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The land hoarding and land inspector dilemma in China: An evolutionary game theoretic perspective

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ABSTRACT

China has experienced considerable economic growth since 1978, which was accompanied by unprecedented growth in urbanization and, more recently, by associated rising urban housing and land banking issues. One such issue is that of land hoarding – where real estate developers purchase land to hold unused in the rising market for a future lucrative sale, often several years later. This practice is outlawed in China, where land use is controlled by increasingly strengthened Government policies and inspectors.

Despite this, land hoarding continues apace, with the main culprits being the developers and inspectors working subversively. This resembles a game between two players – the inspector and the developer – which provides the setting for this paper in developing an evolutionary game theory model to provide insights into dealing with the dilemmas faced by the players. The logic and dilemma of land banking strategy and illegal land banking issues are analysed, along with the land inspector's role from a game theory perspective by determining the replication dynamic mechanism and evolutionary stable strategies under the various conditions that the players face. The major factors influencing the actions of land inspectors, on the other hand, are the costs of inspection, no matter if it is strict or indolent, conflict costs, and income and penalties from corruption. From this, it is shown that, when the net loss for corruption (income from corruption minus the penalties for corruption and cost of strict inspections) is less than the cost of strict inspections, the final evolutionary stable strategy of the inspectors is to carry out indolent inspections. Then, whether penalising developers for hoarding is severe or not, the evolutionary strategy for the developer is to hoard. The implications for land use control mechanisms and associated developer-inspector actions and counteractions are then examined in the light of the model's properties.

Introduction

China has experienced considerable economic growth since 1978, accompanied by unprecedented growth in urbanization. Land reform began in 1988 with the Chinese government approving legislation by which “the right to use land may be transferred in accordance with law” (Wu, 2001). In the early 1990s, China experienced phenomenal and speculative land development across the country (Wong & Zhao, 1999). For quite a long time since then, China's urban land system has been considered as state-owned and territorial, yet fragmented. The local governments have been made the ‘real landlords’, so as to assert full regulatory control over land use and transactions in order to secure rent revenues (Ding, 2004; Hsing, 2006).

Land use rights are therefore remarkably important to developers and they have to apply to, and obtain approval from, the government authorities (Bao, Chong, Wang, Wang, & Huang, 2012). Land acquisition with land leasing strengthens fiscal conditions for local governments, promotes economic and industrial development, and encourages urban encroachment into rural areas (Hui & Bao, 2013). In this context, the land rush tide is consuming large expanses of arable land across China, resulting in developers forming strategies for the advance acquisition and holding of land before development – a process known as ‘land banking’ (Tu, Pu, Huang, & Jin, 2008).

The effect of such considerations is that many Chinese developers would rather leave land already earmarked for residential purposes undeveloped for many years in anticipation of increased

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future housing prices (Liu & Ren, 2008; Wang, 2008; Zhang, Shen, Wu, & Fan, 2009). As a result of hoarding land in this way, many land sites are left idle for speculative land banking purposes, leaving a large quantity of land resources either unoccupied or wasted. Government regulations exist to control land hoarding. These are policed by government employed land inspectors. However, while it is reasonable to assume that real estate developers will, in pursuit of economic interests, hoard land to obtain business opportunities, the extent to which inspectors are necessarily immune from similar considerations is less certain. Under the land inspection system, it is still possible for developers to pursue illegal land hoarding. Consequently, disputes over land often occur between inspectors, whose job is to minimise land hoarding, and developers, who want more land banking. How such issues are resolved, and the complex supervision and anti-supervision relationships involved between land inspectors and developers, is not clear. Also, there is always information asymmetry between the land inspector and the land inspection institution in monitoring land hoarding. With this information asymmetry and other interest-driven issues, land inspectors often encounter moral hazards and corruption risks in the course of their work, which in turn lead to looser regulation and supervision (Wang, 2008).

The developers and inspectors, therefore, both face dilemmas. For the developer, this is whether to indulge in illegal land hoarding that may or may not be detected by the inspector, while the dilemma for the inspector is whether to search too deeply for evidence of hoarding in response to some financial inducement from the developer. This clearly resembles a game between two players – the inspector and the developer – and provides the setting for this paper in developing an evolutionary game theory model to provide insights into dealing with the dilemmas involved. The aim is to analyse the logic and dilemma of land banking strategy and illegal land hoarding issues, as well as the land inspector's role from a game theoretic perspective.

The paper is organised as follows. First, is a literature review covering land hoarding and its control measures in several countries worldwide and China in particular. Then evolutionary game theory framework is introduced in terms of the land developer and inspector players, and the assumptions made and payoff functions involved. Next, the replication dynamic mechanism, and the evolutionary stable strategies, are determined under the various conditions that the players may face. Finally, the implications for a land use control mechanism and associated developer-inspector actions and counteractions are examined in the light of the model's properties.

Literature review

Land hoarding worldwide

Generally considered to be first initiated in The Netherlands in the 1890s, land banking has been growing ever since in other Western countries such as Sweden (from 1904), Canada (from 1950s), France (from 1958) and the USA (from 1970s), often through the government's purchase of unwanted land for planned future development, or as a land market intervention for urban growth management and urban planning implementation (Bao et al., 2012). Land hoarding, speculatively retaining land that would otherwise be sold (in anticipation of a price at a later date in excess of some threshold relative to its current risk-free market value), is a phenomenon reported in many countries. The most recent of these include the U.S., U.K., Australia, Switzerland, Uruguay, Costa Rica, Cambodia, Nigeria, Lesotho, Namibia and other African nations. In fact, a form of land hoarding in the U.S. is reported as far back as its Civil War, when most moneyed Virginians ('Eastern elite') were intent on making themselves even more so through the practice (James, 2012; Morgenstern, 2014).

Most countries exercise no control at all. Where control does exist, it is often in the form of *land taxation*. This occurs in most U.S. cities for example in the form of a property tax, which has been shown empirically to decrease land retention (Adelaja, Hailu, Tekle, & Seedang, 2010). Similarly, a recurrent property tax is applied supplementing an urban land tax in Namibia (Norregaard, 2013). An alternative used in parts of Africa are *investment rules for land*, but these are emerging only very slowly and without and firm commitment from the governments involved (Wohlmuth, 2012). *Re-zoning land areas* for development has also been tried in Sydney, Australia, but with little success in restricting land hoarding (Recsei, 2013).

Other reported control methods include a *land-value tax* (LVT). As Vincent (2012) explains, the U.S. property tax generally taxes buildings much higher than land, which has a corrosive effect on investment, construction and rehabilitation of existing structures. As a result, many old industrial and commercial properties that might have been warehoused or mothballed while waiting for a new use are demolished, so that the (often absentee) owner can avoid taxes. The effect is the degeneration of the districts involved. The opposite occurs in cities that use LVT. In one example of Clairton, Pennsylvania, the adoption of the LVT system tripled the vacant properties' contribution to the city budget, kick starting their sales/development, with the additional benefit of providing "resources to pay for the education of Clairton's children and liberate working and middle-class families from the bonds of labour and capital taxation".

Another case of relevance described by Monk, Whitehead, Burgess, and Tang (2013), is Switzerland, where land hoarding is perceived as a major problem (Weber, 2010). Here, one mechanism to try and avoid land hoarding has been the development of *Land Improvement (LI) Syndicates* of land owners. These are land management tools typically in the form of public corporations, supervised by local authorities that aim to establish coordination between spatial planning and land management issues in order to avoid land hoarding (Weber, 2010). All landowners affected by spatial and land development projects are members and have the right to vote within the decision process, with decisions taken on a majority basis. Together, landowners seek to reorganise the land property to allow valuable development of the land, to equip their properties accordingly and to update the building rights according to the chosen development project (Weber, 2010).

Yet another recorded approach might be termed *the deal*. Vaughan (2012) describes the case of Osa Forest Products (OFP), for example, the second major stakeholder involved in the history of the Costa Rican Corcovado National Park (CNP). Between 1971 and 1973, charges of tax evasion, land-hoarding, repressive actions against settlers, corruption and other activities were levelled against OFP by congressmen from Costa Rica's national legislature and OFP quickly became an example of "land-hoarding" levelled at foreigners and their companies who neither used land, nor permitted nationals to use it. In September of 1975, Eventually, President Oduber began negotiations with OFP to exchange lands controlled by the Costa Rican government and OFP. Specifically the Costa Rican government wanted OFP lands in the CB for CNP, while OFP wanted public lands located in the center of the Osa Peninsula. After extensive negotiations, an agreement was reached for the land exchange in October, 1975.

The remaining cases concern recommendations made that have yet to be implemented. De Shutter (2011), for example, advocate taxing land in discouraging speculative land hoarding by foreign investors in poor countries generally. Similarly, the Teilee (2010) recommends land use planning and taxes on unused land in