Contents lists available at SciVerse ScienceDirect

## **Energy Economics**

journal homepage: www.elsevier.com/locate/eneco

# Environmental performance of state-owned and privatized eastern European energy utilities

### Andrew Meyer <sup>a,\*</sup>, Grzegorz Pac <sup>b</sup>

<sup>a</sup> Ohio Wesleyan University, 61 South Sandusky Street, Delaware, OH 43015, United States
<sup>b</sup> College of Business, Alfred University, 1 Saxon Dr., Alfred, NY 14802, United States

#### ARTICLE INFO

Article history: Received 9 December 2011 Received in revised form 13 August 2012 Accepted 22 August 2012 Available online 4 September 2012

JEL classification: P31 Q48 Q53

Keywords: Privatization State-owned enterprises Electricity industry Environmental quality

#### 1. Introduction

There are various reasons why a country may or may not choose to retain public ownership of energy utilities.<sup>1</sup> Using Poland as an example, the Polish Ministry of Economy listed three objectives for its energy industry in 2000: 1) energy security 2) improvement of competitiveness in energy sector and 3) protection of the environment (Jouret, 2006). Polish citizens that are used to state-owned energy utilities might view government control of energy as more secure than private control (Nestor and Mahboobi, 2000). Competitiveness would theoretically improve with privatization (Holder, 2000). However, it is not conceptually clear what the effect of privatization would be on the environment. We aim to investigate this by comparing environmental performance as measured by sulfur dioxide (SO<sub>2</sub>) emissions for privatized and state-owned energy utilities. SO<sub>2</sub> is a pollutant that has relatively well-understood abatement technologies and environmental effects making it a logical choice for examining firm behavior. We concentrate on the energy utility industry because many of the largest emitters of SO<sub>2</sub> are energy utilities and various governments have retained significant ownership in

#### ABSTRACT

Privatization in Eastern Europe has helped in the transition of the region's economies from planned to free market. However, the effects of privatization on the environment are relatively unknown and many firms remain under state ownership today. We compare the environmental performance of state-owned and privatized energy utility plants in Eastern Europe utilizing a novel panel data that includes reported sulfur dioxide emissions, energy input, and ownership status. We find that state-owned plants emit more sulfur dioxide than privately owned plants; this is environmentally significant as privatization is associated with a reduction in emissions of about 55%.

© 2012 Elsevier B.V. All rights reserved.

this sector. The energy sector makes up approximately 95% of Poland's total *SO*<sub>2</sub> emissions (Republic of Poland, 2007).

Beginning in the early 1990's Eastern European governments privatized many firms that were previously under state control. This provided a source of revenue for government and propelled the transition toward a market economy. While some firms were privatized, others remained under state control. Presently, governments continue to contemplate selling state-owned firms in various industries such as telecommunications and electricity generation. Poland is a leading example of the approach that Eastern European governments have pursued. According to Jouret (2006), Poland has privatized ten out of its twenty-three combined heat and power (CHP) plants. Of its dedicated electricity generation plants, Poland has privatized only four and retains sole ownership of 75% of the electricity generation capacity (Jouret, 2006).<sup>2</sup>

Using a novel plant level data set of Eastern European energy utilities, we investigate  $SO_2$  emissions of state-owned and privatized plants between the years of 2004 and 2009. This data set contains virtually all of the electricity generating and CHP plants larger than 50 MWth in Bulgaria, the Czech Republic, Hungary, Poland, and Romania. Approximately 11% of our 320 sample plants switch from state-owned to privatized during our study period. Exploiting this within-plant variation in ownership we find that, all else equal,





<sup>\*</sup> Corresponding author.

E-mail addresses: agmeyer@owu.edu (A. Meyer), pac@alfred.edu (G. Pac).

<sup>&</sup>lt;sup>1</sup> By energy utilities we are referring to electricity generating and combined heat and power plants.

<sup>0140-9883/\$ -</sup> see front matter © 2012 Elsevier B.V. All rights reserved. http://dx.doi.org/10.1016/j.eneco.2012.08.019

<sup>&</sup>lt;sup>2</sup> Note that these statements were accurate at the time but Poland has since privatized more energy utilities.

privatized plants pollute less than state-owned plants. While some previous studies (Cole et al., 2008; Eskeland and Harrison, 2003) utilize energy use as a proxy for emissions, we make use of actual plant level  $SO_2$  emissions as reported to the EU's Environment Agency. This can be an important difference since the correlation of energy use to  $SO_2$  emissions is only about 0.54 in our dataset.

From a policy perspective, it is useful to understand how plant ownership can potentially affect SO<sub>2</sub> emissions. SO<sub>2</sub> can cause acid rain, which damages aquatic ecosystems and soil quality, harms forests, and deteriorates buildings and infrastructure. In addition, SO<sub>2</sub> contributes to respiratory problems as a local and regional air pollutant. The European Union regulates SO<sub>2</sub> emissions because of these adverse consequences. Under several pieces of legislation, including the Large Combustion Plant Directive (LCPD), member countries are obligated to monitor and report emissions and conform to the standards developed in the directive. The LCPD requires member states to limit sulfur dioxide, nitrogen oxide, and particulate matter emissions from combustion plants with a rated thermal input of 50 MWth or more, so there will be an increasing pressure to reduce emissions from energy utilities. Furthermore, the EU member countries still owning a large share of their energy utility plants, such as Poland and Romania, will undoubtedly investigate privatizing more energy utilities in the future. Our results suggest that this privatization could lead to lower SO<sub>2</sub> emissions.

#### 2. Previous literature

The literature on privatization has been extensive over the past twenty years. There are many papers that compare financial performance of state-owned firms to firms that have been privatized. Megginson and Netter (2001) provide a summary of empirical studies that compare performance of state and private firms. These studies largely conclude that privately owned firms are more efficient and profitable than state-owned firms. There are also other studies that look at various aspects of performance of state and private firms, including the impact of ownership on performance (Frydman et al., 1999, 1998).

There are few studies that compare the environmental performance of state and privatized firms. Beladi and Chao (2006) develop a theoretical model where they show that under certain conditions privatization can be harmful to the environment. Cato (2008), shows that privatization in a mixed market industry with high negative externalities can also be harmful to the environment. There is no direct empirical comparison of environmental performance for state-owned and privateowned firms. We do know that more productive firms tend to pollute less (Holladay, 2010) and that private firms are more productive than state-owned firms (Brown et al., 2006; Dewenter and Malatesta, 2001; Megginson and Netter, 2001). This would lead us to a hypothesis that private-owned firms pollute less than state-owned but no formal studies have been conducted. Earnhart and Lizal (2006) examine the effects of ownership structure and financial performance on environmental performance in the Czech Republic. They examine firms from a wide variety of industries and find that state ownership improves environmental performance relative to other ownership structures.

There are several studies that examine how firm ownership impacts the pollution behavior of firms. This literature compares environmental performance of firms based on foreign ownership and domestic ownership; the results are mixed. Collins and Harris (2002) find that foreign-owned plants spend more on pollution abatement technology than do domestically owned firms. Eskeland and Harrison (2003) find that foreign owned firms pollute less than domestically owned firms. In contrast, Cole et al. (2008) utilize a sample of Ghanaian firms and find that foreign ownership is associated with an increased use of electricity. The inconclusive results may stem from the fact that these studies use energy as a proxy for emissions since data on plant emissions are not readily available. Solely examining energy input ignores the differing abatement technologies among firms. Energy use would not, for example, capture the installation of scrubbers or the use of low sulfur coal.

Furthermore, a majority of studies on privatization use data on manufacturing firms since the largest sector that was privatized was manufacturing. Privatization of energy utilities in developing and transitional countries slowly started in the last decade but most of the energy utilities are only now being sold. The environmental impacts of privatizing energy utilities have not been studied. Studies such as Williams and Ghanadan (2006) for developing and transitional countries and Jamasb and Pollitt (2005) for the European Union summarize the current state of reforms and liberalization carried out in the electricity market. No conclusions are presented regarding electricity market reform and its impact on environment.

Several papers have investigated the link between increased environmental regulation and financial performance. The "Porter Hypothesis" states "more stringent regulations initiate innovation in companies" (Brannlund and Lundgren, 2009). According to the Hypothesis, this innovation then translates into better competitiveness and hence better profitability. However, the Porter Hypothesis has not received much theoretical or empirical support. On the contrary, several studies find evidence against the Porter Hypothesis (Brannlund and Lundgren, 2009; Rassier and Earnhart, 2010).

There are also studies that address the restructuring of regulations and the corresponding effects on electricity generation efficiency. For example, Fabrizio et al. (2007) examine the US electricity market to analyze how changing from cost-of-service regulation to market competition impacts the efficiency of investor-owned firms. They focus on estimating production functions to assess efficiency gains from restructuring and incorporate firms' cost minimization. They find that changing to more market oriented environments improves the efficiency of investor-owned electricity firms, while publicly-owned firms that were not impacted by restructuring experience little gain in efficiency; hence competition improves efficiency in this regulated industry. The effect of market restructuring on firms' pollution levels is not addressed.

As noted by Earnhart and Lizal (2006), liquidity constraints play a potentially important role in a plant's environmental performance. Plants with poor past and present profitability will have more difficulty obtaining external financing. Moreover, if a plant is constrained in its access to capital markets, it needs to utilize internal financing from retained profits to undertake capital investments. Thus, a plant with negative or poor profitability experiences significant liquidity constraints. There may be plants that would like to invest in pollution abatement technology but are prevented from doing so due to lack of financing. Since this constraint lessens as profitability increases, plants with greater profitability will be able to undertake desired capital investments. There is evidence from Uliasz-Bochenczyk and Mokrzycki (2007) that Polish plants were investing in desulfurization facilities during our study period so it appears that plants were in fact interested in enhancing environmental performance with capital projects.3

Uliasz-Bochenczyk and Mokrzycki (2007) examine the emissions from the Polish power industry. They note that "numerous investments in new devices in the Polish professional power industry are being carried out or the existing devices updated, ..., resulting in reduction of harmful emission into the environment." They state that Polish  $SO_2$  emissions have decreased from 1,221,992 Mg in 1995 to 679,849 Mg in 2005. Also, desulfurization facilities in Poland increased from 1 to 31 between 1998 and 2005. Therefore, there is evidence that some firms in our study area were in fact investing in  $SO_2$ abatement technology during our study period.

<sup>&</sup>lt;sup>3</sup> We unfortunately do not have sufficient financial information to test whether or not profitability affects emissions in this paper.

Download English Version:

## https://daneshyari.com/en/article/5065177

Download Persian Version:

https://daneshyari.com/article/5065177

Daneshyari.com