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Research Paper

Do China's economic development zones improve land use efficiency? The effects of selection, factor accumulation and agglomeration

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HIGHLIGHTS

- Land-use efficient firms tend to cluster in economic development zones.
- Development zones present the effects of selection, factor accumulation and agglomeration.
- FDI spillovers significantly enhance firms' land efficiency in development zones.
- Firm heterogeneity affects firm land use efficiency.

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ABSTRACT

China's so-called "development zone fever" has been criticized for leading to inefficient land use. This study aims to explore whether and how economic development zones improve land use efficiency. Using land use data on Shanghai's electronics firms for 2003–2008, this study finds that the average output per land unit of firms within development zones is significantly higher than that of their counterparts outside development zones. Spatial hotspot analysis indicates that land-use efficient firms tend to cluster in development zones. Econometric results suggest that selection effects contribute to the higher levels of land use efficiency of firms in development zones. After controlling for selection effects, both factor accumulation effects and agglomeration effects have impacts on the land use efficiency of firms located in development zones. This study provides empirical justification for the establishment of economic development zones in China.

1. Introduction

China's development zone policy is different from the traditional place-based policies of developed economies, which mainly seek to develop or revitalize laggard regions such as deteriorating downtown business zones and underperforming areas (Glaeser & Gottlieb, 2008; Neumark & Kolko, 2010; Neumark & Simpson, 2014). China's development zones were initially designed to attract foreign direct investments (FDIs) and promote regional economic development (Ge, 1999; Park, 1997; Zhang, 2011), which resulted in a geographically uneven economic, political and institutional landscape. In 1984, China established its first economic development zone in Dalian, and by 1985, it had set up a series of development zones in thirteen coastal cities. The central government enabled development zones with a variety of favorable policies, such as tax credits, cheap land and technological assistance (Lai, Peng, Li, & Lin, 2014; Tu, Yu, & Ruan, 2014). In short, economic development zones have played a vital role in attracting FDIs and boosting China's international trade. For instance, in 2008, 54 national-level economic development zones received US$ 19.5 billion in FDIs and generated US$385.5 billion in output value, accounting for 21% and 15% of China's national totals, respectively (Zhang, 2011).

The success of national development zones encouraged local governments at various levels to build up their own economic development zones, giving rise to the so-called "Development Zone Fever" of the last three decades (Cartier, 2001; Zhang, 2011). This "Fever" was due not only to inter-jurisdictional competition for investments but also to weak institutional capacity, weak governance, and abuses of policy and administrative systems in a transitional socialist economy (Cartier, 2001; Huang & Yang, 1996;

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Yeh & Wu, 1996). In 1996, the number of economic development zones reached 4120. By 2003, it had rocketed to 6866, with a total planned area as large as 38,600 square kilometers. However, this rapid expansion of development zones led to a variety of problems, including loss of agricultural land, uncontrolled urban sprawl, leapfrog development and environmental exploitation (Ding, 2007; Ding & Lichtenberg, 2011; Han & Wu, 2004; Ng, 2003). In response to such uncoordinated growth, the central government had to intervene: in 2006, it introduced a directive, according to which only 1568 development zones were approved and allowed to remain (Zhang, 2011). In other words, approximately 75% of preexisting development zones were required to either restructure or shut down.

As noted above, some recent studies have focused on the negative and positive roles of development zone policies at the macro- and meso-levels (Walcott, 2002; Walcott & Xiao, 2000; Wei & Leung, 2005; Wang, 2013), while others have examined the impact of development zones at the micro-level (Chen, Wu, & Lin, 2006). For example, Yang, Motohashi, and Chen (2009) confirmed that development zones increased firms' economic performance. Recent literature has not only investigated knowledge spillovers between firms located inside development zones (Luo, Liu, Wu, Zhu, & Jin, 2015) but also argued that development zones have affected the growth of retail activities, as well as real estate pricing and construction, in their vicinities (Zheng, Sun, Wu, & Kahn, 2015). Although development zone policies are traditionally seen as a tool to help developing countries accelerate their progress and industrialize quickly (Heiduk & Pohl, 2001), some theoretical and empirical studies increasingly criticize such policies for giving rise to agricultural land loss and inefficient land use—the dark side of the so-called "development zone fever" (Cartier, 2001; Huang & Yang, 1996). The areas designated for the use of development zones can be large, and the area of the actual land used can be substantially larger. Punishment for exceeding land use quotas in development zones is rare (Wei, 2015), which might contribute to the low level of land use efficiency in development zones. However, despite the negative reputation of development zones, there has been little effort to systematically examine the land use efficiency of development zones at the firm level, possibly due to the lack of micro-level data. Whether and how economic development zones improve or reduce land use efficiency merits further empirical investigation. Without firm-level analyses, the underlying mechanisms cannot be fully understood.

This study seeks to fill this gap by examining the land use efficiency of electronics firms located in development zones in Shanghai. The location of Shanghai City in the People's Republic of China is shown in Fig. 1. Shanghai is chosen because China's development zones are efficiency-oriented to capitalize on globalization; thus, they tend to locate in highly developed, highly globalized, and highly ranked administrative centers, such as centrally administered municipalities (e.g., Shanghai) and provincial capitals (e.g., Hangzhou), particularly in coastal China (Wei, 2015). The electronics industry is selected not only because of data availability but also because most of China's development zones are heavily concentrated in coastal cities, which host a large number of export-oriented industries. The electronics industry is a typical export-oriented industry that is often seen in development zones. Specifically, by utilizing various types of development zone policies, Shanghai's local government has enticed a massive inflow of FDIs, transforming Shanghai into a global city (Wei & Leung, 2005). This paper focuses specifically on Shanghai's electronics industry because it is one of the city's dominant industries and accounts for more than 20% of Shanghai's total output (Shanghai Statistical Bureau, 2008). Based on land use data on Shanghai's electronics firms from 2003 to 2008, this study shows that the average output per land unit of firms within development zones is significantly higher than that of their counterparts located outside development zones. Spatial hotspot analysis also indicates that land-use efficient firms tend to cluster in development zone areas. Econometric results suggest that the high level of land use efficiency in development zones is due in part to selection effects. After controlling for selection effects, both factor accumulation effects and agglomeration effects are found to be responsible for the differences in land use efficiencies between firms inside and outside development zones. This paper notes that, from a theoretical perspective, those three types of effects work together and co-shape land use efficiency in development zones. Empirically, we seek a brighter future for developing economies and show that they can industrialize by establishing development zones. Therefore, developing economies should think about how to improve the management of development zones rather than completely abandon them due to recent criticisms of "development zone fever".

This study contributes to the existing literature in several ways. First, existing studies tend to employ economic productivity and other macro-level indices to evaluate the economic performance of development zones, while this paper pays more attention to firm-level land use efficiency and notes the outstanding performances of firms in development zones from a micro-level perspective. Given China's rapid loss of arable land during its urbanization and industrialization, our emphasis on micro-level land use efficiency is of particular importance. Second, this study proposes an analytical framework to understand the underlying mechanisms of land use efficiency in China's development zones, which stresses the need to take into account selection effects, factor accumulation effects and agglomeration effects. Third, this study strongly indicates the presence of knowledge spillovers in development zones, particularly for foreign firms. Finally, this study shows that land use efficiency in development zones is also conditioned by firm ownership. Although state-owned enterprises (SOEs) are often seen as less efficient, this study suggests that, in development zones, the land use efficiency of state-owned enterprises (SOEs) is not significantly different from that of firms of other ownership types.

2. How do economic development zones make sense in China? An analytical framework

Unlike place-based policies in developed countries, which are commonly implemented to develop or revitalize underperforming areas (Neumark & Simpson, 2014; Neumark & Kolko, 2010), economic development zone policies in China are considered a way to stimulate the spatial (re)organization of industries (Chou & Lin, 2007; Luo et al., 2015; Sutherland, 2005). Specifically, economic development zones are established to attract FDIs, create employment, expand production, and promote economic growth in China (Cheng, van Oort, Geertman, & Hooimeijer, 2013; Walcott, 2002; Wang, 2013). Local governments compete with one another for investments in their development zones. Meanwhile, domestic – and especially foreign – investors take advantage of government development zones by searching for the most favorable policies, cheapest land, and best tax credits and by playing local governments in China against each other. Hence, local governments are forced to offer premium policies to investors in order to outperform other local governments in terms of economic growth and development (Zhang, 2011). Because many policies that are favorable to investors are restricted to economic development zones, firms located in development zones can earn "policy rent" (Zheng, Gao, & Hu, 2008). Studies have found that the production costs of firms located in development zones have been lowered due to these firms' easy access to better infrastructure and other privileges. Additionally, the higher efficiencies of these firms have, in