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# **An Examination of the Chinese Housing Market through the Lens of the DiPasquale-Wheaton Model: a Graphical Attempt**

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Many existing studies on the China real estate industry are empirical, or policy-oriented. This paper complements the literature by adopting the DiPasquale and Wheaton model (1996) to study the China housing market, and trace the impact of different policies. Surprisingly, the model is capable of accounting for several developments in the market. We also extend the model to a dual-class housing situation, not only for the analysis of a recent policy change in China, but also for the potentially independent interest of other countries. A summary of the evolution of recent China housing policies is provided.

### **Keywords**

real estate; policy; determination of price and quantity; submarket

### **Introduction**

Recently, the China real estate market has experienced very significant growth, and, therefore, has received much attention. For instance, Deng and Fei (2006) report that the total outstanding mortgage loan balance, as a share of total bank loans, has increased from 0.5% in 1998 to more than 10% in 2004. Interestingly, many existing studies on the China real estate industry are

either reduced-form estimation or policy-oriented.<sup>1</sup> While these studies are definitely very important, it may be instructive to build an equilibrium model for the Chinese housing market, which, in turn, may enable future research for structural estimation and policy analysis. This paper attempts to take a preliminary step towards this direction. First, it takes a preliminary step in theoretical modeling. Specifically, this paper adopts the DiPasquale-Wheaton model (1992, 1996), which has been adopted for university teaching in many universities worldwide, to study the impact of different policies, in different development stages. As in other sectors in China, the real estate industry encounters the administrative intervention and dominant position of the government. Thus, an investigation into the impact of the government's policies towards the market seems to be appropriate. Perhaps surprisingly, the qualitative predictions of the DiPasquale-Wheaton model match the stylized facts of the Chinese housing market well. This may suggest that tools from "Western economics," with appropriate refinement, would also be applicable to the analysis of the Chinese real estate sector, despite many unique features of the Chinese economy.

In addition, this paper provides an extension of the original model to the case with two classes of housing, and adopts it to analyze a very recent policy change in China, which restricts the amount of "small units" to constitute at least 70% of the whole development project. This not only contributes to the policy discussion of the China market per se, but it may also carry an independent interest. As the "sub-market" issue continues to be emphasized in some recent literature, this simple, yet practical, theoretical extension may be applicable to other countries or environments.<sup>2</sup>

Clearly, there are some limitations to this research. Some aspects of the housing market are not captured by the DiPasquale-Wheaton model, such as bargaining and search, leverage effect, monopoly power of the government in land supply, the political economy of the housing supply, strategic interactions among real estate developers, etc.<sup>3</sup> Also, this paper does not

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<sup>1</sup> The subject has been discussed in some international media, including the *Economist* magazine and the *Wall Street Journal*. Even if we restrict our attention to the academic literature, the citations are too numerous to be reviewed here. Among others, see Bardhan and Edelstein (2006), Deng and Fei (2006), Deng and Liu (2006), Deng, Zheng and Ling (2005), Liu, Yun and Zheng (2002), Peng, Tam and Yiu (2005), Ping and Chen (2004), Renaud (2005), and the references therein.

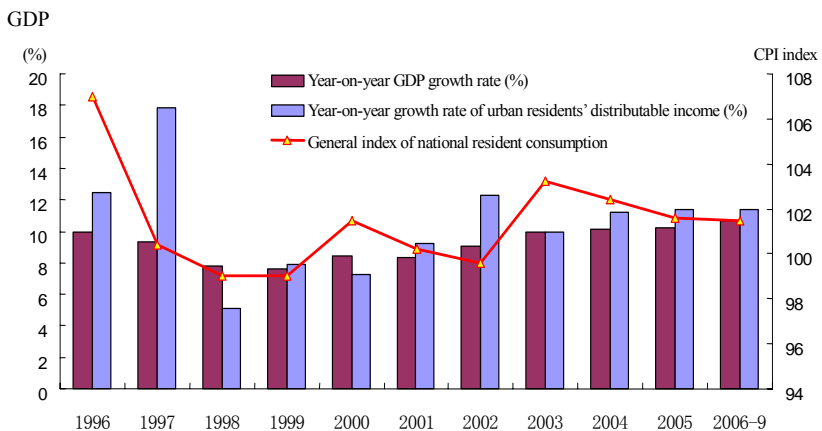
<sup>2</sup> This can refer to sub-markets within a country, or within a city. Again, it is impossible to review the literature here. Among others, see Bourassa, Hoesli and Peng (2003), Goodman and Thibodeau (2003), Bao (2006), and the references therein.

<sup>3</sup> Again, it is impossible to fully review the literature here. Among others, see Chen (2001a, b), Chen and Wang (2006), Lai and Wang (1999), Leung (2004), Leung and Zhang (2006), Malpezzi (2007), Ortalo-Magne and Prat (2007), Wang and Zhou (2000, 2006), Wang et al. (2000), Wheaton (1990), and the references therein.

attempt to quantify the policy experiments, or calibrate the model to match the real data. Thus, this research program is still very preliminary. Nevertheless, this paper takes a initial step in modeling the China housing market with the well-known DiPasquale-Wheaton model. Since the analysis is graphical and intuitive, hopefully this will enhance understanding, and attract more research talents to the study of the China housing market. Also, to the best of our knowledge, this paper may be the first attempt to extend the DiPasquale-Wheaton model to the situation with two classes of housing units.

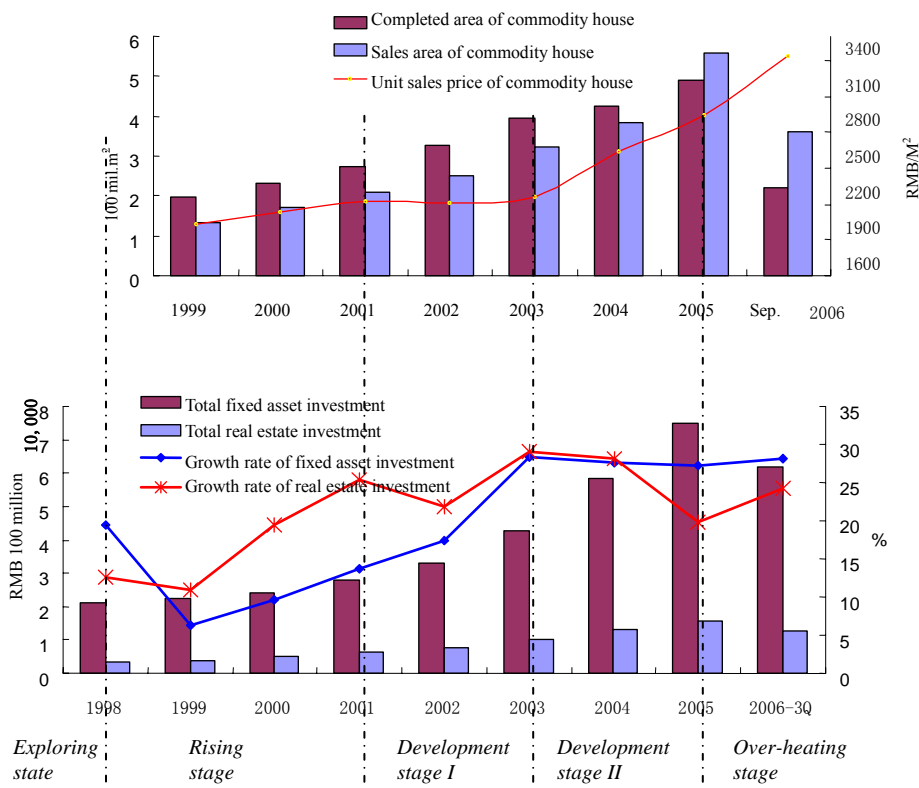
To further motivate the investigation, the following figures provide a visualization of the continuing economic growth in GDP and personal income in China, and illustrate the basic characteristics in each stage of real estate industry. To supplement that, a summary table is also provided.

**Figure 1a: Continuing growth in China**



Information source: Wande Information, Penghua Fund Research Institute

**Figure 1b: Corresponding growth of the housing sector**



**Table 1: A summary of China's real estate industry**

	Rising stage	Development stage I	Development stage II	Overheating stage
Price	Modest increase	Stable	Rapid increase	Accelerated increase
Completed Areas and Sales Areas	Synchronized increase	Synchronized rapid increase	Growth of sales areas greater than completed areas	Sales areas greater than completed areas, short supply
Real Estate Investments	Increase	Accelerated increase	Decelerated increase	Stable increase

The organization of this paper is as follows. The next section will provide a summary of the recent history of the China housing market, and re-phrase the development in terms of the DiPasquale-Wheaton model. Then, we will extend the model to a situation with two classes of housing units and apply that to the recent “large-small housing proportion policy.” The final section concludes. A summary of the historical events is provided in the Appendix.

## **Framing the China Housing Market in the DiPasquale-Wheaton Model**

This section will explain the different stages of the housing industry sequentially and will attempt to frame the development in terms of the DiPasquale and Wheaton model.

### *Exploring stage [Pre-1998]*

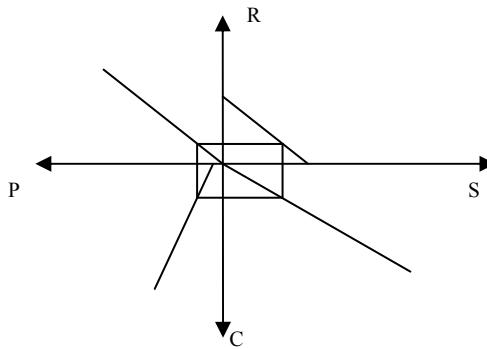
#### Key policy: trial testing and exploration

This stage focuses on theory breakthrough and trial testing. In 1978, the academe first proposed opinions regarding house commercialization and land property rights. In September 1980, the Beijing House Centralized Construction Office established the Beijing Urban Development General Corp., setting the stage for comprehensive development of the real estate industry. In November 1987, the Shenzhen municipal government launched the first land auction for housing development. Since the promulgation of a housing reform plan in Shanghai in 1990, the State Council has approved the housing reform plans from 24 provinces and cities. In 1992, the real estate industry experienced a rapid growth, but still encountered “chaos and bubbles”. Under tightening monetary policies in 1993, real estate investment growth fell significantly, and then the real estate market entered a long, bearish, period before the next boom.

Due to a lack of statistical data, we are unable to describe the changes in this stage. Instead, we simply assume that the markets are in equilibrium, and thus provide a benchmark for the later stages. Figure 2a simply re-produces the DiPasquale-Wheaton model. (For ease of use, we follow their notations, namely that S represents the level of stock, R the rent, P the price, and C the level of new construction, with all the details spelled out in DiPasquale and Wheaton, 1992, 1996).<sup>4</sup>

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<sup>4</sup> We follow the original DiPasquale-Wheaton exhibition that all lines are straight. The linearity assumption can be easily relaxed without significant changes in the qualitative results, as long as monotonicity is maintained.

**Figure 2a: Basic DiPasquale-Wheaton model***Rising stage [1998-2001]*Key policy: support

In 1998, the State Council enacted policy to change the material distribution regime into a currency distribution regime. In the same year, the People's Bank of China issued the "Management Provisions on Residents Housing Loan," encouraging commercial banks to launch residential mortgage business and to give financial support to house consumption. The elimination of the material distribution regime and implementation of mortgage policy marked a new era for real estate investment in China. Our analysis begins from 1998 as well.

Aspects of various policies initiated during the rising stage embody support for China's real estate industry. First, the elimination of the welfare house distribution policy directly created enormous potential demands. In addition, the residential mortgage loan business has provided financial support for house consumption and helped establish Gongji Funds for low- and medium-income families to purchase houses, turning potential demands into real and effective demands.

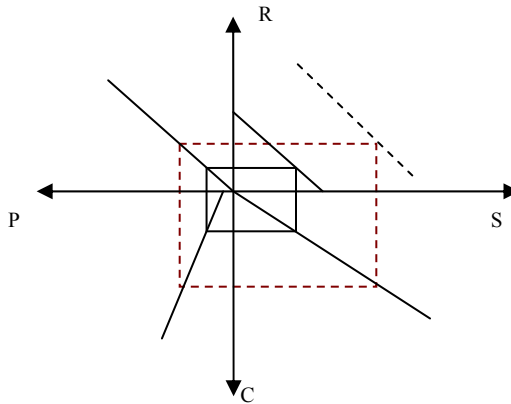
At the same time, preferential taxation policy boosted the real estate market; consistent interest rate cuts gave companies the confidence to expand investments, and the free listing policy for real estate developers symbolized their free access to the capital market, without any prejudice against them. Clearly, all these policies encouraged additional private real estate development.

Model analysis

The elimination of house distribution triggered explosive growth in residential

demand for houses: demand curve shifts to the right. The supporting policy has also given the real estate developers the motivation to build more houses,  $C \uparrow$ , and so do the equilibrium amounts of stock  $S$ , the rent  $R$ , and the price  $P$ .

**Figure 2b: DiPasquale- Wheaton model—the rising stage**



*Development stage I [2001-2003]*

Key policy: normalization

While the real estate industry prospers, a series of problems arise in such an emerging market. During the development stage of 2001-2003, the policies focused on both encouragement and normalization. On the one hand, the real estate industry continued to enjoy policy support, including housing reform, development of the used house market, elimination of improper administrative charges, and historically low interest rates. On the other hand, the government put a great deal of effort into regulating the real estate market, namely strengthening management of land supply, setting guidelines for house sales, organizing the agency market, and normalizing financial business in housing market, etc.

It is worth mentioning the July 2002, No. 11 order of the Ministry of Land Resource, “Regulations on the Grant of State-owned Land Use Rights by Invitation of Bids, Auction and Listing for Sale,” namely “Invitation of Bids, Auction or Listing” for short. This order marks a fundamental change in the land supply system in China, from multi-channel mode to governmental monopoly (the execution of which is centralized to the municipal governments). Prior to this, the state-owned lands in China were controlled by various parties, including companies, armies, and governmental agencies, all

of whom could assign land to real estate developers. Meanwhile, local governments at different levels, from province, city, district, and even township, could acquire land at low cost (by such means as forced removal and farm land confiscation), which means that the land supply changed from a completely flexible mode to the current government monopoly. This policy created barriers for small developers to enter the industry and raised construction costs for developers.

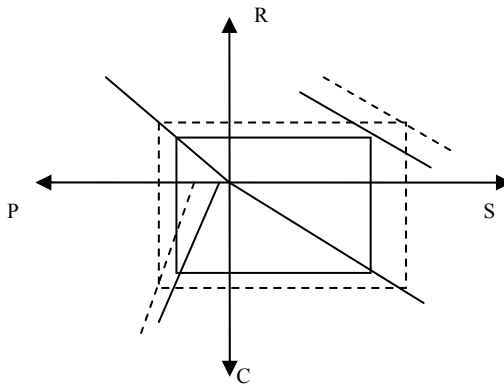
Model analysis

Policy support for the real estate industry and constant growth of disposable income resulted in sustainable secured housing demands: demand curve shifts to the right.

Regulatory policies, especially the “Invitation of Bids, Auction or Listing” raised the threshold for entering the real estate market, and, also, development costs: curve in the third quadrant shifts to the left.

As a result, all variables continue to rise.

**Figure 2c: DiPasquale-Wheaton model: the development stage I**



*Development stage II [2003-2005]*

Key policy: sterilization, demand control

In 2003, the State Council released the “Notice of the State Council on Promoting Sustainable and Healthy Development of Real Estate Market,” namely “Guo Fa No. 18 File,” which first specified real estate as one of pillar industries in China’s national economy.



In order to prevent the economy from “over-heating,” the government promoted a series of macro-sterilization measures against over-growth of fixed-asset investment in some industries, including real estate, from the second half of 2003 to 2004. The land control policies implemented in 2004 consisted of three suspensions: the vertical management policy, as well as reform, and management, policies, which boosted house prices and brought huge gains to real estate developers. The rising house prices drew intensive attention from the government, however, and the stabilization policy was adopted at that time; stability was considered a top priority, and the government neither suppressed the real estate industry nor expanded supply. The government was concerned that a weak real estate market would not only hurt GDP growth but also induce financial risk.<sup>5</sup> On the other hand, with expanded land supply, a new round of investment fervor could rise and cause price hikes of steel and energy; as a result, the achievement of macro-sterilization in 2004 could be neutralized. Ultimately, the government chose to raise the mortgage interest rate.

As a matter of fact, the sterilization may have induced greater impact on the supply side than on the demand side, which, indeed, aggravated supply shortfall. Among various policies, the open land transfer system and land protection policy are most important. These two policies changed “completely flexible” land supply to “monopoly” supply, and such a trend is expected to continue. All these changes led to a supply shortfall in real estate, which further stimulated the housing market. Since early 2005, the real estate market has drawn significant public attention, and, also, more investments, given the limited investment channels of the general public, and the bearish stock market.

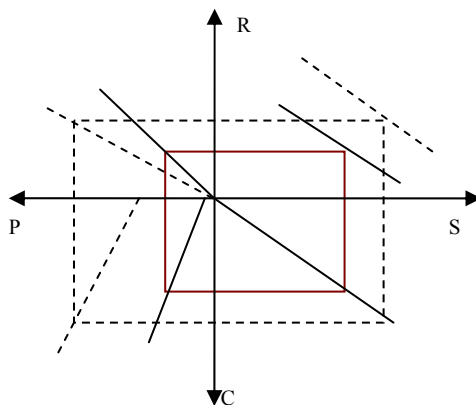
### Model analysis

Along with the growth of disposable income, and urbanization needs, demand shifts to the right. On the other hand, the land tightening policy raised the costs for developers to acquire land – developer curve shifts to the left. Finally, the drop in stock market prices shifts more funds to the housing market. This leads to a further rise in house prices and forms a self-fulfilling prophecy: the expected growth in house prices provides incentive for investors to accept a higher price with the same rental return. This swings the second quadrant curve to the right, and leads to a realization of higher house prices.

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<sup>5</sup> The Asian financial Crisis in 1997-98 may have influenced the policy-making at that time. Among others, see Leung (2004) for a review.

**Figure 2d: DiPasquale- Wheaton model: the development stage II**



*Over-heating stage [2005-2006]*

Key policy: sterilization on both demand and supply

From the end of 2005 to early 2006, housing prices in some cities stayed on an upward trend, suggesting the failure of unilateral demand control policy. As a result, the government changed the focus of these policies.

The general guideline for governmental policy in 2006 was to suppress both housing demand, especially high-profile demand, and investment demand on one hand, and, on the other hand, to increase supply, especially the medium- and lower-profile house supply. Additionally, due to regional differences, given a nationwide guideline, local governments were authorized to choose and implement some particular policies according to actual situations.

On May 29, 2006, the General Office of the State Council released the “Opinions on Adjusting House Supply Structure and Stabilizing House Price,” issued jointly by the Ministry of Construction and eight other ministries. This act specified guidelines and implementation details of “6 Pieces of Opinion of the State Council on Promoting the Healthy Development of Real Estate Industry,” enacted on May 17. To guarantee the implementation of the policy, all local governments were required to announce future land and house supply plans before September 30.

**Table 2: China housing market policy in 2006**

Contents	Expected Effect
Houses under 90 m <sup>2</sup> shall account for at least 70%	Increase supply

Except 20% for houses under 90 m <sup>2</sup> , all others are subject to 30% down payment.	Restrain demand
Term of business tax for used house transfer is extended from 2 years to 5 years	Restrain demand, especially investment demand
All lands with less than 1/3 area developed or less than 1/4 area invested shall be handled as free lands.	Increase supply

Model analysis – Where will these demand and supply control policies lead?

Will this policy package bring “improvement” to the housing market? Or, it will make things worse? We attempt to provide a very preliminary answer through the DiPasquale-Wheaton model.

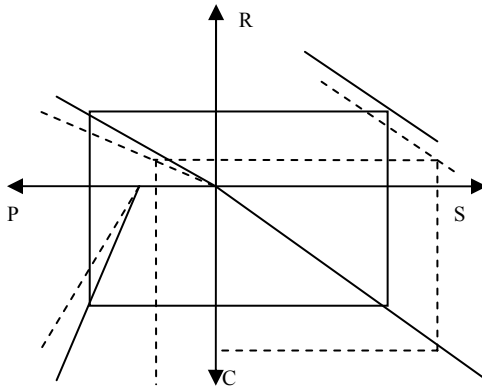
*Short-term policy effects*

From the viewpoint of developers, structural adjustments have increased the weight of small-size houses, which is equivalent to increasing the number of houses, given the unchanged total area. Meanwhile, this places more pressure on the market to access reserved land. In the short term, developers with construction licenses need to finish developing large-size suites as soon as possible, while others, with only land on hand, have to change their original plans to meet the “70% small units” requirement, with the number of newly-built suites thus increasing sharply.

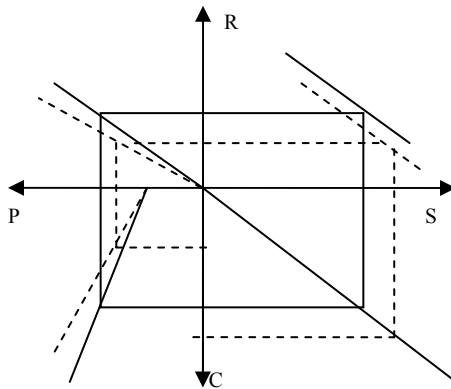
On the other hand, consumers may want to wait until the policy impact surfaces. As a result, the short-term demand curve will shift down (to the left).

This policy cracks down on house investment and speculation by increasing transaction costs, with the expectation that investment demand for small- and medium-size houses will drop. However, for cottage- and large-size houses, due to the large-margin drop in anticipated market supply volume, the price and demand rebound in the short term, due to the shortfall of expected supply.

**Figure 2e: Short term case I: disequilibrium**



**Figure 2f: Short term case II: disequilibrium**



In this case, the developers will reduce new construction area.

To review, the sterilization policies on demand and supply, in the short run, will help stabilize house prices. However, the real estate market may not be able to reach the equilibrium. Some developers may need to exit the market.

*Long-term policy effects*

Developers may be less motivated to bid on lands, due to decreased gross profits resulting from the new policy measures - if not exit the market entirely! The industry may become more centralized as a result. The change in market power may imply that for the same market price, the developers will supply

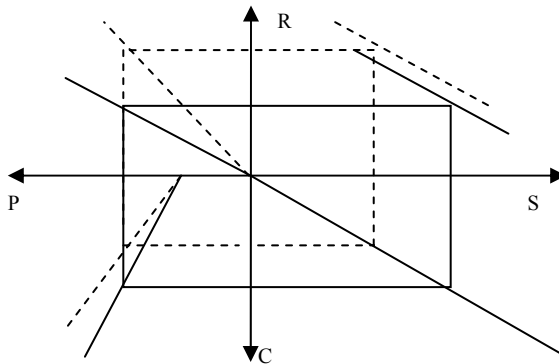
less new housing units.

On the consumption side, we think the long-term demand curve should continue to shift up (to the right), given our assumptions that the demand for housing will continue to grow. (We assume that the Chinese economy and disposable income will keep growing, and further urbanization will also continue.)

Concerning speculation demands, the market is likely to restore to “normal” and “more rational.” Also, the continuing development in the financial markets (including the QFII, more investment choices, foreign participation in China’s banking sector, etc.), will shift funds out of the real estate market, meaning that for the same level of rent, investors would be willing to pay a lower price.

We summarize these conjectures in Figures 2g-2i.

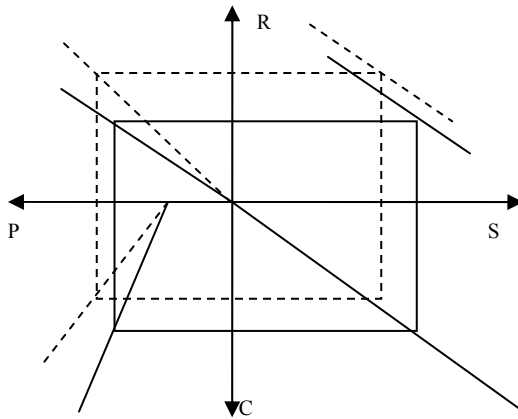
**Figure 2g: Long term case I: constant price**



$$R \uparrow, C \downarrow, S \downarrow, P \rightarrow$$

This is a special case where rent will increase, new construction and stock will decrease, yet the price will remain constant.

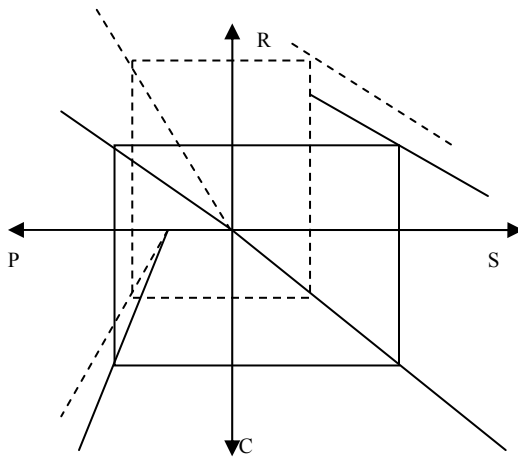
**Figure 2h: Long term case II: higher price**



$$R \uparrow, C \downarrow, S \downarrow, P \uparrow$$

In this case, both rent and price increase, while both new construction and stock decrease.

**Figure 2i: Long term case III: lower price**



$$R \uparrow, C \downarrow, S \downarrow, P \downarrow$$

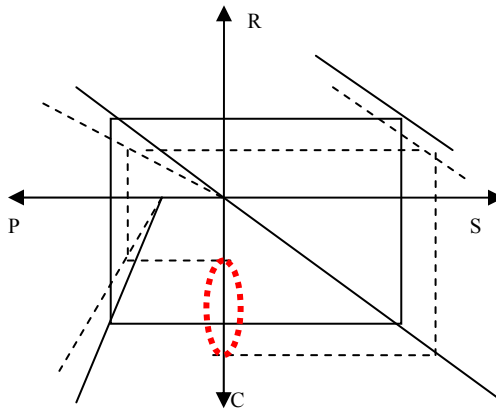
This is another less-expected case where except for rent, all other variables in the housing market decrease.

Thus, the effect on housing price is uncertain, while the rent is expected to rise.

*Policy suggestions*

The analysis above suggests that while the sterilization policy on demand and supply is effective for stabilizing real estate price in the short term, its effect on the long-run price is not clear. Moreover, the conclusion that the short-run situation would be in disequilibrium is disturbing. It is then natural to ask if a “policy” remedy exists? Here, we attempt to provide some suggestions to the DiPasquale-Wheaton framework, namely closing the quantity gap or price gap.

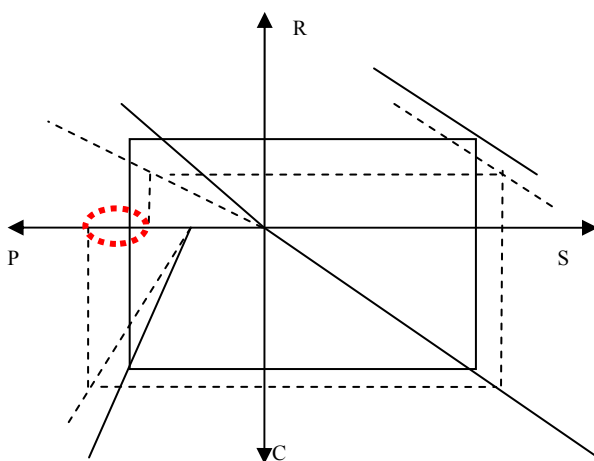
**Figure 2j: Affordable housing: quantity provision**



One can close the quantity gap by providing “affordable housing.” This can be in the form of public rental housing (as in the case of Hong Kong), or subsidized ownership (as in the case of Singapore).<sup>6</sup>

<sup>6</sup> Again, the literature is too large to be reviewed here. Among others, see Ong and Teo (2006), Yeung and Wong (2003), and the references therein.

**Figure 2k: Affordable housing: price subsidy**



Alternatively, the state can “encourage” the developers to provide “affordable housing” by exempting the land transfer fee and 21 tax items in the form of social securities.

**Table 3: Comparison between reality and model output**

	Rising stage	Developm't stage I	Developm't stage II	Overheating stage	Future	
Fact	Price Modest increase	Stable	Rapid increase	Accelerated increase	?	
	Complete areas and sales areas	Synchronize increase	Synchronize rapid increase	Growth of sales areas greater than completed areas	Sales areas greater than completed areas, short supply	?
	Real estate investm't	Increase	Accelerated increase	Decelerated increase	Stable increase	?
Model output	R↑, C↑ significantly, S↑ significantly, P↑ modestly	R↑, C↑, S↑, P↑	R↑, C↑, S↑, P↑ significantly	C↓ in short term, P↑ unable to reach equilibrium	R↑, C↓, S↓, P uncertain	

To summarize, we confirm that the predictions of the DiPasquale-Wheaton (modified) models are by and large consistent with the reality in different stages. We believe that appropriate “affordable housing” policies can be adopted by the Chinese government, and achieve their intended goals.



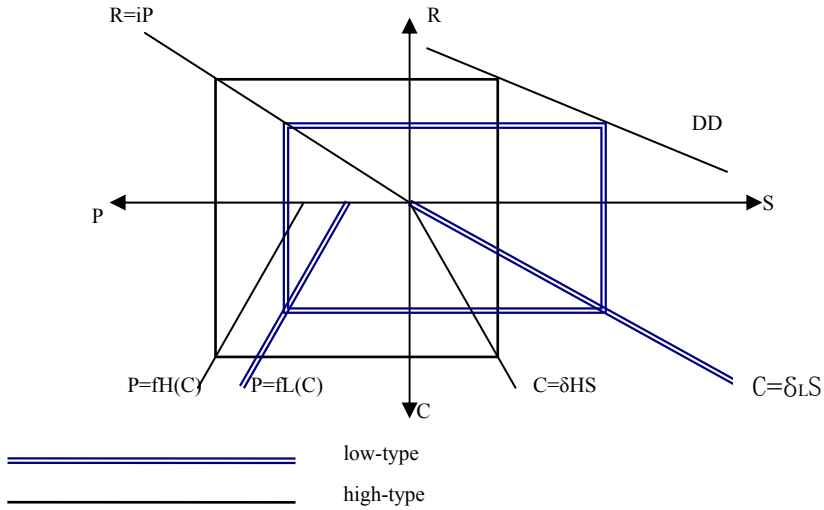
### **Extension: Dual-house types in the DiPasquale-Wheaton model**

The analysis above follows DiPasquale-Wheaton (1992, 1996) closely and has presumed a single class of housing. However, one may argue that in China, the markets for low-type (“economic housing”) and high-type (“luxurious housing”) are segmented. In fact, the new policy measure concerning the ratio of new construction to reach a certain percentage implicitly assumes that there are two sub-markets (those with 90 m<sup>2</sup> or more, and those without). Thus, there is a call for an extension of the DiPasquale-Wheaton model to a dual-class situation. This section takes a preliminary step towards that direction.

Figure 3a captures several assumptions.

- Both the high- and low-type housing (double line in the figure) face the same demand curve. (If the high-type faces a higher demand curve, the results will be even stronger).
- Both the high- and low-type housing (double line in the figure) face the same capitalization rate. (If the high-type attains a higher capitalization rate, the results will be even stronger).
- High-type housing has a higher “overhead cost.” Thus, a higher market price for high-type housing is demanded by the developers in order to provide the same amount of new construction - which seems to be a natural assumption.
- High-type housing depreciates faster, which means that for the same amount of new construction, the low-type housing can maintain a higher level of stock at the steady state. This also seems to be a natural assumption.

**Figure 3a: DiPasquale-Wheaton model with dual types of housing**



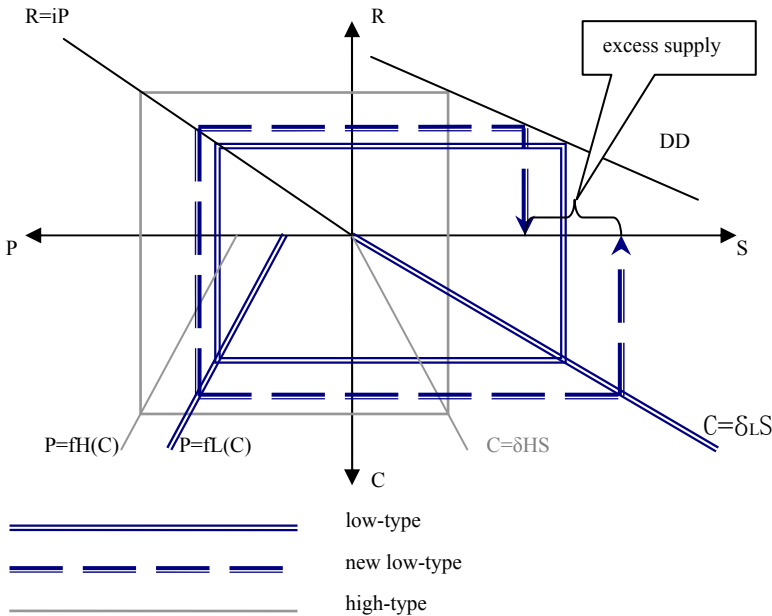
Given all these assumptions, several features are exhibited at the equilibrium:

1. The high-type charges a higher rent and price.
2. The level of new construction of the high-type is higher.<sup>7</sup>
3. The level of (steady stock) for low-type is higher.

Clearly, these implications are consistent with the reality. Now, within this model, we consider the policy to increase the proportion of low-type houses (more “affordable housing”).

<sup>7</sup> As will be seen later, this implication can be changed under certain policy interventions.

**Figure 3b: DiPasquale-Wheaton model with dual types of housing: disequilibrium**



Without any other changes in the markets, the only way to motivate the developers to build more low-type houses, and, hence, a larger stock in the market, would be through a higher market price. With the same capitalization rate, however, investors will charge a higher level of rent. The demand for low-type housing will decrease, which leads to a disequilibrium situation because the available stock has increased, but the demand has decreased! This is consistent with the earlier analysis.

**Figure 3c: DiPasquale-Wheaton model with dual types of housing: cross-subsidization**

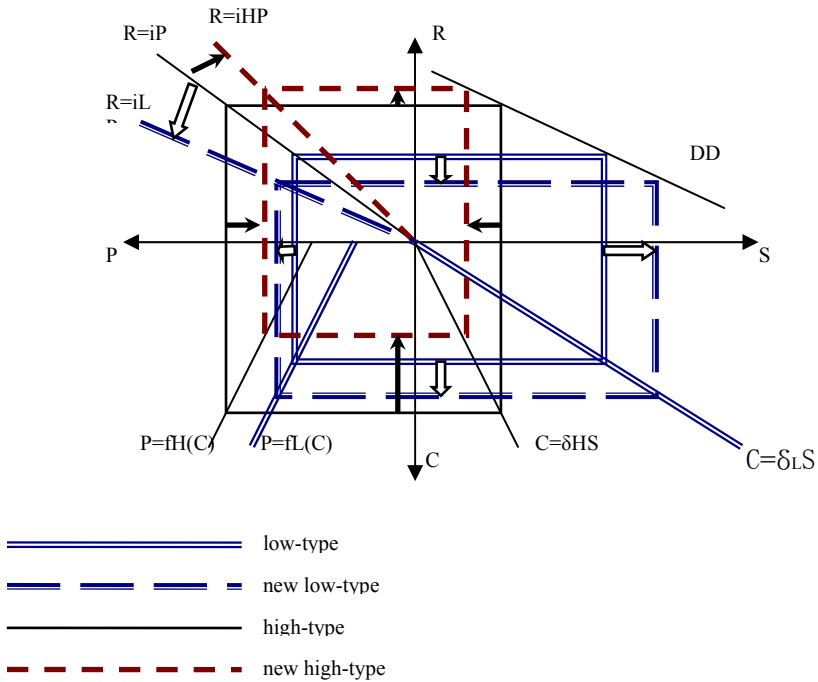


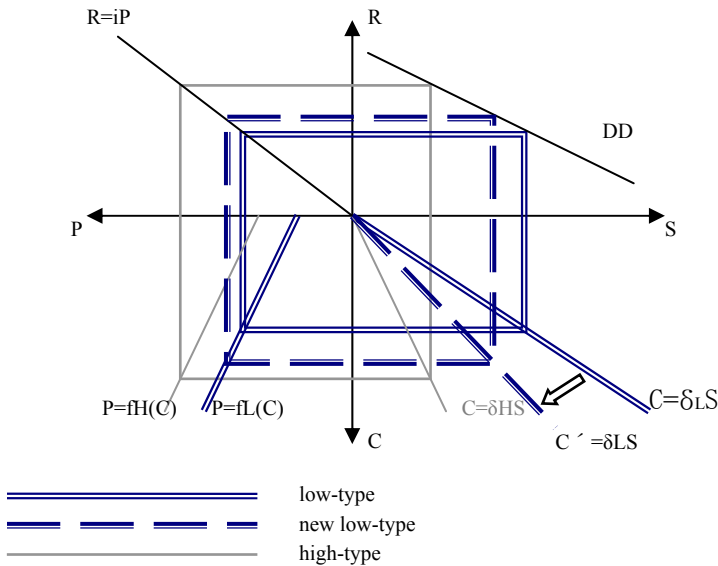
Figure 3c displays another possibility, which is a cross-subsidization scheme. To simplify the analysis, the demand curve, the depreciation rates, and the developers' cost functions are assumed to be unchanged. However, low-type investors face a higher capitalization rate now (from  $i$  to  $iL$ ). (For instance, there is a subsidy from the government or from the real estate developers.) From the figure, it is clear that when the "investment curve" changes from  $R=iP$  to  $R=iLP$ , it means that for the same level of rent, the investors are now willing to pay a higher price, because they are compensated by a subsidy (not reflected directly in the figure). This motivates people to invest, and pushes up the price. In turn, it provides incentives for the real estate developers to build more low-type housing and thus leads to a higher level of steady-state stock. However, since the capitalization rate has change, it is possible that the rent decreases with a higher price.

On the other hand, for high-type housing, investors now face a lower capitalization rate (from  $i$  to  $iH$ ) (represented by a dotted line in the figure). (For instance, there is a tax from the government or additional charges from the real estate developers.) This change in capitalization rate leads to a lower

level in price, in new construction, and in steady stock, but it also leads to a higher level of rent. The ratio of new construction of high type relative to low type used to be more than unity. After the police change, we can actually change the ratio to less than unity.

Unfortunately, cross-subsidization is not easy to implement in practice because some new market participants could enter and under-cut the market. It also demands very accurate calculations of all the market responses, to balance the overall budget. Figure 3d shows yet another possibility, which is a compromise of quality (for instance, using less durable materials), which leads to a higher depreciation rate for low-type housing. This means that for the same level of new construction, the amount of (steady-state) housing stock will now significantly decrease. As a result, the level of new construction increases, and so does the price, yet the level of stock decreases in the steady state, which leads to a higher level of rent.

**Figure 3d: DiPasquale-Wheaton model with dual types of housing: compromise in quality**



Although this is only a hypothetical situation, it has important implications. Notice that, in practice, *typical house buyers may not be able to distinguish high quality from low before a long period of residence*. This is especially true in China, where housing transaction information is not as transparent as in countries like the United States. Thus, it is possible for the developers to “cheat” on the quality without being caught, for a significant period of time.

In other words, the policy could lead to a deterioration of consumer welfare. It may also mean that more materials may be wasted in the process.

To summarize, the theoretical analysis here suggests that (1) it would take cross-subsidization (and careful calculations) to reach the “ratio goal” of “large” versus “small” housing units, and, (2) without cross-subsidization, the policy could lead to chaos (dis-equilibrium) or a compromise of quality (a likely social welfare deterioration). Needless to say, the analysis here is only qualitative, and not quantitative. In addition, this analysis is not very explicit with regard to social welfare calculations. Clearly, further research is needed.

## Concluding Remarks

This paper attempts to contribute to the literature on China’s real estate industry in several ways. First, it tries to frame recent developments in the China housing market within the DiPasquale-Wheaton model, and attempts to account for some of the price and quantity movements. Since the model was originally developed to account for the U.S. housing market, it is particularly interesting now to apply it to the China market, which has much stronger government intervention and market imperfections. Second, the paper extends the DiPasquale-Wheaton model to a dual-class situation and analyzes a recent policy measure which states that new housing units less than 90 m<sup>2</sup> shall account for at least 70% of the total stock. Clearly, the model can also be applied to other contexts, as long as market segmentation is an important ingredient. More importantly, this study demonstrates the possibility that “Western economics” can be applied to emerging markets, to account for at least some features of the market. While existing empirical studies have proved to be very helpful in understanding the operation of the Chinese housing market under specific institutional details, theoretical explorations can also be complementary to consolidate different thoughts in a coherent framework, and to identify some common forces at work in different markets. Additionally, extending the DiPasquale-Wheaton model to dual-type housing is proven here to be a convenient vehicle for policy experiments, which may be applied to other countries, thus carrying an independent interest.

In terms of future research, efforts can be extended to, for instance, the empirical estimation of the China housing market as a system of equations. Alternatively, one could propose a dynamic equilibrium model and “estimate” the key parameters through simulations and calibrations. These efforts will prove to be helpful for a deeper understanding of the China housing market, and perhaps even for the Chinese economy as a whole.<sup>8</sup>

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<sup>8</sup> Among others, see Leung and Cheng (2007) for some preliminary attempt.

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## Appendix: A summary of Chinese housing policies since 2002

This table draws from many official documents, to summarize the historical development of China's housing-related policies.

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
July 2002	State Ministry of Land Resource enforced land auction/price bidding system	Land supply	Raise barriers for small developers to enter the industry, regulate market operation, and reduce the uncertainty in real estate market	Real estate development becomes more market-oriented; the open transfer policy makes the industry more centralized, and land rent solicitation and state-owned assets drainage are curbed.
Sept. 2002	Beijing municipal government opened real estate markets to foreigners as well as citizens.	House sale	Attract more foreign businessmen/foreigners, enterprises, institutions and individuals from other provinces and cities to invest in Beijing properties, and promote the sustainable development of Beijing real estate market.	Opportunity and challenge co-exist, directly raising the effective demand for luxury properties. The competition becomes very keen.
Jan. 2003	“Management Provisions on Affordable Houses”	House sale	The benchmark price of affordable housing is composed of three parts, namely development cost, tax, and profit. Construction cost of operative facility inside residential quarters; construction and installation cost of office space and operative facility reserved by developers and various apportioned fees; various compensation fees, penalty for breach of contract, delay penalty, and fines shall not be included into the price of affordable housing.	Affordable houses, including those in governmental construction plan, are now subject to administrative land transfer, enjoying preferential policy provided by government, and offered to urban families with medium- and low-income.
Feb. 2003	Ministry of Land Resource tightened the land supply used for luxury residence and cottage.	Land development	The state suspended review, approval and supply of land used for luxury residence and cottage.	It decreases the new supply for luxury residence, and further stimulates their prices
June 2003	“Notice on Further Reinforcing Real Estate	Real estate finance	Strict regulations on 7 items including land reserve loan, working capital loan, and personal mortgage	Intended to “crash the bubble” in the real estate market and temporarily suppress the price and

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
	Credit Management” Business		loan during the real estate development process are formulated.	trading volume.
June 2003	“Juridical Explanation on Dispute over Commodity House Purchase Contract”	House sales	More specific regulations on the validity of commodity house presales contract, commodity house sales advertisement, and house area shrinkage, etc., are made. Punishing compensation principle can be applied to the malicious breach and fraud of developers.	Helps the commodity-house purchasers to protect their legal interests and rights, reduces legal disputes, and changes house purchaser’s weak bargaining position during house purchase.
Aug. 2003	File No. 18, specifying real estate development direction	Industry policy	Specifies real estate as pillar industry in national economy for the first time.	Provides a political justification of the market development, giving more confidence to the developers and consumers.
Sept. 2003	“Regulations on Property Management”	Property management	Specified that owners enjoy 19 types of rights in property management activity.	Specifies the right, and responsibility of all parties, and prevents unnecessary legal disputes.
Oct. 2003	“Management Method on Sales of Public House Purchased from Central Government Departments in Beijing”	Sales of used houses	The market launch of public houses purchased by the central government departments in Beijing (also referred to as a central government house) is formally initiated on October 1. It released 800,000 suites into the market.	Symbolizes that a consolidated secondary housing market with regulation and management has been formed in Beijing.
Dec. 2003	“Management Provision on Urban Real Estate Transfer in Beijing,” specifying that pricing is based on in-suite floor space	House sales	Specified that all transactions with regard to pre-sales of houses within the Beijing area shall be priced based on in-suite floor space (wall body area + in-suite use area + balcony area).	Fraud in housing market, conducted by real estate developers, is reduced; Pricing based on in-suite floor space emerges as a unified standard.
Dec. 2003	Management Provisions on Economic Houses for Urban Low Income Families	House lease	Families entitled to housing subsidy (as determined by real estate administrative authority of city and county governments) can rent a house they need, and report to the real estate administrative authority for approval, after signing a lease with lessor; the authority shall grant lease subsidy to this family via	Secures the basic housing needs of low-income urban families.

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
Jan. 2004	“Guidelines on Urban House Removal Assessment”	House removal	funding directly to the lessee, to offset the rent. Removal assessment company shall be appointed in an open, transparent way, approved by the person whose house is removed. The party involved in the removal is obliged to provide information for price assessment, and assist the assessment company in the site survey. The site survey record shall be approved with signatures of price assessor, house remover and the involved person.	Ensure the openness and fairness of the compensation paid to the involved households, reduce disputes caused by house removal and regulate house removal market.
Jan. 2004	“Management Provision on Property Maintenance Fees”	Property management	Selections of property management company and property management fees are specified, to encourage transparency and fairer competition.	Regulation on property management is further enhanced, and legal disputes further reduced.
Jan. 2004	Supplementary Regulation on Suspending Agreed Assignment of State-owned Land Use Right (2004) No. 4	Land assignment	Completely eliminates the formerly provided 5 cases in which the agreed assignment can be continued, namely, green-separating-belt projects, old and endangered house transformation, small-scale construction projects, land use in other important construction projects, and some operating projects planned as high-tech or for industrial purposes.	Realizes completely open, fair and transparent land supply in Beijing.
Feb. 2004	“Notice on Establishing National Real Estate Information Release Conference System”	Industry policy	Releases statistical information on real estate in 40 key Chinese cities, including relevant real estate policy of the state, laws, and statute information, etc.	Intends to increase the transparency of real estate information, and enhance the sustainable and healthy development of the market.
Feb. 2004	Announcement of China Banking Regulatory Commission about “Guideline of Risk Management on Commercial Bank Real Estate Loan”	Real estate finance	All commercial banks shall focus on investigating the debtor’s repayment capability when granting personal house loan, and specify that the proportion of the buyer’s monthly repayment shall not exceed 50% (inclusive) of his/her income. Prevents buyers from purchasing more than one property.	No major influence on first-time house buyers, but significantly suppresses real estate speculations.

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
March 2004	All places in China stop approving establishment and expansion of development areas	Approval of development area	2046 development areas are canceled, merged, and integrated. Departments of land resource, supervision and audit take joint action to enlarge investigative forces and handling of illegal land cases.	In 2003, 178,000 illegal land cases were detected, and 128,000 cases were investigated and treated within China. Even more investigative efforts are then undertaken.
Apr. 2004	Term deposit interest rate raised.	Finance	The central bank raises term deposit interest rate by 0.5% again, from the present 7% to 7.5%.	Mainly limits the bank's capital source, and forces some weak developers out of the market.
Apr. 2004	"Restriction on Assignment of Future Houses in Shanghai"	House Presale	Specifies that "in case of pre-purchase of commodity house without registration, or assignment in conformity with relevant provisions of municipal people's government, the pre-registration for the assignment of pre-purchase shall not be handled."	Restrain the real estate investment in Shanghai.
Apr. 2004	Capital levels in four major industries raised.	Real estate finance	Elevates the proportion of real estate development and investment capital to 35% and above, with real estate industry entitled to macro-sterilization by the state.	Real estate becomes a target of state macro-sterilization, restraining the overall investment and sales price rise in the short term.
Apr. 2004	Land market rectification	Land policy	Seeks to deepen land market rectification, reinforce land management, and rectify projects such as golf course, exhibition center, logistic park, and shopping mall.	Strengthens revision on real estate project construction, and curbs over-growth in real estate investment through strict control on land supply.
May 2004	Three suspension policies and vertical land management	Land policy	Suspends the approval on use change of farm land in all places in China; suspends the modification to the general plan on land use in cities (districts) transformed from counties, and in towns transformed from townships, whose transformation was approved recently; etc.	The three suspensions are a strict measure of the state's ability to rectify the land market, and significantly restrain real estate investment.
July 2004	Property management fee charged as specific price	Taxation policy	Specifies that the property management enterprise shall explicitly specify each service item and pricing standard.	Attempts to standardize property management fees.

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
Aug. 2004	“Method on Land Reserve in Shanghai,” “Management Method on Land Use Scale Control in Construction Project Approval in Shanghai”	Local industrial regulation	Enlarges the force of control and adjustment on land market, and changes the present mode of “gross assignment” of state-owned land-use right into “mature assignment,” improves land supply mode, enhances reserved land to enter the market, and land not developed within anticipated period will be retrieved from the developer, as per law.	The government will adjust and control the primary land market via land reserve institution and in the mode of planned delivery, to balance the short-term and long-term land use demand.
Sept. 2004	Management Method on Presale of Urban Commodity House	Advance sale of commodity house	Within 90 days from the delivery of advance-sold commodity house, the purchaser shall complete the ownership registration procedure at the relevant department. The decision on approving the advance sale of commodity house shall be publicized.	Plays an active role in accelerating the house ownership certificate registration, but the specific implementation is not feasible.
Oct. 2004	Benchmark interest rate elevated.	Interest rate policy	One-year deposit benchmark interest rate of the Central Bank and monetary institutions is elevated from 1.98% to 2.25%, and one-year loan benchmark interest rate is elevated from 5.31% to 5.58%.	Directly increased the capital cost of the house purchaser and developer.
Dec. 2004	“Decision of the State Council on Deepening Reform and Strengthening Land Management”	Land policy	Declares that, in the future, people’s government of province, autonomous region, and municipality’s illegal lowering of land price will be strictly prohibited.	Strictly regulates local government land management, curbs the land drain and the increase in fixed-asset investment due to “business invitation.”
Jan. 2005	Taxation Method of Used House Transaction in Beijing	Local taxation policy	The taxation authority shall, in general, take the transaction price provided in the “House Purchase Contract” as the taxable basis.	Taxation uncertainty is reduced.
Mar. 2005	Elevation of house mortgage interest rate	Interest rate policy	The current preferential interest rate of housing loans shall be regressed to the level of interest rates for loans with same term. Lower-limit management is executed, and the lower-limit level of interest rates shall be 0.9 times the benchmark rate of a loan with same term., Legal representatives of commercial banks can determine the interest rate level and internal pricing rules independently. In cities or areas	Attempts to slow the growth of housing prices.

Time	Policy	Policy Type		Basic Contents	Effect on Real Estate Industry
				where real estate price rises too rapidly, the first installment of a personal housing loan can be elevated from the current 20% to 30%.	
Mar. 2005	“Several Opinions on Current Strengthening of Real Estate Market Adjustment and Control, and Promoting the Sustainable Development of Real Estate Market”	Industrial policy Shanghai	in	Shanghai municipality treats projects differently, by category, utilizes comprehensive financial and taxation, monetary, legal, and administrative measures, and increases the supply of low- and medium-price ordinary commodity houses.	Increases the supply of medium- and low-price ordinary commodity houses, elevates its proportion in market supply, and attempts to reach the total supply volume of 85%.
Mar. 2005	“Notice on Business Tax on Sale of Ordinary House in this City”	Policy house transaction taxation Shanghai	on in	Shanghai Local Taxation Bureau specifies that, from March 7, 2005, for an ordinary house in Shanghai, purchased by an individual and resided in for less than one year, business tax and additional tax shall be levied, based on the difference between the sales price and the original price, with the tax rate of 5%.	Restrains real estate investment behavior, especially short-term transactions, and reduces the trading volume of the Shanghai market.
Mar. 2005	“Notice on Further Strengthening House Removal Management”	Removal policy Shanghai	in	Strengthens house removal management, regulates approval procedure strictly, guarantees the openness and transparency of removal, regulates removal behavior, reinforces removal supervision.	Regulates house removal in Shanghai, and guarantees right and interest of any household whose house is removed.
Mar. 2005	Policy on Loan Interest Rate Discount for House Purchase by Low- and Medium-Income Families	Industrial policy Shanghai	in	From January 1, 2005, the unit price per square meter of commodity house purchased by low- and medium-income families in Shanghai, and enjoying the rate discount policy, has been adjusted from the formerly provided no more than 3,500 Yuan to no more than 4,500 Yuan; and the total price of a used house from the formerly provided no more than 250,000 Yuan to no more than 330,000 Yuan.	Promotes home-ownership for low-income families in Shanghai.
Mar.	“Guidance on Further	Credit loan		16 Chinese banks in Shanghai will terminate the	Restrains investment by means of credit

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
2005	Strengthening Personal House Loan Management”	policy in Shanghai	mortgage transfer service of a personal house loan within the term of 1 year. At the same time, elevates the proportion of first installment in the loan on a second house purchased, and the benchmark interest rate of a loan for third house by 10% to 6.73%.	control, especially with regard to the investment of second and third houses, and adjusts the large-margin rise in house prices.
Mar. 2005	Notice of the State Council on Stabilizing House Price	Industry policy	Requests local government and relevant departments to curb the over-rapid price rise, and enhance the healthy development of the market.	Essentially “defines” house price stability as a primary task of every government.
Apr. 2005	Local governments successively enact measures to stabilize house prices	Local industrial policy	Main measures include increasing the supply volume of affordable house/low-price commodity house, and mortgage proportion to restrict investment or speculation, and regulating the development/sales process of commodity house.	“Stabilizes” the housing price.
May 2005	“Opinions on Stabilizing House Price” of seven ministries	National trade policy	Restricts future house transfer policy; business tax will be levied on house sales and purchases from June 1; adjustment in supply structure, and reinforcing construction of affordable houses; strengthening the construction of reserved land. Idle land fee will be levied for no start of construction after one year; the land use right will be retrieved without compensation for no start of construction after two years.	Mainly restrains short-term speculation of commodity house; strengthens the supply and management of affordable house to guarantee the basic housing demand of families with lowest income; enlarges the force of rectifying idle land.
June 2005	Implement opinions of the seven ministries, and levy business tax	National and local industrial policy	Business tax will be levied on commodity house, the regulation of various places on that for ordinary and high-end commodity houses will be successively completed.	Intends to restrain the investment or speculation demand, and realize supply and demand balance and stable house price.
May	The State Council implemented new round of	National industrial	I. Adjust house supply-structure, with the focus on medium- and low-price, small- and medium-suite	New round of adjustment and control in the real estate field began, with the purpose of



Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
2006	macro-adjustment and control against real estate market, and promoted a series of specific measures, referred to as "Six Opinions from State Council," for short.	policy	commodity, affordable house and low-rent house. II. Further adjust the role of taxation, credit loans and land policy. Strictly execute relevant policy on house development and sale, strengthen land use supervision, and prohibit land co-emption behavior. III. Reasonably control the scale and progress of urban house removal.	curbing over-rapid house price rise, and with measures of restraining demand, especially investment and speculation demand, while increasing the demand for medium- and low-price commodity houses.
May 2006	The General Office of the State Council reissued the "Opinions on Adjusting House Supply Structure and Stabilizing House Price"	National industrial policy	I. Adjust house supply-structure; II. Specify the ratio of newly-built houses. During the 11th 5-Year-Plan period, the weight of houses with in-suite floor space of under 90 $m^2$ must be over 70% of the total development and construction area. III. As for transfer within 5 years of house purchase, business tax will be levied based on the total sales income; VI. From June 1, 2006, the proportion of the first installment of a personal house mortgage shall not be lower than 30%. The first installment shall account for 20% for self-residing house purchased with in-suite floor space less than 90 $m^2$ .	Attempts, firstly, to increase weight of small- and medium-house type in structural adjustment; and, secondly, to enlarge the pressure on reserved land to enter market.
July 2006	Several opinions on implementing the structural proportion requirement of newly constructed house	National industrial policy	I. For new development, houses with in-suite floor space of under 90 $m^2$ (including affordable houses) shall have a weight of over 70%. II. Properly treat commodity house projects that have been approved and granted construction licenses, and determine the specific project that needs type and structure adjustment as specified.	The limit of 90 $m^2$ is directly specified to ensure local government's policy execution, and small influence on standardizing local real estate companies.
July 2006	"Opinion on Regulating Foreign Fund Admission	National industrial	Regulates foreign fund admission into real estate market: Foreign institutions and individuals shall	Capital source of domestic development enterprise is restricted, so that supply will be

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
	and Management on Real Estate Market”	policy	observe existing business principles when investing in and purchasing self-used house inside territory of China, and only with approval from the relevant departments, and after handling relevant registration. In the case of no payment of total registered capital of foreign-funded real estate enterprise, no granting of “State-Owned Land Use Certificate,” or development project capital shall be less than 35% of total project investment, no domestic and foreign loan shall be granted. The foreign exchange administration shall not approve the foreign exchange loan settlement of this enterprise.	curbed to some extent to raise financing costs. Major negative influence on high-end residence and commercial property. Difficulty for foreign funds to enter China is increased, hindering the development of the market.
July 2006	Notice of China Banking Regulatory Commission on Further Strengthening Real Estate Credit Loan Management	Real estate finance	All banks and monetary institutions shall carry out “3 examinations” of real estate loan, and whole-process monitoring of capital level of the developer’s project and its change, and capital proportion of less than 35% (exclusive of affordable house). Loans will not be granted to real estate development enterprises without the certificates	Further tightens the credit loan, controls the bank and project risk, and raises the development cost of the developers.
July 2006	Notice of State Taxation Bureau on Levying Income Tax on Transferring Used House	Tax rate policy	When levying personal income tax on house transfer, the actual transaction price shall be the transfer income. When the house transaction price, declared by the taxpayer, is lower than the market price, without a proper reason, the levying institution shall have the right to verify his transfer income. The institution must guarantee the consistency of taxable price for various taxes.	Leads to a shrinkage in transaction volume.
Aug. 2006	Notice of the State Council on Strengthening Land Adjustment and Control	Land policy	The total price of state-owned land-use right transfer will be included in local budgets, and paid to the local treasury, and the “double lines of income and	IRegulates the use of land transfer fees, so that more will be used in farmland compensation and plowland protection, urban, old, and

Time	Policy	Policy Type	Basic Contents	Effect on Real Estate Industry
			<p>expenditure” management will be executed. From the total land transfer price, land compensation fee, settlement subsidy, above-ground attachment and greenery compensation, removal compensation, and compensation to the shortage in farmers’ social guarantee fund shall be paid firstly. The remaining capital shall be gradually applied to farm land development and countryside infrastructure construction, with a gradually rising ratio, and shall be used in low-rent house construction and supporting facility construction, for the purpose of improving use function.</p> <p>Elevates the taxation standard for paid use of new construction land. The state shall formulate and publicize the lowest price standard for industrial land assignment in various places, as per land grade, and regional land use policy. This price shall not be lower than the sum of relevant costs, such as land acquisition cost, early-phase land development cost and those charged as per regulation. Industrial land must be transferred through open auction, and the lowest transfer price shall not be lower than the lowest price publicized.</p>	<p>endangered house removal compensation, and low-rent house construction. Land transfers are more standardized, and the Central Government’s control over local government more effective.</p>

Information source: Penghua Fund/ China International Capital Corporation