Beijing's Land Use Reforms

by

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1. Introduction

During the 2002-2004 period, the Beijing government's procedures for transferring land use rights changed twice in economically significant ways. We examine the effect that these reforms have had on local house prices using a hedonic house price equation and transaction data for newly constructed homes over the 1998-2006 period. We employ five alternative house price specifications to control for spatial variation in Beijing house prices. We observe significant increases in house prices after the August 31, 2004 reform became effective.

2. Land Ownership in China

There are only two ways to own land in China: *collective ownership* and *state ownership.* Rural land is typically *collectively owned* by groups of farmers. The Chinese government owns urban land. The Chinese government must approve of all *collectively-owned* land acquisitions. The government's rules for converting agricultural land to commercial and residential uses are very strict. This rarely happens as the Chinese government sees the increasing necessity to protect its already insufficient farmland.

State-owned land is mainly land for commercial use, urban residences and infrastructure. The Chinese government grants 70 year leases for residential land use, 50 year leases for industrial use and 40 year leases for retail users. With *state-owned land*, the user of a specific piece of land holds one of two types of and-use rights: an *allocated land-use* right or a *granted land-use* right. An *allocated land-use* right is given to the user by the Chinese government. There is no payment to the government. This transfer of interests may involve a small one-time payment to the previous user. For properties with existing structures, the one-time payment is based on the replacement cost of the existing building. For farmland, the one-time fee is related to the present value of future agricultural revenues. In neither case is the one-time fee equal to the market value of the land. An *allocated land-use* right is not transferable, and cannot be leased or mortgaged. Today, holders of *allocated land-use* rights are required to pay the government nominal land-use rents each year.

Before economic reform began in China, the traditional way for most state-owned enterprises (SOEs), government or semi-government institutions to get land-use rights was to apply to the government and get an allocation of land. Land use reform in China began in 1984 with the emergence of *granted land-use* rights. The recipient of a *granted land-use* right pays

the government a land-grant fee. In the early years of the reform, this fee was unrelated to the market value of the land. Today, the fee is approximately equal to the market value of the land. In addition to the government payment, the buyer pays the previous user a nominal one-time fee, similar to the *acquired land use* payment. *Granted land-use* rights are still granted for fixed terms, like *acquired land-use* leases, but g*ranted land-use* rights are transferable (subject to government approval) and properties obtained with *granted land-use* rights can be mortgaged. The holder of a *granted land-use* right has "user rights" similar to those of private land owners for the term of the lease.

Only state-owned land can be granted. Collectively owned land cannot be granted until it is transferred to the state. The Chinese government must approve of these transfers.

Before 2003, most of the land for real estate development was granted by the government to real estate development companies after an agreement was reached between the development company and the previous land user. The real estate developer's payment for the land had two parts: a nominal fee to the government and a one-time payment to the previous user. The government's fees were based on standard schedules that were much lower than market values. The one-time payment to the previous owner was whatever payment was negotiated between the previous user and the real estate developer. This transfer of rights was called '*by way of agreement.*'

On May 8, 2002, the regulation "Granting State-Owned Land Use Rights by Invitation for Tenders, Auction or Listing" was issued by the Chinese Ministry of Land and Resource. According to this regulation, the right to use state-owned land for non-government office, market rate housing, hotel and recreational use can only be granted by way of: (1) invitation for tenders; (2) auction; and (3) notification (silent auction). Granting land use rights by 'invitation for tenders' requires a government Land Administrative Department to publicly publish information about the land and invite competitive bids from all potential users.[1] When granting the land use rights, the Chinese government evaluates both the competitive bid and the proposed land use. The grant recipient is therefore determined by both the land bidding process and by the government's evaluation of the proposed development.

Granting land use rights by auction occurs when the grantor (a government land administrative department) publishes the announcement of the auction and all bidders participate

[1] Foreigners must receive special permission from the government.

at a designated time and place, announcing their bids publicly. The land user is determined by the highest bidder. The auction typically lasts a few hours.

Granting land use rights by notification is a process whereby the grantor publishes a notice at designated land exchange places, disclosing the terms and conditions for granting the land use rights. The government accepts quotations from bidders and updates the price publicly (in a website). The last bidder is granted the land use rights. The notice period must be at least ten working days. The market price for the land is paid to the government. The effective date for the "Granting State-Owned Land Use Rights by Invitation for Tenders, Auction or Listing" regulation is July 1, 2003.

Following the national regulation issued by the Ministry of Land and Resource, the Administrative Department of Beijing issued a local regulation on June 26, 2002. This regulation prohibited the '*by way of agreement'* procedure for granting land use rights for commercial use, including market rate housing. Transfers '*by way of agreement'* are permitted for some development projects, such as greenbelt projects, small town projects, reconstructing shabby buildings, and other projects which are approved by the Beijing government. The regulation also permitted any '*by way of agreement'* transfer that was already initiated to be completed.

On December 26, 2003, the Beijing government decided to temporarily stop the supply of land for commercial use, including market rate housing, without exception. On January 17, 2004, the Beijing government issued a supplementary regulation which prohibited the '*by way of agreement'* transfer for all commercial purposes, without exception. This regulation prohibits the transfer of land by: (1) invitation for tenders; (2) auction; and (3) notification (silent auction) for commercial purposes, including market rate housing.

During the transition, the Beijing government permitted transfers of land that were in the process of being granted '*by way of agreement*'. To qualify, a developer had to supply the required documentation before Aug. 31 2004. There were about 288 parcels of land, (about 24 million square meters) that qualified to be granted '*by way of agreement'* prior to the deadline. August 31, 2004 is an important date in the Beijing real estate industry.

Under the new regulation, the government receives the (market) transaction price for the land and pays the previous user a nominal fee. The fee is based on the construction cost of the existing structure, or in the case of farmland, is related to the present value of future expected

agricultural revenues. The decision to list a property for sale is made jointly by the government and the existing user. If the land is sold on the open market, the existing user must agree to the transfer. But since the existing land-user must accept the government's nominal fee, as opposed to a price negotiated with the real estate developer, the land-user's incentive to put the property on the market is significantly diminished. As a consequence, the quantity of land for market rate projects has declined significantly in Beijing.

Few pieces of land have been granted by way of: (1) invitation for tenders; (2) auction; and (3) notification (silent auction) between 2002 and 2006: only 4.55 million square meters in 2004; 3.54 million in 2005; and 5.31 million in 2006. Fortunately for the Beijing housing market there was a considerable quantity of land that was in the process of being granted '*by way of agreement*' (24 million square meters of land in 2004).

According to Beijing government statistics, the amount of land granted for market rate housing peaked in 2002, declined by about 25% in 2003 and declined again by more than half in 2005. This occurred during a period when Chinese were moving into Beijing at unprecedented rates. Wenbin, can we get any data on population migration rates during this period to show how demand was increasing. Is there any other data we can use to document an increasing demand for housing over this period? While the supply of land for new housing construction declined, the quantity of market rate newly constructed housing sold increased dramatically. From 2000 to 2002, the production of new market rate housing sold more than doubled. From 2002 to 2004, housing production increased about 65%.

Figure 1

Land granted for housing uses in Beijing.

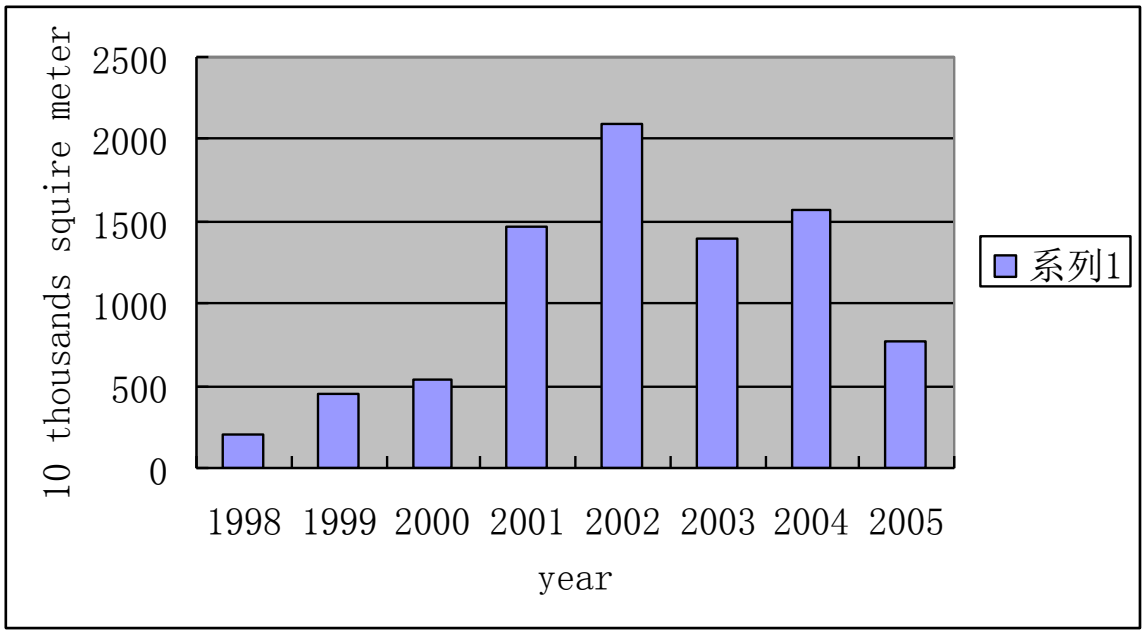
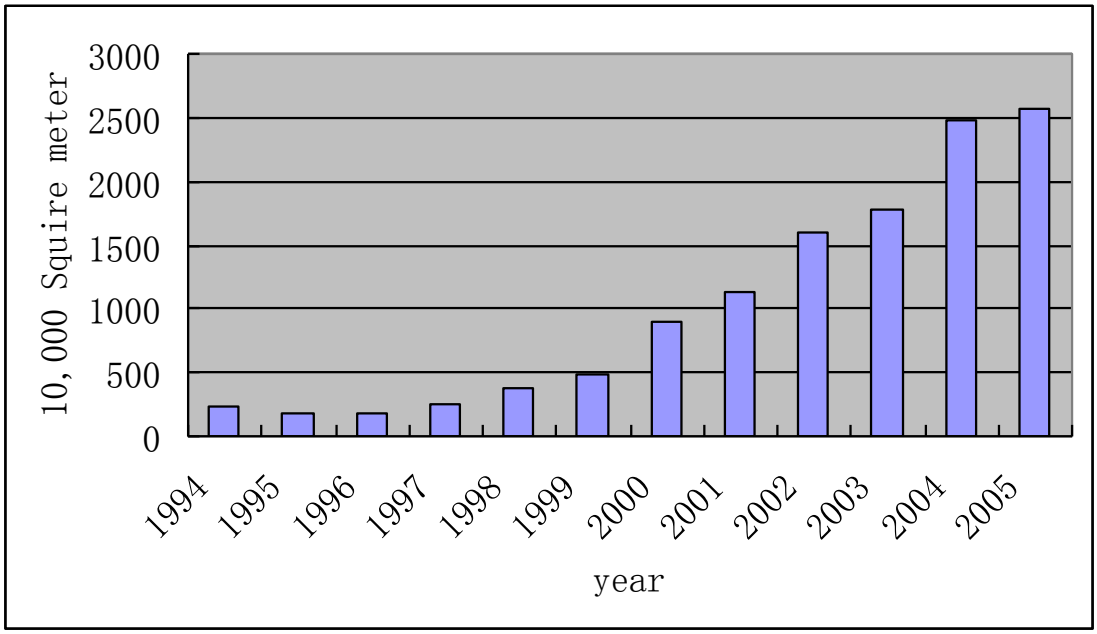


Figure 2

Market rate newly constructed housing sold each year



Developers began to buy land after the 2002 announcement of the new land use policy. The quantity of land supplied to the Beijing housing market reached its maximum that year. The supply of residential land decreased significantly with the reform that became effective on August 31, 2004

The new Beijing land policy is expected to have two consequences: (1) the supply of developable land will decrease because the existing user's benefit from transferring land use rights has decreased substantially; and (2) increasing consumer demand for market rate housing (and other real estate) together with competition will force developers to pay more for land use rights and these higher land prices will result in higher house prices in Beijing.

The City of Beijing has 17 Districts located within its borders. Wenbin, can you describe why Districts are important? For example, school quality, crime rates, distance to the Beijing CBD vary by District. Are there political differences across Districts? Differences in land use? Access to mass transportation? The City of Beijing also has six beltways, or rings, that circle the city.

We empirically investigate the effect that these changes in land use policies have had on Beijing house prices. We use a hedonic house price model with Beijing transaction prices over the 1998-2006 period. Our house price specification investigates the spatial dimension of the Beijing housing market by including: (1) distance to the CBD; (2) ring; and (3) and dummy variables for the Districts within Beijing.

Controlling for within Metropolitan Area Spatial Variation in House Prices

Ultimately we examine the temporal behavior of Beijing house prices and relate observed rates of house price appreciation to changes in government's land use policies. Controlling for within Beijing spatial variation in house prices is important for two reasons. First, Beijing land prices, and consequently house prices, are critically dependent on distance to the Beijing CBD. Second, there is substantial variation in the quality of pubic services across districts within Beijing. (Wenbin, is this correct? Can you elaborate?)

Alonzo (1964) provided the theoretical foundation for land rent gradients. Muth (1960, 1969) and Mills (1967) extended the spatial model of urban land price determination to house prices. While there are numerous centers of economic activity in Beijing, distance to the Beijing CBD remains an important determinant of house prices.

The importance of controlling for within metropolitan area spatial variation in house prices is also well established in the literature. Straszheim (1975) notes that "variation in housing characteristics and prices by location is a fundamental characteristic of the urban housing market" (page 28). Goodman (1978, 1981) reported that hedonic coefficients for structural and neighborhood characteristics were not constant across time or space and concluded that metropolitan markets were segmented. Goodman and Dubin (1990) suggest both nested and non-nested tests for the optimal number and configuration of submarkets.

Goodman and Thibodeau (1998, 2003) define submarket boundaries as geographic areas where: (1) the price of housing (per unit of service) is constant; and (2) individual housing characteristics are available for purchase. They examined housing market segmentation within metropolitan area using hierarchical models (Bryk and Raudenbush, 1992). Their empirical results suggest that the metropolitan housing markets are segmented by the quality of public education.

Hedonic Price Indices: The Functional Form

Our empirical specification relates the log of the average house price per square meter in Beijing to a linear function of structural characteristics, location (as measured by distance to the CBD, rings and District), school quality variables and year of sale dummy variables.

$$\ln P_i = \alpha + \beta_1 * FAR + \beta_2 * YardRatio + \sum_j \delta_j * structure_j + \phi * dcenter +$$

$$\sum_j \theta_j * Ring_j + \sum_j \pi_j * district_j + \delta_1 * hqs + \delta_2 * hqk + \sum_t \rho_t * year_t + \varepsilon_i$$

Where

P_i	=	average price per square meter of the *i*th project sold;
FAR	=	floor area ratio equal to construction area divided by land area ;
yardratio	=	yard area divided by construction area;
$structure_j$	=	dummy variables for various types of building structures: s1 =1 if it is mid-rise; s2=1 if it is high-rise rectangular, s3=1 if it is high-rise square, and s4=1 if it is high-rise mixed; S2 is the omitted variable.
dcenter	=	driving distance from the Tian An Men Square measured in kilometers;
$ring_i$	=	dummy variables for project location measured by circles from center defined by Beijing Government: r1 = 1 if a project is located between the 1st and the 2nd circle and 0 otherwise; r2=1 if a project is the 1st and the

		2nd circle and 0 otherwise; r3=1 if a project is located between the 3rd and 4th circle and equals 0 otherwise; r4=1 if a project is located between the 4th and 5th circle and equals 0 otherwise; r5=1 if a project is located outside the 5th circle and equals 0 otherwise.
$district_j$	=	dummy variables for local district defined by Beijing Government : d1=1 if a project is located in the Congwen District and equals 0 otherwise; d2=1 if a project is located in the Xuanwu District and equals 0 otherwise, ect.
$year_t$	=	dummy variables for sale year, in reserve chronological order: t1 =1 if a project is sold in the year of 2006 and equals 0 otherwise; t2=1 if a project is sold in the year of 2005 and equals 0 otherwise, etc.
hqs	=	dummy variable equal to 1 if there is at least one high-quality elementary school within 2 kilometers from a project and equals 0 otherwise.
hqk	=	dummy variable equal to 1 if there is at least one high-quality kindergarten within 2 kilometers from a project and equals 0 otherwise.

FAR (floor area ratio) is used to measure the density of housing within a project. Yard ratio is included to capture residents' preference for outdoor space. We examine three alternative spatial variables (in five hedonic house price specifications) to capture the effect that location has on house price: 1) "dcenter" is a project's distance to the center of Beijing City (to Tian An Men Square); 2). "Ring" indicates a project's location defined by the major highways circling the city, with Ring1 being the closest one and Ring5 being the furthest one in terms of its distance to the city center; 3) "District" is a municipal area defined by Beijing Government. As these location measures are highly correlated, we investigate five alternative hedonic house price specifications: (1) a specification that incorporates just distance to the CBD; (2) a specification that includes just 'ring'; (3) a specification that includes just District; (4) a specification that includes both distance to the CBD and District; and (5) a specification that identifies both ring and District.

As school quality is an important consideration when people choose where to live, we designate a school dummy variable "hqs" to indicate whether there is at least one high-quality elementary school within 2 kilometers of a housing project, and similarly we use "hqk" to indicate whether there is at least one high-quality kindergarten within 2 kilometers of a project. In order to measure the time trend of price in the Beijing housing market, we include year dummies for 1998 through 2005. Most of the sales occurred in 2006 and this is the omitted year of sale variable.

Data

Our original sample includes 897 high quality housing projects built between 1998 and 2006 in Beijing City. We drop observations with missing information for any of the independent variables. We are left with 732 projects that will be used for the empirical analysis. Our dependent variable is the average price of properties sold in the project per square meter. In our sample, the average distance between a project and Tian An Men Square is 17.24 kilometers. When we measure the location using ring, 38% of the projects were built outside $Ring_5$ (the furthest from the CBD), 20% were between $Ring_4$ and $Ring_5$, 21% were between $Ring_3$ and $Ring_4$, 14% were between $Ring_2$ and $Ring_3$ and 8% were between $Ring_1$ and $Ring_2$. The average floor area ratio (FAR) is 2.94. The average yard coverage ratio (yard area as a percentage of construction area) is 36.38%. In terms of structure, 44% of the projects are high-rise buildings are rectangular, followed by high-rise mixed at 25%, high-rise square at 21% and the mid-rise at 11%. Wenbin-why are these shapes important? Our sample covers 16 of 18 districts in Beijing City. Pinggu District and the Yanqin District are excluded because we have no data from the Pinggu District and only two projects from the Yanqin District. Since Yanqin District is the outermost district in Beijing City, and the housing price in this district is quite different from the rest of the Districts in our sample, we drop these two observations from our study.[2] In our sample, there are four districts with the highest density of new residential construction: 23% of the projects are located in the Chaoyang District; 19% are in the Haiding District; 15% are in the Fengtai District; and 10% are in the Tongzhou District. With respect to school quality, 32% of projects have at least one high-quality elementary school within 2 kilometers, and 37% of projects have at least one high-quality kindergarten within 2 kilometers. We designate year dummies according to the year that the house was sold. In our sample, 41% of the projects sold in 2006, only 3% of projects started selling in 1998 and about 8% for each of the rest years.

(insert table 1 here)

[2] Adding the 2 projects in Yanqian District does not change the results of our regression.

Results

Table 2 provides the empirical results for the five alternative house price specifications. The first column provides the empirical results for the specification that controls for spatial variation in house prices using just distance to the CBD; the second column contains the results for the specification that includes dummy variables for 'ring'; the third includes dummy variables for District; the fourth includes both distance to the CBD and District variables; and the fifth column provides the results for the empirical specification that includes both 'ring' and District. The results shown in Table 2 also collapse Districts with equivalent house price (based upon Chow tests for various groups of Districts). The Chow test results indicate that house prices are statistically the same in Districts 9, 10 and 11; constant in Districts 13 and 14; and constant in Districts 12 and 15.

(insert table 2 here)

We report both percentage change and Rmb effects (based on the mean price of 5,752 rmb per square meter) from our regression results. Since the median price pre square meter (5600rmb) is very close to the mean, we do not expect our results to change much if we calculate price effects using the median price instead. The estimated coefficients for FAR are not statistically different from zero and the estimated coefficients for Yardratio are only weakly statistically different from zero. The weak significance is partly due to the noisy measurement in this variable. The coefficient on yard ratio is significantly positive at the five percent level in both column (4) and column (5), indicating that one percent increase in yard ratio will increase the average price per square meter by about 0.23% (13rmb). There is a large discount for mid-rise structures (relative to high-rise rectangular structure), whose coefficients range from -.10 to -.19, indicating that the average price per square meter is -9.51% (-547rmb) to -17.3% (-995rmb) less than that of high rise rectangular structures. There is no significant difference in high rise square (structure 3) and high-rise mixed (structure 4). The empirical results indicate that the structural difference is mostly reflected in the height of a project.

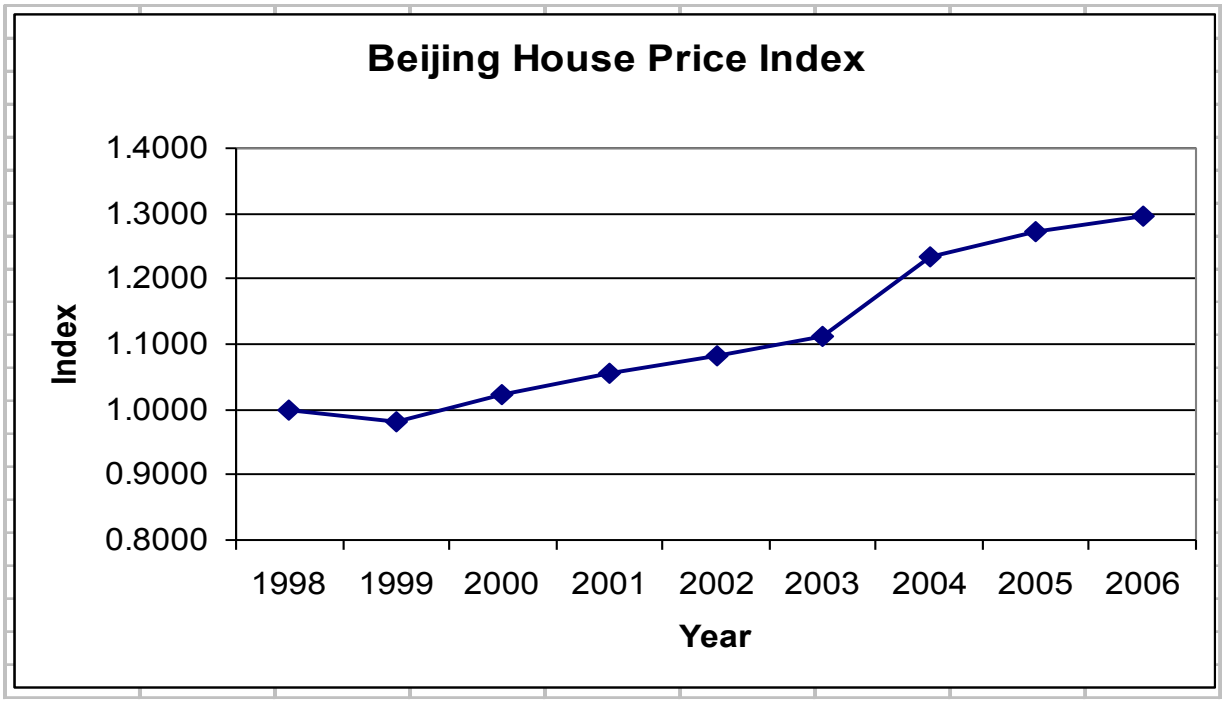
Given that the mean price per square meter is 5,752rmb, a property located an additional 1 kilometer away from the city center reduces the price per square meter by 1.8% (103rmb) in the specification that controls for location using just distance to the CBD (column 1). If we also

control for District, an additional kilometer reduces house price by 1% (57rmb). The specification that controls for location using 'ring' (column 2) omits 'ring5', so the estimated coefficients are interpreted as location premiums relative to locations furthest away from the CBD. The coefficients on "ring1" through "ring4" are 0.6857, 0.5453, 0.4707 and 0.4079, and are all significant different from zero. In column 3, where "District" dummy variables control for location, we observe that except for district2 (Xuanwu District), the estimated coefficients on other districts are significantly different from the omitted district (Chaoyang District). Chongwen District has a price premium of 23% over Chaoyang District; Dongchen District has a price premium of 37%; Xichen District has a price premium of 36%; Haidian District has a price premium of 8%; Fengtai District has a discount of -17%; Shijinshan District has a discount of -26%; the combined Daxin, Sunyi and Tongzhou Districts have an average discount of -40%; the combined Miyun and Fangshan Districts have a price discount of -57%; the combined Changping and Huanlou Districts have an average discount of -43%; and Mentougou District has a price discount of -47%.

Except for column 5, the estimated coefficients for school quality are significantly positive. In column 1 through 4, the estimated coefficients for high quality elementary school varies from 0.06 to 0.12, indicating that there is a price premium on projects having a high-quality elementary school within 2 kilometers. The relative price effect ranges from 6.18% to 12.75%. The coefficients on the dummy variable of high-quality kindergarten varies from .06 to .11, indicating that the relative price effects range from 6.18% to 11.62%.

The estimated coefficients for the year of sale variables are statistically different from zero across spatial specifications. We use the estimated coefficients from Model 5 (distance to CBD and District dummy variables) to construct a Beijing house price index for the 1998-2006 period. Figure 3 illustrates that house prices for new housing construction were basically constant between 1998 and 2000. Between 2001 and 2003, house prices were increasing about 3% per year. In 2004, the price of new construction jumped 11%. In 2005 and 2006, Beijing house prices resumed their 3% annual appreciation rate.

Figure 3



Conclusion

We construct a house price index for new housing construction for the City of Beijing, China for the 1998-2006 period using five hedonic house price specifications that control for the influence that location has on house price.

The Beijing government changed the procedure for transferring land use rights twice over the 2002-2004 period. The second change, in 2004, dramatically reduced the supply of land available for market rate housing. As a consequence, the price of new housing increased by 11% in 2004.

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