



Intra-metropolitan location of foreign direct investment in Wuhan, China: Institution, urban structure, and accessibility



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ABSTRACT

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Coastal cities have been at the forefront of China's economic reform and open-door policy. However, regional differences in cost and income have prompted the government to encourage interior development since the late 1990s. Foreign direct investment (FDI) is one of the most mobile forms of capital and is a key agent of urban spatial transformation in China. This paper examines intra-metropolitan location of FDI location in interior China through a study of Wuhan, the largest metropolitan area in central China and the gateway to China's north-south and east-west linkages. We find that FDI in Wuhan has become more concentrated over time and is centralized on the Wuhan Economic and Technological Development Zone, a national development zone. Combining the logistic model with geographically weighted regression, we examine the effects of institution and urban structure, in addition to the orthodox location factors (accessibility) on the FDI location. We find that FDI in Wuhan is a result of interaction among institution, urban structure, and accessibility. Also, easy access to road and the central business districts (CBDs) has positive impacts on the FDI location. Last, the importance of urban spatial structure is identified through the significance of the traditional auto industrial base, Hanyang, in the FDI location.

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Introduction

Three decades of economic reforms and open door policies have made China the second largest (the largest in 2003) recipient of foreign direct investment (FDI) in the world (UNCTAD, 2013). As such, China's FDI policies merit a closer look. China's economic reform and openness to FDI has been a spatially varying process over the last three decades. Open door policies were firstly applied to special economic zones and coastal cities in the 1980s, and expanded to a few inland cities in the 1990s. The central government encouraged integrated regional development by initiating the *Great Western Development Strategy* in 1999, the *Northeast China Revitalization* in 2003, and the *Rise of Central China Plan* in 2004. At the same time, coastal development and rising demand have caused a shortage of natural resources and rising costs of production in coastal cities (Chibamba & Li, 2008). Such changes in both inland and coastal areas prompt the increasing attractiveness of interior cities to FDI. It is necessary and important to examine spatial patterns and determinants of FDI in inland cities.

Existing studies of FDI focus on coastal cities, and in terms of scale, interprovincial level and intercity level (Lin, Wang, Zhou, Sun, & Wei, 2011; Zhou, Sun, Wei, & Lin, 2011), paying little attention to FDI location at the intra-metropolitan level. Also, the effect of the urban spatial structure, which provides an important physical framework for foreign investment at an intra-metropolitan level, has rarely been studied. Moreover, few quantitative researches that do exist use aggregated data to explain individual firm behavior, not reflecting the heterogeneity of location choices of FDI. This study analyzes the characteristics and processes of FDI location in an inland area through a study of the Wuhan metropolitan area, China's largest inland transportation hub and information center. Based on the 2008 economic census, this research uses spatial statistics and geographic information systems (GIS) to examine spatial-temporal patterns of FDI within Wuhan. It integrates a logistic model with geographically weighted regressions to investigate FDI locational determinants, paying special attention to the varying role of urban spatial structure and its interaction with agglomeration and institution. The objectives of this research are to map the shifts in patterns of FDI within Wuhan since 1990 and assess the effectiveness of relevant policies, to examine the influence of urban spatial structure and its interaction with agglomeration and institution in FDI, and to evaluate the effects of different accessibility.

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Analytical framework and research context

Location theories have been evolved over time. Neoclassical location theory advances a core-periphery pattern, focusing on the significance of accessibility to the central business district (CBD), transportation, and infrastructure in the investment costs (Alonso, 1964). New economic geography provides a new explanation on the concentration of firms through agglomeration effects of investment, emphasizing the positive externalities of increasing return (Krugman, 1991). In addition, the notion of polycentricity maintains that the urban spatial structure defines the characteristics of development sites and thus influences locational decisions of firms (Shukla & Waddell, 1991). Especially within a city with several centers, the traditional center has seen a declining attraction to new firms, while emerging new centers have increasingly attracted them. In recent years, institutional economics has discovered the significance of institution in FDI location (Dicken, 2007). These theories have influenced the policies and research on China's FDI, but they were developed primarily to explain FDI location in Western capitalist cities and therefore could be limited in explaining FDI location in Chinese cities, which have different urban spatial structure and are experiencing rapid urbanization and institutional transition to a market economy. The literature on FDI location within Chinese cities is very limited due to the limitation of data availability. This research is conducted under the framework of institution, urban structure, and accessibility in explaining FDI location.

Institution

New institutional economics focuses on the role of social and legal norms and rules in economic activity. It recognizes that transaction costs are a significant part of investment. Institutions matter for transaction costs in FDI (Coase, 1960). The internalization theory of FDI interprets how institutional market imperfections and market transaction costs may be internalized by multinational enterprises (MNEs) through FDI to minimize investment costs (Buckley & Casson, 1991; Rugman, 1980; Vernon, 1966). It is widely used in explaining the investment motives of firms.

The important role of institutions in foreign investment is highlighted in Chinese context (Wei & Liefner, 2012; Zhou & Wei, 2011). Research on institutional effects mainly focuses on the significance of economic and technological development zones (ETDZs) in FDI location. Wei, Leung, Li, and Pan (2008) and Wei, Luo, and Zhou (2010) find that development zone authorities are a significant force influencing the intramunicipal location decisions of MNEs in Hangzhou and Nanjing, respectively. These development zones provide financial incentives, industrial infrastructures, and quality administration to modulate risks, support operations, and enhance investment environments (Wei et al., 2008). Similarly, Wu (1999) and Wu and Radbone (2005) find the positive impacts of ETDZs in Guangzhou and Shanghai, respectively. However, these existing studies did not assess and evaluate the effectiveness of certain national development strategies and policies in attracting FDI within a metropolitan area. Although there has been extensive research on the success of open policies in coastal cities, little is known about the effectiveness of national policies on FDI in inland cities when national policies toward these cities are changing.

The central government initiated the *Rise of Central China Plan* in 2004, which proposed the idea of the Greater Wuhan Megalopolis, consisting of Wuhan and eight surrounding cities, in order to create a competitive economic region in Central China. In 2005, Wuhan became a strategic pillar city and played a leading role in the *Rise of Central China Plan*, and specific policies were implemented later. In December 2005, the Ministry of Commerce issued *Opinions*

Regarding Attracting Foreign Investment and Promoting the Rise of Central China. The following year, the State Council issued *Opinions Regarding Promoting the Rise of Central China Plan*, and in 2007, the General Office of the State Council issued a notice that 26 cities in Central China were given the same preferential policies as those implemented in the *Great Western Development Strategy* and the *Northeast China Revitalization*. Wuhan is one of these 26 cities. One of the aims of these opinions and notices is to strengthen modern equipment manufacturing bases, including auto and auto parts, and promote rapid development of development zones through the encouragement of investment by private enterprises and foreign enterprises. Incentives were provided to achieve this aim in terms of capital and land. They included fiscal and tax incentives, which increased the fiscal transfer payment to help undertake industrial transfer projects. Also, China Development Bank provided a discounted loan of 15 billion Yuan to basic infrastructure projects in national development zones in Central China. For encouraged projects in the categories of foreign investment, the imported equipment for their own use was duty free. There were also land incentives, which increased the quota of land for urban development and gave higher priority to land use in the industrial parks.

Wuhan has experienced a series of institutional changes since being opened as one of the five open cities along the Yangtze River by the central government in May 1992. Two national development zones, the Wuhan East Lake High-Tech Zone (Wuhan ELHTZ) and the Wuhan Economic and Technological Development Zone (Wuhan ETDZ) were established in 1988 and 1991, respectively. The Wuhan ELHTZ, referred to as 'Optics Valley of China,' focuses on the optical electronics, telecommunication, information, and biology sectors, while the Wuhan ETDZ is a manufacturing base for auto and auto parts. Additionally, each district in Wuhan established its own local development zone in the 1990s. Compared to the national development zones, these local development zones are considered to be local economic development tools and are more related to local interest within a metropolitan area. In 2010, the Wujiashan Economic and Technological Development Zone (Wujiashan ETDZ) was approved by the State Council to become the third national development zone in Wuhan, which is a food industry base. This research examines the effectiveness and influence of these specific policies on FDI location.

Urban structure

The notion of polycentricity identifies a polycentric urban structure in which a number of centers develop within the metropolis (Harris & Ullman, 1945). The important source of polycentric urban structure is increasingly identified as the significance of agglomeration economies (Krugman, 1991; Porter, 1990; Scott, 1988). Investment tends to cluster in several areas resulting from the tension between centripetal and centrifugal forces. The centripetal force is localized external economies in production (forward and backward linkages) while the centrifugal forces include urban land rent (Henderson, 1974). The theoretical work of polycentricity has been tested in a variety of empirical findings in Western capitalist cities (Blotvogel, 1998; Gordon, Richardson, & Wong, 1986; Waddell, Berry, & Hoch, 1993).

Chinese cities' urban spatial structure is quite distinct from that of Western capitalist cities due to differences in their history, socio-economic structure, and population, but its roles in FDI location have not been identified in Chinese cities yet. Further, the urban spatial structure of Chinese cities is experiencing significant changes resulting from rapid urbanization, industrialization, marketization, and decentralization. Rapid leapfrog developments in the suburbs and the emergence of multiple business and service areas in the city center are changing the current urban spatial

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