

Article

The Limits of a Success Story: Rethinking the Shenzhen Metro “Rail Plus Property” Model for Planning Sustainable Urban Transit in China

Congcong Li ^{1,*} and Natacha Aveline-Dubach ² 

¹ Research Unit Géographie-Cités, Université Paris 1 Panthéon-Sorbonne, Campus Condorcet, 5 Cours des Humanités, 93300 Aubervilliers, France

² CNRS, Research Unit Géographie-Cités, Université Paris 1 Panthéon-Sorbonne, Campus Condorcet, 5 Cours des Humanités, 93300 Aubervilliers, France; natacha.aveline@cnrs.fr

* Correspondence: congcong.li.13@alumni.ucl.ac.uk

Abstract

Land Value Capture (LVC) is increasingly being emphasized as a key mechanism for financing mass transit systems, promoted as a sustainability-oriented policy tool amid tightening public budgets. China has adopted a development-led approach to value capture through the “Rail plus Property (R + P)” model, drawing inspiration from the Hong Kong experience. The Shenzhen Metro’s “R + P” strategy has been widely acclaimed as the key to its reputation as “the only profitable transit company in mainland China without subsidies.” This paper questions this assumption and argues that the Shenzhen model is neither sustainable nor replicable, as its past performance depended on two exceptional conditions: an ascending phase of a real-estate cycle and unique institutional concessions from the central state. To substantiate this argument, we contrast Shenzhen’s value capture strategy with that of Nanjing—a provincial capital operating under routine institutional conditions, with governance and spatial structures broadly reflecting the prevailing urban development model in China. Using a comparative framework structured around three key dimensions of LVC—urban governance, risk management, and the transit company’s shift toward real estate—this paper reveals how distinct urban political economies give rise to contrasting value capture approaches: one expansionary, prioritizing short-term profit and rapid scale-up while downplaying risk management (Shenzhen); the other conservative, shaped by institutional constraints and characterized by reactive, incremental adjustments (Nanjing). These findings suggest that while LVC instruments offer valuable potential as a funding source for public transit, their long-term viability depends on early institutional embedding that aligns spatial, fiscal, and political interests, alongside well-developed project planning and capacity support in real estate expertise.

Keywords: sustainability; land value capture; “Rail plus Property” model; policy transfer; planning decisions



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1. Introduction

China serves as a vivid empirical laboratory for the study of development-based, transit-centric Land Value Capture (LVC), driven by developmentalist objectives and characterized by rapid transit infrastructure expansion. Since 2008, Chinese cities have experienced a “metro boom”, largely driven by the CNY 4 trillion economic stimulus package following the global financial crisis, with a substantial portion allocated to infrastructure

projects [1]. This expansion was further reinforced by a strategic shift in the central government's focus on prioritizing public transportation to support urban development [2] and boost local governments' land revenues [3]. Metro construction has accelerated, reaching 10,945.6 km across 54 cities by 2024 [4].

Local governments are the main actors in shaping this dynamic, holding primary responsibility for metro and urban development. To ensure their financial accountability, the State Council requires at least 40% of metro project costs to come from local government fiscal investment [5], with the remainder covered by loans and alternative sources. Land-based revenues, rooted in state land ownership and generated primarily through the leasing of land usage rights by local governments, serve as the fundamental mechanism underpinning metro financing and infrastructure-led urban development in China [3,6].

Due to the prohibition on on-budget borrowing, local governments are unable to incur direct debt, leaving metro companies to cover the remaining costs through corporate borrowing. In each city with a metro system, the metro company, a local state-owned enterprise (SOE), operates under the oversight of the municipal government, specifically the State-owned Assets Supervision and Administration Commission (SASAC) of the municipality. With government-regulated fare controls designed to maintain affordability and boost ridership, combined with the capital-intensive nature and large-scale expansion of the systems, the metro companies in China often operate at a loss, heavily relying on government subsidies. The excessive construction and debt accumulation risk have turned the "metro boom" into a financial burden, undermining the long-term objectives of sustainable urban development.

In response, the traditional government-led borrowing model for metro financing is shifting toward a development-based LVC approach, reflecting broader neoliberal trends in urban infrastructure finance [7]. This mechanism allows the public sector to capture the increase in land value generated by infrastructure projects through real estate development, redirecting it to fund transit investments and targeted urban improvements. Inspired by Hong Kong's experience, mainland China is adopting the "Rail plus Property (R + P) model". Developed by Hong Kong MTR Corporation (MTRC) as a validated approach to self-financing metro development through LVC, the "R + P" model was initially inspired by Japan's integrated rail-property development system [8], but later evolved into a more station-centric and less diversified strategy in Hong Kong [9–11].

The expansion of Hong Kong's "R + P" model to mainland China is facilitated by structural parallels in their land tenure regimes, characterized by public land ownership and government-controlled land allocation. Nevertheless, the literature generally agrees that directly replicating this model in China is unfeasible due to institutional constraints—particularly the requirement for public bidding on commercial land, which compels transit companies to engage in market competition, increasing development costs and introducing uncertainty [6,12–15]. Although the central government endorses LVC-oriented land use and transit integration, the continued absence of national policy coordination and regulatory clarity leaves local governments with limited guidance and increased implementation risks.

In this context, the adaptation of the "R + P" model in China unfolds through local institutional experimentation and is shaped by both structural constraints and pragmatic government interventions. Past research has documented a range of practices that navigate these institutional gaps and constraints. Primarily focusing on the Shenzhen case, the scholarship on "R + P" in China has examined the land acquisition and transfer methods of the value capture mechanism [12,16], its social objectives through the provision of affordable housing [6], and the informal ways used to circumvent institutional barriers in land acquisition [13,14]. However, this body of literature primarily focuses on the technical operability of the value-capture mechanism—particularly through the land acquisition

strategy—and tends to align with the established narrative celebrating the Shenzhen “R + P” model as an emerging financing tool with high potential. The Shenzhen model is also hailed as a prime example in the global policy learning discourse, due to its market-based approach and perceived ability to make the Shenzhen Metro self-sustaining without public subsidies. The G20-OECD Policy Toolkit [17] (p. 62) cites this case as a model for the financing and operation of metro systems in densely populated, transit-dependent cities, highlighting its capacity to create “a sound operation mechanism with self-support function.”

However, existing analyses have largely overlooked a critical interrogation of the model’s structural foundations and the political economy that sustains it. Moreover, its durability beyond the initial momentum remains unassessed, and the reasons behind its limited replication across other Chinese city regions are yet to be examined. This paper challenges prevailing assumptions regarding the performance of Shenzhen Metro’s “R + P” model, arguing that its short-term prosperity obscures deeper structural limits to sustainability and scalability, which are now becoming evident in the context of shifting macroeconomic conditions and institutional dynamics. To this aim, we compare Shenzhen Metro’s expansion-driven model with that of Nanjing Metro, whose experience under a conventional governance setting illustrates the structural dilemmas typical of routine institutional environment in China—marked by limited spatial and governance integration.

We apply a comparative framework centered on three main contextual factors: governance, risk management, and the transit company’s shift toward real estate. The results reveal how local urban political economies shape divergent value capture trajectories: one expansionary, driven by short-term returns and rapid scaling under exceptional coordination; the other more conservative, constrained by fragmented governance and marked by incremental, reactive adjustments. The study revisits the mainstream “successful narratives” in the LVC literature through the lens of these institutional tensions, which produce partial and unstable outcomes. We argue that while LVC instruments offer valuable potential as a funding source for public transit, their long-term viability depends on early institutional anchoring that aligns spatial, fiscal, and political interests—supported by a balanced approach and access to development capacity in real estate.

This paper is divided into three main parts. Part 1 introduces the Materials and Methods. This section opens with a literature review discussing the three key contextual dimensions of the comparative framework: the relationship between LVC and urban governance, LVC and risk management, and the evolving role of transit companies in real estate development. It then outlines the research methodology used in this study. Part 2 presents the comparative analysis of the two case studies, highlighting how variations in institutional and political-economic conditions shaped divergent LVC strategies. Part 3 offers the Discussion and Conclusion, reflecting on how the findings contribute to the theoretical understanding of LVC and outlining their broader implications for policy and practice.

2. Materials and Methods

2.1. Literature Review

2.1.1. LVC and Governance

Land Value Capture (LVC) is a broadly defined concept that includes various approaches designed to enable the public sector to recover increases in land value resulting from public investments and government interventions [18]. While LVC mechanisms can be applied to a range of urban elements, they are increasingly employed to co-finance capital-intensive urban infrastructure networks. This trend aligns with the growing emphasis on transit-oriented development (TOD) [19], which steers urban growth around transit stations and aims to reduce car ownership, traffic congestion, and pollution [20]. Urban transit systems hold significant potential for value creation, especially in densely

populated East Asian cities [21]. The value increment is primarily generated through three key mechanisms: enhanced transport accessibility, intensified land development guided by spatial planning regulations, and agglomeration economies associated with urban (re)development [22–24].

The popularization of LVC as a co-funding tool for urban transport infrastructure is driven by fiscal austerity [25] and promoted by multilateral agencies such as the World Bank [15] and OECD [17,18] as a substitute for public investment. Traditional tax- and fee-based value capture methods used by local authorities are increasingly being supplanted by development-based instruments [15,26]. These typically involve joint development projects near metro stations, particularly on land owned or managed by transit companies.

Regardless of the value capture instrument used, LVC scholars concur that a well-coordinated governance structure is crucial for maximizing value capture and ensuring its equitable redistribution (inter alia [19,27]). Nonetheless, the literature highlights a variety of institutional barriers that hinder these objectives. In the United States, coordination between transit companies and local governments remains limited, and regional leadership is often inadequate to facilitate effective and transparent collaboration [28]. Smith [29] also argues that the state agencies involved in urban transit projects function as a collection of institutional fiefdoms spanning multiple levels of governance, each shaped by distinct cultural norms, values, traditions, and interests. In European cities such as London and Paris, these complex institutional dynamics have constrained the implementation of LVC mechanisms to finance large-scale transit projects like Crossrail and the Grand Paris Express [7,30].

In contrast, East Asian cities such as Tokyo, Hong Kong, and Singapore stand out by having established a high degree of coordination between public and private actors. According to Sharon and Shewmake [21], this was the key factor in their successful financing of transit infrastructure through value capture. Contrary to Western cities, they adopted development-based instruments from the outset, conferring significant rights to transit companies [8]—or, in Japan’s case, institutional margins of maneuver [31]. Although China has followed a similar path, the implementation of LVC faces several challenges related to urban governance. Van der Krabben and others [19] (p. 16) identify four key institutional issues: unclear institutional guidance, dominance of local governments in partnerships (which weakens incentives for private developers), lack of transparency, and an unsupportive urban planning system. To circumvent institutional barriers, Chinese local governments have developed informal practices through a “‘trial-and-error’ process of social learning” [13] (p. 8), providing a way to navigate the entrenched operational challenges commonly associated with LVC [32,33].

2.1.2. LVC and Risk Management

A key governance challenge lies in managing the risks associated with funding infrastructure through joint development [34]. Although this policy instrument is considered one of the most readily applicable for implementing a value capture approach [27,35] and helps reduce reliance on debt through upfront revenue [36], it also involves several risks.

First, large transit systems are often exposed to construction-related risks, which can significantly inflate overall costs, as evidenced in US and European cities [7,26,37]. Delays incur opportunity costs, as property developers are unable to fully or timely develop the real estate assets linked to the value capture project [38].

A second major category of risks relates to the uncertainty of expected revenue streams from joint development projects. LVC scholars emphasize that real estate market conditions are among the most influential factors affecting revenue [27,34,39]. Real estate markets are inherently cyclical and can be further compounded with broader macroeconomic

crises, which may severely reduce income from joint development—as occurred in the U.S. following the Great Financial Crisis [34]. Risk is magnified when property markets are driven by speculation, and projected income relies on extrapolating recent value trends [36].

At the local level, transit conditions and real estate market dynamics can significantly influence the potential income from value capture. A comparative study by Mathur and Smith [34] on the revenue-generating potential of joint development projects in five U.S. cities revealed significant variability in both revenue yields and stability. Page and others [38] contend that each transit line and station area has distinct characteristics. They argue that factors such as local population growth, socio-economic profiles, retail patterns, and built-up density all contribute—among other elements—to shaping highly variable local ridership levels and real estate demand. In the U.S., difficulties in assembling land for developers often lead to the selection of poorly located station sites, such as brownfields, where real estate markets are weak; similar issues arise in sprawling suburban areas that lack neighborhood-level amenities, further limiting development potential [26].

Given the uncertainty surrounding income from real estate projects, value capture strategies based on this approach often fail to bridge the infrastructure funding gap. Studies focusing on the United States show that joint development initiatives contribute only a limited portion of revenue to finance infrastructure [27,34,37]. Similarly, in the case of the Grand Paris Express, property development is estimated to cover just 1.3% of the total transit infrastructure costs [7]. These findings underscore the importance of thoroughly evaluating projected revenues from value capture strategies and incorporating a long-term view into risk assessment, as short-term fluctuations may obscure the sustained benefits and fiscal stability of development initiatives.

2.1.3. The Shift of Transit Companies Toward Real Estate Development

To gain a comprehensive understanding of the prerequisites for efficient station-centric development initiatives, transit companies must acquire practical experience in real estate [40]. This involves a challenging transition process.

A key aspect is fostering an entrepreneurial mindset within organizations traditionally rooted in engineering principles and a public service ethos. Many transit companies are reluctant to engage in market-driven urban development that involves significant financial risk. This is particularly true in the U.S., where only a handful of transit agencies are proactive in this sector [41]. Even when they are open to this approach, transit companies may encounter resistance from oversight bodies. For instance, the company responsible for financing and building the Grand Paris Express, the SGP, had to invest significant effort to secure political approval from higher levels of government [7].

To legitimize their involvement in this new sphere of activity and acquire the necessary skills, transit companies must develop new capacities. According to Adisson [40], these fall into three main categories: organizational, professional, and informational. Organizational changes typically entail the creation of a development unit within the transit company or the establishment of a dedicated subsidiary. Professional resources are acquired by importing real estate standards, instruments, knowledge, and practices from private companies. Studies in Europe have shown that, under fiscal austerity and the growing influence of the New Public Management doctrine, transit companies have increasingly come to view their land holdings as financial assets [42–44]. Staff recruited from private firms with expertise in property development, real estate investment, or asset management have become increasingly influential within the development units of public transit companies, often overshadowing the traditional role of urban planners [7,40].

In contrast, transit companies adopting value capture strategies in East Asia have embedded real estate expertise from the outset, steadily cultivating knowledge and ca-

pabilities in this domain as their metro networks expanded [45,46]. In some cases—such as Japan’s private transit operator Tokyu Corporation—the company originally emerged from a real estate and development firm [47]. While these large groups developed land and property for sale to generate upfront income, they also strategically accumulated rental properties—primarily office buildings and retail facilities—to secure long-term, regular cash flows. This “(asset) management-based” value capture strategy [9] has gained significant traction in Japan and Hong Kong in the past decade. In Japan, demographic ageing and the resulting suburban shrinkage have led major transit companies to form consortia and undertake large-scale developments in the central districts of major metropolitan areas, featuring a mix of income-generating properties and supported by favorable building rights granted by local governments [48]. In Hong Kong, the MTRC lost its ability to acquire new land under post-colonial rule and was compelled to abandon the traditional LVC mechanism. However, it continues to leverage its existing real estate portfolio and generate rental income, in line with Japanese operators’ shift towards management-based LVC in mature urban contexts [9,10].

The shift by European transit operators toward accumulating income-generating properties has been largely inspired by the models of Japan and Hong Kong—albeit implemented on a more modest scale (see, for example, [49] for the French case). As will be discussed below, China has also adopted this dual strategy, combining both development and asset management approaches.

2.2. Research Methodology

This study adopts a qualitative methodological framework that triangulates multiple sources to understand the institutional logics, operational dynamics, and public perspectives surrounding the “R + P” model.

The first component consists of a documentary analysis encompassing three layers of sources: (1) corporate and financial disclosures; (2) formal policy and planning documents; and (3) informal and interpretive materials. Firstly, annual reports of metro companies are compiled and analyzed over time to trace shifts in strategy, financial structure, and business focus, and cross-referenced with credit rating reports. Acknowledging the limitations of domestic credit ratings, this study does not use them as direct evidence, but rather as a supplementary lens into how market actors interpret the institutional logics and financial models of metro companies. The same analytical approach was applied to Shenzhen Metro’s major partner—real estate company Vanke—to examine stakeholder dynamics and the sustainability and risk structure of the “R + P” model. Secondly, policy and planning documents—including urban and transport master plans, and central and local government regulations on metro development, land transfer, and public finance—are analyzed to examine how institutional frameworks shape the implementation of the “R + P” model. Land transaction records are examined to trace how metro companies obtain land, with attention to location, price, intended use, and acquisition methods. This study also consults supplementary materials—including public speeches by government officials, rail transit industry reports, and media commentary—to support the analysis of how local institutions function in practice and to engage with civil society perspectives.

Secondly, semi-structured interviews were conducted with key actors. In the two case study cities, multiple rounds of in-depth interviews were held between 2018 and 2025 with senior representatives from metro companies and planning departments. In Shenzhen, interviewees included four metro company representatives and two officials from the municipal planning department; in Nanjing, four metro company representatives and two officials from the planning department were also interviewed. Metro company interviewees covered roles related to land assembly, real estate development, and corporate

finance, while government officials were responsible for transport and urban planning, with some involved in the decision-making processes. Additional interviews were conducted with metro company officials in Shanghai (2 interviewees), Suzhou (1 interviewee), Ningbo (1 interviewee), and Foshan (2 interviewees) to provide comparative insights and explore broader institutional tendencies. Some interviewees pointed to additional readings of informal, expert commentaries, which are helpful for understanding the practical complexities and contextual nuances of “R + P” implementation. To move beyond government and transit company narratives of “R + P”, this study also incorporates perspectives from metro passengers, local residents, and shop owners in “R + P” projects to take into account perspectives that are often absent from official accounts. Interview responses were recorded in written form to ensure precision and completeness.

Thirdly, site visits were conducted to observe the physical setting and operational environment of “R + P” projects. These visits helped assess transit connectivity and spatial coherence, provided first-hand insights into how the projects are experienced by users, and added a spatial dimension to understanding policy outcomes and practical challenges.

Finally, an internship at a transportation planning institute engaged in government advisory work in Shenzhen enabled participation in research and discussions on metro line financing, which offered practical exposure to the fiscal and spatial logics underpinning transit investment planning, thereby contributing to the development of this study’s analytical perspective.

3. Results

3.1. Justification for Case Study Selection

Shenzhen is located in Guangdong Province, as the next-door neighbor of Hong Kong. It has a short history, rapidly transformed after being designated as a Special Economic Zone (SEZ) by the central government in the wake of China’s economic liberalization and opening up to the world. Endowed with exceptional policy autonomy, including SEZ legislative authority [50], it has long served as a testing ground for controlled liberalization within a socialist framework. While receiving sustained policy attention and dividends from top leadership [51], it has pursued a redevelopment-led strategy that departs from China’s prevailing land-driven urban growth paradigm, positioning it as a rare case of municipal development that is not dependent on land leasing revenue [52]. This distinctive approach and its unique pace of development have resulted in a hyper-dense urban form, with a population density of 8,867 people per square kilometer as of end-2023 [53] (p. 2)—surpassing that of Hong Kong, which was recorded at 6,910 during the same period [54].

Nanjing is the provincial capital of Jiangsu Province, located on the prosperous eastern coast of China. Unlike Shenzhen, which is empowered to lead national development, it operates under a hierarchical governance structure controlled at the provincial level, where policies require higher-level approval, decision-making is more constrained, and institutional innovation is limited. Compared to Shenzhen’s model, it follows a more conventional path that prioritizes administrative compliance over strategic experimentation. Nanjing has experienced rapid urbanization, with construction land sprawling outward from the urban core in multiple directions, giving rise to a polycentric urban structure [55]. This spatial transformation can be attributed to industrialization and the establishment of development zones, which were designed to attract capital and promote economic growth [56].

Both cities have developed extensive metro systems. Shenzhen’s urban rail transit network spans 567.1 km, comprising 16 metro lines and 1 tram line, ranking first among mainland Chinese cities in network density [57]. Despite the scale of its operations, transit operator Shenzhen Metro Group Co., Ltd. (hereafter referred to as SZMC), based in Shenzhen, China, has consistently ranked the highest in industry profitability indicators,

maintaining an asset-liability ratio below 50%—a relatively low level among its peers. It is regarded as a rare example of a self-sustaining transit company in mainland China that operates without direct subsidies, relying instead on a self-support mechanism developed through the “Rail plus Property (R + P)” model [17]. Nanjing’s transit operator, Nanjing Metro Group Co., Ltd. (hereafter NJM), based in Nanjing, China, currently operates 13 lines with a total length of 484 km [58]. NJM has also explored the “R + P” model and other LVC instruments, but did not replicate the impact observed in SZMC. It has not fundamentally altered NJM’s persistent reliance on government subsidies to cover operational deficits.

Nanjing is not selected as a negative counterpoint to Shenzhen’s exceptional case, but as a lens into the structural constraints typical of more conventional governance settings in China, which are often overlooked in policy narratives focused on short-term success. Following the post-2008 stimulus-driven investment boom, metro expansion gained momentum in provincial capitals like Nanjing, where growing fiscal constraints prompted the adoption of transit financing mechanisms beyond direct government investment, including LVC instruments. In addition, Nanjing exemplifies an infrastructure-led urban development model, embedded within the broader trend of promoting urbanization and economic growth through mass transit investment across Chinese cities. Rooted in these structural conditions, Nanjing’s case illustrates the tensions facing growth-oriented cities under fiscal constraints and a less empowered institutional position. As state-owned enterprises (SOEs), both metro companies function as extensions of broader local governance structures. The comparative study helps explain the institutional logics shaping the implementation of the “R + P” model and why development-based LVC mechanisms often face challenges in evolving into mature and durable mechanisms within conventional administrative settings.

3.2. Case Study of Shenzhen

3.2.1. Institutionalizing a Land-Based Mechanism for “R + P”

Metro construction in Shenzhen began in 1998, initially financed through a combination of government investment and bank loans. As the projects expanded in scale, the Shenzhen government aimed to transition the SZMC from a subsidized model to a market-driven one, gradually reducing its cash contributions—from 70% in Phase I to 50% in Phase II—and ultimately replacing them with land contributions in Phase III [12].

SZMC thus planned to adopt the “R + P” model for metro financing from the early stages of metro projects, leveraging its proximity to Hong Kong to benefit from MTRC’s expertise. Around 2003, amid early planning for Line 4, the municipal government opened negotiations with MTRC to explore a potential construction partnership. The initiative functioned as a “soft reform tool” at the time by introducing an external actor to generate peer-driven performance pressure on SZMC, thereby facilitating controlled experimentation beyond the prevailing SOE model. (Interviewee 2: senior representative of SZMC; Interviewee 6: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) The plan was to form a “Build–Operate–Transfer (BOT)”¹ and “R + P” partnership with MTRC, under which it would undertake both metro construction and operation of the metro line, as well as the development of surrounding land parcels. Nonetheless, the proposal was eventually rejected by China’s central government. A representative of the Shenzhen Planning Bureau pointed out that “Amid a tightening policy climate, informal negotiations became impermissible, with land acquisition required to proceed through formal public bidding processes.” An additional comment followed: “Even those agreements negotiated by the municipal government lost institutional backing.” (Interviewee 5: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) As a result, SZMC shifted towards a more administratively aligned approach to “R + P” development, partnering primarily with SOEs, many of which were locally

based. (Interviewee 3: Senior representative of SZMC.) With a clear awareness of MTRC's capabilities in property development, SZMC sought to learn from its development and operational model.

The Shenzhen government exhibited a clear institutional intent to generate and retain land value within the public domain. Unlike other mature cities where metro systems are typically retrofitted into already built-up areas, the Shenzhen government leveraged early-stage urban growth to proactively extend sections of Phase II metro lines into land under its direct control. This strategy enabled metro development to bypass developer-held zones, facilitate more coordinated property development, and retain land value appreciation within public control. At the same time, the government pursued strategic upzoning along transit corridors to support higher-density development and directed additional development capacity toward publicly controlled land parcels, channeling land value into infrastructure provision and public service delivery. (Interviewee 5: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) Additionally, a cross-departmental coordination channel was instituted to mitigate inter-agency tensions and transaction costs, as well as to integrate advisory insights from planning research institutes [12] (pp. 26–27). The municipal government plays a central role in structuring stakeholder relations, steering inter-organizational alignment, and shaping decision-making. Within this framework, SZMC primarily functions as an implementing arm of municipal directives—including investment decisions, route selection, LVC strategies, and in certain cases, its partnership with SOEs and other designated actors. (Interviewee 6: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) The first “R + P” project began with a pilot land acquisition scheme in 2008, in which land was transferred to SZMC through public bidding with eligibility requirements implicitly tailored to its profile—enabling it to bypass market competition and acquire land at a relatively low cost. The municipal government subsequently reimbursed SZMC through a return of funds, effectively enabling it to retain most of the land value appreciation and gain greater flexibility in property pricing.

Around 2010, this land-based mechanism gained widespread traction as a key component of metro financing strategies. This shift was driven by tightening state regulations on local government borrowing, combined with the capital-intensive demands of infrastructure preparation for the 2011 World University Summer Games, which prompted SZMC to increasingly adopt “Public–Private Partnerships (PPP)” and “R + P” models to support metro development. In response, the Shenzhen government pursued a more direct, efficient approach by using land assets as capital contributions to facilitate larger-scale land transfers to SZMC. The shift to land-based contributions redefined SZMC's business model and underpinned its expansion in subsequent phases.

3.2.2. Land-for-Equity: Government Leverage to Facilitate Capitalization and Real Estate Entry

Specifically, capital contribution through land assets refers to the monetization of land use rights, which are treated as equity investments by the municipal government. This arrangement allows the metro company to acquire commercial development rights without direct financial expenditure. It intends to reduce the fiscal burden by substituting land value for upfront cash contributions. By adopting a more direct land transfer mechanism, it better integrates metro and property development, shortens the investment–return cycle, and alleviates capital constraints—especially those related to “Build–Transfer (BT)” repayments. Additionally, the inclusion of land assets in the SZMC's portfolio bolsters its borrowing capacity in capital markets. (Interviewee 4: senior representative of SZMC.)

While the strategy offers immediate fiscal relief, it arguably constitutes a form of institutional arbitrage by circumventing the procedures mandated by the Property Law

for land transactions, which require that profit-oriented land use rights be transferred through public auction processes, risks marginalizing certain actors in the land market and undermining the integrity of the market mechanism. It also subtly circumvents central government regulation on the minimum fiscal contribution required from local governments by monetizing land use rights as equity, thereby fulfilling the mandated fiscal share without equivalent cash-based expenditures. A deeper risk lies in the model's restructuring of land revenue flows: whereas the state was previously entitled to a portion of land transfer revenues, this new arrangement enables local retention and bypasses the central state's fiscal share.

Nevertheless, Shenzhen was endorsed by the central government as the sole locality authorized to implement this land acquisition model for metro financing. It was positioned as a pilot city for land reform, aimed at transforming land from a static physical asset into a financial instrument for mobilizing public investment amid urban fiscal austerity. (Interviewees 5 and 6: senior representatives of Shenzhen Municipal Bureau of Planning and Natural Resources.) In 2012–2013, the Shenzhen municipal government promptly pursued legislation to formalize the operational procedures for land contribution through the SEZ legislative authority, aiming to clarify regulatory ambiguities through technical refinements. Land contribution constitutes a stylized replication of the exclusive land development right in MTRC's model [10], reconfigured within the constraints of China's governance system. Apart from land contribution schemes for large development sites, negotiated land transfer was also employed for a small number of parcels located immediately around transport facilities and within underground space.

The land contribution strategy was predicated on the assumption that land prices would continue to rise, with the expectation that rising land values would generate stable revenues for metro expansion and diminish dependence on public subsidies. (Interviewee 2: senior representative of SZMC; Interviewee 5: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) A similar point is made by Xue et al. [12] (p. 17), who note that “in China, the overall rate of return on land assets is generally higher than that for cash investments.”. The model rests on a speculative foundation that embeds fiscal risk and heightens exposure to shifts in both land markets and the regulatory environment.

Since 2012, amid continued growth in the real estate market, the municipal government has implemented generous land contribution policies to support SZMC. Many of these involved high-value plots in central urban areas, enabling SZMC to accumulate strategically located land assets. These assets become the foundation for a strategic transition for SZMC from low-margin public service to pursue a hybrid business model that integrates transportation and real estate, providing it with a distinct and non-replicable growth trajectory. This transformation was driven by policy-induced partnerships with experienced developers—primarily elite state-owned enterprises (SOEs) based in Shenzhen—to pool both expertise and financial resources. Key partners included CITIC Real Estate Co., Ltd., China Vanke Co., Ltd., Shum Yip Holdings Co., Ltd., and Shenzhen Zhenye (Group) Co., Ltd. Vanke, in particular, operates under a mixed-ownership model, combining significant state shareholding with market-driven management.

For developers, such partnerships offered a means to circumvent the challenges posed by high land costs in the market, but at the cost of diminished control and returns. SOEs were often preferred partners by SZMC due to their institutional alignment and perceived trustworthiness, despite the fact that such partnerships typically entailed lower expectations for short-term returns and a stronger emphasis on compliance with government directives. On the other hand, MTRC's demand for risk mitigation—through contractual protections and the acquisition of land development rights—relied on greater government

risk absorption, which ultimately led to a breakdown in the original land development arrangement. (Interviewee 1: senior representative of Shenzhen Metro Real Estate Group Co., Ltd.) This exemplifies the structural barriers to MTRC's entry into the Chinese mainland market. An additional explanation for the failed partnership in property development lies in shifts in the macro-policy environment. Indeed, throughout the process of partnership building, the greatest perceived risk stemmed from policy uncertainty. (Interviewee 5: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) Reflecting on the market context, a Shenzhen Planning Bureau representative observed that "MTRC didn't get a good deal out of the arrangement. The property market had already taken off, and they couldn't ride the wave." (Interviewee 5: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) The favoritism of elite SOEs concentrates financial and operational resources in the short term, but constrains the formation of a rational risk-sharing mechanism with the private sector, which is the foundational premise of joint development [35] (p. 83–84). This type of arrangement preserves local control over development through state-state collaboration to prevent the full marketisation and "outsider" capture of key urban areas.

Partnership with elite SOEs was pivotal in reshaping the development capacity of SZMC. Its initial independent property development efforts fell short of financial expectations due to limited experience and a lack of dedicated personnel. The first batch of land acquired in 2008 faced a prolonged project timeline and was not brought to market until 2014. In addition, a large portion of the development was allocated to government-mandated affordable housing, yielding limited revenue. SOE involvement facilitated knowledge and skill transfer in real estate development, accelerated project delivery, and catalyzed a shift towards scaling the property business.

While the model offers operational innovation, beneath its surface efficiency, the most overlooked challenge is the structural accountability and financial risk embedded within it. As SZMC's mandate becomes hybrid—partly public service, partly profit-driven—excessive administrative steering driven by political imperatives and short-term fiscal priorities impairs its capacity for long-term financial planning and strategic autonomy. This politicized governance structure dilutes corporate accountability and institutional independence to assess and mitigate risks objectively. When local government becomes both the regulator and the stakeholder, a central question arises: can the government impartially evaluate the outcomes of a model it helped create?

Due to the land contribution mechanism, SZMC was further incentivized to pursue an aggressive project pipeline, which has been evident since 2019 with a renewed commitment to large-scale construction [59] and a strategic equity partnership with Vanke, one of the largest property developers in China. The use of land assets to boost borrowing capacity enables continued expansion, yet institutionalizes incentives for over-leveraging, with fiscal risks ultimately deferred to local governments and the public sector amid market volatility. This creates the conditions for a potential moral hazard, where the metro company engages in excessive risk-taking under the implicit expectation of government backing, with the benefits of LVC accruing disproportionately to elite SOEs and the losses largely socialized. The large-scale land injection reshapes the metro company's asset structure in a way that heightens its exposure to macroeconomic volatility and embeds long-term fragility into its growth model. It further constrains the strategic flexibility of SZMC by locking it into a path-dependent, asset-heavy expansion shaped by land-based financing and policy directives.

This experimental land contribution model facilitated by institutional concession was not extended to other cities. On the contrary, a notable shift occurred in 2020 when SZMC returned to competitive land bidding for the first time in about a decade by acquiring

the Changzhen depot site [60]. This re-engagement with competitive land acquisition continued in 2021 with the purchase of five additional plots [61], including some secured through directional bidding with bidder criteria implicitly aligned with SZMC's profile.

The shift reflects a quasi-marketization under administrative orchestration—best understood as a “partial normalization”, where early-stage capital mobilization under institutional concession is reconfigured in market terms but remains structurally anchored in a state-dominated framework. As projects increase in scale, the rudimentary, politically mediated approach of transforming land into a financial asset for investment is coming under growing scrutiny, particularly as it clashes with the central government's policy orientation toward market-based, compensated land transactions. In this shifting landscape, a realignment of land governance practices towards more standardized and controllable mechanisms within formal institutional boundaries has become increasingly evident. Table 1 illustrates the institutional shifts in SZMC's financing model from early-stage policy breakthroughs toward more regulated and formalized channels. It shows that institutional arbitrage, when deployed as a short-term political maneuver, is prone to clash with the evolving configuration of national policy priorities, undermining its potential to consolidate into a scalable and enduring model at the macro-level.

Table 1. Institutional shifts in the financing model of Shenzhen Metro.

Phases and Timeline	Emerging Mechanisms	Features
Traditional model (2000–2004)	Government funding and loans	High liquidity and flexibility, disciplined transparency, yet with budgetary strain
Early-stage trial (2005–2011)	Build–Operate–Transfer (BOT) and Build–Transfer (BT) Models for metro construction Property Development facilitated by directional land bidding	Pioneering the relaxation of land policy; leveraging land value and SOE partnerships to ease fiscal pressure
Policy-incentivized growth (2012–2019)	Build–Transfer (BT) Model for metro construction Land contribution model to scale up property development	Land-embedded capital mobilization with strong government steering, yet entailing instability and strategic risks
Normalization (from 2020 onwards)	Land concessions and metro financing subject to realignment with formal policy framework	Transition towards formalized and normalized governance

3.2.3. Riding the Boom: Strategic Expansion Through Equity Acquisition of Vanke

The adoption of the land contribution policy provided a turning point for SZMC, facilitating a transition from prolonged deficits towards recovery and profitability by reshaping its asset structure and revenue mechanisms. Subsequent SOE-led joint developments further accelerated its growth, driving its rapid expansion in the property sector. Backed by strong policy support, its development capacity began to mature around 2017, becoming a competitive player in Shenzhen's market, ranking third in overall performance among local developers (Interviewee 3: senior representative of SZMC). In this process, SZMC began to establish itself as a major landowner in Shenzhen, embodying the closest manifestation of MTRC's “R + P” model in mainland China, by leveraging the exceptional institutional concession granted to the city. But would the SZMC become just another MTRC?

In 2017, amid a booming property market and optimistic outlook on real estate trends, SZMC made a strategic leap by acquiring a 29.38% equity stake in China Vanke Co., Ltd.—valued at approximately RMB 66.4 billion—thus becoming its largest shareholder. The massive acquisition, partly financed by RMB 44.5 billion in bank loans, came at a considerable cost. Following this acquisition, SZMC established a subsidiary, Shenzhen Metro Real Estate Group Co., Ltd., in 2019 to professionalize and scale up its real estate operations, bringing in senior management with deep expertise in the real estate sector and SOE background. While the acquisition of Vanke initially relied on substantial borrowing, it led to a notable enhancement in SZMC's financing and capital leverage capabilities. SZMC embarked on a strategic transition towards equity participation, significantly scaling up its asset portfolio by holding stakes in 26 companies and operating 20 subsidiaries [57] (pp. 2, 29–33). This reflects SZMC's shift from core transit functions to a broader extension along the rail transit-affiliated industry value chain, encompassing investment, construction, operations, and asset management.

The alliance between SZMC and Vanke is widely framed as a strategic alignment driven by “mutual needs” and “future positioning”: Vanke seeks preferential access to land and political connections to stay competitive in a volatile market while SZMC benefits from top-tier technical expertise and expands access to capital for ongoing large-scale construction (Interviewee 1: senior representative of Shenzhen Metro Real Estate Group Co., Ltd.; Interviewee 2: senior representative of SZMC; Interviewees 5 and 6: senior representatives of Shenzhen Municipal Bureau of Planning and Natural Resources). These responses convey a form of optimism grounded in technocratic assumptions and framed by a developmentalist perspective. It is in this context, we observe SZMC's strategic choice to pick the market's most high-profile and innovative developer during its rapid growth phase, and to position it as its real estate arm to facilitate skill acquisition and scale up real estate operations. In addition, the political background of this acquisition casts a distinctive light on it. Notably, it emerged from a high-profile boardroom battle, during which the central government intervened to mediate and ultimately blocked the hostile takeover of Vanke by the Shenzhen-based financial conglomerate Baoneng. Several rounds of negotiations, led by the State Council's SASAC and the Shenzhen municipal government, eventually facilitated the transfer of major stakes of Vanke to SZMC and turned the case into a matter of state oversight.

In the early years of the partnership, SZMC experienced a significant financial boost, which—perhaps unsurprisingly—gave rise to the perception of a “successful” investment. The growth was largely driven by investment returns from real estate and strategic control over Vanke, prompting a shift towards a more financialized business model embedded in asset holdings and real estate investment. According to the annual reports of SZMC, its net profit attributable to shareholders rose sharply from RMB 152 million in 2016 to RMB 6.78 billion in 2017. In 2019, following the adoption of a real estate-led strategy and the launch of Shenzhen Metro Real Estate Group Co., Ltd., SZMC reported a net profit of RMB 11.81 billion, nearly all of which came from investment income—primarily generated through real estate development and dividend payouts from Vanke—totaling RMB 11.73 billion. This high profit trend continued in 2020, when SZMC reported a net profit of RMB 11.27 billion and investment income of RMB 11.65 billion. As Vanke's largest shareholder, SZMC has benefited from the developer's high dividend payouts since 2017, receiving over RMB 19 billion between 2017 and 2022, bolstering its profit performance.

While other domestic transit companies also posted profits during the same period, much of this was underpinned by government subsidies. Many transit companies are highly leveraged, facing substantial debt obligations, which translates into significant annual interest expenses, particularly during periods of ongoing capital-intensive construction.

Behind the appearance of profitability lies a system of prolonged fiscal backing by local governments, which, in their role as regulators, help sustain the façade and implicitly facilitate access to financing through a perceived guarantee. (Interviewee 16: Senior representative of Shanghai Shentong Metro Group) As a rare exception, government subsidies accounted for only a small portion of SZMC's profit, for example—approximately RMB 36 million in 2020—setting it apart from more heavily subsidized counterparts.

In this context, SZMC was established as a pioneering model of how effective “R + P” can steer financial success in a challenging industry, and came to be seen as “the sole profitable metro company in China”, “having a self-sustaining revenue model” and “independent from government subsidies”. It quickly became a reference model for other cities, attracting widespread attention through study tours, industry forums, inter-city exchanges, and academic research, and was widely recognized as having opened up a route to sustainable metro development. As its overall capacity matured, Shenzhen Metro Real Estate Group Co., Ltd. has gradually developed the ability to operate competitively in Shenzhen's local market—including land acquisitions and property development—earning SZMC the reputation as having “the highest degree of marketization”, not only as a transit operator but also as a real estate developer. However, most research and learning have centered on technical and operational issues—particularly around land acquisition—while leaving the model's scalability largely unexamined. Moreover, the inherent structural risks remain underappreciated in both academic and industry discussions, which tend to emphasize short-term returns. A Nanjing Metro representative once remarked, in a tone of admiration, that “SZMC's partnership with Vanke is heavily supported by the Shenzhen SASAC”, implying that such a scenario would be unlikely in Nanjing's context. (Interviewee 9: senior representative of NJM).

Unlike the MTRC, which has been criticized for prioritizing high-end markets, high-density construction, and limited social housing provision [9], the SZMC's “R + P” model is not exclusively driven by profit motives, but is also employed to expand affordable housing supply [6]. It features a large-scale inclusion of affordable housing provision within China's “R + P” practice—24 projects totaling 3.88 million m² [57] (p. 61). This is driven by Shenzhen's persistent challenges of hyper-density and worsening housing affordability, and forms part of its SOE mandate to support the municipal government's efforts to expand public housing by 2035. Although the model is seen as a hybrid approach balancing profit-making goals and social goods provision [6], its implementation reveals complex trade-offs. Many of these affordable housing projects are inclined toward skilled young talents with advanced degrees and legal residence permits (hukou, China's household registration system). It indicates Shenzhen's current policy orientation toward consolidating its innovation base at the expense of addressing social disparities, which in turn reinforces spatial and social inequalities and weakens the redistributive promise of LVC.

While advancing the local government's development agenda, SZMC also demonstrates commercial pragmatism, highlighting the structural duality of China's SOE system. Since 2018, SZMC's business model has increasingly incorporated holding-type property assets, echoing MTRC's strategy of long-term ownership of income-generating rental properties. SZMC now manages approximately 1.3 million m² of commercial assets [57] (pp. 18–21)—including transit-connected underground spaces, offices, shopping centers, and hotels, through a mix of leasing and self-operation.

3.2.4. A Shifting Landscape with Loss and Unfolding Risks

SZMC's “R + P” development practice took shape amid a booming property market, becoming institutionally bound to land-based financing and real estate developer Vanke. This has positioned the model within a structurally entrenched and politically steered

trajectory. Such institutional embedding reflects a deep reliance on favorable market conditions and sustained political support—leaving its long-term resilience uncertain when either condition shifts.

Since 2021, following intensified macro-regulation of the property sector and the central government's positioning of housing as "for living, not for speculation", SZMC's net profit moved into deep decline. After the peak years of 2019 and 2020, its net profits fell sharply to RMB 3.00 billion in 2021, RMB 1.04 billion in 2022, and further to RMB 551 million in 2023 [57,62,63]. By 2024, it reported a net loss of RMB 8.07 billion in the first three quarters, as station-area property development—its main profit source—plunged 40.87% year-on-year in the first half. Macroeconomic and policy shifts reshaped the real estate sector, severely hitting Vanke. In 2023, the developer acknowledged liquidity issues and suspended dividends. The situation rapidly escalated in 2024, when Vanke reported a loss of RMB 49.5 billion, a 506.8% drop in net profit from 2023, when it was still profitable. In 2023, it had a profit of RMB 12.2 billion, a 46.39% drop from 2022 [64,65]. SZMC's high-stakes RMB 66.4 billion acquisition in 2017 has resulted in mounting losses and has since evolved into a lingering financial challenge, with signs of continued erosion. The aggressive growth strategy drove a significant surge in both its assets and liabilities in the short term. From 2016, the year preceding the acquisition of Vanke, to 2023, SZMC's total assets rose by 164.84%, while the asset-liability ratio increased by 21.2% [57,66].

Despite these challenges, the expansionary model with rapid capital turnover continues to prevail. Amidst the property market downturn, SZMC has pursued a strategy of active land acquisition followed by immediate construction, with many plots obtained through competitive bidding, as mentioned above. This includes the takeover of a commercial and office plot located in Shenzhen Bay Super Headquarters Base, originally owned by Vanke. This shift in capital flows, with SZMC now providing substantial financial support and political backing to Vanke to stabilize a critical industry player, comes amid Vanke's decision [65] to refocus on its core business and mitigate immediate risks. SOE-led development, through the absorption of strategic sites in the land market during the downturn, functions as an implicit quasi-policy instrument to support local fiscal targets and revive land market activity, thereby preventing further price collapse. This illustrates that the tension between SOEs' political mandate and commercial rationale leads to a shift away from market-driven decision-making. At this stage, SZMC's actions are guided less by market logic than by policy expectations to sustain housing market stability through continued construction and sales, effectively absorbing the systemic risks left by retreating private developers. Although SZMC is already operating at a loss, it remains in operation with compressed margins and the prospect of further losses. The extensive land assets provided by the municipal government, coupled with new land acquisitions, are gradually turning what was once seen as a potential windfall into a long-term financial burden with near-term consequences, compounded by Vanke's decision to scale back its operations and withdraw financial support.

The inertia of an expansionary model—characterized by aggressive leverage and accelerated capital turnover—continues to propel growth under adverse market conditions, driven by institutional lock-in, in which political imperatives and expectations have become embedded in organizational routines. This "growth machine"—fragile by design—relies on compelled, perpetual, and accelerated momentum to sustain liquidity, fulfill government housing targets, absorb mounting debt, and operational costs. The lack of strategic adaptability to macroeconomic shifts reveals its structural fragility and inherent non-replicability—rooted in reliance on uninterrupted capital flows and institutional leverage to re-finance its operations.

As this unfolds, SZMC remains in the midst of a “metro boom”. Launched in 2023, the latest phase of metro development set new historical records in the number of planned lines and overall mileage. Despite its supportive stance, the central government exercised cautious restraint, ultimately approving a scaled-back plan of 185.6 km with a total investment of RMB 195.2 billion [67]. According to a Shenzhen Planning Bureau official, “Fixed-asset investment remains a key growth lever for the central government amid economic downturns and weak consumption. But compared to the post-2008 stimulus era, the current approach appears more measured, as most cities have largely completed their metro build-out.” (Interviewee 5: senior representative of Shenzhen Municipal Bureau of Planning and Natural Resources.) This suggests an ambivalent posture from the central state—caught between political momentum and economic restraint, and increasingly aware of the diminishing returns and fiscal risks associated with the past stimulus tools.

To prolong the growth momentum, SZMC’s business model has shifted toward a significant increase in government subsidization—bringing it in line with peer companies in other cities—and a simultaneous return to conventional borrowing. Capital injection by municipal government has been increasing rapidly on an annual basis, surging from RMB 36 million in 2020 [68] (p. 51) to RMB 730 million in 2023 [57] (p. 72). With the decline of the property market, SZMC’s long-standing image of “operating without subsidies” has become increasingly untenable. Its current metro financing model has evolved to incorporate a more prominent role for liquidity-driven funding mechanisms, combining budgetary investment with bond issuance. The shift signals underlying fiscal constraints and a changing economic cycle, prompting the local government to mobilize capital beyond the public sector to drive the metro development agenda. The Shenzhen government moved back to capital investments, with public funding covering approximately 50% of the total project costs in Phase IV metro development (2017–2022) and around 40% in Phase V (2023–2028). With its distinctive administrative latitude, the Shenzhen government issued China’s first local government special bond for rail transit in 2017 [69] and later became the first municipal government to sell offshore bonds to non-mainland investors in 2021 [70]. In 2020, SZMC issued China’s first registered corporate bond [71].

Given the structural deceleration of property development, SZMC’s long-term capacity to service bond repayments remains uncertain and contingent upon the trajectory of broader macroeconomic conditions. LVC demands a long-term business rationale that is balanced and risk-aware, supported by a degree of organizational autonomy—capacities that are not yet fully embedded in SZMC’s institutional design. While SZMC’s “R + P” model is situated within a broader institutional framework that incorporates cross-departmental coordination [12] (pp. 26–27), its internal governance remains fragmented—shaped by a plurality of perspectives and competing agendas, including construction acceleration, SOE capacity building and marketization, policy compliance, and macroeconomic task fulfillment. The core challenge lies in the extent to which divergent interests can be negotiated into a strategic and durable strategy. The existing discourse predominantly emphasizes SZMC’s short-term performance metrics—such as profitability and scale—while downplaying the dilution of local government’s regulatory function through its growing entanglement in market roles amid increasingly blurred institutional boundaries. This could culminate in the externalization of “failure” through a model that facilitates rapid development but embeds systemic moral hazard by disincentivizing prudence.

3.3. Case Study of Nanjing

3.3.1. A Logic of Growth Without Anchoring: The Institutional Undermining of Station-Based Value

Nanjing began metro construction and launched its first line around the same time as Shenzhen. In Nanjing, metro construction started in 2000, and the first line commenced

operation in 2005. The initial investment was supported by government funding and bank loans. Despite the simultaneous launch of the metro systems in the two cities, their value capture approaches evolved in fundamentally different ways. Unlike Shenzhen, Nanjing—the former capital of the Republic of China from 1927 to 1949—already possesses an established urban fabric. In the early stages of metro development, NJM was subject to high demolition costs in the inner city and to heritage preservation requirements that necessitated routing lines around protected sites. (Interviewee 12: senior representative of Nanjing Municipal Bureau of Planning and Natural Resources.) In contrast to Shenzhen’s hyper-density model, NJM’s metro network has lower density in urban areas and a stronger orientation toward suburban extensions—reflecting underlying municipal and regional planning strategies.

Since the mid-2000s, during its initial development phase, the network planning incorporated extensive suburban coverage before the core urban network was fully established. After the extension of Line 1 beyond the main urban districts, the metro system began expanding outward into peripheral areas in various directions. Among 13 lines in operation, 6 of them serve as suburban lines connecting the main urban area to the outlying districts, and some sections of urban lines extend into suburban areas as well.

The expansionary dynamics and shift in transit priority are embedded in the regional planning strategy of the Nanjing metropolitan area. This strategy aims to rival and counterbalance the influence of two other major metropolitan areas in the southeast—the Suzhou-Wuxi-Changzhou metropolitan area and Greater Shanghai—while positioning Nanjing as a competitive force in regional development. Facing the dominant pull from the southeast, the Nanjing metropolitan area centers on Nanjing and links cities within Jiangsu Province, including Zhenjiang, Yangzhou, Huai’an, and Changzhou (Liyang city and Jintan district), while driving westwards into Anhui Province to link Wuhu, Ma’anshan, Chuzhou, and Xuancheng, emerging as the first cross-provincial metropolitan cluster. In this context, NJM’s network has been increasingly instrumentalized to serve the regional integration agenda, with suburban lines linking the public transit networks of other cities within the metropolitan area.

In addition, strategic preference for outward expansion is driven by the high costs of land acquisition and redevelopment within the main urban core, along with the opportunity to capture rising land values along transit corridors in less-developed areas. (Interviewee 11: Senior representative of Nanjing Municipal Bureau of Planning and Natural Resources; Interviewee 9: Senior representative of NJM) Suburban areas enable faster, less contested construction and expedited project delivery compared to complex urban environments, while also supporting the development of new towns. Consequently, housing prices in the outer districts have surged, some increasingly approaching those in the urban core. Metro expansion serves as a catalyst for investment inflows and growth in peripheral districts.

Following the RMB 4 trillion stimulus package of 2008, NJM experienced a construction “boom”. The municipal leaders ambitiously called for metro lines to reach *“every district and county”*. Since 2010, a series of large-scale municipal projects under the pro-growth administration—including urban renewal, new developments, affordable housing, and the hosting of mega-events like the 2013 Asian Youth Games and the 2014 Youth Olympic Games—have driven heavy public spending, further entrenching Nanjing’s financial reliance on land sales and metro expansion. One interviewee noted: *“Due to the Youth Olympic Games, four new lines were added within three to four years, leading to a significant increase in borrowing. The new lines did bring additional ridership, but it couldn’t possibly cover the massive debt, leaving NJM under growing pressure.”* (Interviewee 7: Senior representative of NJM) The intensified construction was largely politically driven, as the municipality leveraged the event for city branding and to attract population and

industry. (Interviewee 9: senior representative of NJM.) This speculative, growth-at-all-costs urbanization model and event-led investment mirrors the systematic pattern of many rapidly urbanizing Chinese cities under the 2008 stimulus, driven by common institutional incentives.

The pursuit of broad suburban coverage and the commitment to construction did not align with actual demand, resulting in low ridership on suburban metro lines, most notably on Lines S6, S7, S8, and S9. Some metro lines traverse largely undeveloped areas, such as farmland, lakes, and sparsely populated zones. Meanwhile, the inadequate network density in the central urban areas and widespread construction campaigns elicited discontent among the civil society. In the subsequent phase of metro development, with the issuance of Nanjing's Second Phase Urban Rail Transit Construction Plan (2015–2020), later adjusted to 2016–2021 [72], efforts began to focus on densifying the metro network within the central city, addressing the imbalance created by the previous outward-oriented expansion. While Nanjing satisfied the aggregate, city-wide population, and GDP thresholds set by the central government for metro project approval, several segments appeared to diverge from the intended planning criteria. The impetus for metro expansion was shaped by broader political aspirations to demonstrate urban progress and regional integration, and in some cases, advanced ahead of fully developed economic rationales.

There was limited early-stage recognition of station-centric LVC under the macro-driven growth paradigm, with inadequate foresight for spatial planning and stakeholder alignment. The initial LVC approach launched in 2008 followed a more conservative path than SZMC, relying on land servicing income rather than direct engagement with the “R + P” model. The municipal government opted for an approach with lower institutional risk that enabled NJM to capture part of the value increments without having to bypass regulatory constraints—such as mandatory public bidding for commercial land—that would have been required to replicate MTRC's “R + P” model. The LVC model of NJM operates as follows, resembling a practice observed in Wuhan [14], where joint development cannot be directly replicated within the local context. The municipality allocates metro-adjacent land plots to NJM, which uses municipal budgetary funds and bank loans to undertake land servicing, including demolition, site preparation, and infrastructure provision. NJM then releases the land use rights to the market through open bidding. By deducting statutory transfers and servicing costs from the land sale proceeds, it captures the remaining land value. This approach shifts away from the conventional jurisdiction-based land servicing for general urban development. Instead, it links land value increments with metro projects and designates NJM as the primary implementation body to support a more targeted value capture mechanism. (Interviewee 8: Senior representative of NJM) It provided a practical solution to early-stage capital needs, facilitated loan negotiations, and was widely applied across multiple lines, including the southern extension of Line 1, as well as Lines 2, 3, 4, 10, and S1. (Interviewee 9: Senior representative of NJM) However, this model relies on the derivation of lump-sum revenue from land preparation, missing opportunities for deep transit-integrated land use planning and long-term value creation. In addition, stakeholder coordination was hindered by divergent institutional agendas. Along suburban corridors, district governments have weak incentives to offer high-value plots for NJM-led land servicing, as it entails sacrificing profitable land uses critical to their fiscal agendas. The less advantageous location of these plots further limits their capacity to command sufficient market interest and favorable pricing. Consequently, many of these projects fail to generate adequate returns for stable debt repayment. (Interviewee 7: senior representative of NJM.)

Amid increasing fiscal strain and growing hesitation among district governments to allocate land to NJM, the land servicing model has gradually receded in use. NJM stepped back from its previous unconditional commitment to the development mandate, instead calling for commensurate financial contributions from district governments, proportionate

to the benefits accruing to them from metro expansion. This led to a municipal-district cost-sharing scheme, with suburban lines funded by both the municipal and district governments based on the number of stations and track length within each jurisdiction. (Interviewee 7: senior representative of NJM.) The cost sharing between municipal and district governments is a common metro funding mechanism in China to address fiscal challenges by incentivizing district commitment and facilitating intergovernmental coordination. (Interviewee 13: senior representative of Ningbo Metro Company; Interviewee 14: senior representative of Suzhou Metro Company.) While district governments in Nanjing generally welcomed metro expansion into their areas, in some cases, expected fiscal contributions following project completion were delayed. (Interviewee 10: senior representative of NJM.) The lack of accountable fiscal commitment created structural barriers to proactive LVC by placing upfront capital pressures on NJM, leading to mounting interest burdens and limited capacity for value capture generation. In addition, NJM missed the opportunity to establish the enabling condition for LVC—early-stage coordination of land planning—and lacked a mechanism to capture value from the most valuable plots generated by metro development.

NJM's engagement with the "R + P" model began in 2007 with preliminary studies and first materialized in 2012 with the acquisition of land at China Pharmaceutical University Station, the terminus of the southern extension of Line 1. However, this attempt was curtailed due to municipal government policies that prohibited municipal-level SOEs from participating in real estate development. The land was transferred to Jinlun Holdings Limited, a local property developer. Driven by these institutional and policy choices, NJM missed a key window for integrated land-transit value capture during both the peak of metro construction and the property market expansion phase. The lack of systematic LVC planning, coupled with early land use decisions, led to the premature allocation of strategic land, with limited alignment to value capture goals.

3.3.2. Restoring Continuity: TOD Planning in Response to Spatial Fragmentation

Inspired by the success of the SZMC model, NJM began exploring the construction of platforms above metro depots—used for train parking and maintenance—to capitalize on underutilized airspace and promote high-density land use. In Nanjing, there was growing recognition that the past focus on technical delivery had resulted in inadequate station area planning, leaving many stations disconnected from the urban fabric. Depot sites, occupying large tracts of land, were mostly underutilized and excluded from urban development. (Interviewees 8 and 9: senior representatives of NJM.)

In 2015, the Nanjing city planning department and NJM initiated station area redevelopment planning based on Transit-Oriented Development (TOD) principles. More than 300 stations were reviewed to evaluate their land development potential and to identify those with significant areas of underutilized land. A total of 112 stations were ultimately selected for TOD-oriented "integrated design", aiming to consolidate fragmented parcels, improve overall station accessibility, and strengthen spatial integration with the surrounding urban fabric. To support NJM's subsequent land acquisition and "R + P" development, the TOD design is structured around five core pillars: area function and development strategy, land use planning, spatial and landscape design, mobility planning, and value capture from land use. The process involves assessing the surrounding context of the target sites—including planned land use, demographics, environmental conditions, and land acquisition constraints—in order to inform planning decisions and manage their long-term development in harmony with the broader urban environment. The development plans are based on considerations of land use, development scale and intensity, public amenity provision, transport integration, and visual coherence. They also incorporate preliminary assessments of economic feasibility and the coordination mechanisms for LVC. Evaluations

showed that many suburban depots were poorly positioned for redevelopment and passenger flow improvement, constrained by their remote locations and weak surrounding activity. The route layout established during earlier planning phases had a lasting impact that constrained the spatial and market conditions necessary for large-scale “R + P” development. This was closely linked to a dispersed urban development pattern that fostered car dependency and spatial fragmentation, undermining the spatial logic of LVC strategies premised on dense, mixed-use development around transit stations. The design focus has therefore shifted primarily to urban sites, such as Chaotian Palace Station, Sanshanjie Station, Guanghuamen Station, and Xiaotiantang Station. These sites were subsequently acquired by NJM and developed, partly through partnerships, into mixed commercial and residential projects.

3.3.3. Contested Margins: Preferential Land Access and Cycles of Institutional Realignment

In 2012, Nanjing Metro Resources Development Co., Ltd. was established as a subsidiary of NJM to focus on property development. Following this, the “R + P” model was formally incorporated into NJM’s operational strategy. At the current stage, its exploration of the “R + P” model shows limited progress, constrained by inadequate development capacity and market experience, as well as path dependencies rooted in earlier planning decisions. The municipal government has introduced gradual policy adjustments in the form of preferential land access; yet these measures have failed to overcome the entrenched structural constraints and catalyze a substantive shift in “R + P” implementation. As these issues persist, NJM is still seeking effective institutional openings to this day.

Operating within a more restrictive institutional environment, the Nanjing government began with tentative, incremental measures to explore feasible policy levers. Around 2012, NJM was granted a special exemption allowing the conversion of certain transport-designated land parcels under its control to commercial use, enabling the leasing of these reclassified plots. This move signaled an early form of institutional flexibility, allowing for commercially oriented exploration under the emerging “R + P” logic. Leasing of these allocated plots had generated returns. The inflation of asset values provided additional relief to NJM’s asset-liability ratio. (Interviewee 10: senior representative of NJM.) However, while the asset revaluation offered accounting gains, its broader impact remains superficial, as long-term improvement hinges on NJM’s ability to monetize its land holdings through potentially viable development.

In practice, the delayed development of land re-designated from transport to commercial use faces a structural challenge: by the time development occurs, the surrounding urban fabric has already matured, limiting spatial integration and the ability to capture passenger flows. These conditions fundamentally undermine the commercial viability of such projects. A clear example of this is the Zhangfuyuan Station project in the central city, a commercial complex, which is located directly above the station and connected to the metro concourse. It comprises eateries—many of which focus on take-out services—private tutoring firms, and a budget hotel. Despite its physical integration with the transit system, the project’s late launch and proximity to Xinjiekou (Nanjing’s central business district) created a competitive dynamic that suppressed visitor traffic and resulted in difficulties in leasing retail units. Most tenants operate business models geared towards online customer acquisition rather than depending on walk-in traffic. (Information gathered from 13 interviewees, including shop owners and local residents.)

The imperative for integrated transit and land planning prompted an institutional shift in 2015 [73], with the municipal government moving to address the systemic constraints on transit companies’ land access through preferential policies. The regulation introduces a two-tiered spatial framework around stations—a 200 m “core area” and a 500 m “planning

zone”—with land acquisition incentives that encourage NJM to undertake land servicing and property development in these ranges, thereby facilitating coordinated station-area development and cost-recovery objectives.

This approach, however, faced persistent implementation challenges and struggled to gain traction on the ground. The proposed model of transferring land to NJM through negotiated agreements in “core areas” is hampered by its incompatibility with state land policy, and public bidding remains required in practice.

At the same time, as the co-funding model was constrained by inconsistent fiscal commitments at the district level, efforts were made to reopen land negotiations with district governments, taking advantage of the momentum created by new policy shifts. Nevertheless, district governments have remained hesitant to allocate high-potential land for acquisition by the NJM—an issue that has persisted as a topic of negotiation to the present day. (Interviewee 8: senior representative of NJM.) Many sites included in TOD plans ultimately fell outside NJM’s land acquisition scope. In the absence of clear incentive structures for inter-governmental coordination, municipal and district governments tend to operate in a fragmented manner. The reluctance to engage in LVC seems to reflect a pragmatic response to institutional ambiguity. One representative from NJM emphasized that continued negotiation is essential, noting that “If the district government has no interest in developing the area, then even with land access, there’s not much we can do with it. Without broader development in the surrounding area, a TOD project just won’t work.” (Interviewee 7: senior representative of NJM.) The municipal government issued a new policy in 2022 [74], calling for a sharper policy focus on targeted sites to facilitate land acquisition by NJM. However, it had only a limited material impact on the actual land access, as most districts were still reluctant to engage.

Nanjing also explored land contribution by repurposing 117 transport-designated land parcels (1.86 million m²), held by the metro company, as capital assets in 2016, aiming to unlock the financial value of unused land to facilitate financing for transit development [75]. However, the practice has not been formalized and has been applied on a case-by-case basis through special permits, with a significantly smaller scale and impact compared to Shenzhen. In addition, the contributed land parcels remain under transport-use designation, unlike in Shenzhen, where land contribution is accompanied by commercial development rights to the transit company. The Nanjing government is caught between competing imperatives: on the one hand, mobilizing land assets for transit financing by drawing on the Shenzhen model; on the other hand, continuing to depend on revenues from traditional municipal land sales that remain vital to the local fiscal base. These unresolved structural trade-offs impede the ability to scale SZMC’s experimental initiatives into broader reforms. When the land contribution mechanism is extended beyond a localized pilot, its underlying risks can quickly surpass institutional control. During periods of market volatility, these land assets risk moving from projected valuation to sunk fiscal costs, with only high-value core areas of the mega-cities likely to remain resilient against national trends.

As discussed, the institutional fragmentation in Nanjing, characterized by incoherent planning coordination and limited land control, has hindered access to high-value sites for large-scale “R + P” development. Inadequate development capacity and operational experience of NJM pose challenges for effective project delivery and the financial sustainability of completed developments, in turn constraining its transition toward a more market-oriented model. As a result, NJM’s “R + P” remains limited in scale compared to SZMC, and is skewed toward rental-oriented commercial projects—such as retail spaces and offices—with few large-scale residential developments for sale. The lack of commercial land designation around stations during early network development has significantly constrained the land availability and scale of current “R + P” projects. In addition, the

surrounding built environments have led to strict controls on floor area ratio (FAR) and building height, with most commercial projects capped at an FAR of 3.0. (Interviewee 8: senior representative of NJM.) NJM primarily relies on self-development, building in-house teams through professional recruitment. Developers are engaged in mid- to large-scale projects exceeding 100,000 square meters, providing NJM with practical learning in project execution and management. (Interviewee 10: senior representative of NJM.) In most collaborations with developers, NJM held only a minority stake, which limited its share of financial returns. Yet, in a few cases, such as the Poly Yunshang project, jointly developed with the SOE China Poly Group Corporation Ltd., NJM held a larger share and achieved relatively favorable results.

The sluggish property market, combined with a new wave of land policy tightening since 2020, has further constrained the “R + P” development of NJM—an outcome shaped by the broader trend of land policy normalization at the national level. The provincial government halted special negotiations for converting transport land to commercial use, requiring open-market sales and stricter rules on agreement-based transfers. The commercial use of such plots now depends on compliance with updated land policy requirements, including the settlement of price differentials arising from the conversion to commercial land use, based on market valuation. These additional costs directly compress project profit margins. (Interviewee 8: senior representative of NJM.) While NJM has continued to negotiate more flexible policies, shifting institutional priorities toward formalization have left little room for meaningful adjustment. The acquisition of new land parcels has become increasingly challenging under current conditions. Unlike SZMC, it lacks the market competitiveness to engage effectively in open land acquisition. Amid converging pressures of shrinking policy support and a weakening market, the modest incentives once available to NJM have receded, leaving it constrained by existing obligations—prior project commitments, operating costs, as well as a rapidly diminishing prospect of returns.

Commercial “R + P” projects by NJM face ongoing operational challenges due to a deteriorating economic climate, the rise of online commerce, and significantly lower population density in Nanjing compared to Shenzhen. Field investigations conducted during this study found that many shopping centers in Nanjing are likewise experiencing declining foot traffic. When this observation was brought to the attention of the NJM official, the official remarked that “This isn’t something ‘R + P’ alone can resolve—it reflects broader macroeconomic conditions go beyond the project’s scope.” (Interviewee 7: senior representative of NJM.) Rental operations are under increasing strain amid an increasingly uncertain market. Banks were once important tenants preferred by NJM due to their greater stability compared to smaller tenants. However, they are now pulling back from branch expansion and are less willing to rent new units. In light of these dynamics, the launch of new “R + P” projects has significantly slowed, with NJM increasingly initiating tenant discussions in advance to ensure occupancy and mitigate financial risk. Amid tightening conditions, collaboration with developers has become more challenging, leaving large SOEs as the most viable partners, given their continued assumption of policy-aligned roles under institutional expectations. (Interviewee 10: senior representative of NJM.) This reveals a structural tendency for development risks to be internalized by the public sector, in a pattern shaped more by institutional alignment than by market incentives.

4. Discussion

Amid the politically driven “metro boom” and broader infrastructure expansion, both SZMC and NJM explored a shift from government-led metro financing to a transit-centric LVC model (i.e., the “R + P” model), resulting in divergent and unintended outcomes. We have compared two divergent trajectories: SZMC’s expansionary path, enabled by excep-

tional institutional concessions and a booming property market, and NJM's adjustment path, rooted in structural constraints, governance fragmentation, and spatial rigidities. SZMC leveraged exceptional institutional privileges to rapidly scale up its LVC model during a real estate boom, achieving short-term gains at the cost of long-term financial fragility, whereas NJMC, constrained by fragmented authority and lacking early strategic planning, struggled to coordinate LVC amidst conventional governance structures, resulting in chronic implementation failures. Table 2 summarizes the three analytical dimensions of the comparative framework: (1) urban governance; (2) LVC mechanism and risk management; and (3) real estate operation by transit company.

Table 2. Comparative framework for the LVC model of SZMC and NJM.

Dimensions		Shenzhen Metro	Nanjing Metro
Urban Governance	Institutional Features	Strategic early-stage planning Strong coordination and financial leverage Top-down mobilization with weak long-term oversight Shift from institutional concessions to normalized framework	Contested governance Fragmented stakeholder engagement Decline of discretionary policy under normalization
	Urban Development Policy	Policy-led transit-land valorization Hyper-dense compact urbanism High urban land value	Politically driven expansion lacking spatial coordination Disruption of station area value capture
LVC Mechanism and Risk Management	"R + P" Strategy	Land injection through administrative discretion SOE-driven platform model Developer absorption through strategic acquisition Transition into a hybrid rail-property developer Asset-fueled expansion amid market boom	Self-directed land engagement under weak institutional anchoring Reactive, ad hoc development of low-yield assets Rental-focused commercial development Limited development leverage under capacity and market constraints
	Risk Type and Core Drivers	Financial over-expansion and debt socialization Over-reliance on asset-driven, extra-budgetary financing Volatile arbitrage under evolving policy regime	Weak implementation with high coordination costs; limited capture of value Fiscal ambiguity Ad hoc institutional execution Inexperienced transit agency in real estate operations
	Path dependency	Embedded reliance on expansion and debt Rising liabilities from policy-mandated market intervention	Adaptive adjustments under institutional uncertainty Missed window for transition amid shifting policy and market conditions

Table 2. *Cont.*

Dimensions		Shenzhen Metro	Nanjing Metro
Real Estate Operation by Transit Company	Business Scope	Transit operator, real estate developer, investor	Mainly transit operator
	Property Typology	Residential and commercial properties Affordable Housing Shift to expand property holdings	Lack of large-scale residential projects Mainly holding-type commercial property
	Operational Status	Diminishing returns and renewed public subsidy Heightened exposure to long-term real estate risks	Limited internal revenue streams Sustained need for fiscal support

(1) Urban governance as a Structural Context for LVC

SZMC's expansionary model was incentivized by a unique early-stage policy window, as local governments sought diversified financing channels under the state's endorsement of infrastructure-led growth. Under this exceptional window of institutional flexibility, the Shenzhen government leveraged its administrative latitude to create "convenience" for the "R + P" model—through expedited land contributions, coordinated resource deployment, and the embedding of powerful developers. Urban development policy was structured to support the "R + P" mechanism—through a series of planning incentives, early-stage learning from MTRC, and a local context characterized by high-value urban land and a powerful SOE sector. The short-term boom in SZMC's returns and project scale was underpinned by the consolidation of institutional power, under conditions unavailable to most Chinese cities.

However, its long-term sustainability is increasingly in question. The early vision of leveraging local experimentation and SOE marketization for LVC is now giving way to a rollback of exceptional policy allowances and the growing burden of dual exposure to market risk and policy mandates. The early institutional concessions have become self-undermining over time, evolving into a source of fiscal stress under the phase of market downturn. It points to the diminishing returns and growing instability of local institutional arbitrage under China's governance framework, thereby calling into question the structural feasibility of LVC as a routinized or replicable development model.

In contrast, NJM's experience reflects the limitations of LVC under conventional institutional settings. Its LVC practice reveals a breakdown in institutional coordination, yet compensatory policy measures failed to resolve the deeper structural absence of integrative planning and cross-jurisdictional collaboration.

A persistent tension lies in the asymmetric distribution of fiscal responsibility and the capture of value gains across actors. Metro development was framed as a strategic political agenda under municipal leadership. At the same time, the mismatched transit supply and demand, coupled with limited fiscal accountability, shifted the financial burden onto NJM. Despite land value being generated by transit investment, the value capture cycle remained institutionally incomplete due to the lack of early claims on value uplift, the absence of cross-government consensus, and diverging agendas. As a result, policy adjustments and technical fixes remain largely superficial. The LVC model underwent recursive shifts amid ongoing intergovernmental bargaining, which systematically undermined its maturation into a structured mechanism for long-term transit finance. The institutional provision in Nanjing also fell short in mobilizing resources and fostering market engagement through stable developer partnerships. Broader shifts in market dynamics and tightening land governance further constrained the "R + P" model. NJM's model illustrates that in the

absence of a coherent and empowered institutional framework, LVC fails to take root and instead devolves into fragmented, unsustainable practices.

Taken together, these two cases reveal a dual dilemma in China's current institutional landscape for LVC: one of unsustainable acceleration and the other of persistent implementation failure.

(2) LVC mechanism and risk management

SZMC's "R + P" model delivered immediate, short-term prosperity that alleviated metro financing pressures. It transformed into a property developer by leveraging preferential land policies, absorbing professional developer expertise, capitalizing on government-injected land, and acquiring the top-tier developer Vanke, rapidly boosting scale and profit amid a booming market. However, this model reflects structural shortcomings in risk oversight.

The favoritism towards elite SOEs in Public–Private Partnerships fosters internal trust and operational efficiency. This interest-aligned model bypasses market discipline, encourages inflated revenue projections and overextension during the market boom, yet is devoid of safeguards for the downturns. Amid the downturn, SZMC is further tasked with absorbing property market risks, turning it into a quasi-policy instrument for macroeconomic stabilization, perpetuating its expansionary, capital-intensive trajectory. This results in fiscal risks being implicitly guaranteed by the public sector and potentially socialized through the issuance of bonds. When the government acts as both regulator and stakeholder, it introduces a conflict of interest that compromises impartial evaluation of the model that it has instituted. This dual role blurs institutional boundaries, encourages political steering, and disincentivizes prudence. While SZMC has developed considerable organizational and market-oriented capacity through large-scale "R + P" operations, its dependence on political endorsement and informal mechanisms limits the formation of an independent institutional framework and makes it difficult to routinize or scale the model under standardized governance conditions.

NJM's LVC model reflects a low-capacity, high-friction implementation path, where institutional fragmentation, fiscal ambiguity, and market inexperience converge to generate structural vulnerability. While LVC offered short-term fiscal relief, the absence of an integrated institutional framework, coupled with reliance on ad hoc negotiation and reactive land development, undermined its long-term coherence. NJM has engaged in rental-oriented development. This move, however, largely represented a pragmatic response to constraints on delivering for-sale residential projects, rather than a proactive strategy for long-term value creation. As a result, many projects were initiated with an underdeveloped commercial rationale at the early design stage, leaving them more vulnerable to evolving market dynamics and limiting their adaptability over time. Nevertheless, the absence of large-scale residential development helped contain broader financial exposure to some extent. The shifting policy landscape further narrowed NJM's "R + P" development window and added ambiguity to the fiscal trajectory of metro construction repayment.

The two cases reveal distinct types of risk in LVC: SZMC faces risks from over-leveraged expansion, while NJM is burdened by chronic institutional under-capacity and an inability to systematize LVC beyond isolated project responses. They reveal that systemic risk can stem from financial excess as well as institutional fragmentation.

(3) Real estate operation by transit company

The varying "R + P" models between SZMC and NJM have resulted in distinct real estate operations. SZMC has expanded beyond its core transit functions to become a hybrid actor—transit operator, real estate developer, and investor—through strategic acquisitions and shareholding arrangements. It develops a diverse property portfolio that includes residential, commercial, and affordable housing, while incorporating a strategic approach

to property holdings. While it has rapidly achieved profitability and scale, its real estate model is increasingly exposed to losses and long-term risks, as it struggles to adapt to a shifting market environment. The future prospect hinges on macroeconomic trends and the sustained endorsement of government policy.

In contrast, NJM lacks solid institutional backing and commercial development skills and is constrained by fragmented spatial conditions. Its real estate activities have primarily focused on commercial rental properties, with limited engagement in residential development. These rental projects offer limited financial returns and only short-term liquidity relief. The model fails to anchor land value increments induced by transit and reinvest gains back into the system, thus missing the opportunity to establish a positive value capture cycle. The lack of capital-generating assets makes “R + P” struggle to mature into a stable revenue mechanism, leaving it reliant on subsidies and structurally fragile.

These cases demonstrate that effective integration of real estate development into transit project financing depends on robust institutional alignment, market expertise, and planning adaptability.

5. Conclusions

This study provides a counterpoint to the prevailing policy transfer narrative of the “R + P” model in the Chinese context and shifts the analytical lens from depoliticized, functionalist readings to its structural underpinnings. The SZMC’s “R + P” model was undeniably effective in the short term. However, its long-term viability is compromised by structural limits caused by insufficient risk oversight and context specificity, suggesting the need for more prudent scaling and consideration of risk management in LVC. This study does not seek to discredit LVC but examines the conditions under which it operates from a critical perspective. The conclusion of this study contributes to both the theoretical understanding of LVC and the policy-making for its implementation.

The first point corresponds to the relationship between LVC and urban governance. The “R + P” approach in the Chinese context illustrates a governance model for LVC operationalization based on “intra-state bargaining”, where state actors—including local government, SOE transit operator, and elite SOE property developers—are strategically aligned through relationship building, maneuvering, and reconciliation of policy directives to generate contingent fiscal strategy under austerity. The focus on state actors has not eliminated the negotiation process but internalized it within the state apparatus. This model hinges less on institutionalized frameworks and more on the territorialized capacity of the local state for pragmatic coordination and political steering, sometimes involving the strategic use of institutional ambiguities and administrative mobilization beyond formal rule structures. Thus, the success of SZMC’s “R + P” model rests not merely on the availability of land and capital, but is underpinned by the alignment of institutional strength, capacity for state-capital integration, and a rapidly ascending phase of a real-estate cycle. This analysis reframes LVC as a deeply political practice, instead of a procedural, legible governance template. Its operation in China reflects a reliance on political mobilization, where the organizational capacity of local governments takes precedence over institutional building. In essence, what renders a “success story” irreplicable is the transferability of the local state’s organizational capacity.

However, it is important to note that governance capacity alone does not translate into effective LVC outcomes. It must be anchored in underlying institutional structures and long-term fiscal rationality, while remaining responsive to redistributive social imperatives. Without such a foundation, even high-capacity systems may inadvertently create perverse incentive structures and reinforce a path-dependent growth model, ultimately substituting for the deeper institutional reforms needed to address structural urban challenges.

The second concluding point concerns the risk management of LVC. A key limitation of SZMC's success story arises from its LVC strategy, which prioritizes rapid, large-scale infrastructure delivery that brings political efficiency at the expense of prudent risk management. To put it more concretely, the core limitation lies in the inherent pro-cyclicality of the transit company's LVC model—driven by over-optimism in the real estate market and lacking validation through competitive market mechanisms. Instead, it replaces the market-based verification with state actor coordination and politically constructed expectations of land appreciation and fiscal returns. This creates a LVC model that is highly “effective” during market upturns, acting as a fiscal accelerator that amplifies risk while lacking responsiveness to market reversals. For policy-making, this implies the importance of integrating risk management into land-based financing mechanisms beyond pro-cyclical incentives or revenue maximization. The experience of Japanese and Hong Kong transit companies, which shifted toward management-based LVC in mature urban contexts, suggests that when transit companies develop well-planned TOD at an early stage, they are more likely to secure stable, recurring revenues and reduce reliance on pro-cyclical land income.

Another risk factor stems from the high degree of informality in the LVC model, which introduces policy volatility, incentive distortion, and the dilution of the government's regulatory role under closed political economies. It makes LVC contingent on political conditions and vulnerable to macro-policy shifts. The absence of proactive institutional alignment in the early stages of LVC—substituted by informality and ad hoc adjustments—can also trigger stakeholder reluctance, reflecting a rational response to perceived ambiguity in rules and commitments.

In addition, accountability to the general public is systematically downplayed. The process lacks channels for incorporating public opinions. While land value increments accrue to state actors, debt absorption by government reflects a pattern of risk socialization, leaving the public to bear the long-term consequences. The value captured is primarily directed toward financial solvency while falling short of its redistributive rationale and social accountability as framed in normative LVC policy rhetoric. This reflects a broad reorientation of LVC from equity to efficiency in the Chinese context. In practice, LVC's role lies in supplementing a broader fiscal governance system. Yet when captured by pro-growth imperatives, it may entrench reliance on land-based revenues and foster governance complacency.

Finally, in response to the third perspective concerning the shift of transit companies' operations toward real estate, we conclude that this process remains challenging in China. The “R + P” model may face inherent limitations in scaling up as a primary and stable funding mechanism for public transit in China. It is more likely to remain a supplementary tool that is used inconsistently across cities, depending on central-local dynamics and property market conditions.

Empirical findings indicate that SZMC was privileged to receive early instruction from MTRC, enabling it to integrate management-based mechanisms into its own planning framework and establish the basis for the sustained development of the “R + P” model. Under political support, it later acquired expertise from Vanke, one of China's most prominent and innovative developers, and made Vanke its real estate arm to scale up operations. NJM was not initially aware of its potential to act as a developer and absorbed the model more incrementally, with a limited degree of learning that constrained its ability to scale up “R + P”. The comparison illustrates that the transition toward integrated “R + P” operations requires more than technical replication—it demands early institutional embedding, well-developed project planning, and external capacity support. When such conditions are not fully in place, the shift from transit operator to real estate developer becomes institutionally and organizationally challenging.

In addition, China's real estate market remains relatively young, and there is limited historical experience and accumulated knowledge of market cycles. This fosters a tendency towards growth-oriented institutional behavior, based on the long-standing assumptions of perpetual expansion. Having operated within a system of persistent state intervention, actors have grown accustomed to state-led adjustments. The embedded political culture leads to the suppression of risk discourse and conditions actors to defer action in anticipation of state intervention, which in turn weakens risk management and market discipline. These cases offer a valuable lesson for policymakers, especially in state-led, hybrid regimes and rapidly urbanizing systems: LVC strategies should be understood not merely as financial tools, but as mechanisms that influence the spatial distribution of power, risk, and value.

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Abbreviations

The following abbreviations are used in this manuscript:

BOT	Build–Operate–Transfer Model
BT	Build–Transfer Model
LVC	Land Value Capture
MTRC	Mass Transit Railway Corporation
NJM	Nanjing Metro Group Co. Ltd.
PPP	Public–Private Partnership
R + P	Rail plus Property Model
SASAC	State-owned Assets Supervision and Administration Commission
SEZ	Special Economic Zone
SOE	State-owned Enterprise
SZMC	Shenzhen Metro Group Co., Ltd.
TOD	Transit-Oriented Development

Notes

- ¹ Build–Operate–Transfer (BOT) is a model in which a project entity finances, constructs, and manages public infrastructure for a fixed period, during which it may recover its investment and operating costs by charging user fees specified in the contract, before transferring the facility back to the public sector.

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