



# Industrial land price between China's Pearl River Delta and Southeast Asian regions: Competition or Coopetition?



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## ABSTRACT

The planned economy system's previous form of industrial land market control in China has led to current market failure because of a large amount of industrial land being sold at a very low price, causing extensive overuse of land and negative effects on land management. As the "World Factory", the Pearl River Delta (PRD) is well known for its rapid urbanization largely driven by Foreign Direct Investment in labor-intensive industries. A low-land price strategy has been commonly adopted by the local government in order to attract industrial investment. In the past decade, the PRD has increasingly faced the increasing competition from its neighboring competition from its neighboring countries in Southeast Asia that have established preference policies to attract FDI and foreign enterprises. Despite a growing body of literature on the internal forces of industrial land in China, little is known of the external forces involved except for the importance of FDI and the intensity of interregional competition between China and other countries in attempting to attract foreign investment. This research fills the knowledge gap by modeling the situation in the form of an international cooperative game model aimed at revealing the industrial land price formation mechanism between the PRD region and Southeast Asian regions. The conditions of industrial land in the area and several Southeast Asian countries are first analyzed for their industrial land price movements in recent years. A game theoretic model is then built that exhibits similar characteristics. The result indicates that the governments' low land price strategy and the competition between the PRD and its neighboring countries have created unnecessarily high social and environmental costs. Policy suggestions are made to encourage a more appropriate use of industrial land in China, and the most important being the need for a mindset shift from competition towards coopetition between the PRD and Southeast Asian regions.

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## 1. Introduction

There has been a historic leap in industrialization in China since 1992, with its development being generally regarded as an important strategy for achieving higher economic growth (Zhang, 2006; Choy et al., 2013). The economic growth has been largely attributed to economic liberalization, monopoly and industry specialization, and foreign direct investment (FDI) (Xian and Wen, 2008). Of particular relevance are the considerable efforts made to attract

investment (e.g. Luo and Lin, 2003; Qin et al., 2005; Wu, 2007). Numerous tax breaks, low-level premiums, preferential policies and start-up funds have been provided by local governments (Ling, 2006). There is also a huge increase in the competition for investors between cities and regions (Qin et al., 2005; Wu et al., 2014). To attract more foreign investment, local governments have adjusted their premiums to leverage increased industrial areas, enabling the development of a considerable amount of extra urban land for construction and industrial use (Xiao-jun, 2004). A low-price strategy has also been adopted in industrial land development (Luo and Lin, 2003; Zhang, 2006). Another emphasis on industrial land development, particularly in special economic zones (SEZs), can be traced back to 1979, when the Central Committee of the Communist Party (CCCP) formally proposed establishing 'experimental' special economic zones on the south China coast, with the state carving out

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large tracts of coastal zone land for industrial use (Cartier, 2001). Since then, SEZs have gradually become symbols of nationalist reform ideology, which has brought about unplanned widespread ‘copycats’ of the special zone concept and actions (Yang, 1997) resulting in the proliferation of low-level industrial zones in China. For example, in the Su’nan area of Jiangsu, 70% of the 389 local settlements at the village and township level had their own ‘small zones’ [*xiaoqu*] by mid-1993 (Zhu and Sun, 1994). Of these, more than 1800 enterprises had utilized foreign investment (Cartier, 2001).

Industrial land use has therefore become one of the most dominant forms of land use in China today. Much of this originates from the transfer of designated rural land to urban status. This is quite a complex process in China, where all rural land is owned by the village collective (people), while all urban land is owned by the state. Rural land marked for industrial development must first be transferred to state ownership; whereupon the state sells the development rights to the private sector enterprises. The first transaction of a land use right in this way occurred in Shenzhen SEZ in 1987, which effectively brought about the marketization land transfers in China (Zhu, 1994). Following this event, land development became widely understood as a highly profitable channel throughout the country at all levels. However, this has resulted in a major imbalance between industrial land and other land, such as farmland for food production (Xiao-jun, 2004; Hong, 2007), and many adverse consequences to the market and management of industrial land (e.g. Ling, 2006). The amount of agricultural land is decreasing overall and there is a growing concern over reduced national food supply (Wu et al., 2014). This problem is exacerbated by conversion of farmland to industrial land being a virtually irreversible process (Xiao-jun, 2004). Moreover, together with the illegal use of land in some areas, there is an increasing amount of unused or wasteland (Xiao-jun, 2004).

Establishing a cooperative inter-regional pricing mechanism offers a very important means of correcting the situation (Wu et al., 2014). This needs to take into account the fierce competition currently raging for international investment (Qin et al., 2005). Therefore, in the process of setting prices, there is also a need to consider the pricing strategies of neighboring countries (Ding, 2003). Currently, the threats to China’s FDI are mainly from Southeast Asian countries, especially Vietnam, Thailand and Malaysia, which have a great potential for attracting international investment. International competition is increasingly having a significant impact on the price of industrial land in China.

Despite a growing body of literature on the internal forces of industrial land price, such as internal competition (Wu et al., 2014) and land property rights (Lai et al., 2014), little is known of the external forces involved except for the importance of FDI and the intensity of interregional competition in attempting to attract foreign investment. There is also a lack of research into the application of quantitative methods and models to analyze the industrial land price mechanism in China. In response, this paper uses game theory – the study of mathematical models of conflict and cooperation between intelligent rational decision-makers – to reveal the industrial land price formation mechanism involved. This is applied to the example of the Pearl River Delta (PRD), where the process of urbanization and industrialization has been largely influenced by foreign capital and currently faces fierce competition from proximate Southeast Asian countries. The aim is to identify the external driving forces of industrial land prices in the PRD in order to improve the effects of international competition on land prices and identify potential means for improving the industrial land price mechanism involved.

The paper proceeds as follows. Firstly, the key literature on industrial land price and game theories is reviewed. Both qualitative and quantitative research methods (e.g. mapping, description,

statistics) are then used to study the external forces that impact on the industrial land price in the PRD and a game model is developed to analyze the competition between the PRD and Southeast Asian countries. The main findings of this analysis are finally presented and policy suggestions are made to encourage a mindset shift from being ‘competitive’ towards ‘coopetitive’ for both China PRD and Southeastern Asian regions in the future.

## 2. Literature review: industrial land price

As early as the beginning of the 20th century, Weber’s (1929) in-depth research on industrial land provided the theory of industrial location in systematically elaborating the industrial and enterprise location problem. Later Ohlin’s (1935) studies of the regional equilibrium of industrial land in the areas of trade and international trade from a trade perspective/theory were most influential in the analysis of multilateral markets. Early work also considered the price of industrial land space balance (Lind, 1973; Southey, 1974). Krugman’s (1991) work on geography and trade also contributed to the theory of industrial localization, although focusing mainly on the analysis of labor, intermediate inputs and technical inputs, rather than on land issues. Other relevant work includes violence against farmers’ interests (Peng Yi, 2004), the efficiency of industrial land (Xiong and Brown, 2000) and industrial land speculation (Wang and Huang, 2004).

In developed countries, there have been many empirical studies of industrial land prices and a variety of methods used. A popular approach is to analyze the urban industrial land price formation mechanism through data models. Canadian economists Capozza and Helsley (1989) have proposed a dynamic model of urban land prices to identify the driving forces of industrial land price changes. Goldberg and Chinloy (1984) carried out a series of system analyses on the demand for industrial types of land as well as urban land supply and price. They also developed a balanced model of the land market. Similarly, Brueckner and von Rabenau (1981) established a land price model to examine the spatial distribution rules and the impact of different investment conditions on industrial land prices in different cities. Zhu (2000) found that changes in labor and property prices in Singapore contribute indirectly to changes in industrial land prices and structure during a period of changes in the nature of the country’s manufacturing industry due to their influence on production costs. In addition, the potential liability for contaminated land in the USA makes its sale difficult, driving down industrial real estate prices and increasing the amount of idle land (Sigman, 2009).

In China, the industrial land price mechanism has not received any academic interest until recent years, while the introduction of a land market in 2002 has led to land price increases all over the country. However, as reported in 2005, after years of high prices, industrial land prices have trended downward, with negative growth of industrial land prices in some cities (Ling, 2006). Transfer prices of industrial land in Nanjing and Hangzhou, for example, have steadily declined (Qin et al., 2005), while insufficient land supply and falling industrial land prices, with many plots selling at below cost prices, were reported in southern Jiangsu Province in 2006 (Ling, 2006). The same theme continued nationwide in 2007 and 2008, when Local Government industrial land was transferred mainly by agreement and with competing prices even below the land transfer price. In this context, the total revenue from industrial land transactions could hardly be sufficient enough to maintain or change ‘raw land’ into ‘cultivated land’. The final land transaction price can therefore be formed with 0 plus/minus land values or even negative land values (Wu, 2007) and even negative land price premiums (Cao et al., 2005). The fall in price level is attributed to ‘the old way’ of land supply, in which cities compete to lower land prices

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