Habitat International 56 (2016) 63–73

Contents lists available at ScienceDirect

Habitat International

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

A comparative study of land efficiency of electronics firms located within and outside development zones in Shanghai

Zhiji Huang [a], Canfei He [b, c, *], Y.H. Dennis Wei [d]

[a] School of Government, Central University of Finance and Economics, Beijing, 100081, China
[b] College of Urban and Environmental Sciences, Peking University, Beijing, 100871, China
[c] Peking University-Lincoln Institute Center for Urban Development and Land Policy, Beijing, 100871, China
[d] Department of Geography, University of Utah, Salt Lake City, UT84112-9155, USA

ARTICLE INFO

Article history:
Received 29 January 2016
Received in revised form
3 April 2016
Accepted 26 April 2016
Available online 5 May 2016

Keywords:
Development zones
Electronics firms
Land use efficiency
Comparative study
Firms' attribute
Shanghai

ABSTRACT

The establishment of development zones is a vital strategy for attracting foreign direct investments and developing high-tech industries in China. Due to the absence of firm-level land use data, it is unclear whether firms located within development zones consume land more efficiently than their counterparts outside development zones. To fill this gap, this study compares land use efficiency of electronics firms located within and outside development zones in Shanghai. Results indicate that electronics firms within the development zones are significantly more efficient in land uses compared to those outside development zones. This study further shows that the nature of development zones and firms' attributes both condition land use efficiency of firms. This study highlights that the higher land efficiencies of firms in development zones are linked to governmental supports, technological externalities and international linkages.

1. Introduction

Market liberalization and state intervention have been two main concurrent drivers of China's economic success since the 1980s (Wu, Xu, & Yeh, 2013). Market liberalization has been intensified by economic decentralization and increasing openness to international trade. Meanwhile, state intervention remains a strong influence on the economy, especially through political centralization and special industrial policies (He, Zhou, & Huang, 2015). In the context of state intervention, the establishment of development zones has been described as the exploration of place-based policies. The role of development zones has drawn much attention from scholars because China has attained tremendous economic growth since the 1980s (Luo, Liu, Wu, Zhu, & Jin, 2015; Wang, 2013; Wei & Leung, 2005).

Traditional place-based policies explicitly target disadvantaged geographic areas within a country using special treatments, such as tax subsidies, public investments and special rules in order to attract high-quality firms. This results in the allocation of talent, capital and technologies to foster economic growth in lagging regions (Luo et al., 2015). As an important place-based policy, China's development zones have been established for different reasons. They were initially attempted by the Chinese government to test the seeds of capitalism within a socialist framework in coastal areas (Zeng, 2011). Indeed, development zones in China are government-designated areas for industrial and commercial developments (Zhang, 2011) and normally established through a "top-down" approach by governments (Zeng, 2010). Once established, these enclaves act as prime engines for economic transformation in China.

Whether or not development zones have accelerated China's economic growth and structural transformation has been hotly debated recently. This question remains a primary concern for the state as it considers a range of development policy alternatives (Schimnke & Biesebroeck, 2013; Wang, 2013; Yang, Motohashi, & Chen, 2009). Early studies usually yield a positive assessment of the impact of special economic zones on economic development, including attracting foreign direct investments and promoting technological upgrading (Ge, 1999; Park, 1997). However, more recent studies have questioned these findings, pointing to negative

* Corresponding author. College of Urban and Environmental Sciences, Peking University, Beijing, 100871, China.
E-mail addresses: huangzhiji@cufe.edu.cn (Z. Huang), hecanfei@urban.pku.edu.cn (C. He), wei@geog.utah.edu (Y.H.D. Wei).

http://dx.doi.org/10.1016/j.habitatint.2016.04.007
0197-3975/

impacts of development zones on land resources as “development zone fever” (Cartier, 2001; Ding, 2007; Wei, 2015a; Yang & Wang, 2008). The net effect of development zone policy is still undetermined (Walcott, 2003). Most existing studies of Chinese development zones focus on macro-level outcomes (Liu & Wu, 2011). Analyst of micro-economic impact of development zones is less prevalent, in part because of the absence of available data. Thus, whether firms within development zones are more efficient than firms outside remains an open question.

This paper explores the impact of development zones on firms' efficiency based on data of electronics firms in Shanghai. This study answers the question of whether firms in development areas show higher land use efficiency than firms located outside development zones. Using T-test analysis, this study finds that output per unit of land for firms within development zones is shown to be significantly higher than for those outside the development zones, indicating the benefit of development zones on firm efficiency. The findings are robust in considering the nature of development zones and firms' attributes, and in regard to selection bias. We attribute the efficiency gains to supportive governmental policies, technological externalities and external accessibility. We make several contributions to the related literature.

Firstly, this is one of the first attempts to use firm-level land use efficiency indicators to evaluate the economic impact of development zones. The existing literature usually focuses on GDP growth, R&D productivity, patents, employment or new products as a measure of policy influence (Wang, 2013). As land resources for economic development have been increasingly tightened and numerous policies have been implemented to intensify land utilization in China, it is critical to evaluate the land use efficiency in development zones (Lin & Ho, 2005; Xu, Tang, & Chan, 2011; Zhu, 2004).

Secondly, the study applies econometric modeling to evaluate the impact of development zones on firm efficiency so that the selection effects can be controlled. Selection effects refer to that more efficient firms are likely to enter development zones, for a lot of measures have been established by local governments to attract large firms and prevent inefficient firms. Indeed, we do find significant selection effects in development zones.

Thirdly, this study goes further to evaluate land efficiencies for firms in development zones at the national and provincial levels and for those in Economic and Technological Development Zones (ETDZs, *Jingji Jishu Kaifaqu*) and in High-tech Industry Development Zones (HIDZs, *Gaoxin Jishu Kaifaqu*). We report significant efficiency difference for development zones at different levels and in different kinds.

Finally, this study proposes an integrated framework to explore mechanisms of higher land use efficiency in development zones, including governmental supports, technological externalities and international linkages. We primarily test these mechanisms and find the expected outcomes.

2. Literature review

2.1. Theoretical and empirical literature

Why do in-zone firms generally show better performance in regard to economic efficiency? Theories indicate that regional factors may be the drivers. The benefits of technological externalities are largely seen as the main reasons for in-zone firms experiencing higher R&D productivity (Yang et al., 2009). Technological externalities can be attributed to three sources: domestic technology externality, regional technology externality and international technology externality. In addition, the expanding globalization that affords entry for these firms' exports into world markets is an important factor (Yeung, Lee, & Kee, 2009). Aggarwal (2010) argues that the theories of agglomeration economies and global value chains should be integrated to explain the rationale and contribution of development zones. Moreover, the clustering of firms in a development zone is assumed to generate additional benefits, such as inter-firm networks (Poon, 1998) and technological spillovers (Pfirrmann, 1995). These positive technological externalities are likely to contribute to enhancing economic efficiency of those firms located in development zones.

In empirical studies, there are two main foci of studies regarding the impact of development zones. One focuses on the impact of development zones on urban and regional development at the macro-level (Ratinho & Henriques, 2010). Alder, Shao, and Zilibotti (2013) report that the establishment of a state-level special economic zone can lead to a 20% increase of GDP. According to Cheng and Kwan (2000), as well as Graham (2004), provinces hosting special economic zones attract significantly more foreign direct investments (FDIs) than other provinces. Wang (2013) also shows that areas affected by Special Economic Zone (SEZ) policy increase foreign direct investment per capita by 58%, mainly in the form of foreign-invested and export-oriented enterprises.

The second focus is the impact of development zones on in-zone firms, which is more based on micro-level. Using panel data for New Technology-Based Firms (NTBFs) located within and outside the Hsinchu Science Industrial Park (HSIP) in Taiwan, Yang et al. (2009) show that the elasticity of R&D with respect to the output of firms located within HSIP is significantly higher than that of other firms. This positive effect is also significant in European regions. For example, Urriago, Barge-Gil, Modrego, and Paraskevopoulou (2011) indicate that Spanish science and technology parks have a strong and positive impact on the probability and amount of product innovation achieved by firms located within these parks. Using Finnish data during 1970–2002, Squicciarini (2008) finds that park tenants exhibit a competitively better performance on patents. Siegel, Westhead, and Wright (2003) show that firms located in university science parks have slightly higher research productivity than observationally equivalent firms not located in university science parks. Colombo and Delmastro (2002) has not only noticed the advantages of incubators on attracting entrepreneurs with better human capital, but also reported that incubator firms show higher growth rates than their outside-incubator counterparts.

There are a few studies examining the impacts of development zones in China. For instance, Schminke and Van Biesebroeck (2013) find that firms locating in ETDZs achieve much higher export values and firms located in Science and Technology Industrial Parks (STIPs, *Keji Gongye Yuanqu*) perform the best on quality dimensions and have more success in exporting to high-income countries. However, not all studies host the positive attitude towards development zones. For example, Hu (2007) finds that a higher number of firms correlate negatively with labor productivity growth in STIPs. Zhang and Sonobe (2011) argue that within STIPs, congestion effects may outweigh agglomeration effect on productivity, and some are concerned about the lack of strategic coupling between foreign and domestic enterprises (e.g., Wei, 2015b).

2.2. Why firms in development zones have higher land-use efficiency

Despite the ambiguous results reported in previous studies, we argue that firms located in development zones may nevertheless enjoy better land efficiency due to the benefits of policy privilege, international linkages and technological externalities.