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### **Land Use Rights, Government Land Supply, and the Pattern of Redevelopment in Shanghai**

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This paper reviews the urban redevelopment activities in Shanghai as the land market reforms were introduced. We focus on the impact of land use institutions on the spatial pattern of these activities. Sites for private real estate redevelopment were supplied by individual districts in the city. But the need for districts to pay for the resettlement of displaced residents contributed to a spatial mismatch between the supply of redevelopment sites and the market demand for commercial real estate space. Resettlement costs are highest at the high demand locations. State owned enterprises and institutions occupying land allocated by the state also engaged in real estate development. Whereas the density of private redevelopment was sensitive to the volume of commercial activities in a district, this does not appear to have been important in determining the location of the significant increase in the stock of commercial space resulting from development by local enterprises and institutions. This growth shows considerable decentralization between 1993 and 1996,

indicative of spatially inefficient redevelopment activities by land-rich state enterprises.

## **Keywords**

Institutions, Land Market, Economic Transition, Urban Redevelopment, Shanghai.

## **Introduction**

One of the striking features of the economic reform process in China is the co-existence of public ownership and central planning with private property rights and free markets. This cohabitation is as present in urban land markets as it is in other sectors of the Chinese economy. In this paper we study urban redevelopment and the emergence of the land market in Shanghai to discover how the mixture of private and public property rights has influenced the pattern of redevelopment activities in Shanghai.

To study redevelopment we take advantage of the flood of construction activity in Shanghai that followed the land market reforms of the early 1990's.<sup>1</sup> The reforms coincided with the end of forty years of socialist planning and the re-emergence of Shanghai as a business and financial service center. During the socialist period, there was virtually no commercial development. Consequently, at the start of the reform period, there was considerable pent up demand. The reform period ushered in the legalization of some private property rights, opened up the real estate market to foreign developers, and decentralized capital investment budgeting to local governments and state-owned enterprises. This made it possible for local governments to lease land for private real estate development and for state-owned enterprises to exercise the option embedded in the state-allocated land use rights to redevelop their urban sites. In both cases, they could earn revenues from the location value of land under their control. Supply responded to demand with such intensity that the shortage of commercial buildings in the city in early 1990's turned into a gross oversupply in just a few years.

With a market allocation of land, different types of users obtain space based on their willingness to pay for access and neighborhood quality associated with a location. In the classic urban economics monocentric city paradigm,

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<sup>1</sup> In interviews in 1996, municipal officials claimed that there were over 20,000 development sites in Shanghai. Around the same time the Mayor is quoted as saying that fully one quarter of the world's construction cranes were at work in Shanghai.

central locations are the most valuable for those business activities that demand shared service inputs and for which face-to-face communication is particularly productivity enhancing. Firms for which these factors are not as important locate further away from the center.<sup>2</sup> Most cities have a polycentric form, with the CBD as the largest center. In the last two decades, the empirical literature has taken the monocentric analysis of Muth (1969) and Mills (1972) and applied it to polycentric urban forms. This literature includes work identifying the presence and location of subcenters (Greene 1980, McDonald 1987, and Giuliano and Small 1991); analysis of the effects of subcenters on land values (Heikkila, et. al., 1989 and McMillen and McDonald, 1989); and estimates of the price, employment and population density gradients around subcenters (Sivitanidou 1996 and 1997, McMillen and McDonald 1997, and Small and Song 1996). With the notable exception of McMillen's work (1996) on historic land prices in Chicago, most studies of suburban employment nodes take their distribution as given. This paper looks at a particular aspect of urban development, as we examine how the spatial pattern of development is affected by the institutional framework in which development occurs.<sup>3</sup> Even though we look at a short period of time, the volume of new development activity allows us to examine a dynamic process, rather than the static patterns of existing land use.

The first empirical issue we study is the tradeoff between market demand for location and the spatial variation in the unique redevelopment costs that district governments face in supplying land. Unlike a private landowner, the local governments who are negotiating the land lease sales with private developers must provide the households and firms displaced by redevelopment with replacement structures. These costs are not uniform across space. The high residential and manufacturing density in the core urban area, a result of meager investment in urban infrastructure and housing under socialist planning, means that the resettlement costs for redevelopment in these areas can be much higher than in more distant districts. Consequently, the spatial variation in land supply by district governments may be quite different than if they behaved wholly as private landowners, who would not face these resettlement costs.

The second question examines the role of private developers and local enterprises and institutions in changing the land use pattern in Shanghai. We show that, the high value of land for commercial use in central urban

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<sup>2</sup> The classic empirical study of the economics of firm location is the detailed analysis of business activity in New York by Hoover and Vernon (1959).

<sup>3</sup> Bertaud (1996) and Bertaud and Renaud (1997) examine the spatial pattern of urban land use in various cities under different economic institutions.

locations encouraged the conversion of lower-value residential and industrial uses at these locations to commercial use. However, new construction of commercial floor space was less concentrated in central locations than what market demand for business locations would dictate. One question we explore is whether this decentralized redevelopment pattern is a result of redevelopment by state-owned enterprises and institutions of the sites they themselves occupy. These existing land users in the city have land use rights for their sites as part of the bundle of rights allocated to them by the state. They can redevelop their sites for their own uses but cannot trade their land use rights. One effect of the inability to trade is that it reduces the opportunity cost of redeveloping their sites for their own use. Moreover, the uncertainty surrounding the expiry of this redevelopment option and the ready supply of bank loans further distorted the opportunity cost of redevelopment. As a result, land-rich state-owned enterprises and institutions had a strong incentive to redevelop their sites for more profitable commercial uses even prematurely or at less desirable locations than would be the case for an owner in a market economy. We are interested in whether these distorted incentives have affected the spatial pattern of redevelopment and changes in the stock of commercial real estate.

To study the relationship between the land market and redevelopment in Shanghai we employ two sets of data. The first is the sales of land lease by Shanghai's ten urban districts for private real estate development between 1992 and 1994. The second is the aggregate data on the actual change in building floor area by various types of land use in individual districts between 1993 and 1996.<sup>4</sup> For a subset of the observations in the first data set we also know their location within each district. This allows us to obtain a clearer picture of the spatial patterns of redevelopment and to estimate a price surface of land values in the city. By comparing total changes in the quantity of space with the space developed by private developers on land leased from local governments we can infer the volume and location of redevelopment by enterprises and institutions that have state allocated land use rights.

The structure of the paper is as follows. In the next section, we provide a background on Shanghai's development history, land market institutions, and market conditions at the time of the reforms in the urban land market. The historical background would be useful for understanding the demand for, as well as the constraints on, urban redevelopment in Shanghai. Next, we

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<sup>4</sup> The Shanghai municipal government administers 10 urban districts, 4 suburban districts (the fourth, Pu Dong, was created in 1993 out of parts of the three of the urban districts and a suburban county), and six rural counties. Two thirds of the urban population live in the 10 districts, and over 70 percent of non-residential real estate are in these areas.

present the spatial model of land value in Shanghai, utilizing non-parametric techniques to estimate a land price surface for the city. We then analyze the spatial pattern of land lease projects and of the change in land use, providing evidence regarding the two research questions identified above. Finally, in our concluding section, we discuss the implications of our results and avenues for further research.

## Background

### *Historic Patterns of Land Use in Shanghai*

The liberalization of Shanghai's urban land market occurred in a built-up environment that reflected both pre-revolution economic activities and China's communist planned industrialization policies. Prior to 1948 commercial activity was concentrated in the Huang Pu district, the former British Concession. Two main parallel retail corridors extended away from the Huang Pu River: Nanjing Road in the British Concession and Huihai Road (the Avenue Joffre) to the South in the French concession. Even at the beginning of the 1990's, Huang Pu accounted for almost a quarter of all office building space in the city and the highest density of shopping space among the districts, with four times as much shopping space per resident as the average for the other nine urban districts. Nearly all of the principal commercial structures dating from Shanghai's tenure as China's business center remain in place, though the space is now occupied by the offices for government ministries and enterprises, and some light industrial concerns.<sup>5</sup>

Under the planned economy, Shanghai's commercial activities were neglected in favor of industrialization. Without much alternation of the existing stock, planners achieved a great increase in the industrial employment by converting commercial sites to light industrial use. The service sector share of GDP in the city declined from 44 percent in 1953 to 18.6 percent in 1978, as the industrial share increased from 42.6 percent to 77.4 percent.<sup>6</sup> As a result, by the beginning of the reform period industry accounted for 26.7 percent of land use in the ten urban districts. In comparison industrial land uses occupy 6 percent of land in Hong Kong and 9 percent in Seoul. Mixed land use between residential and manufacturing was the dominant form of land use prior to the reforms of the 1990's (Sit 1985). The legacy of this period is an

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<sup>5</sup> In his introduction to the reprinted edition of a 1934 book, *All About Shanghai*, Lethbridge (1983) describes how easy it is to find the reference points of Old Shanghai under the veneer of the current users.

<sup>6</sup> Figures are from the *Statistical Yearbook of Shanghai 1997*.

absence of new space for commercial use, and a surplus of inappropriate uses, such as warehousing and manufacturing in commercial areas.

Shanghai's growth lagged behind other coastal areas in China during the early years of reform. In the 1980's, Shanghai's real GDP grew at an annual rate of 7.4 percent, trailing the national average of 9.3 percent. Only with the de facto government sanction that an economic renaissance in Shanghai was acceptable to Beijing, when Deng Xiaoping designated Shanghai as the 'dragon head' of the Yangtze River, did economic growth in the city accelerate. Between 1991 and 1995 the city's real GDP grew at an annual rate of over 14 percent. Accompanying this growth is a structural transformation as Shanghai reclaims its pre-revolutionary role as China's premier financial and commercial center. The service sector's share of Shanghai's GDP rose from 21.1 percent in 1980 to 40.1 percent in 1995; in some of the urban districts, the service sector GDP accounted for over 80 percent of GDP. The existing stock of real estate was grossly inadequate to meet demand generated by both the high rates of economic growth and the re-emergence of the service sector.

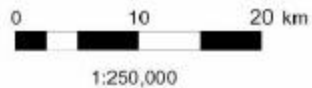
The historic legacy is evident in the pattern of land use and real estate space across districts. In Figure 1 we show 1993 commercial (sum of office, retail, and hotel revenues) and industrial sales per capita by district. The CBD district of Huang Pu has substantially more commercial activity than other districts. Thanks to large investments in the 1980's in suburban heavy industrial facilities such as Baoshan Steel and the Volkswagen factory, industrial land use is much more significant in the suburban districts, which show up in notably higher industrial sales per resident in these districts. Table 1 describes the distribution of floor space among land uses by district for 1993. All activities are evident across the city. Commercial space makes up a substantially greater share of total floor space in Huang Pu and its share of total floor area is highest in the three core districts of Huang Pu, Lu Wan, and Jing An. Outside of Huang Pu, industrial uses accounted for a major share of non-residential floor area. With the exception of Pu Dong, industrial real estate tends to have a greater share of all floor space in the suburban districts; but it still makes up well over 25 percent of the non-residential real estate stock in the urban districts.

Figure 1 : Sales per Capita



District	Industrial	Commercial
Bao Shan	10,728	8,458
Chang Ning	2,002	5,868
Hong Kou	1,467	8,730
Huang Pu	3,745	32,475
Jia Ding	22,561	8,356
Jing An	2,936	16,509
Lu Wan	1,822	14,876
Nan Shi	1,608	10,032
Pu Tuo	1,594	6,154
Xu Hui	2,081	5,933
Yang Pu	1,903	6,433
Zha Bei	2,116	4,219

Industrial  
 Commercial



**Table 1: District size and composition of building floor area, 1993**

District	District Area (km <sup>2</sup> )	Population per km <sup>2</sup>	Total Floor Area (000 m <sup>2</sup> )	Share of Floor Area		
				Residential	Industrial	Commercial
Huang Pu	4.5	70,308	6,110	47.1%	8.5%	34.9%
Nan Shi	7.9	63,533	7,180	64.1%	19.8%	5.0%
Jing An	7.6	57,303	9,470	53.7%	22.0%	14.3%
Lu Wan	8.1	52,217	8,460	54.1%	24.2%	11.5%
Hong Kou	23.5	35,682	17,710	56.0%	26.0%	8.1%
Zha Bei	28.5	23,659	15,020	53.2%	32.5%	4.7%
Yang Pu	52.1	19,963	26,570	45.1%	40.4%	3.2%
Chang Ning	38.3	15,707	15,070	54.5%	23.8%	9.6%
Pu Tuo	54.8	14,752	17,770	54.1%	29.7%	6.4%
Xu Hui	54.8	14,008	22,010	54.3%	23.8%	7.0%
Pu Dong	522.8	2,749	23,750	63.1%	24.9%	4.7%
Bao Shan	424.6	1,519	15,260	41.9%	45.0%	5.0%
Ming Hang	370.8	1,383	10,270	42.8%	43.2%	5.1%
Jia Ding	458.8	1,043	7,660	39.3%	35.6%	11.5%
Urban Districts	280.1	22,874	145,370	52.9%	27.8%	8.2%
Suburban Districts	1,776.9	1,730	56,940	50.6%	35.1%	5.8%
Total	2,057.0	4,609	202,310	52.2%	29.8%	7.5%

Sources: *Statistical Yearbook of Shanghai 1994*.

Over forty years without investment in commercial structures left Shanghai with a stock of commercial space ill-suited for the changes wrought by economic liberalization. The total supply of high quality rental office space in 1993 was a mere 354,000 square meters. With surging demand, rents and asset prices skyrocketed and vacancy rates plummeted. Between 1990 and 1993 the office rental index rose by 158 percent, hotel rates rose by 243 percent as many enterprises began leasing hotel rooms for use as offices. Typical lease rates for the rare buildings with grade 'A' office space achieved annual lease rates of over \$900 per sq. meter. Vacancy rates for grade A rental office buildings declined to 0.3 percent in 1994. In response, construction activity skyrocketed. Total real estate investment rose from about 0.8 billion yuan in 1990 and 1991 to 46.6 billion in 1995. Table 2 lists some of the real estate market conditions in Shanghai between 1990 and 1996.

Shanghai's growth and potential sparked tremendous interest by foreign developers. Between 1992 and 1993, slightly over 200 sites in the ten urban districts with a land area of approximately 2,100,000 m<sup>2</sup> were leased for commercial and residential development with foreign developers and



investors as the target market. In 1994 another 1,000,000 m<sup>2</sup> of land was leased in these districts to these developers. In addition to these land leases, large areas were designated as development zones, principally in the new district of Pu Dong.

**Table 2: Real estate market conditions in Shanghai**

Year	Real estate investment (billion yuan)	Rental office vacancy rate (%)	Office rental index (1985=100)
1990	0.8	31.0	148
1991	0.8	29.0	174
1992	1.3	1.8	264
1993	2.2	1.4	383
1994	11.7	0.3	449
1995	46.6	5.0	497
1996	65.8	4.3*	394

Sources: *Statistical Yearbook of Shanghai 1997* and *Shanghai Real Estate Market 1997*.

\* The vacancy rate was about 20% according to *Asia Pacific Property Digest* (Jones Lang Wootton).

### *The Institutional Framework for Real Estate Development in Shanghai*

Major reforms in urban land allocation began in the 1980's. The legal framework for the registration and transfer of private land use rights was developed in the years following the 1988 amendment to China's constitution. It was finally consolidated in the State Council's 1990 Provisional Regulations on the Granting and Transferring of Land Use Rights for State-owned Land in Cities and Towns.<sup>7</sup> A critical step in these legal reforms was the separation of the right to use land from the ownership of the land. This separation has allowed the state to continue to own the land (means of production), while creating a tradable claim on land, the 'use right'.

The authority to sell land leases and determine the terms of redevelopment rests with the land administration bureau of the local governments. Typically, this is a city or county government, but in a large city like Shanghai, this authority was delegated to individual sub-municipal level district governments. These district governments negotiate with developers on the terms of the sale and allowed density of development on a site.<sup>8</sup> Since 1993,

<sup>7</sup> See Liu (1995, in Chinese) for a comprehensive review of the development of land market institutions between 1980 and 1990.

<sup>8</sup> The contract specifies the land use rights and term of the lease. The standard for these

all real estate developments for commercial or commodity housing uses are required to obtain a land lease. For any land lease transaction, individual districts remit up to 15 percent of the lease premium to the municipal government and retain the remainder of the funds. The primary purpose of these retained revenues is to finance the resettlement of residents and enterprises displaced by the redevelopment.

One reason for the decentralization of land lease negotiating authority to the district governments is that they have the responsibility to resettle residents and enterprises displaced by redevelopment.<sup>9</sup> Households must receive adequate replacement quarters. The policy is used as a vehicle to raise more households above the minimum government standards for unit quality and size. Given the density of Chinese cities, redevelopment can result in very large resettlement costs for local governments. In Shanghai, government officials report that between 60 and 70 percent of the district land lease revenues finance resettlement. To clear every hectare of land, 800 to 1,000 residents have to be relocated at a cost of 50,000 to 60,000 yuan per head (over \$US 5,000). The magnitude of resettlement efforts has been tremendous. Between 1991 and 1994 about 8 million m<sup>2</sup> of buildings were demolished and 200,000 households were resettled.<sup>10</sup> Early efforts relied on in-site resettlement of displaced occupants resulting in distortions in redevelopment; now off-site resettlement is the norm.<sup>11</sup>

The combination of fiscal autonomy and control over land leases by the individual districts created the incentives and opportunities for them to attract outside investment capital by promoting land leases and real estate developments in their jurisdiction.<sup>12</sup> Real estate development benefits

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leases has been 70 years for residential land uses and 50 years for nonresidential uses. Land prices and the maximum permitted floor-to-area ratio for the intended development are supposed to follow guidelines from municipal planning departments, but the negotiating district land administration bureaus appear to have significant freedom in these negotiations.

<sup>9</sup> Districts would prefer to resettle residents on land for which they have the land use right. Districts lacking sufficient vacant land will enter into contracts with districts who have land, paying them to resettle residents.

<sup>10</sup> Figures are from Shanghai Economy Yearbook.

<sup>11</sup> See Dowall (1994) and World Bank (1993) for an analysis of resettlement.

<sup>12</sup> Before 1980, the districts' budget accounted for less than 7 percent of the total fiscal budget of the city. By 1995, the districts and counties controlled 53.7 percent of fiscal revenue and expenditure in the city. Their revenues come from the enterprises under their jurisdiction and a variety of tax revenues that the districts share with the municipal government, including personal income tax, real estate tax, business tax, and the capital gain tax on land.

individual districts in several ways. First, there are the revenues they collect directly from land use sales. After remitting funds to the municipal government and paying for resettlement, a district might be left with 10-25 percent of the lease revenues. Second, the district governments frequently participate in the land lease projects through their real estate development subsidiaries. This allows them to extract funds from the redevelopment process, which unlike land lease revenues, do not have to be remitted to higher levels of government. Third, the real estate developments attract new business activities and higher income residents to the district, which provides a variety of fiscal benefits and enhanced status to the district government.

Many enterprises and institutions have been allocated land use rights by the state. The reforms have embedded a redevelopment option in these use rights, where the enterprises and institutions could redevelop the land at a higher floor-to-area ratio and a higher quality to create more building space for commercial business use. However, the value of this option is quite different than it would be for the owner of a property in a market economy, where such a redevelopment option can be sold and has no expiry date. One critical difference is that in China uncertainty about future state actions over the allocation of property rights means that this option has an unknown future expiration date. Consequently, redevelopment decisions by enterprises and local institutions may be responding to signals in a fashion different from those of private developers, with implications for the volume, type, and location of redevelopment.

### **Demand for Location: 1992-93 Distribution of Land Prices**

We look at the distribution of land prices in Shanghai to infer the pattern of demand for location. As late as the mid-1930's Shanghai had a very steep downward sloping price gradient, with land prices falling as one moved away from the Bund<sup>13</sup>. According to Tian (1995), in 1933 the site of the Cathay Hotel (the current Peace Hotel) commanded a market value of 360,000 ounce of silver per mu (0.165 acre). The market value of land one km to the west along the Nanjing Road at the site of the Sincere Department Store was 37 percent less. Two blocks west of the Bund and two blocks south of Nanjing Road the market value of a site was 56 percent less. We use the 205 land lease transaction from 1992-93 to estimate the current spatial pattern of land prices. We know the locations of these transactions, so it is a matter of estimating the price surface from these points; see Figure 3A and 3B for the location of these land lease sites among the urban districts.

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<sup>13</sup> The waterfront at Huang Pu River in the former British concession.

To generate a price surface, we estimate the price of land as a non-parametric function of location. Like McMillen (1996) we apply Cleveland and Devlin's (1988) locally weighted regression methodology to estimate this function. Over the last half decade there has been a notable increase in the use of non-parametric and semi-parametric estimation techniques for analyzing the pricing of land and real estate. Papers by Meese and Wallace (1991), Coulson (1992), Pace (1995), and McMillen (1996) use different forms of these techniques to allow flexibility in the estimation of parameters in hedonic house and land price equations, density gradients, and other functions of interest. McMillen and McDonald (1997) use the Cleveland and Devlin procedure to identify sites of increased employment density. However, unlike these papers, we do not parametrize the function in any way. Instead, we let the data to describe the variation in land prices over space, so that all variation in land prices is treated as a function of location. Since we do not want to identify the effects of local accessibility and neighborhood quality separately, only to examine how preferences for location vary spatially, there is no loss from the more parsimonious specification. Visual inspection of the price surface reveals the value placed on location within the ten urban districts.

We generate an estimate of the land price at every point on a 20 km by 10 km grid map, where grid points are spaced 0.25 km apart. The estimated price at any point on this grid is a distance weighted average of the land lease prices for the nearest 30% of the land lease sites, where distance is a straight line Euclidian measure.<sup>14</sup> Weights are determined as follows. For a given location on the grid  $i$ , let  $u_i$  be the distance to the  $j$ th most distant land lease site from  $i$ ; cross-validation determines what percentage of the sample to use, thus determining as well the value  $j$ . Let  $x_{i,m}$  be the distance to some closer site  $m$ ,  $m \leq j$  (land lease sites further away than the  $j$ th site have a weight of zero). The weight for observation  $m$  in estimating the land price at  $i$  is:

$$w_{i,m} = \frac{(1 - (x_{i,m}/u_i)^3)^3}{\sum_j (1 - (x_{i,m}/u_i)^3)^3} \quad \text{where} \quad x_{i,m} \leq u_i$$

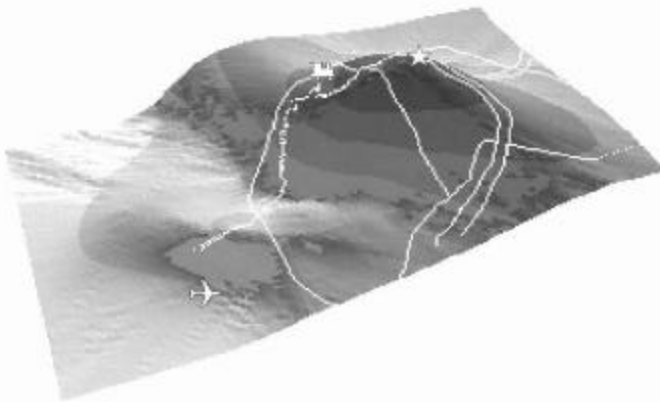
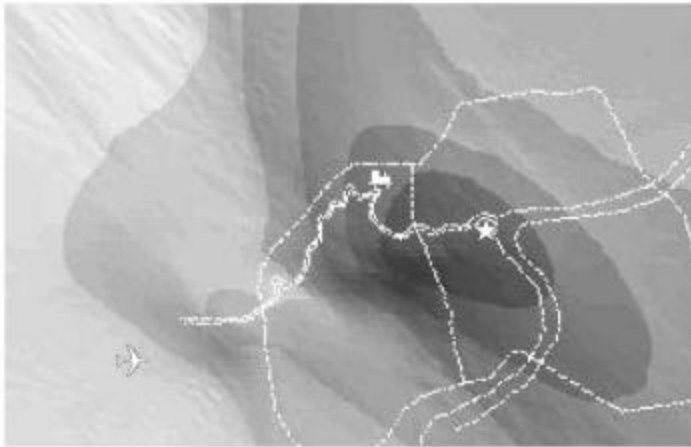
Figures 2A and 2B show the price surface that results from our estimation. Shanghai is strongly monocentric, but the land price peak is not in the heart

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<sup>14</sup> There are a large number of potential kernel estimators that could be used in place of the tri-cubic function. But as Hurdle (1990) points out, most kernels yield qualitatively similar results. More important is the choice of bandwidth. Using cross-validation procedures we find that the best performance comes from using a bandwidth of the closest 30 percent of the observations. See for a review of Yatchew (1998) non-parametric regression techniques.

of the Huang Pu district, but further west and north centered around the

**Figure 2A and 2B. Surface Model of Land Prices using a 30% Band**



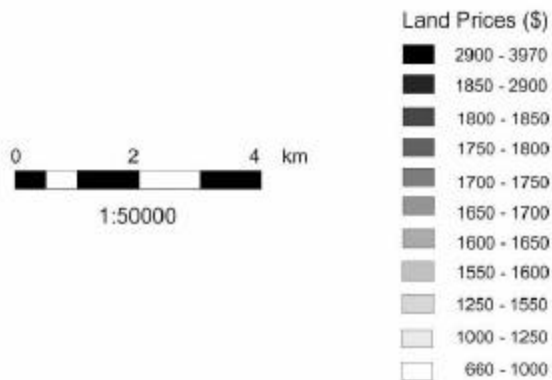
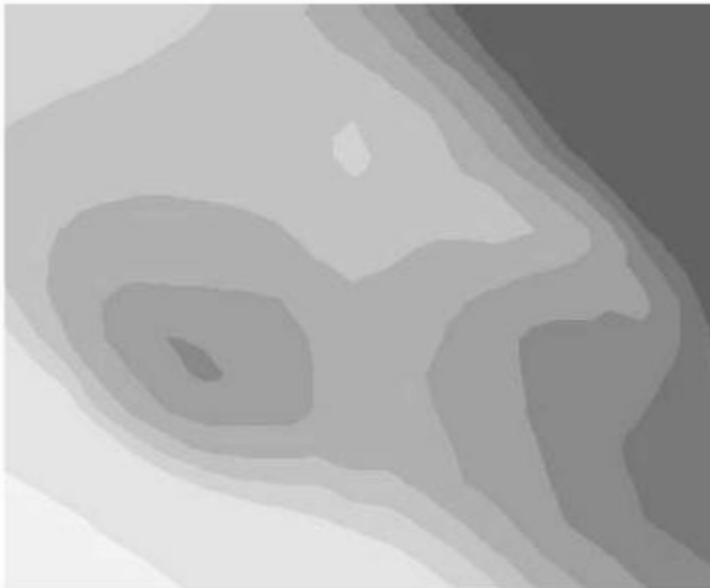
-  Airport
-  Railroad Station
-  Peace Hotel  
(East Nanjing & Bond)

Land Prices (\$)	
	3498 - 3970
	3025 - 3498
	2552 - 3025
	2079 - 2552
	1606 - 2079
	1133 - 1606
	660 - 1133

(using EI function)

border between Huang Pu and Jing An along Nanjing West Rd. There also appears to be a sub-center in Chang Ning in the vicinity of the Hong Qiao development zone, near the inter-section of the ring and airport roads. Although the price gradient flattens in this area, a close up view in Figure 2C shows that there is a small peak. Although there are other centers of development, the land prices and intensity of development at these locations are insufficient to exhibit a local price peak. The steepness of the price

**Figure 2C. Land Prices around the Mini-Peak**



gradient reinforces the view that the three core districts in Shanghai remain the center of commercial activity. Our land lease data includes no transactions for Pu Dong. It is likely that there prices may either rise slightly in the area of the new financial center, or fall away from the CBD more slowly than they do in other directions.

## **The Spatial Pattern of Redevelopment**

Urban reconstruction in Shanghai began prior to the introduction of land market reforms. Between 1980 and 1993, floor area for residential, industrial and commercial space all increased, with annual growth rates of 5.3, 3.1, and 7.1 percent respectively.<sup>15</sup> With the main post-reform construction beginning in 1993, there was a sharp drop off in the growth of industrial space and an acceleration in the construction of residential and commercial space. From 1993 to 1996 the annual growth rates for floor space in these property types were 7.5, 0.4, and 10.9 percent respectively. This post-reform change reflects the relative return on different types of space as well as the need to provide space for the rapidly growing service sector.

### *The Location of Land Lease Projects*

We first examine the spatial distribution of the land lease sites in the urban districts for the period from 1992 to 1994. All land leases in these districts were for residential, commercial, or multi-use development. The multi-use projects are a mix of office space with some combination of retail, hotel, and apartment space. One might expect that given Shanghai's transportation network, concentration of amenities in the core, and the historic absence of non-local serving commercial development outside of the CBD and retail districts, that commercial and mixed-use developments will be concentrated in the core. Furthermore, since units in the residential projects development by foreign developers was originally targeted towards overseas investors and expatriates, we might expect them to be located near commercial districts.<sup>16</sup>

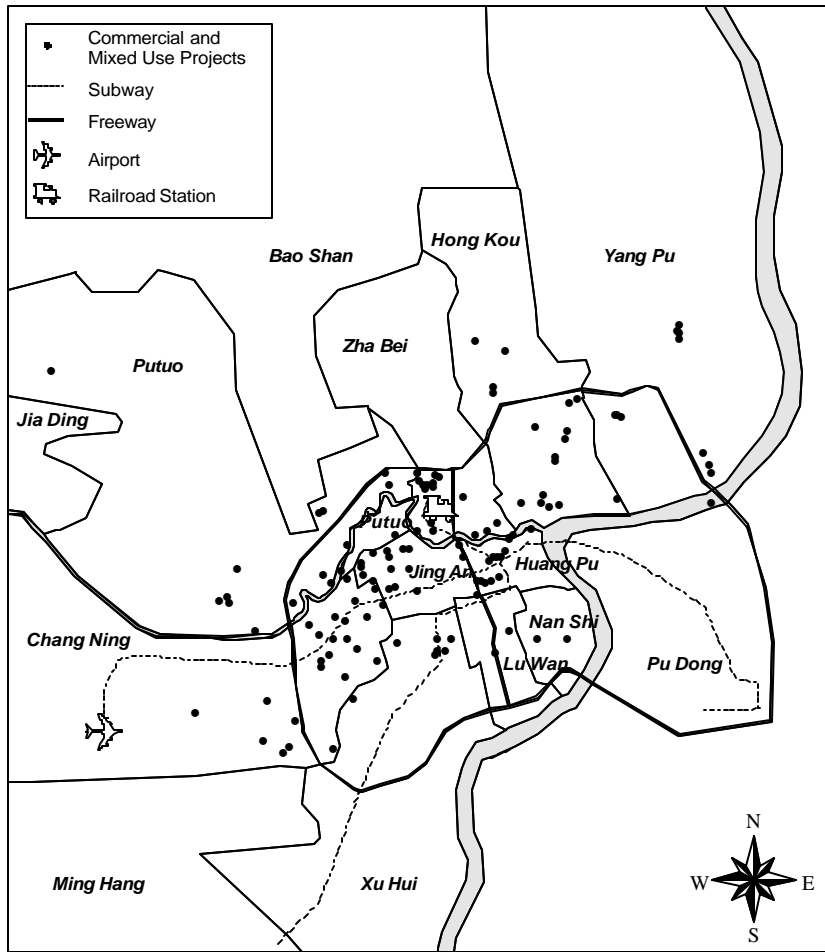
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<sup>15</sup> The comparison with building stock figures prior to 1993 is problematic because over the period there were changes in the urban boundary.

<sup>16</sup> With the mammoth overbuilding in Shanghai, developers have begun to market their projects to local buyers too (*South China Morning Post*, December 16, 1998)



Figure 3A. Location of Commercial and Mixed Use Projects

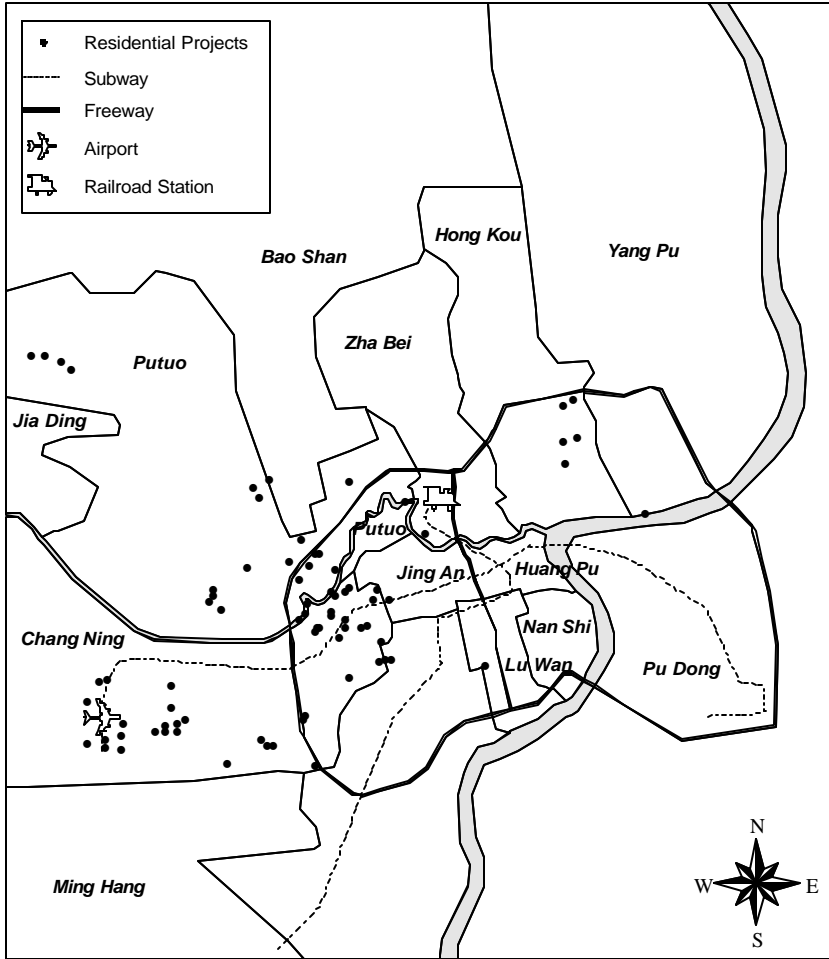


3800 0 3800 7600 meters



1:190,000

**Figure 3B. Location of Residential Projects**



3800 0 3800 7600 meters

1:190,000

Redevelopment is not evenly spaced throughout the city. Fully 25 percent of the sample is in the Chang Ning district. Figures 3A and 3B show the locations of these sites for the commercial and mixed-use projects and the wholly residential projects, respectively. Residential projects are concentrated in a few relatively distant districts, with a particularly noticeable cluster of low-density villa projects in the Chang Ning district near the airport.

Relative to residential projects, commercial and mixed-use projects are distributed more uniformly across districts. They do have several areas of clustering: in the shopping district along Nanjing West Road at the border of Jing An and Huang Pu districts, in Zha Bei near the rail road station, in Xu Hui near the Xujiahui subway station, and in Chang Ning, between the airport and the ring road in the Hong Qiao development zone. Table 3 lists the land lease volumes by district in descending order of 1993 population density. Columns 2 and 3 in the table list the total area of land lease sites for commercial projects (multi-use and retail projects) and residential projects (apartments and villas) respectively.

**Table 3: Land lease activities in the urban districts (1992-1994)**

Districts	Total m <sup>2</sup> Land Leased		Average km to CBD (1992-93 only)			
	Multi-use	Residential	Multi-use	Retail	Apartments	Villas
Huang Pu	214,095	0	1.3	1.2		
Nan Shi	107,520	1,590	2.7		3.6	
Jing An	242,608	21,742	4.3		4.4	
Lu Wan	219,391	17,138	3.0	4.3		
Hong Kou	123,476	75,284	2.1		3.0	
Zha Bei	145,924	0	3.3			
Yang Pu	178,121	0	5.4			
Chang Ning	162,748	882,554	7.9		8.9	11.2
Pu Tuo	100,358	117,031	6.1		9.6	14.7
Xu Hui	301,058	253,958	6.6	6.9	6.9	8.3
<b>Grand Total</b>	<b>1,795,300</b>	<b>1,369,297</b>	<b>4.5</b>	<b>4.8</b>	<b>7.5</b>	<b>11.6</b>

Source: Shanghai Land Administration and calculation by the authors.

To shed light on the distribution of land lease sites for commercial development, Figure 4 presents the density of land lease sites in individual urban districts. Between 1992 and 1994, Huang Pu leased 4.7 square meters of commercial development site for every 100 square meters of land, by far the highest level among the urban districts. Jing An and Lu Wan, which include the prime retail areas along Nanjing West Road and Huihai Road, also had exceptionally high density of commercial development sites. One might expect commercial development sites to be more centralized relative to residential development sites, because of the greater importance of proximity to the CBD for business activities. This is indeed the case, as revealed by the last four columns in Table 3. In each district, multi-use projects locate relatively near the CBD than do residential projects. Overall, multi-use projects have a mean distance of 4.5 km to the CBD, compared to 7.5 km for apartment projects, and

11.6 km for villa developments. The latter are the projects clustered at the most distant locations in Figure 3B.

**Figure 4. Land Lease Area as a Percentage of Total District Area**



District	Residential	Commercial & Mixed Use
Chang Ning	2.30%	0.42%
Hong Kou	0.32	0.53
Huang Pu	0.00	4.72
Jing An	0.29	3.18
Lu Wan	0.21	2.73
Nan Shi	0.02	1.37
Pu Tuo	0.21	0.18
Xu Hui	0.46	0.55
Yang Pu	0.00	0.34
Zha Bei	0.00	0.51

■ Residential Percentage  
 ■ Commercial and Mixed Use Percentage



*District Government Land Supply and Redevelopment*

Our first question is whether having land supplied by district governments instead of private landowners affects the distribution of redevelopment in Shanghai. Given the institutional framework in Shanghai, we would expect that districts seek to maximize revenues net of resettlement costs. Consequently, they should supply more land in high demand, high land price areas, but less at locations where they will incur high resettlement costs. We frame this question by stating the counterfactual, that land supply follows a dartboard model. In this case, demand and resettlement costs are constant across locations, so that land lease sites will be randomly distributed across the city. An implication of this outcome is that a district's share of land lease projects (in terms of land area leased) will be proportional to its share of land area. With private landowners, those districts with more attractive locations will attract proportionally more land lease projects, but resettlement costs will have no effect on the supply of leased land. However, in Shanghai the district government is the landowner and they also have to pay for resettlement, so that they should be more likely to supply land at locations with lower resettlement costs. Our dependent variables in the first set of regressions are land lease intensity as measured by the land lease area as a percentage of total district area; we run separate regressions for residential and commercial or mixed-use projects.

While we know the precise locations for land lease sites in 1992 and 1993, we only have district aggregates for 1994. More restrictive is that our proxies for site attractiveness and resettlement costs are all district level aggregates. These district aggregate values are shown in Table 4. As a result, with only ten true degrees of freedom the power of these tests is very low. This makes it difficult to generate meaningful results, or even ones that are statistically different from zero. This is a problem that plagues all of our empirical analysis that follows in this section. In response, we interpret our results as suggestive of causation and reflective of underlying relationships, but in no way conclusive evidence.

If local district governments behave like private landowners they will use demand as the sole criteria in determining how much land to lease and at what locations. However, as we describe above, other issues affect their supply decision. Here we seek to evaluate whether land supply and thus the pattern of redevelopment follows the pattern we would expect of private landowners, or whether resettlement costs that enter the government's objective function alter the distribution of redevelopment. To measure

**Table 4: Density of land leases and determinants of land supply by districts.**

District	Commercial & Multi-use Land Lease Sites as % District Area	Residential Land Lease Sites as % District Area	Commercial Sales per Capita 1994 (yuan)	Mean Land Lease Price of Commercial & Multi-use Sites 1993 (\$US/m <sup>2</sup> )	Population Density of Residential Land 1993 (Pop/km <sup>2</sup> )	Average Floor Area per Resident 1993 (m <sup>2</sup> )	Mean Land Lease Price 1993 (\$US/m <sup>2</sup> )
Huang Pu	4.72	0.00	42,139	6,393	210,441	9.0	6,393
Nan Shi	1.37	0.02	14,192	3,098	77,817	9.2	3,098
Jing An	3.18	0.29	20,728	4,034	130,028	11.7	3,389
Lu Wan	2.73	0.21	19,577	2,915	170,273	10.9	2,915
Hong Kou	0.53	0.32	13,243	2,477	159,983	11.8	2,358
Zha Bei	0.51	0.00	10,891	2,940	174,855	11.8	2,940
Yang Pu	0.34	0.00	8,042	1,733	76,837	11.5	1,733
Chang Ning	0.42	2.30	11,901	2,443	111,278	13.7	1,208
Pu Tuo	0.18	0.21	10,165	2,580	111,543	11.9	1,752
Xu Hui	0.55	0.46	9,013	1,819	110,267	15.6	1,328

Sources: Statistical Yearbook of Shanghai, Shanghai Economy Yearbook, and calculation by the authors.

demand for or attractiveness of a site we use the 1994 commercial sales per resident for each individual district. If all commercial activity is local serving, there will be no unique employment nodes, and this figure will be constant across districts. Districts with high commercial sales per resident are commercial centers that serve an area greater than the local area. Land supply by private landowners could be expected to follow this demand. To measure the resettlement costs from redevelopment of land lease sites facing a district we use the population density of residential land use. The results of the regressions are shown in Table 5.

The extent of commercial and mixed-use development is strongly correlated with the attractiveness of a district for commercial business activities. Whether we measure this demand by commercial sales per capita or mean land price, these very simple regressions (column 1 and 2 in Table 5) suggest that districts are responding to demand and making more land available for non-residential land lease activities in those districts where demand appears strongest. However, where resettlement costs are likely to be higher, the supply of land lease sites is lower (column 1). This last result is not statistically different than zero. Still it is indicative that resettlement costs can affect the pattern of development.

**Table 5: OLS estimates of the determinants of district land lease activity**

Dependent variable	Commercial & multi-use lease sites as % of district area		Residential lease sites as % of district area	
	1	2	3	4
Constant	-19.43 (-3.24)**	-21.73 (-1.92)	-2.31 (-2.02)*	-1.03 (-0.86)
ln(commercial sales per resident)	3.49 (8.03)***		0.15 (1.52)	0.42 (2.46)*
ln(avg land price – retail & multi-use land lease sites, \$US/m <sup>2</sup> )		4.04 (3.61)***		
ln(avg land price - all land lease sites, \$US/m <sup>2</sup> )				-0.44 (-1.82)
ln(population per km <sup>2</sup> of residential land)	-1.06 (-1.52)	-0.76 (-0.55)		
Per-capita residential floor area (m <sup>2</sup> )			0.09 (3.52)***	0.06 (1.80)
Dummy for Chang Ning District			1.96 (15.56)***	1.75 (11.30)***
Unadjusted R <sup>2</sup>	0.94	0.77	0.98	0.99

Notes: The observations are the 10 urban districts. T-statistics are in parentheses.

\*\*\* Statistically significant at 1% level;

\*\* statistically significant at 5% level;

\* statistically significant at 10% level.

The results for residential development shown in columns 3 and 4 in Table 5 are not as strong. We would expect that the development of residential units for foreign investors and business expatriates would be near business centers and indeed the volume of residential land supplied to developers is positively affected by the extent of commercial activity, but the t-statistics are smaller than they were for non-residential development. We add another measure of site attractiveness, per-capita residential floor area. Our prior is that districts with larger residential units are more pleasant locations. Again intensity of residential land leases is higher in districts where residential space per capita is higher. However, residential projects have to compete with commercial real estate projects for land. If demand to develop a site for a non-residential purpose is high, then average land prices at the location will be higher. Holding constant the attractiveness of the district for residential projects, supply of residential sites should be lower if the average land price for non-residential developments is higher. We find this too holds, but the

relationship is again not statistically different from zero by conventional standards. The primary difference between residential and non-residential development is that residential development is unaffected by potential resettlement costs. The most likely explanation for this is that residential projects are overwhelmingly concentrated in those districts with lower population densities and more residential floor area per capita.

#### *Dynamic Structure of Redevelopment*

Our second area of inquiry is the role of Shanghai's institutional framework in determining the distribution of redevelopment across space. There are two aspects to this question. The first is whether the need to resettle residents affected the evolution in the pattern of redevelopment. From above, we know that the percentage of a district's area leased to foreign developers is lower when the expected resettlement costs are higher. Here we ask whether there has been any change over time in net space added because of resettlement requirements. The second is whether the spatial pattern of redevelopment by those local enterprises and institutions who had the redevelopment option as part of their state-allocated land use right differs from that of profit-maximizing developers.

The absence of a functioning market for residential housing has forced district governments to provide housing for those residents displaced by redevelopment. As Dowall (1994) demonstrates, the initial plan to provide in-site resettlement was uneconomic, so that district governments had to construct or contract for resettlement housing at other locations. While the governments of large districts away from the core, such as Chang Ning and Xu Hui, have ample land for resettlement, this is not true for the core districts like Huang Pu, Jing An, Lu Wan, and Nan Shi. Resettlement is particularly important because as indicated in Table 4, these four core districts have the highest population density among all the urban districts. The need to contract with other districts for land raises the cost of resettlement for these districts. However, this condition has improved over time as redevelopment in less central districts and in particular in suburban districts like Min Hang has created a stock of housing for resettling displaced residents.

With land market reforms and resettlement there has been a marked and rapid decentralization of Shanghai's population. Between 1993 and 1996, total population in the urban area increased but that in 10 urban districts decreased. The share of Shanghai's population in the 10 urban districts dropped from 68 percent in 1993 to 66 percent in 1996. Much of this transfer of population is related to the resettlement of residents from sites in the core slated for redevelopment. While the 4 suburban districts had 32 percent of



Shanghai's non-rural population in 1993, fully 53 percent of the net increase in residential space between 1993 and 1996 occurred in these districts.

The large increase in space in the suburbs has meant that urban district governments could now resettle residents without using the high value land in their own districts. Consequently, we would expect land lease activities in more central districts, particularly the land leases for commercial and multi-use development sites, to grow faster as their relative cost of resettlement diminished over time. We use the share of the total floor area of redevelopment projects in the four core districts (Huang Pu, Jing An, Lu Wan, and Nan Shi) to measure the spatial concentration of redevelopment activities in the land market. For commercial and mixed-use space their share of the annual total has risen from 27 percent in 1992 to 35 percent in 1993 to 73 percent in 1994. Their 1993 and 1994 share of the cumulative totals are 30 and 46 percent respectively. This pattern does not hold for residential projects, but the majority of these projects are in the larger, less densely populated districts of Chang Ning and Xu Hui.

Most redevelopment to date in Shanghai has been by enterprises and institutions who hold non-transferable land use rights on the sites they occupy. Their land use rights are allocated by the state, and thus obtained without cost to the enterprise. Along with the use right is an option to redevelop the site. These enterprises and institutions may even find way to lease out the new space in excess of their own needs. Initially, enterprises could keep all redevelopment profits, but since 1995 they are legally obligated to share any redevelopment gain with the municipal government. Given the easy availability of bank loans in the early 1990's and the uncertainty over the expiration date of the redevelopment option, it is not surprising that many of these entities decided to redevelop immediately their sites. This raises the question whether this bundle of non-market rights and input prices distorted the growth in the urban form. It can cause the distortion in at least two ways. First, by encouraging redevelopment well before the optimal private market date. And second, by discouraging the business activities undertaken by land-rich state enterprises and institutions from being located close to the central business district.<sup>17</sup> To analyze this proposition we compare the spatial pattern of commercial space supply from land lease projects with that of changes in the stock of commercial real estate. This is an imperfect comparison at best. Changes in the stock of commercial real estate reflects those completed development projects started by local enterprises and institutions, any completed land lease projects, and any demolition of existing

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<sup>17</sup> For instance, if all sites redeveloped immediately, this might have occurred several years too early in some core locations, but decades too early in more suburban locations.

structures. Unfortunately, we cannot separate these into individual effects.

To answer this question we use a simple approach of comparing aggregate district level data on the stock of real estate. As Table 6 shows that growth in commercial space was decentralizing. The growth in commercial floor area in the four core districts was proportionally lower than in the 10 urban districts as a whole, resulting in a reduced share of commercial floor area for the core districts (from 39 percent in 1993 to 35 percent in 1996). Moreover, the per-resident commercial floor area in the core districts declined from 151 percent of the value for all 10 urban districts in 1993 to 145 percent in 1996, so commercial space was decentralizing faster than was population. In contrast, land lease projects were much more centralized. The core-district share of floor area in commercial and multi-use land lease projects ranged from 27 percent in 1992 to 73 percent in 1994. However, their share of the net addition in commercial floor area between 1993 and 1996 was only 22 percent. Simple regressions also indicate the difference between the overall change in the stock and floor completion from land lease projects.

**Table 6: Spatial distribution of commercial floor area**

Share of commercial floor area by four core districts (percent of 10-urban-district total)			Per resident floor area: core relative to all urban districts	
1993 total	1996 total	Change in total	1993	1996
39	35	22	1.51	1.45

Sources: Calculation by the authors based on *Statistical Yearbook of Shanghai*, various years.

Table 7 presents a set of very simple regressions describing the estimated addition of commercial floor area in land lease projects with the actual 1993-96 change in the stock of commercial space. Regression (1) tests the covariance of the commercial floor area supplied from land lease projects during 1993-96 period as a percent of each district's land area. The dependent variable in regression (2) is the change in actual commercial space 1993-96 as a percent of district land area. In each case, the explanatory variables include district values of log commercial sales per capita and log population density for residential land use. With such a small sample size, ten districts, most of the estimated coefficients are not statistically different from zero. However, one clear result is that a district's supply of commercial space from land lease projects during the period is sensitive to the district's volume of commercial activity, but that this does not hold true for the total change in the stock of commercial floor space. These figures do suggest that while private

developers are quite sensitive to demand, the net change in space, which includes development by enterprises and institutions with land use rights, does not reflect this sensitivity.

**Table 7: OLS estimates of the determinants of commercial redevelopment activity, 1993-1996**

Dependent variable	Floor area completion in commercial & multi-use land lease projects # as % of district land area	Net change in total stock of commercial floor area as % of district land area
Constant	-20.91 (-1.42)	-44.31 (-3.00)**
ln (commercial sales per resident)	3.88 (3.63)***	1.08 (1.01)
ln (population per km <sup>2</sup> of residential land)	-1.18 (-0.69)	3.04 (1.71)
Unadjusted R <sup>2</sup>	0.74	0.66

Notes: he observations are the 10 urban districts. T-statistics are in parentheses.

# Based on maximum allowed floor area for land lease projects. We assume that 70% of floor area in multi-use projects is for commercial use, that 100% of the space in projects on land leased in 1992 was completed by 1996, 50% for leases signed in 1993, and 0% for 1994 land leases.

\*\*\* Statistically significant at 1% level;

\*\* statistically significant at 5% level.

While by no means conclusive, the data suggest that the pattern of redevelopment by enterprises and institutions on the land they own is more decentralized than the actions of private developers who obtain land lease sites from the city. As we indicate above, we cannot separate out the contributions to the stock by these different classes of development. However, we can infer that the primary explanation for the difference between the land lease data and the total stock data is the new construction by enterprises and institutions, since that is likely to be a more major category than removals. In this case the strong incentives the enterprises and institutions perceived to redevelop before the appropriate time did result in far more decentralization than we would have found in the private market.

## Conclusions and Future Research

We have provided a cursory review of urban redevelopment activities in Shanghai during its transition to a land market, focusing on the impact of land use institutions on the spatial pattern of these activities. Our results suggest

that in Shanghai the blending of socialist and market institutions created a number of distortions in the land market. In particular, the need for districts to pay for resettlement costs affected the volume of land lease, so that new development in some districts was below the level private landowners would have chosen. In addition, changes in the supply of redevelopment sites over time appear to be reinforcing this observation. Land lease activity in central districts only accelerated once housing was available in more distant urban and suburban districts. Furthermore, the huge volume of commercial building redevelopment by enterprises and institutions appears to have been much more decentralized than the activities of private developers of land lease sites.

The highly aggregate nature of much of our data severely limits our ability to analyze these phenomena. Nevertheless, the preliminary findings of this paper indicate the need for studying the institutional features in order to understand the operations of a land market. Future research should be targeted towards a better understanding of redevelopment activity by enterprises and institutions. It is pretty clear that these activities have made up the bulk of the overbuilding that has plagued Shanghai, with current estimates of office vacancy rates of over 30 percent<sup>18</sup>. To understand just what triggered this process, a better understanding of these redevelopment activities is necessary.

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<sup>18</sup> According to *Asia Pacific Property Digest*, Jones Lang Wootton, August 1998.

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