shows productivity, non-wage benefits (proxied by social insurance contributions per capita) and the ratio of blue collar workers by firm size for firms in the sample. There is no

statistically significant relationship between firm size and productivity, but larger firms have larger non-wage benefits and a higher proportion of blue-collar workers.

**Table 4 Productivity, non-wage benefits and the ratio of blue collar workers by firm size**

	Small Firms	Large Firms	All Firms
Value Added per capita (10,000RMB/Person)	15.41	14.91	15.19
Social Insurance Contribution (RMB/Person)	3983.38	6109.32***	4858.76
Ratio of Blue Collar Workers (%)	70.21	75.24***	72.26

Notes: \*\*\* denotes that the correlation between firm size and ratio of blue collar workers and social insurance contributions are statistically significant at 1 per cent.

**Table 5: Productivity, non-wage benefits, blue collar workers and hourly wages**

	I	II	III	IV
Ln (Number of Employees)	-0.0546*** (0.0173)	-0.0530*** (0.0171)	-0.0226 (0.0172)	-0.0650*** (0.0176)
Years of Schooling	0.0560*** (0.0091)	0.0549*** (0.0091)	0.0505*** (0.0086)	0.0586*** (0.0092)
Experience	0.0162** (0.0064)	0.0151** (0.0063)	0.0158*** (0.0061)	0.0153** (0.0064)
Experience <sup>2</sup>	-0.0004*** (0.0001)	-0.0005*** (0.0001)	-0.0004*** (0.0001)	-0.0005*** (0.0001)
Male	0.1161*** (0.0376)	0.1237*** (0.0374)	0.1388*** (0.0357)	0.1304*** (0.0378)
Married	0.0695 (0.0523)	0.0681 (0.0508)	0.0755 (0.0499)	0.0740 (0.0515)
Fluent Mandarin	0.0077 (0.0420)	0.0258 (0.0413)	0.0078 (0.0394)	0.0197 (0.0417)
Health (Ordinary=1)				
Good Health	-0.1300*** (0.0492)	-0.1295*** (0.0489)	-0.1129** (0.0465)	-0.1329*** (0.0495)
Very Good Health	-0.0679 (0.0483)	-0.0698 (0.0482)	-0.0475 (0.0455)	-0.0756 (0.0487)
Urban Hukou	0.1069** (0.0431)	0.0606 (0.0428)	0.0773* (0.0411)	0.0676 (0.0433)
Communist Party Member	0.1294** (0.0598)	0.1136** (0.0577)	0.1502*** (0.0569)	0.1102** (0.0584)
Trade Union Member	0.0168 (0.0405)	-0.0028 (0.0404)	0.0402 (0.0381)	0.0110 (0.0409)
Position (Ordinary Employee=1)				
Technical Employee	0.0162 (0.0518)	0.0425 (0.0516)	0.0223 (0.0500)	0.0420 (0.0522)
Middle/High Manager	0.3804*** (0.0518)	0.4093*** (0.0506)	0.3895*** (0.0490)	0.4053*** (0.0512)
Occupation (Professional/Technician=1)				
Producer/Transporter	-0.1162** (0.0526)	-0.1355*** (0.0518)	-0.1132** (0.0503)	-0.1338 (0.0524)
Service Worker	-0.0943 (0.0582)	-0.1271** (0.0579)	-0.0912 (0.0560)	-0.1140** (0.0584)
Equipment Operators	-0.1013** (0.0506)	-0.1146** (0.0498)	-0.1178** (0.0481)	-0.1070** (0.0504)

Professional Certification				
(No title=1)				
Elementary Certification	-0.0254 (0.0528)	-0.0443 (0.0492)	-0.0344 (0.0482)	-0.0479 (0.0498)
Senior/Junior Cert.	0.0939 (0.0712)	0.0215 (0.0679)	0.0477 (0.0664)	0.0139 (0.0687)
Ownership Form of Firm				
(State/Collective Own =1)				
Share-holding/Public	-0.0031 (0.0648)	0.0166 (0.0638)	-0.0288 (0.0631)	0.0118 (0.0646)
Foreign/Taiwan/HK JV	0.0975 (0.0694)	0.0680 (0.0679)	0.0550 (0.0664)	0.0873 (0.0687)
Private	0.0024 (0.0741)	0.0379 (0.0716)	-0.0629 (0.0718)	0.0289 (0.0724)
Value added per capita	0.0033*** (0.0009)	No	No	No
Social insurance per capita	No	0.1273*** (0.0279)	No	No
Blue Collar Worker Ratio	No	No	-0.5727*** (0.0912)	No
Social insurance per capita ×ln(no. employees)	No	No	No	0.0183*** (0.0061)
_cons.	1.4242*** (0.1764)	1.4733*** (0.1772)	1.8260*** (0.1822)	1.4822*** (0.1818)
No. obs.	536	538	563	538
F(β=0)	15.94***	16.19***	17.59***	15.33***
R <sup>2</sup>	0.4172	0.4201	0.4288	0.4069

Notes: The numbers in parentheses are standard errors. \*\*\*, \*\*, \* denote significance at the one, five, and ten percent levels, respectively.

**Table 6: Regression of productivity on firm size and other variables**

Ln (Number of Employees)	-0.6279 (2.6508)
Social Insurance per capita	0.6069 (3.7403)
Ratio of Blue Collar Workers	-30.1080** (13.6040)
Fixed Assets	0.0001 (0.0001)
Technology Level (Advanced=1)	
Ordinary Level	-4.9371 (5.6466)
Ratio of R&D to Sales	-0.6274 (1.8289)
_cons.	40.8168*** (13.5992)
No. obs.	50
F(β=0)	1.3 (Prob > F = 0.2795)
R <sup>2</sup>	0.1531

Notes: The numbers in parentheses are standard errors. \*\*\*, \*\*, \* denote significance at the one, five, and ten percent levels, respectively.

In Table 5, we return to the full specification reported in Table 3 and add variables measuring productivity, non-wage benefits and the ratio of blue collar workers. Specification I in Table 5 indicates that firms with higher productivity pay higher wages, but there continues to be a negative relationship between firm size and wages. Specifications II and IV in Table 5 indicate that firms which have higher non-wage benefits pay higher wages, suggesting there is no trade-off between wage and non-wage benefits. Specification III in Table 5 indicates that firms with a higher ratio of blue collar workers pay lower wages. Table 6 examines whether there is a negative relationship between productivity and firm size by regressing value added per capita on firm size, non wage benefits, the ratio of blue collar workers, fixed assets, technological capabilities and the ratio of R&D to sales. The results suggest no relationship between firm size and non-wage benefits or productivity, but that firms with a higher ratio of blue collar workers have lower value added per capita.

#### **4. CONCLUSION**

In this paper we have investigated the relationship between wages and firm size in China. In contrast to existing studies for other countries we found that larger firms pay lower wages. We examined three possible explanations for this finding. The most likely explanation is that larger firms in China employ more blue-collar workers who are paid lower wages.

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