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FULL ARTICLE

Master development, land appreciation, and government finance: Evidence from the Disney project in Shanghai

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Abstract

Using the difference-in-differences method, this paper employs a unique government land transaction dataset at the individual level and investigates how much extra government revenue is generated by the Shanghai Disney Resort through land value appreciation in nearby areas. The results suggest that the Shanghai Disney project significantly increases the nearby land value and then increases local extra government revenue. The average annual extra growth rate was 9.81% (37.01 billion CNY) of Shanghai government revenue from 2009 to 2015 through nearby land value appreciation after the approval of the Shanghai Disney project in 2009. There also exists a heterogeneous impact of the Shanghai Disney project on different types of land value.

KEYWORDS
China, government revenue, land finance, land market, Shanghai Disney resort

1 | INTRODUCTION

China's rapid economic development heavily depends on a large amount of spending on infrastructure, which has raised great concerns about the Chinese government's financial health and sustainability (Pan et al., 2015; Wu et al., 2015). One important mechanism to support Chinese local governments is a revenue-making mechanism called land finance, which refers to governments' efforts to obtain extra-budgetary revenue through land grant premiums by leasing state-owned lands that benefit from land value appreciation due to their proximity to newly

commercial real estate development projects.[1] Most previous studies on land finance in China are qualitative studies that discuss the relationship between land finance and government revenue (Ding, 2003; Zhang, 1997). Some empirical studies use provincial- or city-level aggregate data to examine the impact of land leasing on local government revenue (Lin & Yi, 2011; Tao et al., 2010; Tian & Ma, 2009). However, from a microlevel perspective, quantitative analysis of how an individual investment project affects government revenue through land finance is rare.[2]

This paper examines the land finance mechanism by studying the case of the Shanghai Disney Resort project which was approved in 2009 and aims to provide evidence to understand the game of land finance in China. Specifically, using a difference-in-differences (DID) method, our study is based on a unique government land transaction dataset at the individual level during the period of 2003–2015 and investigates what proportion of extra government revenue is generated by the approval of the Shanghai Disney Resort project through nearby land value appreciation.[3] There are three findings in our study. First, the Shanghai Disney project significantly increases nearby land value. Specifically, 1 km increase in the distance from Shanghai Disney decreased the land value by 4.7% on average. Second, our results show that investment in the Shanghai Disney project has the potential to increase local extra government revenue through the growth of land value. Specifically, after the approval of the Shanghai Disney project in 2009, the average annual extra appreciation in Shanghai government revenue was 9.81% (37.01 billion CNY) from 2009 to 2015 through nearby land value growth. Third, there is significant heterogeneity in the impact of Shanghai Disney. For instance, the commercial land market decrease 11.5% in land value as the distance from Shanghai Disney increases by 1 km, which reduces more than the residential land market (3%).

In this paper, the identification is essentially a difference-in-difference (DID) method comparing the difference in land value before and after the intervention of the Shanghai Disney project for groups affected by the intervention to the same difference for unaffected groups. Our DID approach with fixed effect controls for unobserved region- and time-specific shocks. There are two potential identification issues: first, the presence of control variables including omitted variables such as local amenities and large events; second, certain biases depending on how to choose the comparison groups. Many local amenities, such as schools and parks, are exogenously determined, as they are the legacy of the former planned economy, mitigating the concern of omitted variables (Zheng & Kahn, 2008). Because our DID method focuses on the change rather than the absolute levels for the comparison groups, we can fully address the impact of large events that seem to have major influences on the whole city rather than an area or a district in Shanghai. In addition, the validity of the DID approach relies on the equal trend assumption. The comparison groups might be observationally different. However, as long as this difference is constant over time (in the absence of Shanghai Disney treatment), it can be differenced out by deducting group-specific means of the outcome of project intervention. The remaining difference between these group-specific differences must then reflect the causal effect of project intervention. Therefore, we will test the parallel trends using comparison groups before estimation to ensure the internal validity of our models. Violation of the parallel trend assumption will lead to biased estimation of the causal effect.

Nevertheless, we still carefully dealt with omitted variables and certain biases resulting from making the comparison group choices. We include total fixed assets investment with a time lag of one year (*FAI_lagged*) to control for the changes in area amenities and large events that might be correlated with the land market. The Chinese FAI measures the change in the total spending on urban infrastructure (such as transportation, electricity, and public facilities), real estate and industry. To that extent, we use *FAI_lagged* as a control variable to eliminate

[1]Urban land in China is owned by the state. The land users need to pay land grant premiums when the city government grants the land use rights to them. Land use rights refers to the right to use a parcel of land for a certain period (be affected by regulatory constraints). Land use rights in China is not land ownership, and only land use rights can be tradable.

[2]Government revenue corresponds to government budgetary revenue for city governments.

[3]In China, there is no direct property tax as there is in the United States where property tax is imposed. However, by conveying the usage right of state-owned land to others, Chinese local governments turn these land grant premiums into so–called "extra-budgetary revenue" to maintain government operations (Ding, 2003). This land driven "extra-budgetary revenue" has become a major portion of the local government budgets in China (Zhao & Cao, 2011).

the impact of omitted variables on the land market. When using DID, researchers often use subject matter knowledge to choose comparison groups and then evaluate whether trends are parallel. To address certain biases resulting from choosing comparison groups, we further use the synthetic control method (SCM) and triple DID by interacting the distance from each land parcel to the Shanghai Disney with the DID estimator to mitigate the bias in our estimation. The SCM is an appealing alternative because it is a data-driven way to select comparison groups. Using the SCM approach will mitigate our concern regarding the choice of comparison groups. The intuition of triple DID is that the difference between two biased DID estimators will be unbiased if the bias is the same in both estimators. In that case, the bias will be differenced out when the triple difference is computed.

This paper contributes to several strands of the literature. First, this paper contributes to the literature on land finance in China by providing a quantitative case study with evidence from a microlevel perspective. Some previous empirical studies on land finance focused on province-level data (Lin & Yi, 2011; Pan et al., 2015, 2017; Wang & Ye, 2016; Wu et al., 2015; Ye & Wu, 2014), city-level data (Jin & Choi, 2019; Shu et al., 2018; Tang et al., 2019; Tao et al., 2010; Zhu et al., 2019) and county-level data (Lu et al., 2019; Mo, 2018). To the best of our knowledge, this paper is among the first to investigate the causal effect of a specific project (the Shanghai Disney project) on local land value and further discusses the implications on local public finance using individual-level data in a city.

The second contribution of this paper is that it improves the current understanding of the issue of Chinese local government financial health and sustainability. We provide evidence that the Chinese government uses land as an instrument to attract foreign direct investment (FDI), often through master plan development, such as the Disney project in Shanghai. Master development, in turn, promotes the local economy and land value appreciation. Land value appreciation, under the Chinese land finance framework, maintains financial stability and sustainability by increasing extra government revenue. Over the past decade, Chinese local governments faced increasing fiscal pressure; they usually relied on land finance mechanisms to gain extra revenue and support investment in infrastructure because direct borrowing from banks was forbidden by budget law (Fan & Lv, 2012; Pan et al., 2015). Therefore, a possible channel is that local governments adopt land finance strategies to mitigate their fiscal deficits through large-scale commercial real estate development projects by conveying land use rights. Then, local governments can receive extra revenue from land transactions. In addition, this land finance strategy can stimulate urban land markets, further adjust the land price dynamically, and help local governments in their public finance.

Finally, this paper provides important implications for policy-makers or urban planners who want to learn from the experiences of the Shanghai Disney project. The financing of large commercial real estate development projects, such as the Disney project, plays an important role in urban planning. The land market of a region can be raised by financing, which can help increasing revenues from land sales and therefore extra government revenue. The use of the land finance system for city governments also has a positive influence on improving the development of infrastructure (Guo & Shi, 2018; Li et al., 2016; Zhong et al., 2019). The findings may provide insights that help policy-makers or urban planners better understand the positive role of large-scale commercial real estate development financing.

The rest of this paper is structured as follows. Section 2 provides background information on land finance in China and the Shanghai Disney Resort project. Section 3 describes the data and presents the empirical strategy. The empirical results and findings are discussed in Section 4. Section 5 concludes.

2 | BACKGROUND

2.1 | The relationship between land finance, urban commercial real estate development project financing and local government finance in China

Land finance plays an important role as a public revenue source in China. All of the land used for urban purposes in Chinese cities first has to be expropriated by the local governments and converted into state-owned land. Local

governments turn state-owned land into their own lucrative revenue source by conveying land use rights to land users. Thus, land grant premiums paid by land users become a source of total fiscal revenue for city governments. This fiscal revenue strategy for city governments is often called "land finance.." In China, local total government fiscal revenue equals local government budgetary revenue plus a land grant premium, so called extra-budgetary revenue (Tang et al., 2019). The local government revenue in China usually corresponds to government budgetary revenue. Land grant premiums are not part of local government revenues, but both land grant premiums and government revenue belong to total government fiscal revenue. In this paper, all "government revenue" phrases refer to "government budgetary revenue." "Land grant premiums or land revenue" phrases refer to "extra-budgetary revenue" and are part of total government fiscal revenue, which is equal to government revenue (government budgetary revenue) plus land grant premiums (extra-budgetary revenue). Chinese local governments place great emphasis on land grant premiums, which increased greatly from 542.13 billion CNY in 2003 to 3,122.06 billion CNY in 2015 (with an annual growth rate of 20.69%) (China Land and Resources Statistical Yearbook, 2004–2016). In 2009, Shanghai (104.3 billion CNY), followed by Hangzhou (105.4 billion CNY), became the second highest land grant premium city among 70 Chinese cities, accounting for 41.06% of the local government revenue (China Index Academy, 2004–2016). In some cities, land grant premiums even exceed local government revenue (Tao et al., 2010). Land grant premiums have become a major component of local government budgets (Zhao & Cao, 2011).

Since the tax reform was implemented in 1978, the total tax revenue is shared by the central and local governments in China has been allocated. The tax revenue share for local governments significantly decreased. However, the lack of a direct property tax under the current Chinese tax system means that local governments cannot tax residential and commercial properties as a source of revenue. Under fiscal pressure and competition between city governments to promote economic growth, local governments find new sources of revenue through land finance (Wu et al., 2015). Local governments usually face different tasks, such as building urban infrastructure, providing public services and promoting economic growth. It is reasonable to argue that they will endeavour to take advantage of land finance to complete their tasks. Under fiscal and competition pressure, local governments will make use of the right to convey land use rights to attract investment by mastering urban plan development to further help local public finance from land sales and land value growth (Du & Peiser, 2014; Wang et al., 2011).

In 2002, *regulations on the conveyance of land use rights by tender (zhao biao), auction (pai mai) and listing (gua pai)* were issued by the Ministry of Land and Resources. Land use rights have to be conveyed by tender auctions and listings when land is used for commercial, tourism, entertainment or residential purposes. Based on the rules, land use system was established. This system helps local governments convey land use rights in a relatively fair and transparent way. However, there may still exist other situations, such as official misconduct, causing unfair transfer of land use rights. As it is difficult to obtain relevant data on land corruption cases in various districts of Shanghai at this stage, we look forward to further research on this issue in the future. Under the system, local governments control the right to convey land use rights. However, there are no effective measures to restrict the conveyance of land use rights. Therefore, local governments will make great efforts to convey land use rights (including commercial, residential and industrial uses) to land users to achieve their target of total government revenue growth.

In sum, attention should be given to the revenue-making mechanism of land finance. The existence of the land finance mechanism makes it possible for local governments to support commercial real estate projects, such as the Disney project in Shanghai, and use it for increasing revenue and future urban development.

2.2 | The background of the Shanghai Disney Resort project

Shanghai secured approval for the first Disney project in Mainland China in 2009, and the park opened in 2016 after more than a decade of discussions and negotiations. The possible anticipation effect might bias the estimate

downward, since agents are forward-looking and they will alter their plans once they obtain new information and news about future changes in Disney establishments. To address and investigate this issue, we further collect timeline information on the Shanghai Disney project and list the information in Table 1. We argue that the anticipation effect might not be substantial due to the uncertainty of the project, specifically, the repeated back and forth rumours and denials about the construction of Shanghai Disney. In Table 1, we have listed the timeline of the Shanghai Disney project. We found that before 2009, there were many rumours about the construction of Shanghai Disney. The earliest rumour and denial about Disney dated back to 2002. Later, in 2005, there were rumours that Disney had started negotiations with the Shanghai government or that the Disney project would be launched in Shanghai. However, rumours were later denied by the Shanghai Municipal Government or the Disney Company in 2006. In 2007, rumours that the Shanghai Disney project started again, and all parties immediately denied the rumours. In 2008, relevant news was officially announced, but both the Shanghai government and the Disney Company denied the approval of the construction of the park in Shanghai. After years of discussion, in 2009, the central government announced the approval of the Shanghai Disney project application. Therefore, we can see that before 2009, whether the Disney project will settle in Shanghai is full of uncertainty. Before 2009 when the Disney project was finally confirmed, with such repeated transmission of positive or negative information, it might be difficult for the anticipation effects to substantially affect agents' behaviour. Therefore, we argue that the anticipation effect might not be substantial due to the uncertainty of the project the uncertainty of the Shanghai Disney project shown in Table 1.

The Shanghai Disney project is located in the Pudong New Area in Shanghai and has approximately 1,000 acres of land. The reason why Disney built a resort in the Pudong New Area in Shanghai may be related to several types of advantages. First, Shanghai has the world's largest subway system, and line 11 runs directly to the front gates of the

TABLE 1 Timeline of Shanghai Disney Resort

Date	Event
July 2002	The Walt Disney Company announced that they will establish a Disney theme park in Shanghai.
October 2002	The Walt Disney Company has abandoned plans to build a Disney theme park in Shanghai.
July 2005	News about the construction of Disney in Shanghai came out again.
March 2006	Shanghai Mayor Zheng HAN responds to rumours of establishing Disney Resort in Shanghai. Shanghai officials have not confirmed the construction of the Disney project.
December 2007	The Shanghai Disney project has quietly started, and all parties immediately denied the rumours.
June 2008	The relevant news will be officially announced, but both Shanghai government and Disney company denied the approval of the construction of the park in Shanghai.
November 2009	Authorities of the central government of China officially accept the Project Application Report (PAR) for a Disney resort in the Pudong district.
April 2011	Construction of the Shanghai Disney Resort begins.
October 2013	The first steel column is installed, and vertical construction of the Shanghai Disney Resort commences.
April 2014	Total investment increases by 5 billion CNY to rapidly expand the Shanghai Disney Resort.
June 2016	Opening of the Shanghai Disney Resort.
May 2017	Ten million individuals visit Shanghai Disney Resort in the first 11 months.
June 2017	First anniversary of the Shanghai Disney Resort. Over 11 million visitors in its first operation year.

Sources: http://www.shendi.com.cn/ShanghaiDisneyResort; https://www.thewaltdisneycompany.com/; http://sh.sina.com.cn/news/z/shdisney/index.shtml

Shanghai Disney theme park. In addition, Shanghai is well positioned as an international transportation centre in the Asia-Pacific region. The site outside of downtown Shanghai in Chuansha town of the Pudong New Area was chosen because of its proximity to Shanghai Pudong International Airport (approximately 18 kilometres) and the central location of the Huangpu River area (approximately 27 kilometres). Shanghai Disney will influence approximately 300 million potential customers living within two hours of the site, located between the airport and downtown.[4] This means that Shanghai Disney will influence the areas within a two hour drive or subway journey (approximately 30 kilometres), which affects almost the whole Pudong New Area.

According to Zhengyi Liu, deputy district mayor of Pudong New Area in Shanghai, the Shanghai government's support of the Disney project in Shanghai was mainly via urban planning and development, land use planning and infrastructure investment.[5] The local government does not choose land as the share of investment in the Shanghai Disney project; instead, the Walt Disney company needs to pay land grant premiums when the government grants land use rights to them. For the investment of the Shanghai Disney project, both Chinese authorities and the Walt Disney Company acquired shares using all cash, and neither land use rights nor intellectual property rights can be used as an investment.

The Shanghai Disney project, which costs approximately 24.5 billion CNY, is a joint venture between The Walt Disney Company and Shanghai Shendi (Group) Co., Ltd. (Shendi), a state-owned enterprise. The partnership structure of Shendi is a consortium of four powerful government-owned companies (Jin Jiang Hotels; the Shanghai Radio, Film and Television Development Company; Bailian retail shops; and a property developer, the Lujiazui Group).[6] Each of those companies has separate business ties to the Shanghai Disney project. The Shanghai Disney project comprises two owner companies (Shanghai International Theme Park Company Limited and Shanghai International Theme Park Associated Facilities Company Limited) and a management company (Shanghai International Theme Park and Resort Management Company Limited). Shanghai Shendi holds 57% of the ownership shares, and Disney holds 43% of the ownership shares (The Walt Disney Company, 2016). A management company in which Disney has a 70% stake and Shanghai Shendi Group has a 30% stake is responsible for operating the resort on behalf of the owner companies (The Walt Disney Company, 2016).

The Disney project established in Shanghai has brought many benefits to local development. This large-scale commercial financing project might have a positive effect on the nearby land market by attracting other infrastructure or project investments, such as transportation, hotels, and shopping malls, due to its brand influence and great location in the Pudong New Area. The increase in the price of land will further support local total government revenue. The possible reason is that the Disney project in Shanghai directly and indirectly will create a huge number of new jobs. Land demand for commercial development, such as hotels, shopping malls and restaurants, could be increased. In addition, residents value accessibility to job opportunities and benefit directly from Shanghai Disney, increasing land demand for residential development. Considering the effect of the Shanghai Disney project, the Shanghai government may invest more in local infrastructure, such as subways and road networks, leading to capitalization of land value.

3 | DATA AND METHODS

3.1 | Data

The study area in this paper covers 15 districts of Shanghai, and we use various data sources for the variable measurements. To measure the changes in the land value, we collected individual land transaction data that include 15 districts in Shanghai for the period of 2003 to 2015 from the China Real Estate Index System (CREIS), which

[4]Source: https://www.nytimes.com/2009/11/04/business/global/04disney.htm
[5]Source: http://finance.sina.com.cn/chanjing/gsnews/20110408/19259660099.shtml
[6]Source: http://www.shendi.com.cn/

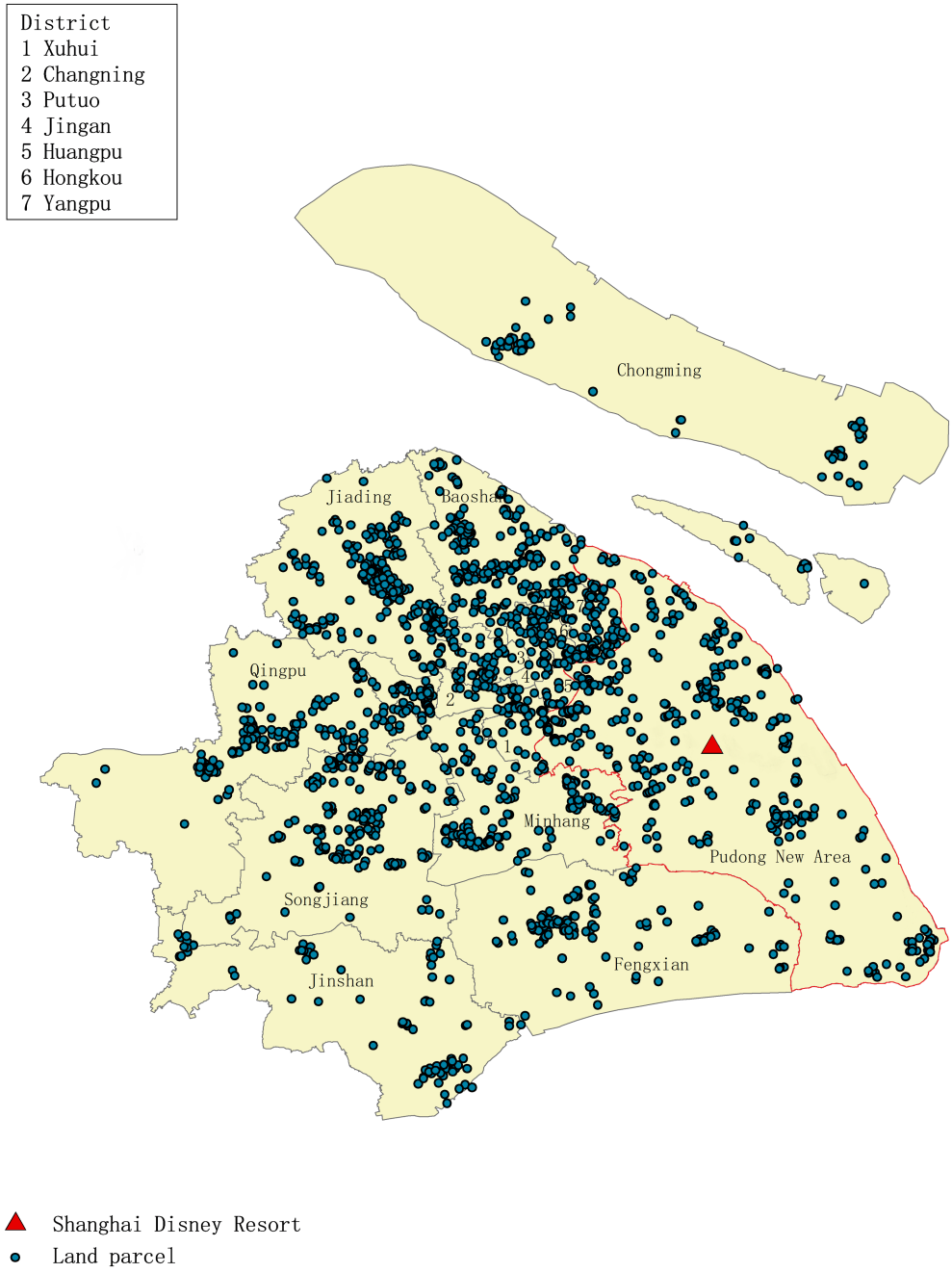

FIGURE 1 Locations of land parcels between 2003 and 2015 and the Disney project in Shanghai

describes the real estate and land market in China.[7] During the sample period, the Shanghai Disney project was approved in 2009. The advantage of using this CREIS land parcel dataset is the repeated cross individual structure and its rich land transaction information, which enables the tracking of individual land transactions. The CREIS can

[7]We remove transactions that appear to miss or have had information incorrectly. We also eliminate the transactions of island Chongming district, because of its complex dynamics and administrative divisions of Chongming island which might causing the biased estimation.

track land parcel transactions that include land leasing price, date of leasing, land area, plot ratio, land use type and latitude and longitude of the land parcel. We use latitude and longitude to identify the location of the land parcel and to calculate the distance from each land parcel to Shanghai Disney. Figure 1 shows the geographical distribution of individual land transactions from 2003 to 2015 in 16 districts of Shanghai. The island Chongming district will be eliminated in our analysis due to its complex dynamics and administrative divisions. The area with enclosed thick lines is the Pudong New Area with the Shanghai Disney Resort in the centre (triangle). Geographic information on Disney is obtained from Baidu Map.

We also add a series of control variables. To control for population impact, we use population density in districts collected from the China Index Academy (2004–2016). To control for the changes in area infrastructure, real estate and industry that might influence the land market, we add total fixed assets investment with a time lag of one year (*FAI_lagged*) in the district collected from the Department of Comprehensive Statistics and Department of Rural Survey of the National Bureau of Statistics (2004–2016). The *FAI_lagged* in Shanghai measures the changes in the total spending on urban infrastructure (such as transportation, electricity, and public facilities), real estate and industry. The distance from land parcels to Pudong International Airport will be used, considering its proximity to the Disney project (approximately 18 kilometres).

We consider the reasons mentioned above as to why the Walt Disney company chose Chuansha Town of Pudong New Area as the site of Shanghai Disney. Interestingly, according to the survey of the Walt Disney company, the effect of Shanghai Disney may cover approximately 300 million potential customers within two hours driving or subway distance (approximately 30 kilometres). The Shanghai Disney project seems to have a range of influences on the Whole Pudong New Area.

In this paper, the sample is divided into two groups: the Pudong New Area with the Shanghai Disney project and the non-Pudong New Area without the Shanghai Disney project (or the rest of the Shanghai area). Table 2 shows the summary statistics of the variables in our dataset. The number of observations is 2,007. The dataset includes 15 districts in Shanghai from 2003 to 2015. Table 3 illustrates the comparison of numerous characteristics of the Pudong New Area and non-Pudong New Area before and after 2009 (the approval time of Shanghai Disney). The

TABLE 2 Summary statistics of variables from 2003 to 2015

Variable	Definition	Mean	SD	Min	Max
Land Price	Land parcel leasing price per square meter (CNY/sq. meter)).	16297.94	30528.67	8.20	248,742
Density	Population density per district (people per km^2).	6444.79	7814.48	554	42,055
Land area	Land building area (sq. meters).	59237.31	55957.38	931	542,199
Plot ratio	The land floor area divided by the building area.	1.93	2.40	0.16	100.56
FAI_lagged	Total fixed asset investment with a time lag of one year in each district which measures the changes in the total spending on urban infrastructure (such as transportation, electricity, and public facilities), real estate and industry (100 million CNY).	399.24	439.80	14.1	1765.73
Distance to Pudong International Airport		42.43	15.65	3.70	84.47
Observations		2007	2007	2007	2007

TABLE 3 Summary statistics of variables from 2003 to 2015 by Pudong New Area and Non-Pudong New Area

	Pudong New Area		Non-Pudong New Area	
	Before 2009	After 2009	Before 2009	After 2009
Average Land Price	4795.45	39276.44	4681.77	17671.94
Average Density	5,137	4292.21	6616.77	7063.63
Average Land area	68563.06	38170.76	75556.02	55122.54
Average Plot ratio	1.53	2.14	1.78	1.99
Average FAI_lagged	679.27	1385.92	154.44	221.09
Average Distance to Pudong International Airport	48.62	40.01	44.34	41.36
Observations	117	277	557	1,056

average land price is at its highest of 39,276.44 CNY per square metre for land parcel transactions after 2009 in Pudong New Area. The average land price appreciated from 4,795.45 CNY per square metre to 39,276.44 CNY after 2009 in the Pudong New Area, which is more than in the non-Pudong New Area. The increase in average land price in the Pudong New Area is likely due to variation in other factors, such as land attributes and local attributes, such as population density, FAI, and distance to Pudong International Airport. We control these attributes in our following estimation.

3.2 | Methods

To examine the land finance mechanism, one important question is to determine how much extra land revenue the Shanghai Disney project has provided to the local government through nearby land value appreciation. To tackle this question, we take a DID approach to examine the effect of the Shanghai Disney project on nearby land value. We also use the synthetic control method (SCM), and triple DID by interacting the distance from each land parcel to Shanghai Disney with the DID estimator to mitigate the bias in our estimation. Then, we estimate the extra amount of local government revenue based on the DID estimates by calculating the ratio of the extra land revenue after approval of the Shanghai Disney Project and Shanghai government revenue. Specifically, we compare the land values near the Shanghai Disney project in the Pudong New Area (treatment group) before and after the approval of the Shanghai Disney Project with the values for control areas that are in the non-Pudong New Area (control group).

Before we estimate the before and after effects of the Disney project shock by using the DID approach, we introduce the synthetic control method (SCM) to plot the time trend of land prices in the Pudong New Area from 2003 to 2015. The SCM has been recently applied in various fields of study, such as economics and political science (Abadie et al., 2015; Billmeier & Nannicini, 2013). The SCM is based on the idea that a combination of unaffected groups often provides a more appropriate comparison than any single unaffected group alone. To examine the effect of establishment of Disney in the Pudong New Area, other similar areas outside of Shanghai's Pudong New Area as the controlled area might be considered. However, these areas are very much different from the Pudong New Area after all. We therefore adopt a synthetic control method (SCM) proposed by Abadie and Gardeazabal (2003). To do so, we use multiple areas other than Shanghai Pudong New Area to make appropriate linear combinations to construct a better "synthetic control region" so that the "synthetic Pudong New Area" is similar to the "real Pudong New Area" before Disney was established. Compared to the DID method, the advantages of the SCM are that the optimal weight of the linear combination can be selected by using a data-driven procedure, which avoids the arbitrariness of the researcher's subjective selection of the control group. SCM also helps reducing the error of subjective

choice and avoids policy endogenous problems (Billmeier & Nannicini, 2013). We first use the SCM to mitigate the concern of comparison groups in DID. In addition, the SCM can provide an intuitive graph to compare the Disney effect of the " synthetic Pudong New Area" with the "real Pudong New Area." The disadvantage of the SCM is that there is no analytical solution and the standard error of the coefficients. Therefore, we first use the synthetic control method to provide intuitive images to understand the impact of the establishment of Disney on the Pudong New Area. Then we use the DID model to examine the extent of Disney's influence on Pudong New Area.

According to Abadie and Gardeazabal (2003), the SCM uses the counterfactual as the control group, which involves a weighted combination of groups. In particular, we have a control group with a set of districts ($j = 1, ...,J$) over T time periods. T denotes the duration. Suppose $t = 1, ...,T$. We assume that the sample has a positive number of preintervention periods, T_0, and a positive number of postintervention periods, T_1, with $T = T_0 + T_1$. District i (Pudong New Area) is exposed to the treatment intervention during periods $T_0 + 1, ..., T$, and the intervention has no effect during pretreatment period $1, ..., T_0$. We assume that district i (Pudong New Area) received the treatment intervention (Disney project approval) at time d (2009 in this paper), where d is a terminal date. Moreover, suppose that each district j has an optimal weight $W = (w_1, ..., w_j)$ as a $(J \times 1)$ vector of weights with $\sum_{j \in J} w_j = 1$ for $t < T_0$. Under the SCM, optimal weights are used to estimate the counterfactual outcome for $t > T_0$. Such weights provide the counterfactual scenario Y_{it} (0) for the treatment effects of Shanghai Disney Resort approval. Let Y_{it} (1) denote the land price in district i with the Disney project treatment. The treatment effect on the land price is $\beta_{it} = Y_{it}(1) - Y_{it}(0)$, comparing the actual treated group to the synthetic control group. We use synth in Stata to implement the SCM estimation.

Figure 2 plots the trends of land prices in the Pudong New Area (continuous line) and the synthetic Pudong New Area (dashed line) by using the SCM. The latter refers to the counterfactual, which is the non-Pudong New Area that does not obtain approval for the Shanghai Disney Resort. The remaining 14 districts in the control group are used to contribute to the weights to estimate the synthetic Pudong New Area outcome. Note that districts in the control group with over 50% missing values are excluded from the analysis. In this figure, the synthetic Pudong New Area provides a suitable comparison group for the Pudong New Area to analyse the effect of the Disney

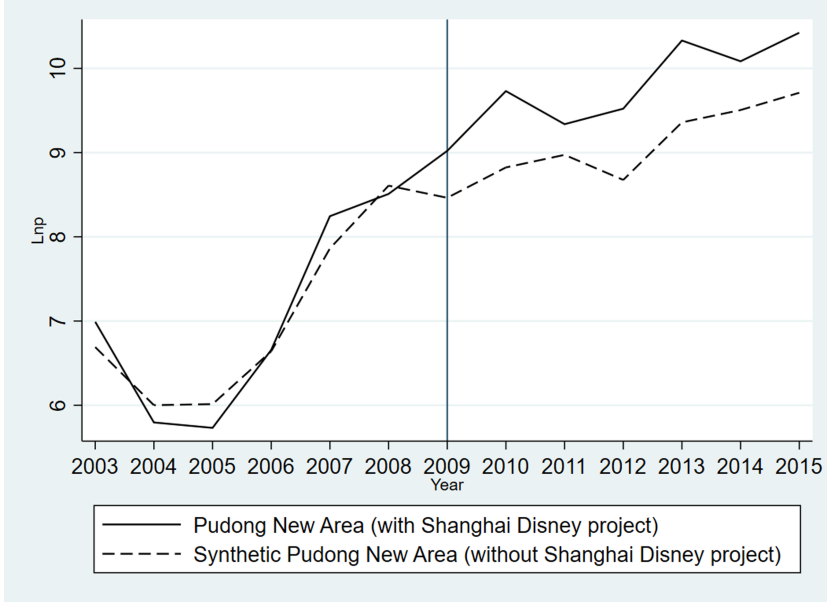

FIGURE 2 Time trends of the land price in the Pudong New Area: actual versus synthetic control group

project. The results show that the trends begin to show divergence in 2009, when the authorities first released information on the Disney project in the Pudong New Area. The result suggests the different trends between the actual land price and the synthetic control groups after the Disney project intervention.

Using cross-sectional data of individual land transactions, we adopt the DID method to investigate the effect of the Shanghai Disney project on the land market. The treatment is defined as the moment (Year 2009) the Shanghai Disney project was approved. The treatment group contains land parcels in the Pudong New Area, which is a district located east of the Huangpu River across from the historic city centre of Shanghai in Puxi that receives the treatment. The control group is land parcels in the areas outside the Pudong New Area or the remaining districts in Shanghai that do not receive the treatment.

We choose the land parcels near the Shanghai Disney project in the Pudong New Area as the treatment group for several reasons. First, the transportation system and potential customers are mainly considered when the Walt Disney company chooses the site of the Shanghai Disney project. Importantly, the distances from Shanghai Disney to Shanghai Pudong International Airport and the central location of the Huangpu River area are approximately 18 km and 27 km (approximately two hours' drive or subway), respectively. According to the Walt Disney company report, Shanghai Disney will influence approximately 300 million potential customers, almost covering the whole Pudong New Area. Second, as a direct-administered municipality, districts in Shanghai usually have their own policies, which might cause differences between districts. Since the Shanghai Disney project is located in the Pudong New Area, the conveyance of land use rights may be more convenient and more efficiently accessible to the Pudong district government due to the consideration of urban planning and development.

Using the DID approach, we focus on changes in the absence of the Shanghai Disney project rather than absolute levels. We believe that it will address some omitted variables, such as large events at the city level. We add a triple DID estimator by interacting the distance from each land parcel to Shanghai Disney with the DID estimator to mitigate the bias in our estimation. We use triple DID to further identify the impact on nearby land prices relative to the distance to Shanghai Disney. To further eliminate the bias of choosing comparison groups, we will discuss in the next section by using different distances to the Disney project as the treatment group benchmark for comparison with the district benchmarks. In this paper, although we use Pudong New Area as the treatment group, the intrinsic interest of estimation is still the distance to Shanghai Disney and its impact on land price.

Our DID model uses a semi-log equation for interpreting the coefficients in terms of semi-elasticity:

$$LnP_{it} = \beta_0 + \beta_1\ PNA_{it} * Post_{it} + \beta_2 X_{it} + u_i + v_t + \varepsilon_{it}. \tag{1}$$

Here, the first line on the right side of Equation 1 shows the effect of the "difference" from the approval of the Shanghai Disney project. The second line captures the determinants of land value and current local characteristics at the district level. The third line refers to the fixed effects related to the district fixed effect u_i, which eliminates unobserved district-specific variables that are constant over time, and year fixed effects v_t, which controls for time-specific shocks. Finally, ε_{it} is a random error term.

The triple DID equation is specified as follows:

$$\begin{aligned} LnP_{it} = {} & \beta_0 + \beta_1 PNA_{it} * Post_{it} + \gamma_0 Dist_{it} + \gamma_1 Dist_{it} * PNA_{it} + \gamma_2 Dist_{it} * Post_{it} \\ & + \delta Dist_{it} * PNA_{it} * Post_{it} + \beta_2 X_{it} + u_i + v_t + \varepsilon_{it}. \end{aligned} \tag{2}$$

The triple DID estimator can be computed as the difference between two difference-in-differences estimators. The intuition is that the difference between two biased difference-in-differences estimators will be unbiased as long as the bias is the same in both estimators. In that case, the bias will be differenced out when the triple difference is computed. The definitions of all of the variables are provided in Table 4.

In Equation 2, the variable $PNA_{it}{}^{*}Post_{it}$ implies how the endogenous variables can change for the land parcels in the Pudong New Area, which is affected by the approval of the Shanghai Disney project, compared to the

TABLE 4 Definitions of all variables

Variable	Definition	Source
P_{it}	Leasing price (CNY) of vacant land parcel *i* per square meter in year *t* (land price).	China Real Estate Index System (CREIS)
PNA_{it}	A dummy variable that takes the value of 1 if land parcel *i* in year *t* is located in Pudong New Area and zero otherwise.	_
$Post_{it}$	A dummy variable that takes the value of 1 for all districts if land parcel *i* in year *t* was sold after the Disney project was approved in 2009.	_
PNA_{it}*$Post_{it}$	The actual DID estimator, which takes the value of 1 for the treatment group in the "policy period".	_
$Dist_{it}$	The distance (Kilometre) of the Shanghai Disney from a land parcel *i* in year *t*.	Author's calculation
$Dist_{it}$ *PNA_{it}*$Post_{it}$	The Triple DID estimator, which reflecting the impact of the Shanghai Disney project on the nearby land price relative to the distance from each land parcel to the Shanghai Disney.	_
Den_{it}	Population density (1,000 people per km^2) in district *i* in year *t*.	Shanghai Municipal Statistics Bureau (2004–2016)
$Area_{it}$	Log of the land building area (sq. meter) in district *i* in year *t*.	China Real Estate Index System (CREIS)
$Plot_{it}$	Plot ratio of vacant land parcel *i* in year *t*. Plot ratio equals to the land floor area divided by the building area.	China Real Estate Index System (CREIS)
$FAI\_lagged_{i,t-1}$	Log of total fixed asset investment in district *i* in year *t-1* which measures the changes in the total spending on urban infrastructure (such as transportation, electricity, and public facilities), real estate and industry (100 million CNY).	Department of Comprehensive Statistics and Department of Rural Survey of the National Bureau of Statistics (2004–2016).
Distance to Pudong Airport	The straight-line distance from a land parcel to the Pudong Airport (km)	Author's calculation

non-Pudong New Area, which is not affected by the Shanghai Disney project. β_1, which is the coupling parameter of the PNA_{it} and $Post_{it}$ *interaction*, shows the effect of the Shanghai Disney project treatment on the land market. β_1 *is* an important coefficient of interest. $Dist_{it}$*PNA_{it}*$Post_{it}$ is the endogenous variable change in the distance to Shanghai Disney for land parcels in the Pudong New Area compared to the non-Pudong New Area before and after the intervention of Shanghai Disney, and δ is also the main coefficient of interest. δ reflects the impact of the Shanghai Disney project on the nearby land price relative to the distance from each land parcel to Shanghai Disney.

However, there could still be local characteristics, such as total fixed asset investments (referring to urban infrastructure, real estate and industry) and distance to the airport, that impact the price of the land, which could lead to the overestimation or underestimation of the true effect on the land price if the adjustment of the land price takes place long before or after the commencement of the Shanghai Disney treatment. Such factors would result in biased

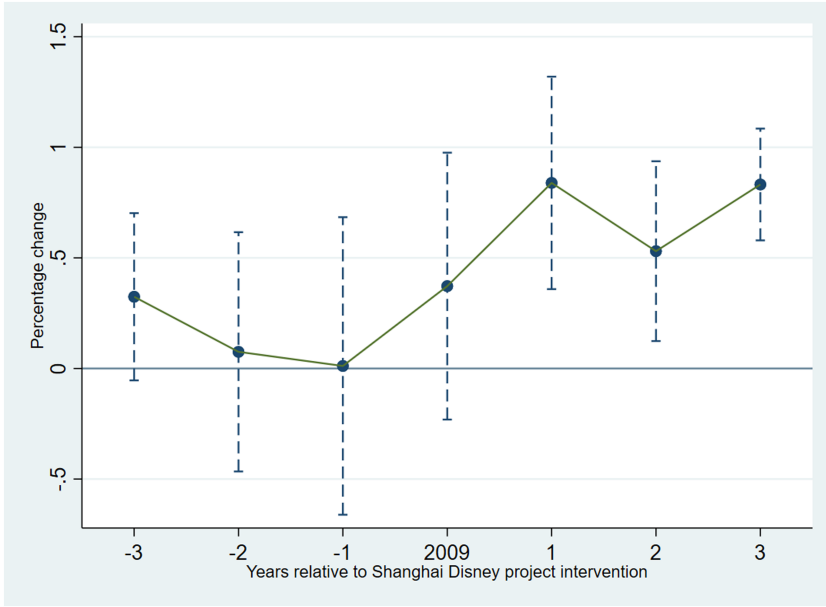

FIGURE 3 The common trend assumption test.
Notes: Vertical bands represent +(−)1.96 times the standard error of each point estimate

estimates. To address this endogeneity issue, a set of control variables was added to control for the treatment effect on the land price.

We added the variable Den_{it} because a higher density is usually associated with higher real estate prices. We also added the variable Distance to Pudong Airport due to its potential effects on land value. Furthermore, we added the variable $FAI\_lagged_{i,t-1}$ to control the effects of other property or urban infrastructure investments on the land market. The attributes of land, such as land building area and plot ratio, are also included.

To estimate the causal effect, the common trend assumption test is required to ensure internal validity of the DID model. Figure 3 depicts the slope of land price changes between the treatment group and the control group over time, before and after the Shanghai Disney shock. The DID model assumes that in the absence of policy shocks, the difference between the treatment group and the control group will remain the same trend over time. Therefore, we provide a common trend graph to observe whether the treatment group and the control group will be parallel or have a common trend without the impact of Shanghai Disney. In Figure 3, before Shanghai Disney's intervention, in 2007 and 2008, the coefficient of difference between the treatment group and the control group was approximately 0 with 95% confidence, indicating that this difference is not statistically significant. In other words, before the intervention of Shanghai Disney, the treatment group and the control group had a common trend. After Shanghai Disney started to shock the Pudong New Area in 2009, the coefficient between the two groups suddenly increased and was statistically significant, indicating that Shanghai Disney intervention had an impact on the treatment group. Therefore, Figure 3 helps to provide evidence showing that the treatment group and the control group have a common trend before the Shanghai Disney intervention, and the impact of the intervention on the treatment group rapidly increases and is statistically significant after 2009.

Figure 4 shows the impact of distance to Shanghai Disney on land value. The y-axis on the left side is the log value of the land price change due to the Disney project. The x-axis is the radius distance ($Dist_{it}$*$Post_{it}$) of the land parcel to the Disney Resort. As shown in Figure 4, the magnitude of the land price change declines with radius, which means that the impact of Shanghai Disney becomes weaker with increasing radius.

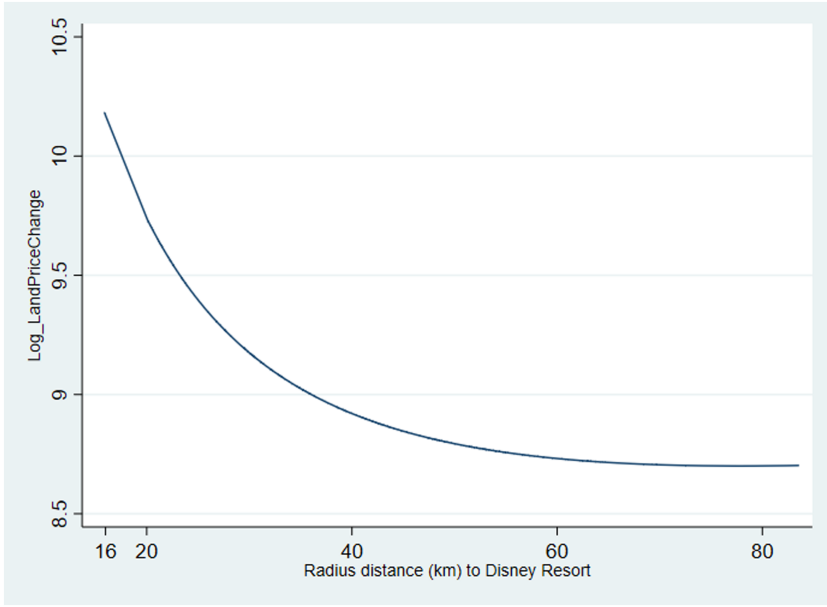

FIGURE 4 The impact of distance to Shanghai Disney on land value.
Notes: Disney is located in the core area of the Shanghai International Tourism Resort. The government has planned an area of approximately 20 square kilometres for this resort. Among all the land parcel observations, the closest one to the Disney Resort is approximately 16 km away. Therefore, the radius distance in this figure begins at 16 km.
Source: http://www.scio.gov.cn/XWfbh/gssxwfbh/xwfbh/shanghai/Document/1478298/1478298.htm

4 | RESULTS

4.1 | DID baseline regression results

Table 5 shows the baseline estimation results from seven regressions with different control variables based on Equations 1 and 2. The columns refer to the (log of the) land price as the dependent variable, and each row reflects the Shanghai treatment impact. The key independent variables are $PNA_{it}{}^{*}Post_{it}$ and $Dist_{it}{}^{*}PNA_{it}{}^{*}Post_{it}$. The estimation with most control variables is in column (7), and the results suggest that the announcement of the Shanghai Disney project significantly increased the land price by 94.7% and that a 1 km increase in proximity from the Disney decreased the land price by 4.7%. There are five control variables and two fixed effects, and we divide them into separate estimations by adding the variables one at a time. In column (1), the model is run with the variables $PNA_{it}{}^{*}Post_{it}$ as well as the district fixed effect and the year fixed effect. Column (2) adds the population density. Column (3) lists the estimation results that include the land area based on column (2). Column (4) further shows the estimation results with the additional variable of the plot ratio. Then, column (5) adds the variable total fixed asset investment. Column (6) lists the estimation results that include all control variables by adding the distance from a land parcel to Pudong Airport. In column (7), we further utilize a triple DID approach to identify the effect of the Shanghai Disney project on the nearby land price relative to the distance from a land parcel to the Disney resort based on Equation 2. In this column, the effect of the Shanghai Disney project is captured by interacting the distance from a land parcel to the Disney resort with $PNA_{it}{}^{*}Post_{it}$. The results show that the coefficient of the interaction term is consistently and statistically significantly positive. The land price in the Pudong New Area increased by 94.7% after approval of the Shanghai Disney project (column (7)). Column (7) also shows that a 1 km increase in distance from Shanghai Disney reduces the land value by 4.7%, holding all other things as constant.

TABLE 5 DID estimates on land price

Dependent Variable: LnP							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PNA_{it}*$Post_{it}$	0.474** (0.166)	0.831*** (0.178)	0.782*** (0.180)	0.761*** (0.175)	0.812*** (0.221)	0.787*** (0.233)	0.947*** (0.277)
$Dist_{it}$*PNA_{it}*$Post_{it}$							−0.047*** (0.009)
Den		0.142** (0.060)	0.135** (0.058)	0.135** (0.056)	0.160* (0.091)	0.157* (0.092)	0.156 (0.096)
Area			−0.104* (0.054)	−0.090* (0.049)	−0.082 (0.056)	−0.083* (0.055)	−0.068* (0.046)
Plot				0.074 (0.062)	0.072 (0.060)	0.072 (0.059)	0.067 (0.053)
FAI_lagged					0.055 (0.129)	0.066 (0.137)	0.059 (0.135)
Distance to Pudong Airport						−0.003* (0.001)	−0.002* (0.001)
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2007	2007	2007	2007	2007	2007	2007
R^2	0.639	0.641	0.644	0.651	0.649	0.649	0.662

Notes: *, ** and *** indicate significance at the 10%, 5% and 1% levels. Clustered standard errors are shown in parentheses.

4.2 | Extra government revenue from the treatment effect

To determine how much extra land revenue the Shanghai Disney project provided to the local government through land value appreciation, we further calculate the ratio of the extra land revenue after approval of the Disney Project and Shanghai government revenue using the DID estimates (0.947) from column (7) in Table 5. The results of Table 6 show the annual amount of extra land revenue from the Shanghai Disney project and the effect on Shanghai extra government revenue.

Interestingly, the results of Table 6 show that the Disney project effect on Shanghai extra government revenue has an increasing trend, from 5.88% in 2009 to 19.23% in 2010, after the approval of the Disney project in 2009. The construction announcement of the Shanghai Disney project in 2011 may entail some negative externalities, such as noise, pollution and crime, causing the decrease in the ratio in column (5) in 2012. Both benefits and costs can be capitalized into nearby land value. These results imply that the Disney project investment in Shanghai helped increase Shanghai extra government revenue through land value appreciation and had a positive effect on Shanghai extra government revenue within several years after the approval of the Disney project.

Considering the period average of the results in each column from 2009 to 2015 (columns (1)–(5)), the results of columns (4)–(5) show that after the approval of the Shanghai Disney project in 2009, the annual percentage extra increase (on period average) in Shanghai government revenue through land value growth was 9.81 (37.01 billion CNY). The approval of the Disney project yielded substantial amounts of funds for both land and local government revenues. In summary, the calculation of the amount of revenue the Shanghai Disney project provided to the local government helps us understand the game of land finance in China. This means that Chinese local governments can gain high revenue by leasing state-owned land near newly constructed commercial real estate development projects due to land value appreciation.

TABLE 6 Revenue from the Disney project effect

	Government revenue (1)	Land revenue (2)	Land finance ratio (%) (3)	Extra land revenue due to the Shanghai Disney project effect (4)	Shanghai Disney project effect on the government revenue (%) (5)
2009	254.03	104.30	41.06%	14.94	5.88%
2010	287.36	141.70	49.31%	55.27	19.23%
2011	342.98	128.90	37.58%	24.67	7.19%
2012	374.37	99.09	26.47%	17.67	4.72%
2013	410.95	226.14	55.03%	63.78	15.52%
2014	487.18	176.39	36.21%	45.77	9.40%
2015	551.95	168.19	30.47%	36.95	6.69%
Mean	386.97	149.24	39.45%	37.01	9.81%

Notes: Government revenue refers to local government budgetary revenue in Shanghai. Land revenue is defined as the land grant premiums in Shanghai. The land finance ratio is the dependence of Shanghai government revenue on land revenue in Shanghai. Extra land revenue due to the Shanghai Disney project effect is calculated by multiplying the estimate from column (7) (first row) of Table 5 and the land revenue of the Pudong New Area. The Shanghai Disney project effect on government revenue (%) is the ratio of extra land value due to the Shanghai Disney project effect to Shanghai government revenue. The unit of currency is billion CNY.
Source: Shanghai land revenue data are collected from the China Index Academy (2004–2016). Shanghai government revenue data are collected from the Shanghai Municipal Statistics Bureau (2004–2016).

TABLE 7 Test using different treatment group benchmarks

Dependent Variable: LnP				
Independent Variable	20 km (1)	25 km (2)	30 km (3)	District (4)
$Dist_{it}$*$Post_{it}$ or PNA_{it}*$Post_{it}$	0.421** (0.154)	0.423*** (0.149)	0.218* (0.132)	0.474*** (0.166)
District fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Observations	2007	2007	2007	2007
R^2	0.638	0.639	0.639	0.639

Notes: *, ** and *** indicate significance at the 10%, 5% and 1% levels. Clustered standard errors are shown in parentheses.

In the following, we check whether the change in benchmark measurement will affect the results. To do so, we estimate the model by adding a distance benchmark for comparison with the district benchmark. The CREIS land parcel data contain the latitude and longitude information of each land parcel. We obtain the latitude and longitude data of the Shanghai Disney project from Baidu Map. Then, we calculate the distance from each parcel to the Shanghai Disney project. All estimations include the variables PNA_{it}*$Post_{it}$, plus the district and year fixed effects, but excluding all of the control variables for the entire period of study. That is, we consider only the benchmark for the treatment, in which some changes occurred in the period of 2003–2015. Table 7 summarizes the results of the estimations with different treatment group benchmarks. As shown in Table 7, columns (1)–(3) show the estimation by using the treatment group within distances of 20, 25 and 30 km as the benchmark. Column (4) is used as a comparison, which shows the estimation by taking the district benchmark as discussed above. As expected, the results reveal that the estimated coefficients for the Disney project treatment impact (first row) are positively and statistically significant in

each column. The results suggest that the changes in the treatment group benchmark are not a major factor that affects our estimates.

4.3 | DID results by different land types

We further discuss whether the Shanghai Disney project treatment effect on land value has different impact between commercial and residential land prices during the same period of time, from 2003 to 2015 (see Table 8). The results indicate a positively and statistically significant effect of the Disney project intervention on both residential (1.058) and commercial (1.283) land prices (columns (2) and (4)). That is, once the authorities announced the Disney project in the Pudong New Area in 2009, residential land prices increased by 105.8%, while commercial land prices increased by 128.3%. Moreover, changes in commercial land prices are apparently greater than those in residential land prices. One possible explanation is that while it boosts local tourism, the Shanghai Disney resort might also have negative environmental impacts on residential neighbourhoods, which are reflected in residential land prices. Table 8 also shows that the Commercial land value decreases 11.5% in land value as the distance from Shanghai Disney increases by 1 km, which reduces more than the residential land market (3%). In sum, the Disney project intervention influences the prices of residential and commercial land, however, the commercial land market benefits more than the residential land market.

We further plot the trends of the land prices in the Pudong New Area (continuous line) and the synthetic Pudong New Area (dashed line) by different types of land (Figure 5) using the SCM. To estimate the outcome for the synthetic Pudong New Area, the remaining 13 districts and 15 districts in the control group are used as the weights for residential and commercial land, respectively. Note that we exclude those districts in the control group with over 50% missing values. In this figure, a gap emerges between the Pudong New Area and the synthetic Pudong New Area for both residential and commercial land when the authorities first released information about the Shanghai Disney project approval in the Pudong New Area. The land price of commercial land affected by the Shanghai Disney project intervention increased significantly more than that of residential land, and this trend continues to boost land revenue. As we mentioned above, the Shanghai Disney project might have negative environmental effects on residential neighbourhoods, which are reflected in residential land prices. Overall, the estimation results for both

TABLE 8 DID estimates by different land types

	Residential land		Commercial land	
	(1)	(2)	(3)	(4)
PNA_{it}*$Post_{it}$	0.866*** (0.278)	1.058*** (0.281)	0.979*** (0.274)	1.283*** (0.227)
$Dist_{it}$*PNA_{it}*$Post_{it}$		−0.030*** (0.002)		−0.115*** (0.005)
Den	0.278** (0.114)	0.277** (0.114)	0.009 (0.078)	0.003 (0.057)
Area	−0.078 (0.069)	−0.079 (0.070)	−0.041 (0.051)	−0.033 (0.058)
Plot	0.227 (0.156)	0.226 (0.156)	0.058 (0.051)	0.056 (0.045)
FAI_lagged	0.021 (0.406)	0.026 (0.406)	0.019 (0.257)	0.022 (0.231)
Distance to Pudong Airport	−0.001 (0.003)	−0.001 (0.003)	−0.004** (0.002)	−0.003 (0.002)
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	946	946	787	787
R^2	0.675	0.675	0.617	0.637

Notes: *, ** and *** indicate significance at the 10%, 5% and 1% levels. Clustered standard errors are shown in parentheses.

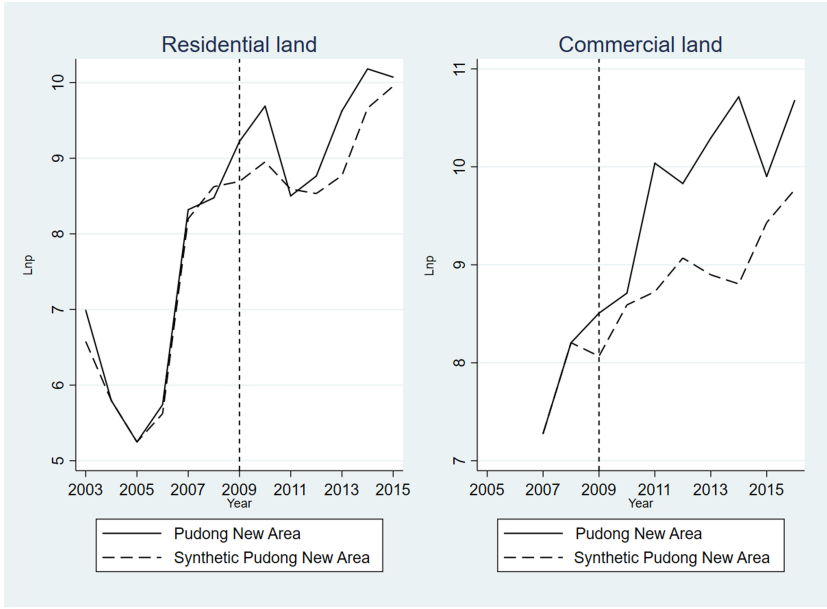

FIGURE 5 Time trends of land price in the Pudong New Area by different land types (residential and commercial land): actual versus synthetic control group.
Notes: Pudong New Area refers to the area that experienced the Shanghai Disney Resort treatment. The synthetic Pudong New Area refers to the counterfactual, which are areas that do not have the approval of the Shanghai Disney Resort

residential and commercial land further confirm that the approval of the Disney project affected both residential and commercial land values.

5 | CONCLUSION

This paper studies the amount of extra government revenue that is generated by large-scale commercial real estate development projects through land value appreciation by focusing on the case of the Shanghai Disney project, which was officially approved and announced in 2009. The findings confirm that the Shanghai Disney project significantly increased the price of nearby land and further increased local extra government revenue. The annual value appreciation of land, on average, was approximately 37.01 billion CNY and accounted for 9.81% of the local government revenue from 2009 to 2015, after the approval of the Shanghai Disney project. In addition, the results suggest that there were heterogeneous impacts on the values of different types of land.

The evidence from the Disney project in Shanghai supports the understanding of the land finance mechanism in China. The Shanghai Disney project served as a channel of infrastructure financing, and the government gained revenue from the project by conveying land use rights. The case of the Disney project in Shanghai provides a good example for other policy-makers who want to know more about the Chinese land finance system and plan to benefit from infrastructure financing.

There are some limitations in this paper that should be addressed in future research. First, the results may be valid only in the Chinese context because of the special land finance policy in China, so readers should use them with caution when generalizing them. The government in China makes decisions regarding the distribution of land revenue. Only state-owned land can be traded in the primary market, and local governments are responsible for

managing land expropriation. Second, some unobserved factors might compete with the impacts of the Shanghai Disney project and influence land value growth and the increase in total government revenue. In addition to the development rights of the land, local governments have various functions, such as public resources allocation, or the protection of the ecological environment and natural resources. These factors will indeed affect the government's revenue and expenditure. However, these unobservable variables data are difficult to obtain, especially at the level of districts in a city. We look forward to furthering research on this issue in the future. Third, the estimates represent average effects of the Shanghai Disney project and could still vary with the characteristics of infrastructure investments and land leasing. Finally, since the land has a value-added function and can increase local extra government revenue, in addition to maximizing local extra government revenue, local officials sometimes respond to real estate regulatory requirements from the public and the central government. Local officials may interfere in some land auctions which can lead to misallocation and corruption (Wang & Hui, 2017). Unfortunately, we are unable to access data on land corruption cases in each Shanghai district. Future research can pay more attention to this issue.

In conclusion, the findings in this paper have valuable implications for policy-makers who may apply the unique database we use to identify how much extra government revenue can be generated by other infrastructure financing projects through land value growth in different cities. In addition, the analysis of the impact of the Shanghai Disney project on land prices can be extended to other factors, such as property prices, employment, and tourism development. Finally, future research can expand the scope of our paper to all theme parks in China, not only the Shanghai Disney project, to support our findings.

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REFERENCES

Abadie, A., Diamond, A., & Hainmueller, J. (2015). Comparative politics and the synthetic control method. *American Journal of Political Science*, *59*(2), 495–510. https://doi.org/10.1111/ajps.12116

Abadie, A., & Gardeazabal, J. (2003). The economic costs of conflict: A case study of the Basque country. *American Economic Review*, *93*(1), 113–132. https://doi.org/10.1257/000282803321455188

Billmeier, A., & Nannicini, T. (2013). Assessing economic liberalization episodes: A synthetic control approach. *Review of Economics and Statistics*, *95*(3), 983–1001. https://doi.org/10.1162/REST_a_00324

China Index Academy. (2004-2016). 300 Chinese cities of land transaction report. *China Real Estate Index Systems (in Chinese)*.

China Land and Resources Statistical Yearbook (2004-2016). Geological Press.

Ding, C. (2003). Land policy reform in China: Assessment and prospects. *Land Use Policy*, *20*(2), 109–120. https://doi.org/10.1016/S0264-8377(02)00073-X

Du, J., & Peiser, R. B. (2014). Land supply, pricing and local governments' land hoarding in China. *Regional Science and Urban Economics*, *48*, 180–189. https://doi.org/10.1016/j.regsciurbeco.2014.07.002

Fan, G., & Lv, Y. (2012). Fiscal prudence and growth sustainability: An analysis of China's public debts. *Asian Economic Policy Review*, *7*(2), 202–220. https://doi.org/10.1111/j.1748-3131.2012.01234.x

Guo, S., & Shi, Y. (2018). Infrastructure investment in China: A model of local government choice under land financing. *Journal of Asian Economics*, *56*, 24–35. https://doi.org/10.1016/j.asieco.2018.04.001

Jin, C., & Choi, M. J. (2019). The causal structure of land finance, commercial housing, and social housing in China. *International Journal of Urban Sciences*, *32*(2), 286–299. https://doi.org/10.1080/12265934.2019.1568285

Li, S., Yang, J., Qin, P., & Chonabayashi, S. (2016). Wheels of fortune: Subway expansion and property values in Beijing. *Journal of Regional Science*, *56*(5), 792–813. https://doi.org/10.1111/jors.12284

Lin, G., & Yi, F. (2011). Urbanization of capital or capitalization on urban land? Land development and local public finance in urbanizing China. *Urban Geography*, *32*(1), 50–79. https://doi.org/10.2747/0272-3638.32.1.50

Lu, J., Li, B., & Li, H. (2019). The influence of land finance and public service supply on peri-urbanization: Evidence from the counties in China. *Habitat International*, *92*, 102039. https://doi.org/10.1016/j.habitatint.2019.102039

Mo, J. (2018). Land financing and economic growth: Evidence from Chinese counties. *China Economic Review*, *50*, 218–239. https://doi.org/10.1016/j.chieco.2018.04.011

Pan, F., Zhang, F., Zhu, S., & Wójcik, D. (2017). Developing by borrowing? Inter-jurisdictional competition, land finance and local debt accumulation in China. *Urban Studies*, *54*(4), 897–916. https://doi.org/10.1177/0042098015624838

Pan, J. N., Huang, J. T., & Chiang, T. F. (2015). Empirical study of the local government deficit, land finance and real estate markets in China. *China Economic Review*, *32*, 57–67. https://doi.org/10.1016/j.chieco.2014.11.003

Shanghai Municipal Statistics Bureau. (2004–2016). *Shanghai statistical yearbook*. China Statistics Press.

Shu, C., Xie, H., Jiang, J., & Chen, Q. (2018). Is urban land development driven by economic development or fiscal revenue stimuli in China? *Land Use Policy*, *77*, 107–115. https://doi.org/10.1016/j.landusepol.2018.05.031

Tang, P., Shi, X., Gao, J., Feng, S., & Qu, F. (2019). Demystifying the key for intoxicating land finance in China: An empirical study through the lens of government expenditure. *Land Use Policy*, *85*, 302–309. https://doi.org/10.1016/j.landusepol.2019.04.012

Tao, R., Su, F., Liu, M., & Cao, G. (2010). Land leasing and local public finance in China's regional development: Evidence from prefecture-level cities. *Urban Studies*, *47*(10), 2217–2236. https://doi.org/10.1177/0042098009357961

The Walt Disney Company. (2016). *Fiscal year 2016 annual financial report*. The Walt Disney Company.

Tian, L., & Ma, W. (2009). Government intervention in city development of China: A tool of land supply. *Land Use Policy*, *26*(3), 599–609. https://doi.org/10.1016/j.landusepol.2008.08.012

Wang, D., Zhang, L., Zhang, Z., & Zhao, S. X. (2011). Urban infrastructure financing in reform-era China. *Urban Studies*, *48*(14), 2975–2998. https://doi.org/10.1177/0042098010392079

Wang, W., & Ye, F. (2016). The Political economy of land finance in China. *Public Budgeting and Finance*, *36*(2), 91–110. https://doi.org/10.1111/pbaf.12086

Wang, Y., & Hui, E. C. M. (2017). Are local governments maximizing land revenue? Evidence from China. *China Economic Review*, *43*, 196–215. https://doi.org/10.1016/j.chieco.2017.02.005

Wu, Q., Li, Y., & Yan, S. (2015). The incentives of China's urban land finance. *Land Use Policy*, *42*, 432–442. https://doi.org/10.1016/j.landusepol.2014.08.015

Ye, L., & Wu, A. M. (2014). Urbanization, land development, and land financing: Evidence from chinese cities. *Journal of Urban Affairs*, *36*(S1), 354–368. https://doi.org/10.1111/juaf.12105

Zhang, X. Q. (1997). Urban land reform in China. *Land Use Policy*, *14*(3), 187–199. https://doi.org/10.1016/S0264-8377(97)00001-X

Zhao, Z. J., & Cao, C. (2011). Funding China's urban infrastructure : Revenue structure and financing approaches. *Public Finance & Management*, *11*(3), 284. https://pfm.spaef.org/article/1309/Funding-China-s-Urban-Infrastructure-Revenue-Structure-and-Financing-Approaches

Zheng, S. Q., & Kahn, M. E. (2008). Land and residential property markets in a booming economy: New evidence from Beijing. *Journal of Urban Economics*, *63*(2), 743–757. https://doi.org/10.1016/j.jue.2007.04.010

Zhong, T., Zhang, X., Huang, X., & Liu, F. (2019). Blessing or curse? Impact of land finance on rural public infrastructure development. *Land Use Policy*, *85*, 130–141. https://doi.org/10.1016/j.landusepol.2019.03.036

Zhu, X., Wei, Y., Lai, Y., Li, Y., Zhong, S., & Dai, C. (2019). Empirical analysis of the driving factors of China's "Land finance" mechanism using soft budget constraint theory and the PLS-SEM model. *Sustainability (Switzerland)*, *11*(3), 742. https://doi.org/10.3390/su11030742

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Resumen. Este estudio utiliza el método de diferencias en diferencias y emplea un conjunto de datos único de transacciones de tierras del gobierno a nivel individual para investigar la cantidad de ingresos extra del gobierno generados por el complejo turístico Disney Shanghái resultante de la apreciación del valor del suelo en las áreas circundantes. Los resultados sugieren que el proyecto de Disney Shanghái aumenta significativamente el valor del suelo en las cercanías y, por tanto, incrementa los ingresos locales extraordinarios del gobierno. La tasa media anual de crecimiento adicional fue del 9,81% (37.010 millones de CNY) de los ingresos del gobierno de Shanghái entre 2009 y 2015 gracias a la apreciación del valor del suelo en los alrededores tras la aprobación del proyecto de Shanghái Disney en 2009. También existe un impacto heterogéneo del proyecto de Shanghái Disney en los diferentes tipos de valor del suelo.

抄録: 本稿では、差分の差分法を用いて、国有地取引の個人レベルでの一意のデータセットで、近隣地域の地価高騰により上海ディズニーリゾートがどれくらいの臨時歳入を生み出しているかを検討した。結果から、上海ディズニー・プロジェクトにより、近隣の地価が著しく上昇し、地方の臨時歳入が増加することが示唆された。2009年に上海ディズニー・プロジェクトが承認された後、近隣の地価高騰により、2009~2015年までの上海市の臨時歳入の年平均増加率は9.81%(370億100万元)であった。上海ディズニー・プロジェクトは、他にもさまざまなタイプの地価にさまざまな影響を及ぼしている。