



The determinants of pollution levels: Firm-level evidence from Chinese manufacturing



Liangliang Jiang^a, Chen Lin^b, Ping Lin^{a,*}

^a Lingnan University of Hong Kong, Hong Kong

^b Faculty of Business and Economics, University of Hong Kong, Hong Kong

ARTICLE INFO

Article history:

Received 30 July 2012

Revised 24 July 2013

Available online 15 August 2013

JEL classification:

F4

K4

O1

Keywords:

Pollution

Local protection

Law enforcement

FDI

ABSTRACT

Jiang, Liangliang, Lin, Chen, and Lin, Ping—The determinants of pollution levels: Firm-level evidence from Chinese manufacturing

Using a large, unique, firm-level dataset from the Chinese manufacturing sector, we study important factors that are related to emission intensity for three pollutants in China – sulfur dioxide, wastewater, and soot. Our main findings are as follows: (1) compared to state-owned enterprises (SOEs), both foreign-owned firms and domestic public-listed firms exhibit less intensive pollutant emissions; (2) firms in regions with less local protection have lower pollution intensity; (3) better property rights protection is negatively correlated with pollutant discharge over and beyond the national standards; and (4) larger firms, firms in industries that export more, and firms with more educated employees pollute less. These results suggest that China should not target foreign firms more harshly in its effort to reduce industrial pollution. Better institutions in the form of more effective law enforcement and lower entry barriers across regional markets are also means of curbing China's pressing environmental problems during its current stage of economic development. *Journal of Comparative Economics* 42 (1) (2014) 118–142. Lingnan University of Hong Kong, Hong Kong; Faculty of Business and Economics, University of Hong Kong, Hong Kong.

© 2013 Association for Comparative Economic Studies Published by Elsevier Inc. All rights reserved.

1. Introduction

China has been undergoing a rapid, large-scale economic expansion that has almost no historical parallel. However, its economic miracle has also made it one of the largest polluters in the world. According to a World Bank report, many newly established heavy industry plants in China do not control pollution as effectively as factories in other parts of the world.¹ The deteriorating environmental quality has attracted great attention globally,² and there have been rising concerns whether the remarkable growth of China can be sustained in the long run if the pollution continues to worsen. While policymakers are urged

* Corresponding author.

E-mail addresses: liangliangjiang@ln.edu.hk (L. Jiang), chenlin1@hku.hk (C. Lin), plin@ln.edu.hk (P. Lin).

¹ See *The New York Times*, August 26, 2007. The article offers more details from the World Bank report, such that “Chinese steel makers, on average, use one-fifth more energy per ton than the international average. Cement manufacturers need 45% more power, and ethylene producers need 70% more than producers elsewhere.” Likewise, “Chinese industry uses 4–10 times more water per unit of production than the average in industrialized nations, according to the World Bank.”

² In January 2013, Beijing drew global media attention due to being encased in thick smog with air pollution hazard levels (according to standards set by the United States Environmental Protection Agency) soaring. See *The New York Times*, January 30, 2013.

to take serious action to tackle the pollution problems, for any policy to be effective, a first and foremost question is about targeting: What kinds of manufacturers tend to pollute more and thus should be regulated more intensively? However, due to the lack of high-quality data, there have been very few studies that systematically investigate the determinants of industrial pollution in China.

This research aims to fill in the gap in the literature by compiling a unique firm-level dataset to empirically explore the factors that are associated with pollution intensity in China's manufacturing sectors. This unique dataset has several appealing advantages: (1) it contains information on pollution emissions at the plant level, enabling us to include a rich set of heterogeneous firm-level characteristics that have to be omitted in the industry- or regional- level analyses; (2) compare with the pollution fee paid by a firm that is often used as a proxy for pollution intensity in previous studies, the quantity of pollutants discharged from each plant recorded in our dataset provides a direct and arguably better measure of pollution³; (3) the dataset allows us to examine the determinants of several different types of pollutants, as it has an extensive coverage of pollutants emission information, ranging from waste water (such as chemical oxygen demand and ammonia nitrogen pollutant concentrations), air pollution (such as sulfur dioxide, burned dust, and industrial soot emission concentration), solid waste to noise; (4) unlike other survey data that mostly limits to a specific region of China, this database is nationally representative, covering all of the manufacturing sectors (SIC 4-digit) across all provinces in China; and (5) as the survey on plant pollution had also been implemented for a while, it enables us to test the effects of various ownership types (such as public-listed firms) and local governance on pollution.

In particular, we examine how a firm's pollution intensity is related to the following several major factors. The first factor is firm ownership. One debate is about whether the majority of the pollution is produced by the state-owned enterprises (SOEs) or foreign-owned firms. While no one denies that SOEs are a big source of industrial pollution, foreign firms are often blamed as well and sometimes are even accused of deliberately relocating heavy-polluting industries to China.⁴ However, defenders of foreign firms argue that multinational enterprises often care about their reputation (a negative image in one country may hurt business opportunities in other countries) and would take more responsibility to protect local environment than domestic firms do. Likewise, public-listed companies are also supposed to take extra corporate social responsibility (CSR) on pollution controls because they are subject to the scrutiny of public investors. A countervailing argument is that since pollution reduction is costly and may eventually harm a firm's profitability, listed-firms may not have strong incentives to pursue the CSR on environmental protection (Friedman, 1970). We empirically examine these competing arguments by comparing six different types of ownership of Chinese manufacturing firms and use the state-owned enterprises (SOEs) as the benchmark group. Our regression results show that both foreign-owned and public-listed companies have lower pollution intensity relative to SOEs.

The second potential factor that affects industrial pollution is local protectionism. Although the national environmental regulations (such as the Pollution Discharge Levy System) have been implemented in China since the 1980s, this system does not give enterprises enough incentives to control their emissions (Florig et al., 1995). It has been well documented in the literature that environmental policies are poorly implemented in developing countries often because of malfunctioned institutions (e.g. Dasgupta, 2000; Bell et al., 2002). In the case of China, in order to maintain local tax revenue, create job opportunities, and promote economic growth, local governments have incentives to support local manufactures (many of which are SOEs) through all kinds of favorable policies, including tolerating their heavy pollution and even protecting them from being penalized for making excessive pollution. For example, Lo et al. (2006) argue that the pervasive "pro-growth" priorities of local governments undermine the implementation of environmental policies in China. A testable hypothesis for our analysis is that firms located at places with stronger local protection will produce more pollution. Our empirical results are consistent with this hypothesis.

Third, we hypothesize that better property rights protection is associated with less pollution intensity. The Coasian theory implies that well-defined property rights can help reduce or even eliminate externalities such as pollution (Coase, 1960, 1990). A well-defined and enforced legal system enables individuals to sue the polluting parties more effectively, thereby discouraging pollution.⁵ The Chinese government recently renewed its efforts to strengthen property rights policies and law enforcement to address the weak institution issue. Therefore, it is of particular interest to examine the effect of property rights protection on pollution. We offer evidence that is consistent with theoretical predictions that better property rights protection is negatively associated with pollution intensity, especially when the pollutants discharge level is over the national standard.

Finally, we examine the relationship between pollution and some other firm performance and characteristics, such as firm exporting activities, firm size, and staffs' education level. There is some evidence in the literature suggesting that these factors could also matter for industrial pollution. For example, a recent study by Holladay (2010) finds that exporters generate significantly less pollution than their non-exporting competitors in the same industry, even after controlling for productivity. Weersink and Raymond (2007) argue that more educated people tend to be more capable of expressing their

³ The current levy system functions as a two-part tariff system with a uniform rate for within-standard emissions and increasing rates for above-standard emissions. However, even with a national standard on pollution emission, local authorities can vary the levy level significantly, reducing or even eliminating the discharge fees at the discretion of local regulators under certain inspections (Wang and Wheeler, 2005). This has caused significant variations in pollution discharge fees across regions of China, given identified factory and pollutant emissions. As a result, using pollution fees as a measure of pollutant discharge across China is rather ambiguous and would cause substantial bias in our analysis.

⁴ In 2007, the Chinese government found that Unilever China and the China branch of Hitachi Construction Machinery Co. were discharging wastewater with higher chemical content than permitted (*China Daily*, September 17, 2007).

⁵ Farzin and Bond (2006) document that high-quality political institutions respond favorably to environmental demands from the population.

Download English Version:

<https://daneshyari.com/en/article/5092382>

Download Persian Version:

<https://daneshyari.com/article/5092382>

[Daneshyari.com](https://daneshyari.com)