Property Rights and Industrial Land Use Efficiency

Empirical Evidence from Shenzhen

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Abstract

This study investigates the industrial land use efficiency difference under different land property rights arrangements. Industrial development contributes significantly to China’s economic growth in the past three decades. As one of the most fundamental institutional arrangements, the urban-rural dual land system plays an important role in China’s industrialization process and hence economic growth. Two types of land including state and collective ownership coexist in the current land administration system. Full rights could be acquired through state-owned land market, whereas collective land cannot be sold, transferred or leased for non-agricultural construction. Property rights theory suggests that property rights have significant effects on economic performance. In the context of industrial development in China, it implies that different land property rights structure may have different economic effects on industrial development. Based on available literature, statistical data, a range of unpublished primary sources and the author’s own experience, this study attempts to investigate how different property rights structures on land may affect the efficiency of industrial land use.

Two districts with an area of 1557km² adjacent to special economic zone in Shenzhen have been chosen for empirical test. Data is based on community-level including all the 24 sub-districts in these two districts in 2005. The main measurement for industrial land use efficiency is industrial value-added per unit of land, and the ratio of collective industrial land area to total industrial land area is used for measurement of land property rights. Other control variables like population and land size are also considered.

The result of regression analysis suggests that land transfer rights have significant positive effects on industrial land use efficiency in the urbanization process in China. The difference on collective land and state land is about 22.4 billion yuan/km²/year. The mechanisms potentially at work may be: 1) Land transfer rights correspond to higher pledgeable income, which means that industrial enterprises on state land have more channels to access to credit. Industrial enterprises may thus have better economic performance due to more investment capital in general; 2) Land transfer rights correspond to better allocation of land by improving land market liquidity, which implicates a better channel to use the land more efficiently; 3) Collective land without transfer rights failed to be included in China’s urban land management system, thus cannot be guided and controlled effectively by urban development strategies and policies.

Key words

Land property rights; Industrialization; Land rights security; Land transfer rights; Land use efficiency

1. Introduction

China experienced rapid and significant economic growth in the past three decades, to which industrial sector makes the most important contribution. According to the survey from state statistics bureau, the proportion of industrial added value account to gross domestic production (GDP) has been increased from 20.5% in 1979 to 50.1% in 2007. Different from developed countries and other developing countries, China’s industrialization is conducted on its unique urban-rural dual land system. Two types

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of land including state and collective ownership coexist in China’s land administration system. For state owned land, separating of land ownership and land use right in the late 1980s allows transfer of land use rights, and arouses the emergence of urban land market. In another word, the rights of exclusivity, to capture income, to transfer all or some of the rights are guaranteed for the land users in the land market. What could be acquired through urban land market are full rights over land during the leasehold period. On the other hand, collective land cannot be sold, transferred or leased for non-agricultural construction including industrial development according to current state land policy.

Land conversion from collective land to state land is mostly through land requisition system, under which rural collectives are evicted and collective land is taken by local governments. Local governments will then convert the collective land to state ownership land and transfer the land through Zhaopaigua mechanism. Many problems arise under this land requisition system. The first direct influence is extensive land violence and conflicts in land requisition process. According to a report, there is one serious land conflict in one county every month on average, which implicates the severe social instability. This is also the common situation in nowadays. Furthermore, land requisition also leads to distinctive economic inequity between urban and rural sectors and population in the nationwide. Many rural sectors and population are deprived of development rights in China’s urbanization process and economic growth. According to Li’s study in 2007, income ratio of urban and rural residents have been increased from 1.70 in 1983 to 3.33 in 2006, which apparently illustrates the dynamic economic inequity between urban and rural population in China. Last but not the least, a huge number of landless peasants are generated in land requisition process, this new vulnerable group with low education and skills and limited access to resource may lead to new social problems.

To resist land requisition and fight for their own economic development rights, many rural collectives in China’s coastal regions have undertaken spontaneous reform to form shareholding cooperatives to conduct land development which is allowed by local governments in the early 1990s. This new bottom-up institutional reform has great significance on the growth of rural collectives and rural development pattern in the big context of China’s urbanization and industrialization. In these districts, rural collectives are allowed to conduct industrial development on their collective land thus could share some benefits of China’s industrialization process thus economic growth. However, industrialization on collective land is constrained by many institutional limitations. As mentioned before, collective land is forbidden to be sold or transferred or leased for non-agricultural use including industrial development. Property rights theory suggests that property rights have significant effects on economic performance (North 1990, Demsetz 1996). Most previous empirical studies have contributed to the theory by empirical test of the relationship between land rights security and agricultural productivity. My study thus aims to add new understandings to this field by studying the effects of land transfer rights. In the context of industrial development in China, the lack of transfer rights on collective land may lead to sub-optimal industrial development and thus wasteful land use. My study thus is conducted to explore and measure the quality and quantity of the relationship between land transfer rights and industrial land use efficiency by making use of the unique urban-rural dual land system in China.

Data used in this study includes: 1) Topographic maps, urban planning drawings, land surveys and relevant governmental research from urban planning, land and resources commission of Shenzhen Municipality; 2) Year books, statistical bulletin and other relevant data from Statistics Bureau and Trade & Industry Bureau of Shenzhen Municipality; 3) Relevant data from available literature such as published papers and books.

The remainder of the paper is organized as follows. Section two discusses previous relevant studies on industrial land use efficiency and land property rights, research gap and contribution thus will be identified. Research hypothesis will then be illustrated in section three. In section four, empirical studies and findings based on Shenzhen city will be presented in detail. Empirical findings will then be presented in the next section. Section five will discuss on how collective land ownership affected industrial land use efficiency in Shenzhen. The study concludes with an assessment of possible challenges and directions to further reforms on collective land rights in China.

2. Literature Review

Industrialization constitutes the most important feature of China’s speedy and extensive urbanization in the past three decades, and industrial development contributes significantly to China’s economic growth. Industrial use was one of the most dominant land-use categories in Chinese cities. Industrial land use, including storage facilities, accounted for 20-30 percent of the land (Ding 2003). It is
extremely important for China to make sure the dominant industrial land is used efficiently due to limited land resource and the difficulty and cost to change its use if developed. In reality, industrial use efficiency has attracted much attention from practice field. Almost all levels of governments in China have made relevant policies and regulation to improve industrial land use efficiency.

In recent years, there is lack of research on industrial land use efficiency in English literature. However, it becomes a very noticeable study field in China recent years in both academic field and practice field. A huge amount of previous studies have made efforts to develop the measurements of industrial land use efficiency (Hong 2006, Wang 2006, Xie and Hao 2006, Sun 2006, Ding 2007). Three main indicators including investment intensity, output value intensity and land development intensity are employed by most scholars and governments to measure industrial land use efficiency to conduct relevant academic research or guide industrial development by formulating relevant land use standards. Concerning investment intensity, mostly used indicators are Industrial fixed assets per unit of land, Infrastructure investment amount per unit of land, Employee number per unit of land. Concerning output value intensity, common measurements includes industrial output value per unit of land, industrial output value added per unit of land, industrial profits tax per unit of land and industrial land price level (M 2008) Land development intensity is also an important indicator in many studies of urban planning field, specific measurements including floor area ratio and building density. Some other studies have contributed to this field by applying these indicators to measure the extent of industrial land use efficiency in specific industrial zones and cities. For example, study by Xiong in Shanghai (Xiong 2000), Huang and Lin’s study in Beijing economic and technological development area (Huang and Lin 2005), Wang’s study in Hangzhou (Wang 2005), Chen and Huang’s study in Suzhou industrial zone (Chen and Huang, 2008), Huang and Hong’s study in Fujian (Huang and Hong 2009). However, most of these studies just applied the indicators to measure the land use efficiency in specific cities, failing to reveal the relationship between these interrelated indicators.

Recent work in economics, law, and political science has directed attention to the importance of a society’s institutional structure in determining incentives for economic behavior and performance. The existence of property-rights institutions and their impact on investment and resource use has become a central issue in attempts to explain differences in economic growth (Alston 1996). Property-rights structure on agricultural land and its impact on agricultural productivity received sufficient attention in the past decades (Feder 1987, Roth 1994, Besley 1995, Alston 1996, Li 1998, Deininger 2002, Deininger 2006, Do 2008). These empirical studies on property-rights institutions address both broad questions of institutional change and as well as narrower issues of economic development (Alston 1996). The importance of secure and transferable land rights to provide the incentives for long-term investment has been recognized and scientifically examined in agricultural sectors. This perspective also offered meaningful inspirations to examine the relationship between land property rights and urban sectors.

However, there is less sufficient literature concerning urban economic development when compared to agricultural sectors, and most relevant literature mainly focus on residential communities and housing related economic activities, attention has heavily put to individual households’ investment incentives and behaviors. Most influential works concerning this issue are from Prof. Erica Field working at Harvard University and Prof. Sebastian Galiani from Washington University in St Louis. In a series of papers, Erica Field examined and theorized the impact of a large titling program in urban squatter settlements in Peru on labor supply, access to credit and fertility reductions (Field 2003, 2005, 2007). Galiani and Schargrodsky (2010) studied the effects of titling exploiting a natural experiment of land occupation in the outskirts of Buenos Aires, Argentina, in 1981. By reviewing relevant literature, land property rights may affect efficiency of urban resource allocation through different channels. First, just as agricultural sectors, it could enhance investment incentives by limiting expropriation risk and it might reduce the need to divert private resources to protect property. Second, land titling might affect the intra household allocation of resources and structure. Third, it could facilitate trade in assets thus enhance land and property transactions. For example, Lanjouw and Levy (2002) and Galiani and Schargrodsky (2010) find that house rentals are facilitated by titling.

To conclude, concerning literature on industrial land use, there is lack of relevant research in English literature. In the Chinese literature on industrial land use, a huge body of detailed studies having been carried out to develop the indicators of the efficiency of industrial land use. Some studies have contributed to this field by applying these indicators to measure the extent of industrial land use efficiency in specific cities. While this kind of research has provided us with important and useful measurements of industrial land use efficiency based on which can we conduct empirical studies, it failed to reveal the relationship of these interconnected indicators and also the relationship between
other deep-seated factors and industrial land use efficiency; concerning literature on land property rights, most literature on the effects of land property rights on urban economic performance mainly focus on residential communities. Attention has heavily put to individual households’ investment incentives and behaviors. However, no efforts have been made to examine other urban economic sectors like industrial development and commercial development to land property rights arrangements. Therefore, my study aims to fill research gap on the relationship between institutional arrangements on land property rights and urban economic performance in industrial sectors, the emphasis is on industrial land use efficiency. It is enabled by rich evidence of recent land reforms in China.

3. Research Hypothesis

This study investigates the industrial land use efficiency difference under different land property rights arrangements. Specifically, collective land and state land with different property rights structure were examined in the context of China’s industrialization. In summary, there are three main different aspects concerning property rights on collective land and state land. First, state land has full property rights security to conduct industrial development while collective land has incomplete security. There is still possibility that city governments would expropriate collective industrial land. Second, as mentioned before, collective land is forbidden to be sold/ transferred/ leased for non-agricultural use. This shows another important different element-land transfer rights-between collective land and state land. Last but not the least, different land property rights structure leads to different land management status in urban governance system. Collective land without transfer rights failed to be included in China’s urban land management system, thus cannot be guided and controlled effectively by urban development strategies and policies. Therefore, my research hypothesis is based on these three differences between collective land and state land which has been illustrated as follows:

1) Land property rights security is positively related to industrial land use efficiency.
2) Land transfer rights are positively related to industrial land use efficiency.
3) Urban land management system matters for industrial land use efficiency.

Land security has positive impact on agricultural land productivity. From the theoretical perspective, the most obvious effect of lack of secure land ownership is increased uncertainty by the farmer as to whether he will be able to benefit from the investments that he makes to retain or improve the farms’ productive capacity. Such investment may be in the form of equipment, structures, irrigation infrastructure or land conservation measures (Feder 1987). The impact of ownership security on investment is discussed in several empirical studies. Villamizar (1984) found that farm capital per hectare is substantially higher on titled land than on undocumented or encroached land. Using Thailand data, Feder(1987) illustrated that farmers with secure ownership had significantly higher capital/land ratios, and a higher probability of undertaking land improvements, than farmers without secure ownership. Recently, more and more advanced studies have measured the exact impact of land property rights security on investment or output. For example, study by Besley in Ghana and India (Besley 1995, 2000), Alston’s study in Brazilian frontier(Alston 1996), Platteau’s study in sub-Saharan Africa (Platteau 1997), studies in China (Li 1998, Carter 1999, Deininger 2003) Jacoby’s study in Nicaragua(Jacoby 2002), Brasselle’s study in Burkina (Brasselle 2002), studies in Ethiopia(Deininger 2006, Holden 2008), Do and Iyer’s study in Vietnam (Do and Iyer 2007). In sum, most empirical evidence is compatible with the theoretical assumption that land property rights security is positively related to agricultural productivity. In my study, I will extend this hypothesis to industrial sectors.

Theoretically, land transfer rights may affect land use efficiency through two possible mechanisms. On the one hand, the rights to transfer, exchange, mortgage, lease, and then sublease land use rights may create a formal market for land. Land transactions may thus be possible at a larger scale. Then better allocation of land and the realization of economies of scale may be achieved. Land transfer rights should induce consolidation of highly fragmented ownership of land as well as transfers of land from less productive to more productive individuals and firms. This suggests that land use efficiency may be improved through land market mechanism. On the other hand, land transfer rights may correspond to higher pledgeable income, which means that industrial enterprises on land with transfer rights have more channels to access to credit. Industrial enterprises may thus have better economic performance due to more investment capital in general. In his well-known work, De Soto argues that capital is the engine of a market economy. What prevents poor countries from becoming rich is the lack of property rights system that enables individuals to transform their fixed assets including land and real estate into capital. He explores the history of property rights in America and examines the untapped wealth owned by the poor (H De Soto 2000). In the context of China’s urbanization process, the failure to converting
collective land to source of capital may lead to inefficient land use.

The unique two-tier land ownership system in China leads to different land management status of state land and collective land in the industrialization process which may contribute to different land use efficiency. Collective land system was firstly adopted to organize agricultural development before the late 1970s. In China’s urbanization, a huge part of collective rural land has been expropriated by state governments and then converted to state land to meet the needs of urban development. This part of land will then be transferred to private users through urban land market system and included in the urban land management system. Concurrently, some village collectives have spontaneously conducted industrial construction on their collective land, on which land transfer rights have been limited by state governments. A great amount of collective land has been illegally transferred to industrial use and thus failed to be included in urban land management system. Since land management system is an important channel to implement urban development strategies and policies by directing and regulating land use, the failure to including collective land to urban land management system may leads to land use inefficiency on collective land.

4. Empirical Study

4.1 Industrial Development Process in Shenzhen

In the past few decades, the industry in Shenzhen has developed rapidly from scratch along with the introduction of village shareholding cooperative system. Before 1980s, Shenzhen was only a small fishing village without any industrial development. The area of construction land in Shenzhen is 6 square kilometers in 1980. Until 2007, the area of industrial land use has increased to 269 square kilometers, with the total area of construction land increasing to 750 square kilometers in Shenzhen (UPDIS 2010). Industrial development has expanded from special economic zone to Bao’an and Longgang district from 1980s to 2000s. Large part of industrial districts inside special economic zone have been gradually converted to residential and commercial use, industry districts now mainly locate in the areas in Bao’an and Longgang district which are close to traffic arteries. Until now, all the land suitable in Shenzhen for industrial use has been developed already. The size and spatial distribution of industrial land expansion from 1980s to now could be summarized as following figures and table.

<table>
<thead>
<tr>
<th>Year</th>
<th>The Whole City</th>
<th>SEZ</th>
<th>Total</th>
<th>Band</th>
<th>Longgang</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>2.546</td>
<td>2.546</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>6.607</td>
<td>6.607</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>82.38</td>
<td>14.12</td>
<td>68.26</td>
<td>37.66</td>
<td>30.60</td>
</tr>
<tr>
<td>2001</td>
<td>131.19</td>
<td>15.07</td>
<td>116.12</td>
<td>68.39</td>
<td>47.73</td>
</tr>
<tr>
<td>2003</td>
<td>208.33</td>
<td>20.11</td>
<td>188.22</td>
<td>108.99</td>
<td>79.23</td>
</tr>
</tbody>
</table>

Table.1 Evolution of industrial land use area in Shenzhen

4.2 Evaluating Industrial Land Use Efficiency in Shenzhen

Compared with other mainland Chinese cities, Shenzhen has an excellent performance on land use efficiency. From available data on land use efficiency in 2004, we can see that land use efficiency of Shenzhen is much higher than other mainland metropolitan cities including Guangzhou, Beijing, Shanghai, Tianjin, Suzhou in the respect of GDP per unit of built-up area, yet much lower than overseas cities including Hong Kong, Singapore, Tokyo. Referring to industrial added value per unit of land, Shenzhen and Shanghai are almost equal to each other yet much lower than Hong Kong, Singapore, Tokyo. This implicates that there is still room for Shenzhen to improve its urban land use efficiency.

<table>
<thead>
<tr>
<th>City</th>
<th>Year</th>
<th>GDP per unit of built-up area (Billion yuan/Km²)</th>
<th>Industrial added value per unit of land (Billion yuan/Km²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shenzhen</td>
<td>2004</td>
<td>5.1</td>
<td>9.32</td>
</tr>
<tr>
<td>Suzhou</td>
<td>2004</td>
<td>1.43</td>
<td>—</td>
</tr>
<tr>
<td>Guangzhou</td>
<td>2004</td>
<td>2.16</td>
<td>—</td>
</tr>
<tr>
<td>Tianjin</td>
<td>2004</td>
<td>1.17</td>
<td>—</td>
</tr>
<tr>
<td>Beijing</td>
<td>2004</td>
<td>1.67</td>
<td>—</td>
</tr>
<tr>
<td>Shanghai</td>
<td>2004</td>
<td>3.51</td>
<td>9.5</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>2003</td>
<td>53.91</td>
<td>30.51</td>
</tr>
<tr>
<td>Singapore</td>
<td>2003</td>
<td>24.41</td>
<td>74.48</td>
</tr>
<tr>
<td>Tokyo</td>
<td>2002</td>
<td>101.59</td>
<td>57.08</td>
</tr>
</tbody>
</table>

Table 2: Comparison of construction/industrial land use efficiency in different cities in Year 2004

Source: The first national economic census 2006

Concerning the city itself, land inside of the special economic zone has better performance on industrial output value than the land outside of special economic zone including Bao’an and Longgang district. According to the first national economic census in China and land data by survey in Shenzhen, Bao’an District and Longgang District are 13.8 and 11.7 Billion yuan/km² respectively in 2003, while special economic zone is 155.0 Billion yuan/km² in the same year, which is roughly ten times higher than the area outside of special economic zone in respect of industrial output value per unit of land. Referring to
industrial added value per unit of land, Bao’an District and Longgang District are 3.0 and 4.0 Billion yuan/km² respectively in 2003, while special economic zone is 42.9 Billion yuan/km² in the same year. The spatial distribution of industrial output value per unit of land in year 2003 is presented as the following figure, from which we can see that sub-districts in special economic zone have distinctly better performance on industrial land use efficiency than that outside of special economic zone. This rough comparison may suggest that state land with complete property rights has higher industrial land use efficiency than collective land with incomplete property rights in terms of industrial output value in Shenzhen. However, it fails to reveal the real and exact difference on these two types of land because other factors like infrastructure situation and policy preference inside and outside special economic zone may also contribute to this difference. We thus apply a more scientific and precise method-cross-sectional analysis-to measure industrial land use inefficiency under different land property rights arrangement in the next section.

<table>
<thead>
<tr>
<th>Industrial Land Use Efficiency (Year 2003)</th>
<th>The Whole City</th>
<th>SEZ</th>
<th>Bao’an District</th>
<th>Longgang District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial output value per unit of land (Billion yuan/km²)</td>
<td>27.0</td>
<td>155.0</td>
<td>13.8</td>
<td>11.7</td>
</tr>
<tr>
<td>Industrial added value per unit of land (Billion yuan/km²)</td>
<td>7.4</td>
<td>42.9</td>
<td>3.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Table.3 Industrial land use efficiency in Shenzhen in Year 2003
Source: Shenzhen urban planning and design research institute 2006

Figure.2 Spatial Distribution of Industrial output value in Year 2003
Source: Shenzhen urban planning and design research institute 2006

4.3 Land Property Rights and Industrial Land Use Efficiency

I have chosen two districts-Bao’an and Longgang district-in Shenzhen but outside of Special Economic Zone with representative dual land system to conduct cross-sectional analysis on the preliminary relationship between land property rights and industrial land use efficiency. These two districts are located adjacent to special economic zone, covering an area of 1557km². The local collective economy is predominantly important in these two districts. Data used in this section is based on community-level including all the 24 sub-districts in these two districts. The geography boundaries and distribution of sub-districts are illustrated in the following figure.
Independent variable is land property rights structure. To measure land property rights structure of each sample, I use the ratio of collective industrial land area to total industrial land area of every individual sub-district. The ratio of collective industrial land of these 24 sub-districts varies from 35% to 81%. The specific magnitude and spatial distribution of collective industrial land and state industrial land in Bao’an and Longgang district in 2005 is illustrated in figure 6. Land property rights data come from Urban Planning, Land and Resources Commission of Shenzhen Municipality.
Two reasons contribute to the variation of ratio of collective industrial land to total industrial land in these samples. On the first hand, land with different magnitude and location in these two districts has been unsystematically expropriated by city governments in the different time in the urbanization process. As mentioned before, land conversion from collective land to state land is through land requisition system in China in many cases. Shenzhen is not exceptional. To meet the needs of urbanization and economic development, some part of collective land in these two districts were expropriated and converted to state land for urban use. However, land requisition in these two districts is conducted in an unsystematic way. The common land requisition process has been illustrated as follow: There is a specific development project perceived by big real estate developers or industrial firms first. Then developers or firms may discuss the proposal with city governments. Governments then will conduct land requisition process on particular piece of land for the potential developers or industrial firms. Therefore, this quasi-random requisition process finally leads to the collective industrial land ratio variation of these sub-districts. On the other hand, along with land requisition system, there have been some land conversion programs which confirmed land rights security and transfer rights on part of collective land to villages, yet in an unsystematic and fragmentary way.

Dependent variable is industrial land use efficiency. The measurement applied here is industrial output value per unit of industrial land. Other control variables like resident population, registered population, developed collective land ratio and land size are also considered. Data concerning industrial output value and population of sub-districts come from 2006 Yearbook of Bao’an and Longgang district.

4.4 Empirical Findings

The result of regression analysis indicates that the ratio of collective industrial land area to total industrial land area significantly relates to land use efficiency. The relationship is negative. Resident population has a positive relationship with industrial land use efficiency. No relationship has been found between industrial land size and land use efficiency according to the estimation result. The finding suggests that industrial sectors in sub-districts with smaller ratio of collective industrial land to total industrial land tends to have much better economic performance. Based on available data and the regression result, we have calculated the difference of industrial land use efficiency on collective land and state land. It’s about 22.4 billion yuan/km²/year. To conclude, Collective land without full property rights in China has been suffering inefficiency of industrial land use when compared to state land with full property rights. The possible mechanisms at work to inefficiency of industrial land use on collective land will be discussed in the next section.
Industrial collective land ratio  -6.530282  0.006  
Developed collective land ratio  -0.1737264  0.958  
Industrial land area  -0.1160187  0.761  
Resident population(log)  0.8648528  0.017  
Registered population(log)  -0.3600995  0.266  

Table.4 Empirical Estimates

5. Discussion

5.1 How property rights system affects collective and state land use

As mentioned before, urban and rural dual land system is the institutional foundation for land conversion and industrial development in China. Under current dual land system, urban land is owned by the state, while rural land is owned by collectives. As far as urban state land is concerned, separating of land ownership and land use right from Year 1988 allows transfer of land use rights, and arouses the emergence of urban land market. Full rights could be acquired through urban land market. On the other hand, collective land is forbidden to be sold, transferred or leased for nonagricultural use. In another word, if collective land is converted to urban use, it has only exclusive rights and income rights. Collective land can’t be transacted through market mechanism, which means it doesn’t have transfer rights and collateral rights. Through black land market, which is illegal, collectives may have part of land transfer rights.

<table>
<thead>
<tr>
<th>Land Ownership</th>
<th>Exclusive rights</th>
<th>Income rights</th>
<th>Transfer rights</th>
<th>Collateral rights</th>
</tr>
</thead>
<tbody>
<tr>
<td>State land</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Collective land</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Table.5 Property rights of state land and collective land in China

In the context of industrial development in Shenzhen, two different types of industry zones coexist, which is a ubiquitous phenomenon over China- industry zone on urban state-owned land and on collectively owned land. Different development processes on two types of land reflect different property rights structures.

Urban industrial land normally is transferred to competitive large and medium enterprises from governments including city-level to sub-district level. Full infrastructure is provided too by governments on urban industrial land to attract investors and enterprise. Enterprises conducted on urban industrial land are normally well developed with considerable strategic plans and methods depending on sufficient capital from legal credit market. Urban industrial land thus has more excellent economic performance regarding to industrial technology and product output.

In the meanwhile, industry is also prosperously developed on collectively owned land. As mentioned before, collective land doesn’t have transfer rights and collateral rights. Collective land users are not allowed to mortgage the land, the mode of “investment with low technology + labors with low capability + collectively owned land with low price” does not compose a necessary condition for higher and better use of land. Low efficiency of land use is observed on most of collective land of every village in Shenzhen. The chain of “low price land – attract investment – industry development and rent collect – new land development – new land rented” goes on, and pushes the villages to develop land at a low level to ensure the revue for all peasants.

5.2 How land governance affects collective and state land use
From the perspective of land governance, collective industrial land is totally out of urban management system. This situation greatly contributes to low efficiency of collective land use in Shenzhen. To understand the lack of governance on collective industrial land use better, we have divided this problem into several main aspects.

Firstly, there is no main body of governmental management for collective industrial land use. Seven different management processes are responsible for different types of industrial land in Shenzhen. Under current industrial land management, industrial land has been categorized into seven types, including: High-technology industrial zone, industrial cluster zone, industrial park area > 5ha in SEZ, industrial park area > 5ha in Bao’an District, industrial park area > 5ha in Longgang District, collective nonagricultural land and Collective illegal industrial land. The specific management points and body for each type of industrial land could be illustrated as following figure. According to this figure, the first five types of industrial land are state owned, and collective industrial land includes the last two types—collective nonagricultural land and collective land. Compared to the first five types of land, there is nearly no necessary supervision and control section for the last two types of industrial land.

Second, there is no prophase administration for collective industrial land use. For Hi-technology zone, industrial cluster zone and industrial park area > 5 ha, corresponding agencies have carried out their own land use standards, thus could effectively managed industrial projects in the early stage. However, no prophase administration is available for collective industrial land use. What’s more important, since different agencies are responsible for different corresponding types of industrial land respectively, they may have their own special needs and pressure of attracting investment and economic development, this situation may lead to inefficient distribution of industrial projects and thus low level prophase land administration.

Last but not least, there is lack of land use standards and follow-up tracking management for collective industrial land use. According to the figure of status quo of industrial land management in Shenzhen, all the industrial land of each type is lack of following-up tracking management by government departments. There is no regulation and administration body concerning on whether industrial project is finished on time or not, nor whether it is built up according to expected requirements, or whether industrial land use is efficient or not.

Because of above reasons, urban planning and control for collective land in Shenzhen does not function at all in the real practice. Construction on collective land is out the control of urban planning system. Taken Dongfang-Tantou area for example, this area is located in Bao’an District, with most of its land collectively owned. Many plans have been worked out for this area before Year 2005. Here we have chose 2005 plan as a standard of comparison to real situation. According to 2005 plan, Dongfang-
Tantou area has an excellent transportation network and a well-designed road system. Certain area of land in the northern part of this district is planned as a park to satisfy the recreation and leisure needs of local people. However, the real situation of built environment in this area in Year 2008 is totally different with what have been planned in Year 2005. There was obvious lack of roads and transportation facilities in Dongfang-Tantou area in 2008. Existing road system was problematic because of too limited width, poor connection and road condition. Industrial buildings in this area were also in severe disorder and thus result in low development ratio as well. No green space was created in this district either. All these aspects demonstrate the failure of urban planning system on collective industrial land.

Figure 7 Urban planning in Year 2005 and real situation in Year 2008 of Dongfang-Tantou area
Source: Shenzhen urban planning and research institute 2006, 2008

6. Conclusions

Industrial development contributes significantly to China’s economic growth in the past three decades. As the unique ingredient of urban-rural dual land system, collective land plays an important role in China’s industrialization process. The incomplete property rights imposed on collective land, however, lead to sub-optimal industrial development and wasteful land use. Two districts adjacent to Special Economic Zone in Shenzhen have been selected for empirical cross-sectional study. Our regression analysis implicates that there is huge difference of industrial land use efficiency on collective land and state land. In terms of industrial output value per unit of land, land use efficiency on collective land is 22.4 billion yuan less than state land per km2 in 2005. Under the condition of land resource shortage in China, the problem of collective land use inefficiency will severely threaten sustainable economic development in the coming years if not been treated well.

To improve land use efficiency on collective land in these two districts in Shenzhen, the government has carried out a series of gradual land reforms which have produced very important positive effects on the economic development. The most influential one is the city-wide land conversion program in 2004. After the program, about half of total collective land which is available for new construction is expropriated successfully and converted to state land by city government with compensation. A small part of built-up land is delineated as non-agricultural land, collectives continue to have land use rights of non-agricultural land, which has been endowed certain transfer rights and collateral rights. For another part of built-up collective ownership land, city government intended to expropriate the part of land from rural collectives too but not successful in the end. This type of land with insecurity and incomplete property rights continues to be used by collectives. The significance of land conversion program can be identified as follows: a) The expropriated land is successfully incorporated to land market and urban land management system, and provides the necessary foundation for future urban development and economic growth; b) Rural collectives and individual villagers are officially entitled to urban economic development opportunity for the first time in China’s urbanization process through delineation of non-agricultural land. However, there is still a lot of room to improve land use efficiency from land property rights perspective and thus more effective and sustainable industrial development. Two possible directions for future institutional change may be: a) New efforts need to be made to
improve the transferability and management of non-agricultural land. b) Effective mechanism and specific policies need to be established to transfer the namely illegal land to legal land which could have full property rights and be governed by land management system.

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