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The Backward Incidence of Pollution Regulation on Workers' Wages: Empirical Evidence From Shanghai

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Abstract:

In this study we examine the extent to which firms pass back the cost of pollution regulation to workers in the form of lower wages using a unique matched employer-employee dataset for Shanghai. The benefits and costs of pollution regulation in China are important topics to study as China comes under increasing pressure to move from a single-minded focus on energy-driven economic growth to a more balanced approach to economic growth. The benefits of such a shift, particularly in terms of health, are relatively well-studied, but the costs are less so. The hip-pocket effect of pollution regulation on workers' wages is particularly important given that it is likely to influence public support for a more balanced approach. Our main finding is that the reduction in average wages attributable to firms taking measures to control for pollution is between 13.8% and 18.8%, all things being equal.

Keywords: Wages, Pollution abatement, China

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Introduction

China has had one of the highest rates of economic growth among developing countries for a period spanning three decades. However, China has been heavily dependent on dirty-burning coal to fuel its high rate of economic growth**.** China has been the world's largest consumer of coal since 1986, the second largest consumer of electricity since 1995 and the second largest consumer of oil since 2002 (BP, 2009). China's energy efficiency, though, remains relatively low (Ma *et al.,* 2009). As a result, China's carbon dioxide emissions have increased dramatically in recent times, such that China is now the second largest gas emitter in the world (Auffhammer & Carson, 2008). The high energy consuming industries in China produce the majority of industrial air pollution (Cole *et al.* 2008). As a consequence, China has been described as 'choking on its own success' (Kahn & Yadley, 2007). In response to concerns about poor air quality and environmental degradation, there is some evidence that the Chinese government is reconsidering the costs of an unfettered emphasis on economic growth. Environmental protection is a cornerstone of China's commitment to more balanced economic growth, reflected in the Hu-Wen notion of a 'harmonious society'. China's industrial firms are coming under increasing pressure to curb pollution emissions.

A series of theoretical studies have examined the backward incidence of pollution control (Yohe, 1979; Yu & Ingene, 1982; Forster, 1984; Wang, 1990). These studies suggest that expenditure on pollution abatement is a cost of production that shifts the supply curve to the left. Moreover, firms which spend on pollution abatement will, whenever possible, pass the cost on to workers in the form of lower demand for labor and/or lower wages. This paper examines the backward incidence of pollution abatement on wages using a unique matched employer-employee dataset collected from Shanghai. Specifically, the paper addresses the

following question: Who bears the cost of pollution abatement and to what extent do firms pass the cost of pollution abatement back to labor in the form of lower wages?

This question is important to address in the Chinese context because China's strategy of growing rapidly through burning coal has been a major reason for the rapid growth in urban incomes. Rapid industrial growth has literally lifted tens of millions of people out of poverty. If the Chinese government is going to adopt a more balanced approach to economic growth, it is important to be aware of the potential costs to labor in terms of lower wages. A more balanced growth path has been lauded because of its positive effect on urban living standards and the health of the urban populace via reduced pollution levels (Li *et al.*, 2004; World Bank, 2007). However, to the extent that the costs of pollution abatement are passed on to workers in the form of lower wages, there is also a potential adverse effect on living standards. The effect on the hip pocket is also likely to influence the extent to which China's urban workers support a more balanced approach to economic growth. If the cost in terms of lower wages is too high, support for balanced growth policies are likely to wane.

Chinese Context

China has experienced annual GDP growth of 10% per annum over an extended period. China's energy consumption has expanded, both in terms of volume and growth rate to facilitate China's high rate of economic growth. China's primary energy consumption was 2002.5 million tonnes oil equivalent in 2008, with annual growth of 16.8% over the period 2002-2008 (BP, 2009). China is now the second largest consumer of energy products after the United States and it is fast closing on the United States. In 1978, at the start of economic reforms in China, China's share of global energy consumption was 6.3%, while the corresponding figure for the United States was 28.6%. In 2008, China's share of global energy consumption was 17.7%, while in the United States it was 20.4% (Ma *et al.*, 2010).

China's energy consumption has generated pollution on a large scale. China is the largest coal producer in the world. Coal is the major source of energy in China, constituting about 75% of all energy sources. Coal contributes 90% of China's sulphur dioxide emissions and about 70% of China's total dust, nitrogen oxide and carbon dioxide emissions (Zhang, 2007). China has twice the sulphur dioxide emissions of the United States with some estimates suggesting that in the future China's sulphur dioxide emissions will be up to five times their current level. According to the World Bank, China has 16 of the world's 20 most polluted cities. In 2005, only 31 per cent of Chinese cities met national air quality standards and more than 75 per cent of water in rivers in China's urban areas could not be used for drinking or fishing (Economy, 2007). The World Bank (2007) estimates that only 1 per cent of China's urban population of 560 million breathe air considered safe in the European Union.

The World Bank (2007) estimates that the health costs of air and water pollution amount to 4.3 per cent of GDP and the non-health impacts to 1.5 per cent of GDP, making the total cost of air and water pollution in China, 5.8 per cent of GDP. According to World Bank estimates from the 1990s, the number of annual pollution related premature deaths in China from a mixture of outdoor air pollution in large cities, indoor air pollution from inhaling fumes from coal-burning stoves and cooking oil as well as cancers and diarrhoea from drinking polluted water, were about 400,000 (Toy, 2007). In a preliminary version of the World Bank's (2007) most recent study on pollution in China, it estimated that the annual number of premature pollution-related deaths in China are as high as 750,000. While this figure was censored from the final version of the World Bank (2007) report, it was openly discussed at the conference launching the World Bank study and has been reported in the media (see eg. Kahn &

Yardley, 2007; Toy, 2007). China's air pollution is also held responsible a high prevalence of asthma (Watts, 2006) and cardiovascular disease (Kan *et al.*, 2009) in Chinese cities.

As part of the Chinese government's commitment to more balanced growth, under the Hu-Wen administration, the State Environmental Protection Authority (SEPA) of China has been elevated to full ministerial status. This has empowered SEPA to push for more stringent implementation and monitoring of environmental regulations. As a result, SEPA has had some success in halting projects that have not undertaken proper environmental impact assessments (Zhang, 2007). This said, one problem with environmental regulation in China is that while the central government and SEPA profess a commitment to environmental protection, these regulations are not always fully enforced at the local level. This is because at the local level, officials are rewarded on the basis of meeting GDP targets that do not take account of environmental degradation. In 2004, for the first and only time, the Chinese government reported figures for Green GDP, which adjusted GDP to reflect the cost of pollution. The figures, however, were sobering, with the pollution-adjusted growth rates in several provinces being close to zero. The idea of reporting Green GDP in China has since been shelved because of strong opposition from local government officials (Kahn & Yardley, 2007). Local officials were opposed to Green GDP as a concept from the start because lower adjusted growth rates reduce their prospects for promotion (Economy, 2006).

However, while local officials are sometimes reluctant to monitor environmental regulations, China has a nascent environmental civil society movement. Since the mid-1990s about 3000 environment oriented non-government organizations (NGOs) have been established in China. These organizations, such as the well-known 'Friends of Nature' and 'Global Village of Beijing', primarily focus on raising awareness and hands-on environmental activism

(Martens, 2006). Citizen complaints about the environment, expressed on official hotlines and in letters to local officials are increasing at 30 per cent per annum and were expected to top 450,000 in 2007 (Economy, 2007). There are also an increasing number of political demonstrations complaining about the environment. Economy (2007) mentioned one such demonstration in 2005 when 30,000 to 40,000 people in Zhejiang province vandalised 13 chemical plants as part of a protest about air pollution. The Chinese central government provides tacit support for this environmental movement as a means of scrutinizing environmental protection at the local level, although no criticism of the central government's policies are permissible (Larson, 2007; Martens, 2006; Mol & Carter, 2006).

The data in this study is collected from Shanghai. Shanghai is one of China's most populous and prosperous cities. Situated on the estuary of Yangtze River, facing the East China Sea, in 2005 Shanghai had a permanent population of 13.8 million people and 5.8 million rural-urban migrants (SBS, 2006). Energy use and pollution problems in Shanghai are similar to China as a whole. Coal accounts for about 70% of the city's total energy consumption. Air and water pollution is severe in Shanghai (Chan & Yao, 2008) and is associated with several adverse health effects (Fang, 1989, Chen, 1994). In a series of simulation studies for Shanghai, Li *et al.* (2004) found the health benefits from pollution reduction would be substantial, relative to the direct cost of the investment needed for such initiatives. Similar to other cities in China, firms in Shanghai are subject to a mix of formal and informal pollution regulation. Following Cole *et al.* (2008) we define formal regulations as those imposed by SEPA or local authorities ('government regulation'). Wang (2002) and Wang and Wheeler (1999) provide detailed discussions of such measures. In contrast to formal regulations, informal regulation occurs when communities or China's civil environmental protection movement regulate firms through lobbying and petitioning ('self regulation').

Existing Literature

This study is related to several strands of literature. One series of studies compute willingness to pay for clean air based on wage differentials across cities (see eg. Cropper & Arriaga-Salinas, 1980). A second series of studies examine whether there is a wage premium for working in pollution intensive industries (Cole *et al*., 2009). A third series of studies has analysed the extent to which firms shift the burden of mandated social security obligations or payroll taxes back on to workers in the form of lower wages (Gruber & Krueger, 1991; Gruber 1994, 1997; Holmund 1983). A fourth series of studies have considered the effect of pollution abatement on labor productivity (see eg. Christiansen & Haveman, 1981)

There are few studies that have directly examined the effect of pollution abatement on the demand for labor or wages. Berman and Bui (2001) examined the impact of new air quality regulations on employment in the affected industries in Los Angeles introduced between 1979 and 1992. These authors found that these regulations did not, in fact, reduce the demand for labor in Los Angeles, but may have increased it. Shadbegian (2005) examined the impact of air quality regulations on employment in US manufacturing as a whole using panel data over the period 1974 to 1985 and found environmental regulation significantly reduces the demand for production workers and non-production workers. Hollenbeck (1979) employed a computable general equilibrium model to analyse the effect of restrictions on levels of permissible emissions from stationary sources set by the 1970 Clean Air Act Amendments in the United States. He finds that the Act Amendments have a regressive effect on earnings.

Among related studies for China, China's energy consumption and its relationship with economic growth has been extensively analysed (see Ma *et al.* 2010 for a survey). Cole *et al.*

(2008) studied the determinants of industrial pollution in China. Wang and Wheeler (1999) and Wang (2002) examined the impact of pollution regulation on abatement expenditure for Chinese industrial polluters and found that abatement expenditures are responsive to pollution regulation. He (2006) and Dean *et al.* (2009) tested the pollution haven hypothesis, which states that foreign direct investment is attracted by weaker environmental regulation. He (2006) found support for the hypothesis. Dean *et al*. (2009) found support for the hypothesis for firms from Hong Kong, Macao and Taiwan, but not other countries. Smyth *et al* (2008) examined the impact of pollution on subjective well-being across 30 Chinese cities, while Zhai and Suzuki (2008) examined willingness to pay for environmental quality in Tianjin. None of these studies, however, are concerned with wages. In the spirit of the third set of related studies mentioned above, Nielsen and Smyth (2008) examined the effect of compliance with social insurance obligations on wages in Shanghai. That study found that employers which complied with social security obligations in Shanghai passed on part of the cost to workers in the form of lower wages. However, these authors did not consider the effect of pollution abatement on wages. To summarize, there are few empirical studies that have considered the relationship between pollution abatement and either the demand for labor or wages of workers and there are no studies that do so using Chinese data.

Data

We use a matched worker-firm data set from Minhang district in Shanghai collected by the Chinese Academy of Social Sciences (CASS) 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. Once missing data was removed, we had valid data for all the variables of interest in the study for about 600 employees and 69 firms. Table 1 gives descriptive statistics for the firms in a sample and compares them with descriptive statistics

for firms in Minhang District and Shanghai as a whole. The descriptive statistics in Table 1 suggest that the sample is generally representative of firms in Minhang District and Shanghai.

Table 2 presents descriptive statistics for the employees in the sample based on whether the respondent worked for a firm that reported undertaking measures to control pollution. These pollution measures could be the result of either government regulation or self-regulation. Of the 41 firms that had introduced measures to control for pollution, 14 did so in response to government regulation and 27 do so as an act of self regulation. Table 2 reports both the gross hourly wage rate (including bonuses) for employees in the sample and for all employees in the firms that were surveyed. The gross average hourly wage rate of surveyed workers is slightly higher than the gross average hourly wage rate of all workers in the firms surveyed. However, for both the employees in the sample and for all employees in the surveyed firms, wages in firms that reported undertaking measures to control pollution were statistically lower than in firms which reported taking no measures to control pollution. This gives some initial support for the notion that firms subject to government or self-regulation on pollution pass the costs on to workers. In the wage equations, reported below, while we are primarily interested in the effect of pollution abatement on wages, we also control for a range of characteristics of the worker. Descriptive statistics for these variables, based on whether or not the firm reported undertaking measures to control pollution, are given in Table 2.

Empirical Specification and Methodology

We employ a Mincer (1974) earnings function in which gross hourly wage earnings including bonuses (measured in RMB) is regressed on years of schooling, post-school experience, post-school experience squared, a dummy variable for whether the firm reported undertaking measures to control pollution and a series of control variables. The specific control variables

that we employ are gender, marital status, health, household registration status, language ability, whether the individual is a member of the Communist Party, the size of the firm for which the individual works, proxied by the log of the number of employees, and dummy variables for professional certification, occupation and ownership form of the firm.

If firms pass the cost of pollution abatement on to workers we can expect a negative relationship between pollution abatement and wages. Turning to the other variables, based on human capital theory, wages are determined by investment in human capital. Schooling and on-the-job training are major types of investment. Thus, we expect a positive relationship between years of schooling and wages. Post-school experience is a proxy for job-training investment. We expect the wage-experience profile to follow a parabolic shape in experience. Wages will initially increase, reach their peak when human capital is at a maximum and eventually fall as human capital depreciation dominates accumulation.

Of the control variables, we expect that individuals with better self-reported health will have higher productivity and earn higher wages. We expect that individuals with urban household registration will earn more, given that previous studies report evidence of labour market discrimination against migrants, who typically have a non-urban household registration (see eg. Liu, 2005). We expect that being a member of the Communist Party will command a wage premium. Previous studies have found that Communist Party members earn more than non-Communist Party members in the Chinese urban labour market (see eg. Appleton *et al.*, 2002; Li, 2003; Bishop & Liu, 2008). There are two possible explanations. One is that a wage premium for Communist Party members could simply be economic rents for a privileged group. A second explanation is that the Party can be viewed in much the same fashion as a college in Western countries, as a screen for talent, motivation and other personal

characteristics correlated with productivity (Bishop & Liu, 2008). The expected sign on marital status is *ex ante* unclear. Individuals who are married might, in a time allocation sense, have less time available for work tasks because of family commitments. However, marriage can also generate efficiencies through specialisation and the division of labour where tasks are divided between spouses, freeing up time (Baker & Jacobsen, 2007). Language proficiency is a form of human capital. We expect that individuals with better command of Mandarin will earn higher wages. We expect that males will earn more than females, given widespread evidence of gender discrimination in earnings in Chinese urban labor markets (Zhang *et al.*, 2007). A number of studies suggest that firm size and wages are positively correlated (Oi & Idson, 1999). However, previous research suggests that in China larger firms, in fact, pay lower wages. The reason for this is that large firms in China employ a disproportionate number of blue collar workers (Gao & Smyth, 2010).

Regressions are estimated using ordinary least squares (OLS) with White heteroskedastic-consistent standard errors. Whether the firm undertakes measures to control pollution is potentially endogenous. The Durbin-Wu-Hausman test (augmented regression tests) for endogeneity was performed employing a dummy variable set equal to 1 if the firm implemented measures to address pollution because it was subject to government regulation and set equal to zero if it was acting as a form of self-regulation as the instrumental variable. Cole *et al.* (2008) found that government regulation is an important determinant of industrial pollution in China. The Durbin-Wu-Hausman test suggested that the dummy variable denoting whether the firm undertakes measures to control pollution was exogenous.

A potential problem with the OLS estimates of the earnings function is the omission of an individual's ability, which may bias the OLS estimates of returns to schooling. The OLS

estimator has two ability biases relative to the average marginal return to education: one attributable to the correlation between schooling and the intercept of the earnings function, the other attributable to the correlation between schooling and the slope of the earnings function (see Card, 1999 for a review of the literature focused on ability biases). OLS may overestimate returns to schooling due to positive correlation between schooling and ability. Alternatively, OLS estimates may underestimate rates of returns to education due to heterogeneity among individuals in returns to schooling. While acknowledging these estimation issues, this study applies OLS because the dataset does not contain any appropriate instrumental variables for schooling, such as parent's education or spouse's education, and because estimating the returns to schooling is not the prime focus of the study.

Results

Table 3 presents the results of the Mincer (1974) earnings function. We present four alternative specifications in which different combinations of the dummy variables for certification, occupation, ownership and position are included. The results suggest that, depending on the specification, for those individuals surveyed hourly wages were between 1.4 RMB per hour and 1.9 RMB per hour lower in firms which reported implementing measures to control pollution. For those who have a 48 hour working week, which is the official working week in China, this amounts to between 67.2 RMB and 91.2 RMB per week. For those who work a 60 hour working week, which is the official working week plus the maximum overtime allowed by law, this equates to between 84 RMB and 114 RMB per week. Given that the average hourly wage for surveyed individuals was 10.1 RMB per hour, the results imply between a 13.8% and 18.8% reduction in the average hourly wage for those individuals in firms which reported implementing measures to control pollution.

Of the other variables, for each additional 1% in the number of employees, the hourly wage is about 1 RMB lower (roughly 1% lower). Each additional year of schooling equates to an additional 1-1.1 RMB per hour. Males earn 2-2.4 RMB per hour higher than females. There is a wage premium for being married and being a member of the Communist Party. Married individuals earn 1.5-1.6 RMB per hour more than those who are single, while Communist Party members earn 1.8-2.1 RMB per hour higher than those who are not members of the Communist Party. To put the cost to workers of firms implementing pollution controls in perspective, based on the upper bound estimate of 1.9 RMB per hour in Specification 4, the returns to working in a firm which does not implement measures to control pollution, relative to one that does, is roughly equivalent to the returns to being a member of the Communist Party (1.8-2.1 RMB per hour) or two additional years of schooling (2-2.2 RMB per hour).

As a robust check on the pollution abatement variable in Table 3, in Table 4 we examine the effect of implementing measures to control for pollution on the average hourly wage rate in the firm using data at the firm level. Specifically, we regress the average hourly wage in the firm on a dummy variable denoting whether the firm implemented measures to control for pollution, the log of firm size, the proportion of female workers in the firm, the ratio of blue collar workers in the firm, the profit to sales ratio in the firm and ownership dummy variables. The results suggest that, depending on the specification, the average hourly wage for all workers in the firm is between 1 RMB per hour and 1.1 RMB per hour lower in firms which reported implementing measures to control pollution. Given that the average hourly wage across firms in the sample was 8.4 RMB per hour, this equates to between 9.2% and 11.9%, which is similar to the lower bound estimate of 13.8% from the Mincer equation.

Conclusion

In spite of several theoretical studies suggesting that firms will pass the cost of pollution regulation back to workers in the form of lower demand for labor or lower wages, there is little empirical evidence on the backward incidence of pollution regulation. This is particularly true for the effect of pollution regulation on wages. The reason for the lack of empirical evidence is probably the relative scarcity of matched employer-employee data which also contains information on whether the firm implements measures to control for pollution. In this study we have examined the extent to which firms pass back the cost of pollution regulation to workers in the form of lower wages using a unique matched employer-employee dataset for Shanghai. The benefits and costs of pollution regulation in China are important topics to study as China moves from an unfettered focus on energy-driven economic growth to a more balanced approach. The benefits of such a shift, particularly in terms of health, are relatively well-studied, but the costs are less so. The hip-pocket effect of pollution regulation on workers' wages is particularly important given that it is likely to influence support for a more balanced approach among the urban populace. Our main finding is that in those firms which undertake measures to control for pollution, whether it be as a result of government regulation or self-regulation, the reduction in average hourly wages attributable to controlling for pollution is between 13.8% and 18.8%, all things being equal.

The study has some limitations that could be addressed in future research. First, while Shanghai is a major Chinese city that is, in many ways, representative of other major cities in China in terms of its energy use and pollution problems, our data is for a single city. Future research is needed for other cities in China including, where possible, multiple cities in the one study. Second, our dataset is limited in the sense it does not have appropriate instrumental variables for years of schooling. Thus, we need to be cautious about comparing

the effect of pollution regulation on wages with the effect of years of schooling on wages because the estimate for the latter might be biased. Future research could potentially use data with a broader set of instrumental variables. Third, our dataset is cross-sectional. It would be interesting to examine the effect of pollution regulation on wages over time using panel data. Fourth, we have measured pollution abatement using a dummy variable denoting whether the firm implemented measures to control pollution. Future studies could potentially use actual expenditure on pollution, which is likely to provide more precise estimates.

Table 1 Representativeness of the sample

	Sample	Minhang District	Shanghai
Number of Employee (person)	182.82	202.83	190.38
Sales Revenue (10 thousand RMB)	8896.69	11974.22	12445.22
Profits (10 thousand RMB)	675.27	800.10	866.94
Average Wage of Employees (RMB/month)	2145.55	2383.42	2423.25

Source: The data for Minhang District and Shanghai are from SBS (2008).

Table 2: Descriptive statistics for the sample.

Variable	Does firm take measures to control pollution?		
	No	Yes	Overall
Hourly Wage [a]	11.15	9.74	10.11
(based on employee survey)			
Hourly Wage [b]	8.99	8.01	8.41
(based on firm survey)			
Years of Schooling	11.72	11.22	11.35
Experience	14.76	17.11	16.49
Male (%)	45.32	56.80	53.83
Married (%)	75.37	74.48	74.71
Speak Manadarin well(%)	71.78	61.79	64.37
Good Health (%)	76.85	79.18	78.57
Urban Hukou (%)	55.45	56.72	56.39
Member of Communist Party (%)	4.43	12.85	10.65
Member of Trade Union (%)	34.72	37.82	37.01
Occupation (%)			
Professional/Technician	25.76	20.66	22.01
Producer/Transporter	24.75	23.58	23.89
Service Worker	17.17	15.17	15.70
Equipment Operator	32.32	40.59	38.39
Professional Certification (%)			
No Title	79.50	78.16	78.51
Elementary Certification	13.00	14.38	14.03
Junior/Senior Certification	7.50	7.45	7.46

Ownership Form of Firm (%)			
State/Collective Owned Firm	-	11.88	8.80
Share holding/Public firm	24.63	34.25	31.76
Foreign/Taiwan/HK JV Firm	60.10	33.22	40.18
Private Firms	15.27	20.65	19.26
Number of Respondents	203	581	784
Number of Firms	28	41	69

(a) Difference statistically significant with a p-value of 0.01
(b) Difference statistically significant with a p-value of 0.03

Table 3: Determinants of hourly wages of respondents

VARIABLES	(1)	(2)	(3)	(4)
Firm Takes Measures to Control Pollution	-1.611**	-1.386**	-1.425**	-1.924***
	(-2.449)	(-2.070)	(-2.111)	(-2.806)
Ln(Firm Size)	-0.903***	-1.013***	-1.031***	-0.951***
	(-3.202)	(-3.534)	(-3.570)	(-3.211)
Education	1.141***	1.104***	1.069***	0.962***
	(8.378)	(8.073)	(7.563)	(6.355)
Experience	0.130	0.142	0.132	0.118
	(1.239)	(1.351)	(1.250)	(1.095)
Experience^2	-0.00321	-0.00327	-0.00310	-0.00330
	(-1.402)	(-1.431)	(-1.352)	(-1.417)
Male	2.261***	2.374***	2.315***	2.043***
	(3.810)	(3.992)	(3.859)	(3.219)

Married	1.466*	1.586*	1.556*	1.641*
	(1.715)	(1.855)	(1.815)	(1.875)
Good Health	-0.459	-0.486	-0.479	-0.338
	(-1.197)	(-1.259)	(-1.232)	(-0.851)
Speak Mandarin Well	-0.135	-0.184	-0.213	-0.191
	(-0.195)	(-0.266)	(-0.305)	(-0.271)
Communist Party Member	2.104**	2.120**	2.043**	1.777*
	(2.176)	(2.187)	(2.066)	(1.747)
Urban Hukou	0.187	0.134	0.131	0.436
	(0.264)	(0.190)	(0.184)	(0.597)
Member of Trade Union	-0.0217	0.225	0.213	0.0440
	(-0.0345)	(0.348)	(0.325)	(0.0649)
Ownership Dummies?	NO	YES	YES	YES
Certification Dummies?	NO	NO	YES	YES
Occupation Dummies?	NO	NO	NO	YES
Position Dummies?	NO	NO	NO	YES
Constant	0.172	0.140	0.877	2.876
	(0.0678)	(0.0514)	(0.316)	(0.935)
Observations	605	605	602	569
R-squared	0.229	0.237	0.240	0.303

Notes: Numbers in parenthesis are t-values. ***(**)(*) denotes significance at 10%(5%)(1%)

Table 4: Determinants of average hourly wage in the surveyed firms

VARIABLES	(1)	(2)	(3)
Firm Takes Measures to Control Pollution	-0.987*	-1.096*	-1.136*
	(-1.802)	(-1.855)	(-1.852)
Ln(FirmSize)		0.497	0.408
		(1.555)	(1.220)
Proportion of Female Employees		-1.323	-1.384
		(-0.906)	(-0.873)
Profit/Sales Ratio		2.300	2.468
		(0.921)	(0.966)
Ratio of Blue Collar Workers		-3.325*	-3.465*
		(-1.894)	(-1.914)
Ownership Dummies	NO	NO	YES
Constant	8.997***	9.897***	10.82***
	(21.32)	(6.258)	(5.230)
Observations	69	61	61
R-squared	0.046	0.151	0.174

Notes: Numbers in parenthesis are t-values. ***(**)(*) denotes significance at 10%(5%)(1%)

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