



Foreign direct investment, institutional development, and environmental externalities: Evidence from China



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ABSTRACT

The question of how foreign direct investment (FDI) affects a host country's natural environment has generated much debate but little consensus. Building on an institution-based theory, this article examines how the institutional development of a host setting affects the degree of FDI-related environmental externalities in China (specifically, industrial sulfur dioxide emissions). With a panel data set of 287 Chinese cities, over the period 2002–2009, this study reveals that FDI in general induces negative environmental externalities. Investments from OECD countries increase sulfur dioxide emissions, whereas FDI from Hong Kong, Macau, and Taiwan shows no significant effect. Institutional development reduces the impacts of FDI across the board. By focusing on the moderating role of institutions, this study sheds new light on the long-debated relationships among FDI, institutions, and the environments of the host countries.

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1. Introduction

Based on the common belief that foreign direct investment (FDI) benefits its host economies, governments of emerging economies such as China have granted FDI a high priority on their development agenda. Often they offer a wide array of incentives—including subsidies, lower taxes, duty exemptions, and local market access (UNCTAD, 2001)—with the expectation that any FDI they attract will contribute positively to the local economy due to technology transfer, management know-how, global market access, and industrial competitiveness (Blomström and Kokko, 1998; Javorcik, 2004). However, the potential effects of FDI on host countries' natural environments remain controversial (Meyer, 2004). This question holds great importance, especially considering expanding worldwide initiatives to address environmental concerns.

Researchers offer competing hypotheses about FDI's environmental externalities. For example, one stream of literature suggests a possible asymmetry between foreign and local environmental standards that attracts dirty industries to developing countries, because multinational companies are motivated to reduce the pollution abatement costs associated with their operations. This perspective represents the “pollution haven hypothesis,” according

to which FDI aggravates pollution (Mani and Wheeler, 1998; Bommer, 1999; Cole, 2003, 2004; List et al., 2003; Levinson and Taylor, 2008; Lan et al., 2012). In contrast, some researchers claim that FDI diffuses best management practices and advanced environmental technologies, creating “pollution halos” in developing countries and thereby reducing pollution (Christmann and Taylor, 2001; Eskeland and Harrison, 2003). These conflicting views cite evidence in support of each direction, and to date, little consensus has been achieved.

The unsettled question results in part from the lack of a well-defined framework to explicate the institutional contexts for FDI's environmental externalities. Existing economics literature largely focuses on empirical examinations of the processes by which FDI exerts an impact on environments, namely, through changes in economic scale, industrial composition, and techniques (Grossman and Krueger, 1995; He, 2006). This approach is similar to the one economists have used to explore the dynamics by which economic development (Grossman and Krueger, 1995) and trade liberalization (Antweiler et al., 2001; Copeland and Taylor, 2004) influence the environment. Although this process-oriented approach documents various environmental externalities due to the inflow of FDI, it largely ignores the role of local institutions in the FDI–environment relationship, despite increasing evidence that institutions are critical influences on FDI-related strategic choices (Dunning and Lundan, 2008; Cantwell et al., 2010). In this realm, previous research on FDI fruitfully explores how institutional factors, such as

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environmental standards, corruption, and democracy, affect the location and environmental behavior of multinational companies (Eskeland and Harrison, 2003; Javorcik and Wei, 2004). However, this institution-based perspective is yet to be fruitfully exploited in investigating the consequences of FDI on a host country's environment, which represents a significant gap in our understanding.

In response, with this study we ask: Does FDI generate significant impacts on the environment in China, and if so, in what direction? Do institutions matter for FDI's environmental impact? How does FDI with different ownership origins—such as investments originating from Hong Kong, Macau, or Taiwan versus those from other countries—differ in its environmental impacts or the way it gets affected by institutions? We consider these questions in the context of 287 Chinese cities over the period 2002–2009,¹ which offers an apt study context for several reasons. First, China has been one of the greatest FDI recipients since 1990s, featuring steady growth in FDI inflows, unlike the sluggish performance exhibited in some OECD economies. But this remarkable progress seems to parallel some serious environmental pollution problems and the influence of FDI on China's environment is still unclear (Dean et al., 2009; Wei et al., 2012). According to one study, two-thirds of Chinese cities fail to meet the air quality standard established by China's Environment Protection Agency, which means that more than three-quarters of its urban population suffers from seriously polluted air (He, 2006). The simultaneous momentum in FDI inflows and aggravated environmental conditions suggests the need to investigate the FDI–environment link using a comprehensive, updated data set.

Second, emerging economies such as China experience fundamental institutional changes across multiple dimensions, such as legal systems, regulatory frameworks, intermediary sectors, and the role of governments (Xu, 2011; Yang and Wu, 2012). Such institutional changes coevolve with the countries' economic development and significantly shape the ways that multinational firms behave in host countries (Cantwell et al., 2010). International business (IB) researchers note that though institutions shape the markets of all countries, their impacts are most salient in emerging markets, whose institutions are in transition and constantly evolving (Peng et al., 2008). In addition, China is characterized by a regionally decentralized, authoritarian system (Xu, 2011), in which subnational governments have overall responsibility for local economic growth and for initiating and testing new policies and reforms. The resulting differences in institutional development provide a unique, within-country setting for examining how institutions affect FDI's environmental impacts.

Third, we find two main types of foreign investors in China: overseas Chinese investors from Hong Kong, Macao, or Taiwan (HMT) and other foreign investors, mainly from OECD countries. Previous literature has documented greater productivity spillovers by OECD investors, because of their generally superior technology and innovation capabilities (Wei and Liu, 2006; Buckley et al., 2007). However, few studies assess the environmental consequences of each type of FDI. In particular, we cannot specify how the clustering patterns of investors from different source countries might differ in their environmental impacts or their interactions with institutional forces. This study makes an initial attempt to examine these issues.

Furthermore, this study contributes to literature pertaining to FDI's environmental externalities. In particular, we build on an institution-based view and find that the environmental externalities of FDI are subject to the host country's own institutional development. In places with more developed institutions, the potential damage of inflowing FDI can be mitigated. However, in places with underdeveloped institutions, the potential damage may be magnified. This new perspective partly resolves the inconsistent findings in previous literature that suggest FDI's environmental impact is positive, negative, or insignificant. In addition, we amass large-scale panel data (2002–2009) from multiple data sources, including the *Urban Statistical Yearbooks of China*, China's Environmental Protection Agency, and National Economic Research Institute, to provide insights into this topic. Finally, our analysis of how institutions interact with FDI of different origins provides several fine-grained implications for host governments, in terms of their potential reform and development of local institutions and more discriminant management of FDI.

2. Conceptual framework and hypotheses

2.1. FDI and the environmental externality

The growing importance of FDI as an engine for economic growth has prompted considerable debate about its other impacts, including on the environment. Literature on the relationship between FDI and the environment has pointed to both positive externalities through a pollution halo effect (Birdsall and Wheeler, 1993; Vogel, 1995; Antweiler et al., 2001; List et al., 2003; Levinson and Taylor, 2008) and negative externalities through a pollution haven effect (Leonard, 1988; Low and Yeats, 1992; Mani and Wheeler, 1998; Bommer, 1999; Cole, 2003, 2004). Central to debates about FDI's environmental externalities are economic processes, including growth (scale effect), industrial composition (structural effect), and environmental technology spillovers (technique effect) (Grossman and Krueger, 1995).

Scale effect is a pollution-increasing factor. It indicates the increase in pollution that would be generated if the economy were simply scaled up, holding constant the mix of goods produced and production techniques (Antweiler et al., 2001). The structural effect is associated with changes in the patterns of economic activity, such that it might imply positive or negative environmental externalities (Araya, 2005). The FDI-related transition in OECD countries from manufacturing to services could be beneficial from an environmental viewpoint, because services tend to be less pollution-intensive than traditional industrial activities (OECD, 2001). Or this transition could lead to the relocation of manufacturing industries from developed to rapidly industrializing countries, which ultimately might induce negative environmental externalities (Araya, 2005). Furthermore, the structural effect comprises two forces related to environmental regulation. On the one hand, relatively lax environmental regulations in emerging markets attract the inflow of dirty foreign capital, leading to a greater proportion of polluting sectors in industrial composition. On the other hand, emerging markets' rich endowment in cheap labor may allow less polluting, labor-intensive industries to expand due to FDI inflows (He, 2006). The ultimate structural transformation and subsequent environmental externalities likely depend on the contrast between these two forces in the host economy (Copeland and Taylor, 2004). The technique effect refers to positive spillovers from the use of environmentally friendly technology. Direct technique effect denotes the transfer of advanced environmental technology through collaboration and cross-nation diffusion of technological innovation (OECD, 2001; Zhu et al., 2007). Indirect technique effect arises when FDI enhances economic growth and hence a wealth increase

¹ As a key indicator of environmental condition, sulfur dioxide emission data have been published by the Environmental Protection Agency and National Bureau of Statistics since 2002. The institutional data were published by the National Economic Research Institute during 1997–2009. Therefore, the longest window of data available to examine the relationships among FDI, institutions, and environmental externalities in our study context was 2002–2009.

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