



The Government Land Sales programme and developers' willingness to pay for accessibility in Singapore, 1990–2015



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ABSTRACT

Singapore has been internationally referred to as a successful model of state-led spatial development alongside world-class infrastructure investment, but there is a paucity of evidence on the effectiveness of the city-state's Government Land Sales (GLS) programme as an instrument of strategic spatial integration used to increase land productivity/profitability via accessibility enhancements at various locations in dynamic sequences. This study examines whether developers' willingness to pay for accessible land around major transport and green infrastructure facilities was consistent with the city-state's strategic spatial vision by analysing GLS transaction cases for the period 1990–2015. The spatiotemporal regressions of the GLS programme's transaction unit prices, attributable to tendering conditions, permitted development parameters, and locational characteristics, including the availability of major infrastructure facilities within certain distances, reveal that accessibility premiums appeared to be most significant within 500 m of mass rapid transit (MRT) stations, where Singapore's statutory agencies were likely to distribute state-owned sites reactively after the new MRT stations came into operation. Singapore's experience over a quarter of a century implies that government land ownership and development guidance could bring about competitive and sustainable market outcomes if a range of site sales implemented by local agencies are collectively programmed for strategic spatial planning in fast-growing regions of the world.

1. Introduction

Academic researchers and international organisations have commended the spatial integration of land development with major transport and green infrastructure as a strategic action for shaping competitive cities along sustainable pathways, most importantly in fast-growing regions of the world (OECD–Organization for Economic Cooperation and Development, 2006; Kamal-Chaoui and Robert, 2009; UN-Habitat, 2011; Cervero, 2013; Suzuki et al., 2013; Seto et al., 2014). Today's city leaders are progressively adopting such spatial guidance alongside the delivery of megaprojects through public–private partnerships capable of generating productivity, welfare, and capital gains via changes in land use or *accessibility*. Accessibility is defined as the locational advantage of competitive firms and households to reach a wide variety of economic resources, social opportunities, and environmental amenities at a short distance and/or low cost, counting the amount of energy consumption and greenhouse gas emissions, within and between cities on global, regional, and local production networks.

According to bid-rent theory, spatial integration is thought to improve land productivity, trigger private real estate investment for profitable land use, and induce rent capitalisation by enhancing

accessibility around transport nodes and central marketplaces (Alonso, 1964; Muth, 1964; Mills, 1972). In practice, however, the degree and pattern of rent capitalisation appear to be rather elusive across cities in developing countries, due in part to the inadequacy of government land ownership and/or land regulation (Han, 2004; Dowall and Monkkonen, 2007; Dowall and Ellis, 2009). Institutional complexity and limited experience generally impair municipalities' abilities to reform land development programmes and coordinate major infrastructure provisions with private developers in newly emerging markets, including China and India (Gladstone and Kolapalli, 2007; Tian and Ma, 2009; Dimitriou and Gakenheimer, 2011; Suzuki et al., 2015). To fill gaps in knowledge and skills, public agencies as well as private partners now call for the world's best case studies and land market analyses with a special focus on the implementation and consequences of spatial integration under government leasehold or similar landholding systems.

In response to such global inquiries, Singapore has increasingly been referred to as a successful model of state-led spatial development and management. In fact, over the last half century, the small island city-state has been undergoing dramatic physical transformation from a poor country to one of the world's most competitive finance, business service, trade, and education hubs (Perry et al., 1997; Sim et al., 2003;

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Tan and Phang, 2005; Sidhu et al., 2011). With its scarcity of land and natural resources firmly in mind, Singapore's real estate market formation has been judiciously guided by statutory authorities, along with the upgrades and extensions of land transport, airport and seaport terminals, college campuses, and green infrastructure systems (Wang, 1986; Phang, 1996; Haila, 2000; Lui and Tan, 2001; Han, 2005a; Newman, 2010). In particular, integrated public transport networks have been strategically placed to become a spine of accessible new town development and to produce polycentric rent capitalisation as envisioned in a long-term Concept Plan and medium-term Master Plan (Cervero, 1998; Sim et al., 2001; May, 2004; Han, 2005b, 2010; Lam and Toan, 2006; Richmond, 2008).

The method of converting strategic spatial vision into realistic programme implementation is of special interest to both public agencies and private developers worldwide. In Singapore's case, the Government Land Sales (GLS) programme has been playing an instrumental role in controlling development parameters on a site-by-site basis and achieving spatial development objectives collectively in accordance with the statutory land use plans. Although a range of entrepreneurial state interventions have been widely recognised as a powerful factor in Singapore's market efficiency and green urbanism, only a few studies have inspected the GLS programme's spatial coordination and price formation from specific aspects, such as urban design regulation and public auction procedure (Ooi et al., 2006, 2011; Lee, 2010). Indeed, the functional principles and administrative challenges of public leasehold in resource allocation and wealth distribution have long been debated across monarchy states, agrarian economies, socialist countries, and transitional markets from legal, fiscal, and political viewpoints (McDonald, 1969; Archer, 1974; Barrows and Roth, 1990; Bourassa and Hong, 2003; Lai, 2005; Wu et al., 2006). However, there is still a paucity of evidence on the effectiveness of public land leasing programmes as instruments of strategic spatial development that guide productive real estate market formation and induce rent capitalisation via accessibility enhancements at various locations in dynamic sequences, especially from Asia's centralised states and advanced markets.

This study adds to the limited body of empirical literature in three important ways. First, it spatiotemporally covers almost all GLS transaction cases for several site uses as administrated by two statutory agencies in the whole island of Singapore over the past 25 years. Second, based on neoclassical theory, spatial data analysis attempts to estimate the accessibility premiums revealed by developers as intermediate land consumers around an assortment of major transport and green infrastructure facilities that have been completed sequentially in recent decades. Third, the timing effects of government land disposal and development coordination with the delivery of major infrastructure projects on rent capitalisation are scrutinised by regressing the GLS transaction prices for some years before and after each infrastructure segment came into operation. The detailed spatial order and dynamic price formation revealed by this empirical work contribute to identifying critical measures of land-infrastructure integration under state leasehold schemes and projecting long-lasting development trajectories in newly emerging markets.

The remainder of this article proceeds as follows. Section 2 highlights Singapore's background with respect to its strategic spatial vision, world-class infrastructure development, and government leasehold system. Section 3 describes the methodology applied to analyse Singapore's GLS transaction data, and empirical results are reported in Section 4. Finally, Section 5 concludes by discussing key findings, international implications, and analytical challenges for future applied research.

2. Case of Singapore

2.1. Strategic spatial vision

The Republic of Singapore is a sovereign nation in Southeast Asia, consisting of one main island and 62 islets. The small island city-state, with a total land area of about 720 km², has a current population of more than 5.6 million inhabitants, having absorbed approximately 2.5 million people in the past 25 years (Singapore Department of Statistics, 2017). Given land constraints, Singapore's human settlements have been intensely composed in line with the city-state's strategic spatial vision for 40–50 years. Shortly after gaining independence from Malaysia in 1965, Singapore's newly established government, with the assistance of the United Nations, prepared the first Concept Plan in 1971, which systematically outlined the spatial configuration of the entire island with a commercial centre, new towns, industrial estates, recreational spaces, Changi Airport, and land transport networks as the Ring Plan until the late 1980s (Wang, 1986; Phang, 1996).

The Concept Plan has been serially updated to reflect the island city's dynamic changes and meet its diverse needs. The revised Concept Plan of 1991 largely adopted the idea of commercial decentralisation by sketching a hierarchical formation of the central area, regional centres, and sub-regional centres together with the development of technological corridors linking office complexes, science parks, and college campuses (Singapore Urban Redevelopment Authority, 1991). This polycentric outlook is generally known as the Constellation Plan, aiming to bring workplaces and amenities closer to homes and to mitigate excessive concentration of activities in the central area (Cervero, 1998). The Concept Plan of 2001 further sought to develop a global financial hub by introducing a flexible, market-responsive zoning system (called "white site") to the central area, while proposing to create a liveable city by using park connectors to make green spaces and playgrounds more accessible (Singapore Urban Redevelopment Authority, 2001). In 2011, the most recent edition of the Concept Plan presented broader land-use initiatives to sustain a high-quality living environment and room for future spatial development, as the island city's population is forecasted to grow to 6.5–6.9 million by 2030 (Singapore Ministry of National Development, 2013).

2.2. World-class infrastructure development

In the evolving spatial vision, the mass rapid transit (MRT) system has continually been positioned as a chief mode of Singapore's sustainable development. In 1982, after conducting a series of feasibility studies on major capital projects, the government approved a budget of S\$5 billion for the initial phase of MRT construction on the basis that it would induce greater real estate investment and generate higher land premiums compared to bus-based alternatives (Singapore Centre for Liveable Cities, 2014; Han, 2010). The system developed in phases and successively extended to 192 km of five main lines with 118 stations over the main island for the period 1987–2017. The island-wide MRT network encompasses many estates in its station catchments complemented by three light rail transit (LRT) circulars, whereas bus lines and taxi stands are aligned to fill gaps in service coverage. Due to the increased demand for road-based mobility and city-wide connectivity, the government has constructed around 163 km of 10 grade-separated expressways over the period 1966–2013, accompanied by innovative demand management applications, such as a vehicle quota system (VQS) and electronic road pricing (ERP) (Seik, 2000; Lam and Toan, 2006; Chu, 2012). Essentially, the VQS and ERP applications are expected to curb private vehicle ownership and usage, thereby increasing public transport ridership and, in turn, induce high market demand for real estate development (rent capitalisation) around MRT stations. However, the road and public transport systems were administrated separately until the establishment of the Land Transport Authority (LTA) in 1995. A White Paper issued in January 1996 states the LTA's

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