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Urban growth dilemmas and solutions in China: looking forward to 2030

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Abstract: China's urbanization and industrialization are occupying farmland in large amounts, which is strongly driven by land finance regime. This is due to the intensified regional/local competition for manufacturing investment opportunities that push local governments to expropriate farmland at low prices while lease land at high market value to property developers. The additional revenue obtained in this way, termed financial increment in land values, can drive local economic growth, and provide associated infrastructure and other public services. At the same time, however, a floating population of large numbers of inadequately compensated land-lost farmers, although unable to become citizens, have to migrate into the urban areas for work, causing overheated employment and housing markets, with rocketing unaffordable housing prices. This, together with various micro factors relating to the party/state's promotion/evaluation system play an essential role leading to some serious economic, environment and social consequences, e.g., on migrant welfare, the displacement of peasants and the loss of land resources that requires immediate attention.

Our question is: whether such type of urbanization is sustainable? What are the mechanisms behind such a phenomenal urbanization process? From the perspective of institutionalism, this paper aims to investigate the institutional background of the urban growth dilemma and solutions in urban China and to introduce further an inter-regional game theoretical framework to indicate why the present urbanization pattern is unsustainable. Looking forward to 2030, paradigm policy changes are made from the triple consideration of floating population, social security and urban environmental pressures. This involves (1) changing land increment based finance regime into land stock finance system, (2) the citizenization of migrant workers with affordable housing and (3) creating a more enlightened local government officer appraisal system to better take into account societal issues such as welfare and beyond.

Key words: new-type urbanization, sustainable development, industrial land, property tax, affordable housing construction, land finance, land increment finance based finance regime

1. Introduction: the process of China's urbanization

The rapid continuous industrial development of China in recent years has resulted in the ascent of many modern cities. Since the early 1990s, the central government has also removed many restrictions on market economy. This, together with a decentralized fiscal system has resulted in local governments accumulating a significant amount of development capital. Along the accompanying circulation flow of capital and economic growth, the focus is no longer solely on agricultural production or living conditions and local governments now pay more attention to business development and direct rapid urbanization (Zhou et al., 2004; Lu, 2007).

The conversion of farmland to urban construction land and the associated so-called "floating population" or *liudong renkou* become two tendencies of macro performance in urbanization process. For instance, in 2012, urban population in China was over 710 million, equals to 52.6% of the country's total population -4.13 times than the data at the time of the 1978 *Reform and Opening Up* policy – with an annual average urban population growth rate of 3.7% from 2000-2012. In the next place, the national urban construction area was 45 751 square kilometers in 2012, an annual growth rate of 6.25% since 2000. As these figures indicate, the land expansion rate is nearly double the population expansion rate, which will inevitably influence urban land use efficiency – a critical issue in such a densely populated country as China.

Urbanization and urban growth issues have already been investigated in several countries. Grimm et al. (2008), for example, propose six hypotheses concerning the local to regional effects of urbanization and pollution, while Kabisch et al. (2006) analyze the chances and limits of urban modeling in developed cities to explain and assess the urban shrinkage process at many places in Europe. In less developed parts of the world, Cohen (2003), typically, points out that urban growth has become one of the most important challenges of the 21st century and is being affected by continued global economic integration and the struggles of developing countries, while Ravallion et al. (2007) comment on the negative externalities of geographically concentrated poverty and irreversibility resulting from the costs of migration. Similarly, Heinke (1997) lists the many problems for Asian mega-cities to deal with, including control of the population, conservation of resources, careful planning for the redevelopment of current mega-cities, etc. More research into China's urban growth challenges has been conducted over the last two decades recent years. Wong (1994), for instance, argues that urban migrants, being relegated to the margins of civil society, are likely to remain a barrier to urban stable development. Hills & Barron (1997), on the other hand, regard sustainable development as a challenge for Hong Kong because of the existing relationship between pollution control and economic growth, while Chen (2007) focuses more on agricultural production, observing the major risks involved in the decreasing availability of cultivated land because of the urbanization process. Other studies also analyze urban growth dilemmas from other aspects, such

as land scarcity, water scarcity, policy and eco-environment coupling (Chen et al., 2008; Tan et al., 2005; Liu et al., 2005; Hsing, 2010; Jiang, 2009).

Although China covers a vast area and has abundant resources, large differences between regions make land a scarce natural resource, especially in the coastal developed cities such as Beijing and Shanghai. Parcels of land cannot, of course, move independently from space to space even under the force of value laws. Thus, strict urban construction land supply and urban planning are required (Qiu, 2010). Meanwhile, however, local governments are dependent on attracting businesses through land leasing (Tang & Lv, 2008). For instance, the government prefers to sell industrial parks and industrial land leases at a low, or even zero, land price to induce purchases and attract the flow of capital into the area (Wei & Cong, 2005). In contrast, a popular action with commercial-residential land transference is to set high prices to strengthen local government finance (Zhang & Zheng, 2010).

Such behaviors seriously interfere with the market allocation of scarce land resources, however, with national income consequently reduced and the contradiction between population, land and environment becoming increasingly extreme. Therefore, if local governments continue to use the current extensive urban expansion method to seek higher local economic returns, the eventual outcome for the whole country will be counterproductive. In recognition of this, in 2014 the Xinhua News Agency was authorized to issue a “national new urbanization plan”, pointing out the unsustainability of relying on a cheap labor supply, extensive resource consumption and inequitable distribution of public services to promote urbanization.

According to World Population Prospects research, the urbanization level in the world as well as in China has continuously risen from 1950 and is expected to continue to 2050 (Figure1). In the mid-1970s, China’s urbanization level was less than the world average, but the extraordinary progress since has narrowed the gap considerably and is expected to disappear by about 2020. When a country’s urbanization rate surpasses 30%, it is generally believed that it is in an accelerated development period and needs more resources, population and capital transfer as material support (Liu et al., 2005). The country is now well beyond this and has entered a rapid growth state. Of course, China has certainly received positive effect brought by urbanization. For instance, urbanization helps cities create more job opportunities and absorb a large number of rural surplus population. Moreover, precious economic pattern in China mainly was dominated by the secondary industry while rapid urbanization well develops the tertiary industry later in order to promote industrial transformation and achieve sustainability as well. Whereas, every coin has two sides. Such development momentum raises much social problems, including the effect of growth on the environment, quality of life, economic competitiveness, and inequalities within regions (Wiewel & Schaffer, 2001). Specifically, questions of how to coordinate the complex relationship between urban, population and land in a sufficiently equitable manner are the explicit requirements in China. Under the new urbanization guiding principles such urban-rural integration, intensive use and harmonious development, it is necessary to identify an appropriate way to do this in the future.

<Insert Figure 1>

2. The mode of urban growth promotion in China

2.1 Three production factors in the market

This paper is based on neoclassical economics and aims to identify the urban growth track needed for China through production factors and the background of urban growth. Western economics regards the variety of resources used in production as production factors and declaims production process equals to the integration happened among these factors. The first person who came up with such ideas was British Classical economist William Petty, one famously held that “labor is the father and active principle of wealth, as lands are the mother” in his “Treatise on Taxes and Contributions” (Petty, 1769). Since then, land and labor were considered to be production factors and “value” was defined as co-creation brought out by them. However, Petty did not propose the concept of production factors directly. This emerged only some time later in Say’s 1803 “A Treatise on Political Economy”, where the notion “land, labor and capital interact with each other to produce a corresponding value in which land is the most important factor” was put forward(Say & Biddle, 1851).

2.2 Development background of urban growth: market factors

2.2.1 Labor: a dual structure between the urban and rural on census register

In the agrarian age, humans took land as the original source of production. The population of settlements steadily grew and villages gradually evolved into towns (Ann et al, 2014). The spread of urban civilization requires an adequate labor force (Zhang et al, 2010). As China’s urbanization expands, so does the labor population, which research shows will continue into the foreseeable future – expecting to reach 1 billion by around 2025 (Yang & Lu, 2006).

The labor population is often divided into two groups: urban labor and rural labor. The urban labor population usually lives and works in the city. Nonetheless, not all labors in countryside create value. A certain percentage of rural labor moves into cities and works for cities (Song, 2003). In China, such people cannot receive fair treat as townsfolk who possesses a city census register. The urbanization rate, for example, is calculated through dividing the total population by the urban population. Usually, urban population statistical data relates to two distinct groups: the urban residential population and the registered urban household population. These two groups are different sizes because the rural population that migrates into the city cannot register and therefore is not classed as part of the urban household population. In some areas, these numbers are rarely discrepant.

However, even though dual structure between the urban and rural indeed exists in the census register, many migrant workers still swarm into cities. Why? This is due to the fact that living and production resources are unequally distributed between rural and urban areas, and rural people come to the city being pursuit of a higher quality of

life. Since surplus rural labor can make positive production outcomes, local governments are sometimes glad to see population flow. However, the problem is this inflow of human capital also causes many city administration problems. Take a simple analogy. The local governments' attitude towards the rural inflow population is similar to that of broiler chicken farmers solely concerned with income. Greater numbers of chickens result in greater gains from sales. Whereas, the broiler house becomes increasingly crowded at the same time which, if continued, will eventually lead to the farmers' decline in sales as the chickens' health deteriorates in such confined conditions. In terms of the inflow of rural people to cities, firstly, the infrastructure and service facilities in cities are limited. People compete for limited resources and thus social conflicts occur. Governments therefore expand the "house" to increase the supply of public services because of which the city becomes more attractive and more rural population arrives. The census register system emerges as the times require with the aim of ensuring citizens' intact welfare (Cai, 2001). In short, rural migrant workers do not have the same share in social security systems, for they are not citizens, their census registration continuing to remain in the countryside.

2.2.2 Land：a dual structure between the urban and rural land property

In contrast with its large-scale population, urban land is relatively small in China. This kind of relative crowdedness has driven cities to expand rapidly (Hui et al., 2015; Chen, 2007). As mentioned, urbanization at the microscopic level involves the influx of population and urban expansion of the surrounding land. The latter refers to the conversion of farmland to urban construction land, or transformation of the rural landscape into urban landscape (Ou, 2002). China has launched a number of land policy reforms to improve land-use efficiency, to rationalize land allocation, and to coordinate urban and rural development (Ding, 2003). Nowadays, the basic law of land is the dual structure between the urban and rural land property. The PRC land administration law chapter two on the ownership and right of use of land provides that "land in urban districts shall be owned by the state; land in the rural areas and suburban areas including land for building houses, land and hills, except otherwise provided for by the state, shall be collectively owned and retained by the peasants". In this way, for rural land to be transformed into urban land, it must involve a process of land ownership transition. Clearly, property transformation follows capital exchange. The local government obtains the land ownership from the (collective) peasant owners in return for cash compensation other monetary equivalent such as discounted social services etc.

Urbanization needs land, but what remains unknown is the exact number of other land uses needed to convert this into construction land (Deng et al., 2010). Different land uses exhibit different rates of spatial decline in land prices and development density which drives the spatial separation of land use (Ding, 2004). During 1997 to 2010 in Zhejiang Province, the central government issued 667 km^2 of space to transform other-use land into construction land while the actual areas approved by Zhejiang Province in 1997-2003 was 1150 km^2, an area greater than the whole of Hong Kong! Thus, urban development has to rely on space expansion, yet the limited

amount of urban land and the urban–rural dual structure of land property make land expropriation a pivotal activity in the urbanization process.

2.2.3 Capital: tax sharing system reform

Since the advent of a more market-oriented approach to construction procurement, local governments have acquired stronger financial power than the central government. As a result, local construction work has been in full swing, while the central government's regulatory policies created terrible crises due to its lack of adequate financial resources. In 1993, for example, the GDP proportion of fiscal revenue and central financial revenue to total government revenue were 12.6% and 28.4% respectively - far below the international average (Zhou, 2006). At that time, the national financial deficit was CNY 25.6 billion, of which CNY 19.1 billion was central financial deficit. At that time, central finance over-drafted from the bank, and yet some local governments embezzled the financial fund to lend money at usury rates. This is the reason for China's chaotic finance and economics in the 1990s. The central government's financial deterioration affected its macro-control functions in defense and military construction resulting, in 12 September 1993, Comrade Zhu having deep discussions with Guangdong authorities and pointing out "central finance is in big trouble, and has an unsustainable proportion. If central finance power is not strengthened by concentrating fiscal revenue to the central government, the country will eventually suffer greatly" (Zhen, 2011).

Discussions could help with easing resistance as well as resolving central-local conflicts, and finally assisted new policy in the form of a system of tax distribution to be introduced smoothly. This was launched on 1 January 1994 to further strengthen the capacity of central macro-control, improve the function of state finance and build a sustainable national economic development system. As a result, local governments, especially county and township governments, had to contribute more revenue to the higher authorities while still having more responsibilities in serving the public. With lower income and higher expenditure, local governments were in considerable difficulty. Local finance income mainly depended on the level of economic development for, if regional GDP gaps were small, the differences in financial income were narrow and *vice versa*. As shown in Fig 2, after the implementation of the tax system, local governments lost their control of the incomes of township businesses and total income declined in turn. For most regions, the revenue share of GDP consequently reduced in comparison with financial expenditure, which rose steadily – with concomitant weakening of local economic power.

<Insert Figure 2>

2.3 Urban growth mode

2.3.1 Investment invitation: cheap leasing price of industrial land

In 20 years of accelerated industrialization, China's position in the international trade market has risen steadily to become an industry trade power in the supply of primary and labor-intensive products (Yang, 2015). Trade barriers have been gradually liberalized after joining the WTO and a large amount of international capital flows into China markets thanks to factors of production worldwide. As shown in Fig 3, manufacturing output has maintained an upward trend since 1992, with the growth rate further increasing since 2000. Meanwhile, United States manufacturing was also increasing, but at a slower rate, narrowing the gap with China. In 2010, manufacturing GDP surpassed the United States, making China truly a "world factory".

<Insert Figure 3>

How could China achieve such great economic growth? One important key is the promotion of local investment. This originated in development zones established with the 1978 *Reform and Opening-Up* policy, mostly concentrating on attracting direct foreign investment. At present, this refers to the local government releasing more industrial land to attract giant foreign investors. With the development of the market economy, capital can freely flow among the regions, and local governments, as providers, use capital through competition to create jobs and achieve GDP growth.

From the perspective of factor markets, namely capital, land and labor, we can easily analyze how local governments intend to achieve investment invitation. Local governments obtain the inflow of non-native capital, technology and management through leasing industrial land. It is done by local governments by setting land as bait first, and establishing certain number of industrial parks and lowering industrial land lease prices to attract the presence of more incoming businesses. This in turn will create more employment opportunities and attracts more industrial workers, which means an inflow of labor force. As cheap industrial land lease prices significantly benefitted the promotion of investment by local governments, the central government began to establish special economic zones and coastal open cities in the early 1980s. At the end of 2006, 200 national development zones had been approved by the State Council and over 1000 by local governments.

The use of auctions for allocating commercial land leases has been comprehensively promoted since 2003. For industrial land, however, administrative allocation and negotiation still dominate because of its special nature. Industrialization creates supplement and urbanization creates demand. In other words, industry is the driving force of the stable development of the city. Lowering the prices of industrial land leases temporarily reduces local revenue, while the establishment of industrial parks creates more employment, with increased future tax revenue and associated infrastructure generating positive externalities. These all eventually benefit local revenue and are indispensable for gaining popularity and encouraging the development of other industries. Moreover, strong substitutability and relaxed

location requirements make the industrial land lease market much wider than others do so that suppliers have to compete with each other in a large regional market, with the mobility of capital making competition even fiercer. Such intensive competition compels local governments to debase land lease prices to improve competiveness ability, meaning businesses can reduce cost by simply selecting the county with the lowest prices.

2.3.2 Fiscal financing: expensive leasing price of commercial-residential land (CRL)

Macro-control, or *the visible hand*, provides an effective way of solving the problem like market failure to meet public demands. In other words, one of the most important functions of local government is to provide citizens with public goods and services and maintain stable social development through the implementation of public policies. To achieve this goal, local governments require sufficient manpower and material resources - the fundamental guarantee for these resources being the revenue they can generate.

“Land finance” is the method through which local governments try to obtain the corresponding revenue through the lease of land use rights in order to maintain local fiscal expenditure (Zhu, 2012). Generally, land finance only refers to the revenue from leasing land use rights, but the concept can be expanded to include all revenue generated from the land. In 2013, for instance, land transfer fees accounted for CNY 4 trillion, land-related taxes (urban land use tax, farmland occupation tax, etc.) CNY 1 trillion, and CNY 3.5 trillion in mortgage loans (estimated from 2012 data). The land has therefore generated approximately CNY 8 trillion in local government revenue - more than local revenues of CNY 6.1 trillion. Clearly, therefore, local governments gather a great deal of money by leasing land and land finance has become an important driver of rapid economic growth.

As mentioned earlier, administrative allocation and negotiation still dominate the sale of industrial land leases and this, coupled with severe competition between regions, makes the price of industrial land leases much lower than those of residential land. Therefore, local governments can rarely benefit from the lease of industrial land in terms of land transfer fees, and most revenue from land finance is from the lease of commercial and residential land. In 2008, the area of commercial and residential land accounted for only 44.20% of the total, while its net income accounted for 82.59% of total revenue. In the same year, the industrial land supplement, which accounted for 52.1% of the total supplement, created only 15.62% of land transfer net income (Xue, 2011). U.S. economist Alonso has proposed the co-ordination of supply and demand as the premise of land market equilibrium in bid rent theory. Larger bid-rent curve slopes are associated with more intense tenant rent competitions (Alonso, 1960). Tenants competing for land in the CBD often have a stronger capacity for payment, especially when accompanied by rapid development of the city when downtown land values rise rapidly as well as increased pressure of competition between lessees.

3. What dilemmas that Urbanization bring about?

3.1 Cheap industrial land transaction cost

3.1.1 Industrial land leasing game

Land and capital are complementary elements in demand market. In normal circumstances, companies attempt to obtain maximum benefits by grouping production factors optimally. When land prices are low, companies choose a mode that combines maximum land and minimum capital providing the production technology permits. However, such a development method ultimately results in extensive industrial land use (Wu, 2007).

<Insert Table 1>

In Table 1, areas A and B are two analytical objects. Suppose the investment environments in the two areas are similar and total investment is fixed. In the initial stage, areas A and B both use normal policies for land transaction fees, and investment projects are therefore distributed evenly between the two. In addition, the land use method is intensive. Imagine that area A suddenly abandons its normal land leasing policy and reduces transaction fees and area B cannot make a sufficiently timely response, In this case, more businesses are attracted into area A while area B suffers a loss in investments. Nevertheless, although area B receives less capital than area A, its land use pattern is intensive which means area A land use is more extensive due to the additional capital inflows. In reality, the benefits obtained by lower industrial land lease prices far outweigh the loss in land transaction fees. Therefore, area B will cut land transaction fees to retain the existing businesses, or even to attract new investors. Once area B adjusts its price policy to a lower level than area A, the investment gap is reversed. B obtains more projects than A, so A reduces land leasing again and the cycle continues. The cycle stops at the point when a balance is reached, investment distribution is the same as the initial composition, industrial land value stabilizes at a lower level and land use is extensive.

In principle, even taking other factors such as location, technology or investor preferences into account, this conclusion will not be changed, because not only do these factors inhibit local behavior, but stimulate authorities who are weak in resources to further decrease land lease prices to make up for deficiencies.

3.1.2 Extensive industrial land use

Although it is possible for purchasers and sellers to have a period of negotiation before concluding a transaction, low industrial land leasing prices, perhaps sometimes a zero price, still occur (Wu, 2005; Yang & Rao, 2012).

Since 2003, the State Council has cleaned up a total of 6024 development zones over an area of 35,400 km^2, among which 2046 zones have been revoked. According to city planning of China, there is 100 m^2 of land per capita, so when China's urban population was 340 million in 2003, the total area of development zones cleaned up was equivalent to the size of the total built-up area. Therefore, a large amount of

development zone construction can attract investment in the early period when industrial land lease prices are very low. However, this land strategy led directly to a large proportion of industrial land and urban sprawl (Wu et al. 2014).

Land resources are limited with a relative shortage in China, and low industrial land lease prices have provided space for speculators seeking rent. In some cities, it is even common to obtain designated industrial land leases at a low price but carry out other property development, indirectly resulting in a huge loss of state-owned assets. This kind of vicious competition has resulted in an imbalance between industrial layout and factor endowment, which has caused unreasonable industrial land layout, extensive land use, a low industrial agglomeration rate and weak international competitiveness.

3.2 Expensive commercial-residential land (CRL) transaction cost

3.2.1 Game theory in land pricing: commercial-residential land vs industrial land

Industrial land leasing can create long-term stable social benefits despite being unable to help governments acquire enough development funds in the short term. The industrial land lease market is a "buyer market" where governments are just the recipients of the premiums, which explains why they do not hesitate to adopt "cheap land lease price" or "zero land lease price" strategies (Zheng & Shi, 2011). In contrast, the price of CRL leases, particularly those for residential land, a rigid demand commodity, can be easily controlled through official policy to supply government with a one-time profit due to the lack of property tax in China. In other words, long-term benefits of CRL do not exist. Furthermore, low industrial land transaction fees lead to a fiscal shrink, while urban development needs substantial monetary resources to carry out infrastructure construction. In that case, local governments tend to sell CRL leases at a high price to fill the fiscal gap and meet the need for construction.

<Insert Table 2>

Table 2 illustrates four results that will occur if different pricing decisions concerning CRL and industrial land leases are made in county A. When county A implements an *expensive* industrial premium policy, there will be fewer investment projects due to its poor price competiveness. Consequently, local government then need to do something else to provide employment opportunities for the migrant population because of the lack of incoming businesses. At this point, if the government adopts a policy of expensive CRL transaction fees, it can obtain considerable revenue. However, the expensive CRL premium triggers excessive housing prices in the property market, which severely affects the living needs of low-income families. If, on the other hand, the government resorts to a cheap CRL transaction fees policy, the total premium it acquires from industrial land and CRL leases decreases significantly - while housing prices stay stable and more people can afford residential property (although the migrant employment crisis remains)

When county A implements a *cheap* industrial premium policy, there will be more investment projects due to its strong price competiveness, which creates employment opportunities for migrants to flow into the area compared to other counties. At this point, if the government adopts a policy of expensive CRL transaction fees, it can obtain considerable land revenue to compensate for the financial loss caused by the low industrial premium. However, this will also inevitably induce excessive housing prices. In contrast, if the government resorts to a low CRL transaction fees policy, the total premium that it acquires from industrial land and CRL leases decreases significantly - weakening its ability to provide public services - although the property market is stable and functions well in improving housing demand. This would appear to offer a minimum regret solution in the form of reduced local government revenue in exchange for good migrant employment opportunities and a stable housing market with reasonable housing prices.

If considering into some micro situation impact, we can better understand why this solution is popularly adopted. In China, government officials have strong administrative power and free disposition rights. Since ancient times, they are regarded as “parent-like”, being responsible for solving employment problems and providing living and working places for people. As the analysis shows, the most fundamental way to deal with unemployment is to bring in new businesses by offering low lease prices. However, the promotion prospects of officials are tied to the local economy and measured by increased GDP, and increased GDP means economic growth, which always follows from urban infrastructure investment. At the same time, the public finance system is less than perfect, with administrative expenses accounting for a large proportion of the total expenditure - “eating finance”, for example, is still very popular (Zheng & Zhou, 2007) – which indicates the difficulty in maintaining infrastructure construction with normal fiscal revenue. Therefore, officials seek additional ways to increase government financial strength when looking for promotion. At present, the most effective and convenient way is to sell CRL land leases at a high premium.

From above analysis, it can be concluded that, as promotion is decided by GDP, the officials will prefer to solve the employment problem rather than the housing issue. The government therefore avoids facing the problem of excessive housing prices in the property market, which leads to severe housing problems for low-income families. Many are migrants, because of their reduced circumstances caused by the often-large wages differences and occupational segmentation between citizens and migrants, being the object of discrimination in the labor market and position in the lower realms of society (Meng & Zhang, 2001).

3.2.2 High cost of housing in China

At the end of 1992, outstanding household deposits reached CNY 1.1545 trillion, a 26.8% growth on the previous year, exceeding the annual total volume of retail sales of CNY 1.0894 trillion at a 15.7% growth rate. Huang (1993) has vividly compared household deposits with a “caged tiger”, for the capital is deposited in the bank instead being used for purchases. Of course, there is another layer of meaning, if

household deposits are withdrawn from the bank, the merchandise inventory will undoubtedly be quickly used up.

The old welfare housing distribution system ending in 1998 was followed by monetization housing distribution, from whence housing became a consumer good. Local government now uses industrial land leases as a bargaining aid to gaining competitive advantage. Residential land lease transactions exhibit high sale prices and low transaction volumes. More capital flows into the residential property market due to living, investment and speculative preferences - a phenomenon that is likely to increase in the future. Therefore, supply cannot keep up with the speed of demand growth because local government, the only supplier in the land lease market, is limited to the random provision of construction land. That is why housing prices are always high. In addition, based on the current "land leasing-land selling tax charges-mortgage-land leasing" mode, land taxes must guarantee high CRL transaction fees. Eventually, however, developers will transfer these costs to the consumers who are at the end of the transaction chain. It is clear therefore that, compared with household deposits, housing consumption could be a huge black hole absorbing all the energy from the "caged tiger", replacement creditors and debtors. The residents are the borrowers, while the bank is the creditor, and thus are born the so-called "house slaves".

3.2.3 Potential crisis caused by land increment relying fiscal system

By the end of 2012, the outstanding government obligations from land sales of 21 provincial capital cities had reached CNY 774.697 billion, accounting for 54.64% of all outstanding obligations and CNY 118.397 billion more than 2010. Meanwhile, the sales of land property rights for development in these cities was CNY 13.508 billion (2.83%) less than 2010. Disposable land sales (the cost of expenditure less the revenue extracted by the state) was CNY 17.956 billion (8.82%) less than it in 2010. These 21 provincial capital cities had to repay CNY 231.573 billion in principal and interest from land lease sales in 2012, 25% more than disposable land sales. In some cities, outstanding obligations increased while land lease revenue growth declined and solvency dropped. If this situation continues, land finance will face big problems. The root cause of this is that sales of commercial and residential land leases cannot generate a long-term and stable income for the government. With increasing land lease sales, urbanization development based on land finance is certain to face a greater challenge.

4. Sustainable solutions on urban growth: the outlook for 2030

4.1 Introduce property tax: transform land increment relying finance into land inventory relying finance

Is it possible that changing government land increment relying finance to land inventory relying finance can generate permanent income from residential land? How can land stock finance be operationalized? The key is property tax. Property tax, a local government stable income source, can provide financial support for sustainable urbanization. In most developed countries, property tax is usually based on actual sale

prices and commodity market price assessment, especially in the United States and Europe where land and property tax are the cornerstone of city revenue and possess considerable administrative expediency (Netzer, 1966). Since property tax is very stable, the government no longer needs to rely on high-strength “land finance” or sell large quantities of industrial land leases at a low premium. In addition to providing a stable fiscal income, property tax also has the advantage of intergenerational equity. Nowadays, with the current fertility policy and a better-developed health care system in China, more (increasingly macrobian) babies are born and the working-age population face a greater pressure from their upbringing needs as well as housing in the future.

Explaining the age dependency ratio gaps between generations involves analyzing data, such as fertility age and the male and female population of all ages from China’s sixth census. The dependency ratio is calculated in 2010=(14 years old and younger population +64 years old and more)/(15-64 years old population)*100%=2.92:1 (orange section in **Error! Reference source not found.**/ red section in **Error! Reference source not found.**). The result shows that approximately three working-age populations are responsible for one non-working-age population. Later, PADIS-INT is used to predict the population structure in 2030. The total fertility is set to be 1.7 and 1.05 sex ratio at birth regardless of international migrants. The outcome is shown in **Error! Reference source not found.** and **Error! Reference source not found.**, where the estimated dependency ratio in 2030 turns out to be 2.02:1 - about two work-age populations (orange section in **Error! Reference source not found.**) taking the responsibility of one non-working-age population (red section in **Error! Reference source not found.**).

In other words, the 0-15 year old people now in the bottom of the pyramid will become the most important social wealth creators in 20 years’ time. Because of China’s one-child policy, which allows them no siblings, they will have the most responsibility for raising the 2.02:1 dependency ratio when they enter adulthood and an open childbearing policy returns. As for the housing problem, most residential properties belonging to middle age groups are allocated through the planned economy. Therefore, even if some are acquired by purchase, their prices will be quite different to current prices. Moreover, by 2030 these groups will become of retirement age, while the state will continue to provide them with corresponding subsidies. Today’s middle age groups will therefore obtain maximum social benefits with minimal effort. If housing prices keep rising, the gap between generations will increase and people who become the social mainstay in 20 years’ time will need to find a solution. Therefore, it is necessary to introduce a property tax for primitive capital accumulators - today’s middle age groups In China – to help government transfer capital from middle-age groups to youth groups. In general, market economy is a kind of exchange structure with the premise of labor division, meaning the same “value-in-use” can produce varied values in the hands of different people. Property taxes can make transfer the property which belongs to the people who lacks of the ability to pay and gain revenue to those who can pay (Wu, 2004).

<Insert Figure 4>
<Insert Figure 5>

4.2 Migrant workers citizenization: provide ample affordable houses

As shown in the Sixth Census, the total population of China is 1.34 billion (excluding Hong Kong, Macao and Taiwan) and the urbanization rate exceeds 50 percent. The social structure has also experienced a historic turning point (Yang, 2013). The exact amount of the migrant urban population who has been living in cities over six months remains unknown. This is a total floating population approaching 230 million by the end of 2011 and accounting for 17% of the total population according to the *2012 Report on China's Migrant Population Development* (hereinafter referred to as the Development Report) released by the Family Planning Commission. Approximately 170 million migrants (of the total floating population of 230 million) live in cities and 56 million live in towns. Assuming the urbanization rate of China in 2011 is 50% (slightly lower than the real number), the total urban population is a little more than 440 million (1340*0.5-230=440), the total rural population is a little smaller at 670 million (1340*0.5=670), and the total floating population is 230 million. Assume the peak of China`s total population is 1.6 billion and that the urbanization rate will be higher than 2011 but it will change little because of the stability of living style etc. From this, we can roughly predict that the rural population will reduce to around 500 million, while the urban population is likely to increase to 500 million. Therefore, when China reaches this population peak, the total floating population will be 600 million. According to the Twelfth Five-Year Plan, China will build 36 million units of affordable housing within the next 5 years, so that national affordable housing will be deficient by up to 20%. These 36 million units of affordable housing can benefit 108 million people in terms of families of 3. At present, China's natural population growth rate is 4.95‰. With 1.3 billion people, even if the natural population growth rate increases to 1%, the total new population over five years will be only 65 million, which means affordable housing can be used simultaneously to solve the migrant housing problem. In addition, the Development Report points out migrants from rural areas account for 80% of the total, showing that the majority of migrants comprise the rural labor force migrating to cities. China's new urbanization plan (2014-2020) emphasizes the citizenization of 100 million people from rural area.

Stability and domestic demand are two major issues in China. On one hand, migrants cannot enjoy the same treatment as citizens in public housing, basic education, basic health care, etc. because of the urban-rural dual structure, which has a serious impact on the quality of China's urbanization. If this issue is not properly addressed, it is likely that slums will appear in cities in the future, leading to social unrest. On the other hand, demand will naturally be stimulated if the new urban population receives better treatment, by providing affordable housing, making the education of their children no longer subject to institutional discrimination, access to a sound health insurance system, etc. Housing is a basic necessity that provides shelter from the elements and is the setting for the communal life of the household (Anderson et al., 2003). Since more migrant households have been settling in urban areas, they

are still alienated from housing reform policy (Hiroshi, 2006). Modernization process can bring in middle class, a colossal development stabilizer, on the contrary excessive price damages social class structure through falling middle class into a role called home mortgage slave (Zhang, 2010). Thus, there are no obvious obstacles to this, since affordable housing land can meet the needs of a growing population of both citizens and migrants.

4.3 Industrial restructuring: focus on green GDP

Since the new century, financial crisis and industrial technological revolution come to be two emerging power in the world. Countries like the U.S. (Hall et al., 2006), supports new technology industries and promotes green industrial transformation strongly to achieve economic recovery. In the same way, China ought to make some effort to maintain sustainable development as well. The cement output of China in 2009 accounted for 60% of world production; crude steel production in 2010 accounted for 44.3% of the world's steel production; and coal production in the same year accounted for 45% of world production - making China a world factory. Since 1978, total energy consumption has maintained an upward trend, especially in the new century, with the energy consumption growth rate spiking upward, involving more than three billion tons of standard coal in 2010.

The high environmental cost and carbon tariff mentioned in the 2010 United States Clean Energy Security Act makes sustainable development in China faced with dual pressure from both home and abroad and, if carbon tariffs are fully implanted, could involve an average tariff of 26%, causing a decline of 21% in exports. Therefore, industrial restructuring is an inherent requirement for sustainable development, with the promotion of government officials being based on a more comprehensive evaluation system incorporating ecological and social indicators, rather than simply based on economic indicators.

5. Conclusion

Urbanization boost models that are based on “low industrial land transaction fees and high CRL transaction fees” land finance have laid the foundation for urban development in recent decades. However, the problems triggered, such as extensive land use and excessive housing prices have also seriously jeopardized sustainable social development. For the sake of steady urbanization progress and city sustainable growth, in looking forward to 2030 the government needs to pay more attention to land stock finance and consider introducing a property tax to continue revenue from CRL. New urbanization requires the city to achieve urban integration, and eliminate discriminatory treatment between migrants and citizens by constructing affordable housing to solve migrant housing problems. In addition, the GDP performance evaluation system of government officials severely hampers the development of new urbanization, with an enormous environmental cost. Hence, the government needs to consider adjusting the industrial structure to establish an official’s green service awareness through which more importance is attached to local social and environmental indicators.

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Figures

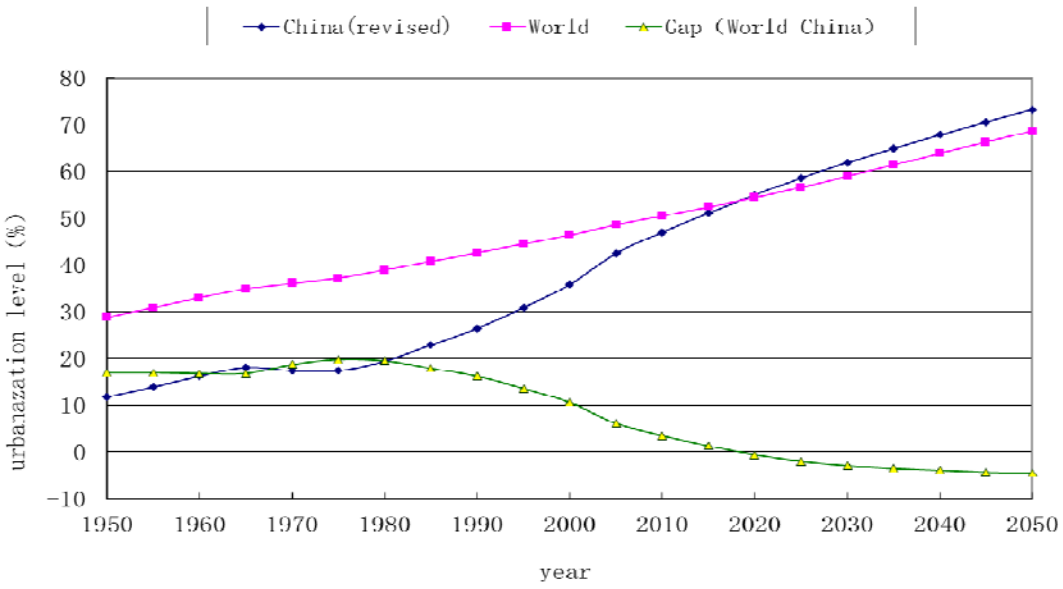

Figure 1 World and China's urbanization level change in 1950-2050
Data source: United Nation, World Population Prospects: The 2009 Revision, http://esa.un.org/wup2009/unup/,2010

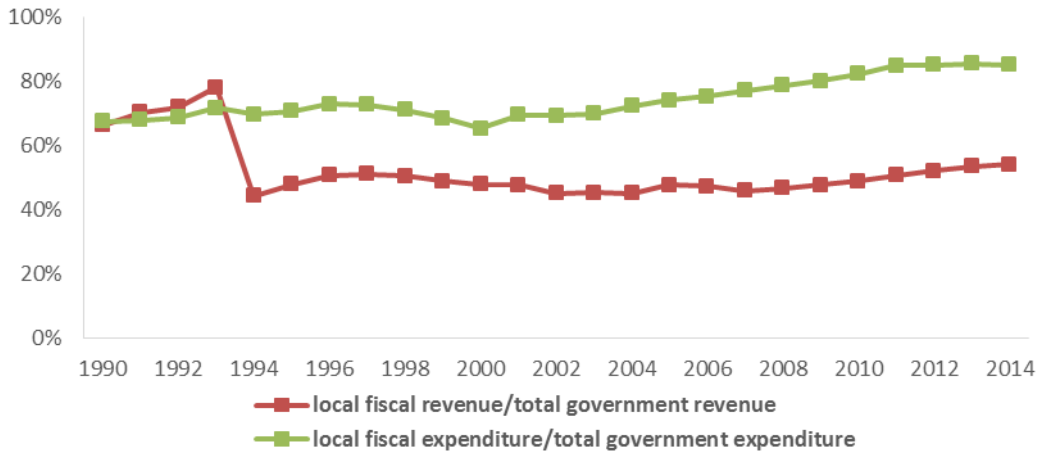

Figure 2 local fiscal income and expenditure change figure

Source： China Statistical Yearbook, 2013

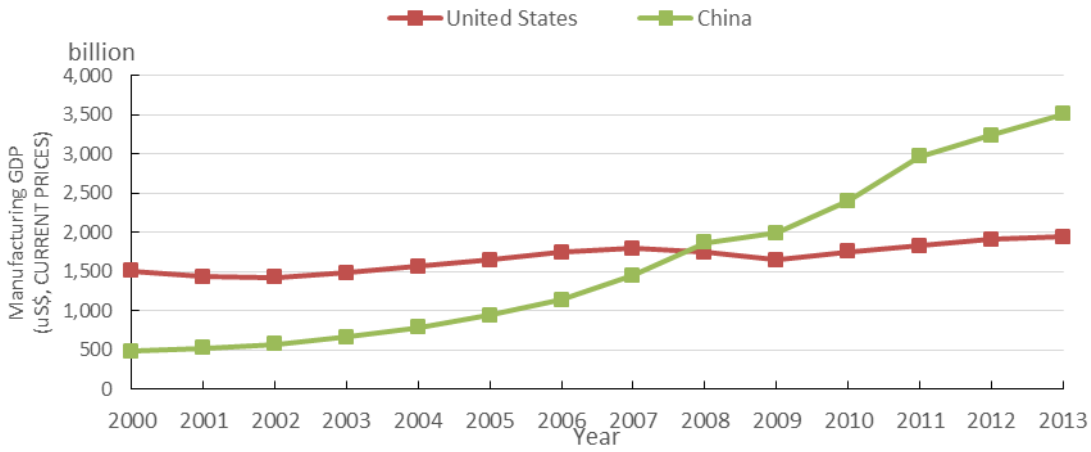

Figure 3 manufacturing GDP of China and United States, 2000-2009.

Source：The World Bank, World Bank national accounts data, and OECD National Accounts data

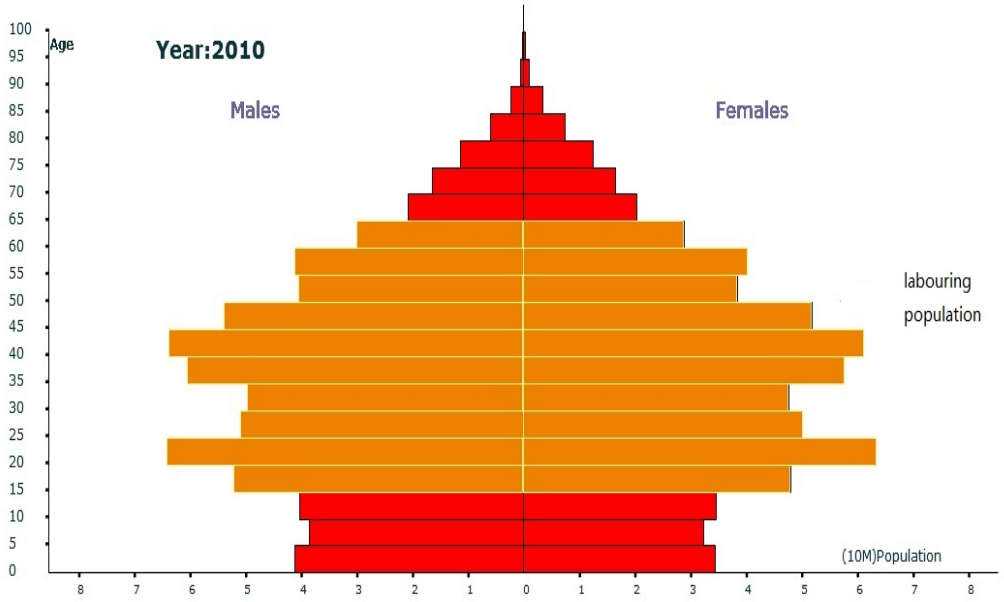

Figure 4 2010 population pyramid in China

Source：China’s sixth census

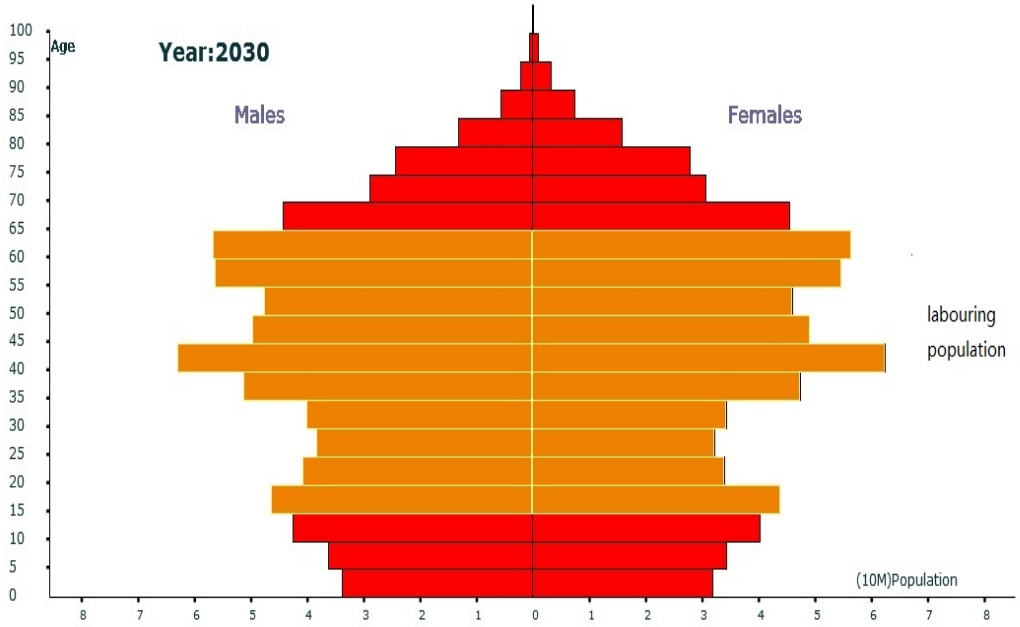

Figure 5 2030 population pyramid in China

Source：China’s sixth census

Tables

Table 1 Interregional industrial land pricing game

Policy in area B / Policy in area A	**B_1 (normal land transaction fees)**	**B_2 (low land transaction fees)**
A_1 (normal land transaction fees)	Intensive land use No effect in attracting businesses	Area A: intensive land use, investments suffered loss Area B: extensive land use, attract more businesses
A_2 (low land transaction fees)	Area A: extensive land use, attract more businesses Area B: intensive land use, investments suffered loss	Extensive land use No effect in attracting businesses

Table 2 Game theory in land pricing: commercial-residential land vs industrial land

Industrial land / CRL	Expensive transaction fees	Cheap transaction fees
Expensive transaction fees	Weak industrial land competitiveness Migrant employment crisis Considerable land revenue Excessive housing prices	Strong industrial land competitiveness Enough migrant employment opportunities Considerable land revenue Excessive housing prices
Cheap transaction fees	Weak industrial land competitiveness Migrant employment crisis Ordinary land revenue Normal housing prices	Strong industrial land competitiveness Enough migrant employment opportunities Ordinary land revenue Normal housing price