



# Industrial land policy, firm heterogeneity and firm location choice: Evidence from China



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## ABSTRACT

Using micro-level data of Chinese manufacture firms for the year 2009, this paper estimates a conditional logit model to examine the impact of industrial land supply and allocation policies on firm location choice. It is found that both expanding industrial land supply and balanced industrial land allocation policies are positively related to firm location choice. It is also found that the impact of industrial land policy varies with firm heterogeneity in terms of ownership and industry-specific attribute. Compared to their peers, joint ventures are less sensitive to industrial land supply policy, whereas firms in labor-intensive industries are more sensitive to industrial land allocation policy. The estimation result is robust after controlling for other key factors which influence firm location choice. These findings support the argument that industrial land policy plays an important role in determining the spatial distribution of manufacture firms.

## 1. Introduction

China's industrial land policy has experienced dramatic changes in the past decades. Since the 1980s, in order to attract more investment from home and abroad, local governments have generally negotiated with investors. As part of those negotiations, local governments have promised to provide industrial land at extremely low price. In the early stage of China's industrialization, such low-price land policy played an important role in attracting foreign direct investment (FDI) and stimulating industrial growth (Wu et al., 2014; He et al. 2014). However, the ubiquitous nature of low industrial land price resulted in excessive development of industrial land. Since 2006, China's central government has conducted a series of land market reforms, in order to transform the traditional land use pattern to a new pattern featuring more intensive land usage (Meng et al., 2008; Tu et al., 2014).

Such a transformation of industrial land policy also had a significant impact on firm location decisions. On the one hand, the previous low-price industrial land policy was formally banned. This, in turn, compelled local governments to focus on the scale and allocation of local industrial land. On the other hand, in China, industrial land is not only a production factor but also an important tool for firms' financing. As firms could no longer obtain industrial land at low price after 2006, they began to pay closer attention to local industrial land supply and

allocation policies, in order to minimize the costs related to the acquisition of industrial land.

So far, the important role of industrial land in China's industrialization has been stressed in many studies and from different perspectives (e.g., Deng et al., 2010; Ping, 2011). Nevertheless, how industrial land policy influences location decision of firms remains under-explored. In addition, most of the previous studies relating to firm location choice in China exclusively focused on multi-national enterprises (MNEs) or joint ventures (e.g., Du et al., 2008; Jean et al., 2011; Salike, 2016). By comparison, the determinants of domestic firm location choice were rarely investigated. Moreover, as location choice is a typical firm-level decision, the overlook of firm heterogeneity (e.g., ownership or industry-specific attribute) could not explain how firm-level differences contribute to firm location choices.

This paper attempts to fill these research gaps by conducting a thorough empirical analysis of the impact of industrial land policy on firm location choice in China. Using the micro-level data of Chinese manufacture firms for the year 2009, this paper estimates a conditional logit model to examine to what extent industrial land supply and allocation policies influence firm location choice. We also examine how the impacts of industrial land policies vary with firm heterogeneity.

The remainder of this paper is organized as follows: Following the introduction, Section 2 reviews previous studies relating to firm location

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choice. Section 3 develops hypotheses regarding industrial land supply and allocation policies, firm heterogeneity and firm location choice. Section 4 describes the methodology used in the empirical analysis, including the specification of regression models, data source, and variable measurements. Section 5 reports the estimation results of conditional logit model and conducts robustness check. Section 6 summarizes the findings of this paper and provides some policy suggestions.

## 2. Literature review on factors influencing firm location choice

A substantial number of studies have explored the various determinants of firm location choice. In a broad sense, firm location choice is influenced by three types of factors, namely regional attribute (e.g., market conditions, production factor prices, and agglomeration economies), government's intervention (e.g., tax competition and preferential policy), and firm attribute (e.g., ownership, size, and development strategy).

The impact of regional attribute on firm location choice have been mainly analyzed in the field of neo-classic economics. In general, firms are assumed to choose the optimal location to maximize their profits. This essential assumption indicates that local attributes are attractive to firms because they could affect firm profits or production costs. In this regard, location theories have documented a close relationship between transport costs, market competition, land use, and industry location. In particular, firms that produce differentiated goods tend to cluster in large cities when the relevant transport costs are sufficiently low (Papageorgiou and Thisse, 1985). This geographic concentration of firms could generate positive externalities, which in turn attract even more new firms. Early work by Marshall (1920) classified the three sources of firm agglomeration as follows: input sharing, labor market pooling, and knowledge spillover. All of them tend to result in the co-location of firms within similar industries. In addition to Marshallian localization, Jacob (1969) identified another type of externality (i.e. Jacobian diversification) which arises from the co-location of firms across diversified industries. The NEG theory, pioneered by Krugman (1991), formally analyzed the insights of location theories and agglomeration economies with a general equilibrium model under conditions of imperfect competition. Monopolistic firms tend to locate their production operations in large markets, in order to save on transport costs. This finding is summarized as the “home market effect” which has been further confirmed by many empirical studies on firm location choice in developed (e.g., Davis and Weinstein, 2003) and developing economies (e.g., Li et al. 2012).

Government intervention is also a key factor which influences firm location choice. Because the agglomeration of firms has a significantly positive impact on economic growth (Zheng and Kuroda, 2013), local governments intensely focus on attracting new firms with various interventions. Studies of government interventions can be traced back to Tiebout's (1956) foot voting model, which analyzed government competition for mobile factors. Subsequent studies in this field have found that, with increasing capital mobility, competition for investment among local governments has become a process of a “race to the bottom (RTB)”. However, the RTB intervention will not work effectively in the presence of agglomeration economies. For example, Forslid (2005) summarized the interactions between tax competition, agglomeration economies and firm location under a NEG framework. Forslid (2005) found that, in regions with higher level of agglomeration economies, firms tend to be less sensitive to low tax rates. So far, most of the existing studies investigate the role of government competition for the location of firms using either tax preferential policies (e.g., Crabbe and Bruyne, 2013) or environment deregulation (e.g., Levinson, 1996). The impact of land use policies on firm location choice has seldom been examined. Friedrich and Nam (2011), among others, constructed a two-stage model to investigate how land-use strategies in German municipalities influence the location choice of innovative firms.

The influence of firm attribute on location choice has been broadly investigated in recent studies examining firm heterogeneity and economic geography. In general, location choice reflects a firm's decision-

making process or its investment strategy (Brouwer et al., 2004). Furthermore, MNEs variation in terms of strategic intent and their impact on FDI locations have been extensively documented by Dunning's Eclectic Paradigm (Cole et al., 2007). Empirical studies have also provided evidences that the firm location is not only determined by regional attributes, but also by firms' inherent attributes and interactions (e.g., Hong, 2007; Duanmu, 2012).

Using micro-level data of manufacture firms, an increasing number of empirical studies have investigated industrial location in China. Most studies generally sum up firm-level data in terms of industries. This allows the researchers to investigate the trends and determinants of industrial agglomeration in China (e.g., Lu and Tao, 2009). As these studies employed aggregated industry-level or region-level data, they could not explore the micro mechanism of firm location choice. While some studies have considered the firm-level decisions relating to location choice, the main research focus of these studies is the spatial distribution of MNEs or FDI in Mainland China (e.g., Du et al., 2008; Jean et al., 2011; Salike, 2016).

China's unique socialist institution allows the government to implement economic policies much easier and faster than other developed countries. As a result, the role of government intervention or other institutional factors in the geographies of manufacturing has received considerable attention from researchers. While several studies have confirmed the importance of local protectionism (e.g., Bai et al., 2004; Zheng and Kuroda, 2012), regional economic institutions (e.g., Du et al., 2008), and environmental regulation (e.g., Dean et al., 2009), the role of land policies in shaping industrial geography has often been overlooked. Until very recently, Gao et al. (2014), among others, used geographic analysis to investigate the relationship between land market transformation and geographies of manufacturing in Beijing. They found a significant trend of industrial decentralization during the period from 1985 to 2008. Meanwhile, manufacturing has become more and more agglomerated in Beijing's outer city. These new patterns of industrial location are closely related to state land policies and land market reforms.

To the authors' knowledge, although land has been considered a key factor in stimulating China's industrial growth, empirical studies investigating the relationship between industrial land policy and the spatial distribution of firms have rarely been conducted. By comparison, this paper contributes to existing studies by conducting a thorough empirical analysis of the impact of industrial land policy on firm location choice in China.

## 3. Hypotheses development

In this section, we analyze industrial land policy in terms of industrial land supply and allocation. We first summarize how industrial land policy influence firm location choice, based on the findings in existing literature and the stylized facts of China's industrial land market. We then proposes four hypotheses regarding the impact of industrial land supply, allocation, and their interactions with firm heterogeneity on firm location choice.

### 3.1. Industrial land supply policy and firm location choice

Since the 1950s, as the distributor of state-owned land, local governments have assigned land-use rights by means of administrative allocation. This method of industrial land transfer was formally defined as “agreement transfer” in the Land Administration Law passed in 1986. Since 2006, China's central government has put forward market-oriented reforms of industrial land transfer policies. The State Council released a Circular on Intensifying Land Control (2006). According to this circular, “industrial land must be transferred by way of bidding, auction or listing” and “the price of industrial land must not fall below the minimum price set by the Ministry of Land and Resources.” Local governments have not been permitted to directly negotiate industrial land price with investors in this post-reform period. Nevertheless, industrial land is still used as leverage for attracting

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