TAXING THE BUBBLE:
THE EXPERIMENTAL RESIDENTIAL PROPERTY TAX ON
TRIAL IN SHANGHAI AND CHONGQING AND THE
EFFECT ON HOUSING PRICES

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I dedicate this thesis to my family and Boyang Wang.

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Introduction

When the U.S. housing bubble burst in 2007, it not only caused the property market to crash here in the U.S. but also led the world into the worst economic crisis since the Great Depression. In an attempt to rectify the faltering economy, governments around the world began releasing vast economic stimulus packages. The Brookings Institute estimates that the total stimuli released by the G-20 countries during 2009 equaled $692 billion, or 1.4% of their combined GDP in 2008. [1] The effectiveness of these stimulus packages is still highly debated and much of the world, particularly Europe, is still suffering the effects of financial crisis. However, a few countries, namely China, showed themselves to be relatively resilient throughout the crisis, realizing growth rates of more than 6% every quarter throughout 2009. [2] This strong economic growth after the collapse of the world financial markets can be attributed to many factors, but one of the most notable is the economic stimulus package released by the Chinese central government in 2008. [3]

As China experienced a dramatic drop in exports during the early stages of the financial crisis, the central government quickly recognized the need for fiscal intervention in order to counterbalance the major loss in economic activity. Released in 2008, the government's stimulus package totaled 4 trillion RMB (580 billion USD) and triggered a major uptick in domestic trade and investment. However, a relatively large amount of this

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[1] Deng, Yongheng, et al. "Monetary and Fiscal Stimuli, Ownership Structure, and China's Housing Market*." NBER Working Paper* No. 16871. March 2011. 2

[2] Deng, et al., 4

[3] Apart from the central government's economic stimulus package many other factors helped to buoy the Chinese economy during the financial crisis: a strong fiscal situation relative to the West, an advantageous situation to fill investment gaps around the world left by the troubled industrialized nations and a vast domestic market of their own (Yu, 20).

new investment was concentrated in the real estate market. [4] This led housing prices throughout China to rise considerably, with average housing prices in China's seventy largest cities realizing a 5% increase every month during the following year. By mid 2010, housing prices in Beijing's Chaoyang district averaged $300 per square foot, meaning a typical 1,000 square foot apartment would cost more than 80 times the average Beijing resident's annual income. At the same time, high-end housing prices in Shanghai were up 54% y-o-y to a staggering $500 per square foot. [5] By the end of the year, investment and trade in real estate accounted for upwards of 60% of local GDP in many of China's major cities. [6] These numbers began to worry the Chinese government, which feared an ominous bubble might have developed in the domestic real estate market. Therefore, policy makers have begun to take a much more proactive approach in controlling the market and reigning in the steep rise in housing prices.

[4] Qiao, Xiao. *A Review of the Chinese Real Estate Market*. Thesis. UPenn, Wharton School, 2010. SIRE, 2010. Online. 19

[5] Roberts, Dexter. "Mania on the Mainland." *Bloomberg Businessweek*. Bloomberg, 30 Dec. 2009. Web. 11 Nov. 2011.
<http://www.businessweek.com/magazine/content/10_02/b4162030091917.htm>.

[6] Bo, Cai. *The Dilemma of Real Estate Market in Mainland China*. Thesis. University of Applied Sciences - Finland, 2011. Vaasa, Finland: Business Economics and Tourism - VAMK, 2011. 14

Figure 1: Shanghai and Beijing Housing Price Growth 2007-2010
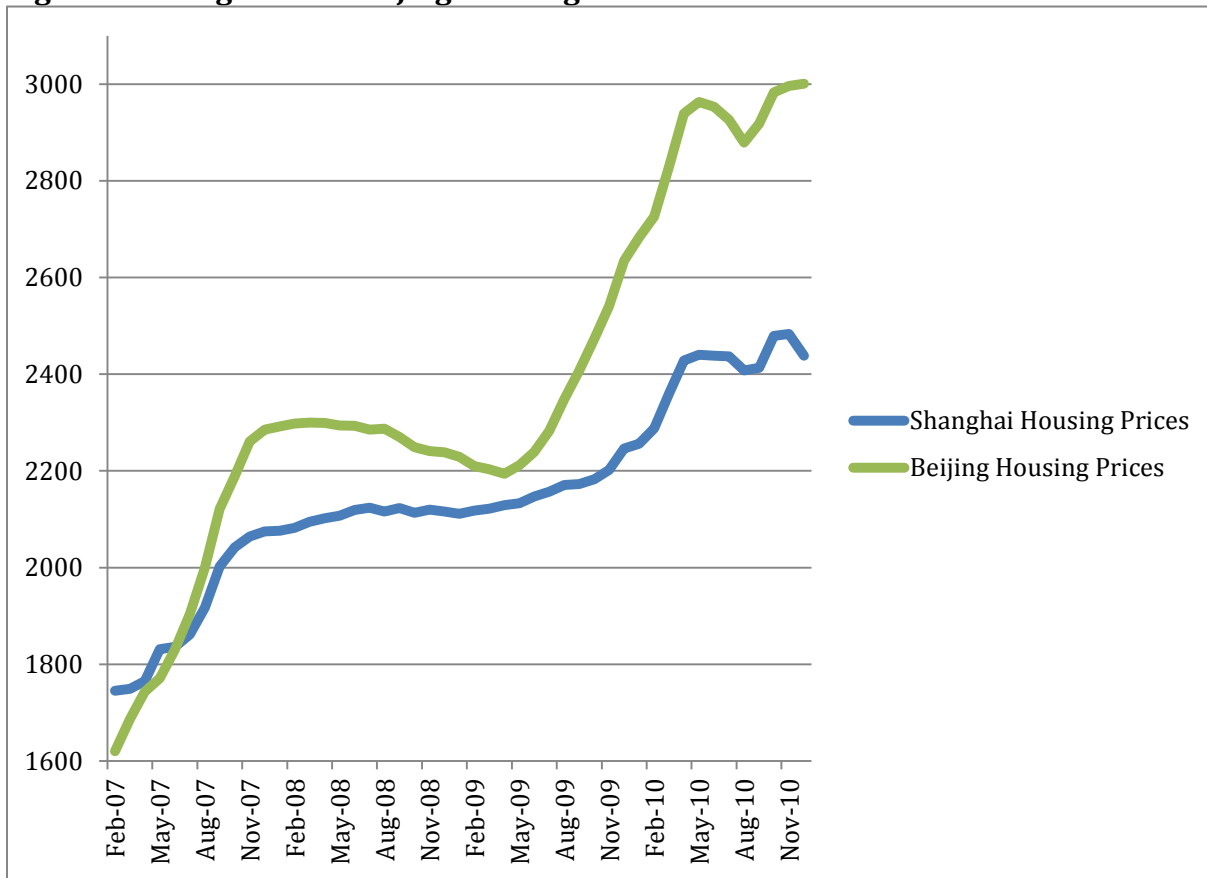
(Source: *SouFun Database*. CREIS. Web. 1 Mar. 2012. <http://soufun.com/>.)

By mid-2010, the Chinese government began implementing measures aimed at stemming speculative investment and cooling the property market. However, these policies have shown to be only marginally effective, with investment and housing prices rebounding the moment the government showed any hint of loosening its controls.[7] Faced with the mounting crisis in the real estate market, the Chinese government announced a new policy scheme at calming the market. This scheme came in the form of an experimental residential property tax that was implemented on a trial basis in Shanghai and Chongqing in late January 2011. The tax is the first of its kind in China, and the government has

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[7] Zhang, Yanbing, et al. "Monetary Policy and Housing Prices: A Case Study of Chinese Experience in 1999-2010." *BOFIT Discussion Papers* No. 17. 2011. 6

indicated plans to expand its implementation across the country. This has led many to closely watch the implementation of the tax and its consequent effects on its respective property markets. [8]

The aim of this thesis will be to examine the residential property tax on trial in Shanghai and Chongqing, and evaluate its effects, if any, on the two cities' local housing prices. The remainder of this paper will be divided into the following sections: Background on the Chinese real estate market and the new tax on trial in Shanghai and Chongqing; Theoretical Framework; Data and Methodology; Analysis; and Conclusion and Policy Implications.

1   Background

1.1   *Development of China's Real Estate Market*

The commercial real estate market in China is relatively young in comparison to the developed world. After the foundation of the People's Republic of China in 1949, China relied on a Soviet-style system of "welfare housing". Under this system, the majority of housing was allocated to employees by state owned enterprises (SOEs) with little to no regard of supply-and-demand economics. China continued to rely on this system until Deng Xiaoping began his heralded economic reforms in the late 1970s. The real estate industry then began a gradual transformation that developed it into the more market-oriented industry that it is today. Hung-Gay Fung, Jau-lian Jeng and Qingfeng "Wilson" Liu break

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[8] KPMG. *Shanghai and Chongching Pioneering Property Tax on Trial Basis*. Issue brief no. 6. China Alert. 2011.

down the complicated development of China's real estate market into five simple stages that more easily explain its development after the founding of the People's Republic China. [9]

The first stage of development accounts for the period between the founding of the People's Republic in 1949 to the economic reforms in 1978. During this period, the real estate industry was left relatively unchanged and relied on the aforementioned Soviet-style of "welfare housing." The second stage of development began after Deng Xiaoping initiated economic reforms in 1978 and lasted until 1987. This period saw communist China's first experiment in a market-based real estate industry. It began using the "One-third Housing Sale Model" in select cities, and thus, began the gradual dismantling of the long used Soviet-style "welfare housing" system. This model required the government, SOEs, and individuals to each cover one-third of construction and maintenance costs of new housing units.[10]

The third stage of development lasted from 1987 to 1991 and saw the formal initiation of the marketization process of the real estate industry with the passage of an amendment to the constitution allowing for the transfer of land-use rights. However, before the transfer of land-use rights was introduced throughout the country, the government created the Public Accumulation Fund (PAF). This program was funded by a wage tax and aimed to ease the coming burden of housing purchases by Chinese citizens.[11] The fourth stage, from 1992 to 1997, witnessed the adoption of the Real Estate Law, which provided the legal framework for the real estate market at the national level. It also witnessed

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[9] Fung, Hung-Gay, et al. "Development of China's Real Estate Market." *Chinese Economy* 43 (2010): 71-92. 72
[10] Fung, et al., 72
[11] Fung, et al., 72

gradual relaxation of regulations, and the introduction of land-use right transfers on a wide

scale in designated economic development zones.[12]

The fifth and current stage of development began in 1998 and has seen the removal

of all the remaining parts of the Soviet-style "welfare housing" system as well as a

furthering of real estate industry's marketization process. In 1998, the State Council issued

a directive essentially ending the "welfare housing" system by forcing employers to convert

real housing distribution to financial housing assistance. Thereafter, urban residents have

relied on personal salaries, the PAF, personal mortgage loans, and financial housing

subsidies provided by employers in order to purchase housing.[13] Since this current phase

began in 1998, the Chinese real estate market has grown at an extraordinary fast pace, with

real estate capital accounting for 42.6% of national GDP by 2005.[14]

As personal wealth began to grow more rapidly in China, people began to pour

money into the quickly developing real estate market. Real estate investment has, thus,

boomed over the years, increasing at an annual rate of 22% from 1998 to 2007. [15] By 2011,

real estate investment alone, accounted for upwards of 60% of local GDP in many Chinese

cities, such as Beijing and Hangzhou. [16] This huge push towards real estate investment can

largely be attributed to the lack of investment opportunities for the majority of Chinese

citizens.

In most countries, the real estate market and the stock market are the two most

conventional options for investors. However, China's stock market has consistently

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[12] Fung, et al., 72
[13] Fung, et al., 73
[14] Fung, et al., 82
[15] Yang, Luo. "Real Estate Tax (RET) of People's Republic of China." *Journal of China Tax & Policy* 1.1 (2011): 34-40. 38
[16] Bo, 14

performed lower than the world average for the majority of its existence. The market did realize some heavy growth after it began operating in 1990, but after peaking in 2000, it slowly reversed and lost half its 2000 market capitalization by mid-2005. This downturn in the stock market also coincided with the first major boom in the domestic real estate market, and, thus, resulted in a negative perception towards investment in stocks among Chinese citizens.[17]

In addition, without the sound accounting or auditing systems, or the efficient legal or bond-rating systems, commonly found in more developed countries, China also lacks a well-developed bond market. As a result, most firms typically shy away from obtaining capital through such avenues, thus, further decreasing investment options for Chinese people. With the absence of other major investment avenues in China, the majority have chosen real estate, and have, thus, helped to push the huge boom in real estate investment.[18]

1.2   *Current Issues in the Real Estate Market*

This real estate boom has made many people in China considerably rich, but has also allowed much of China's new wealth to be heavily concentrated in the real estate market. For example, on the list of China's richest people in 2011, four of the top ten made their wealth from real estate development. Two others on the list made their money from the home appliance and construction manufacturing industries; two industries that are both heavily reliant on the growth of the real estate market. When looking past the top ten,

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[17] Qiao, 3
[18] Qiao, 4

people who have made their wealth from the real estate market grow even larger in

number.[19]

Chart 1: Richest People in China 2011

RICHEST PEOPLE IN CHINA 2011	WEALTH	INDUSTRY
Liang Wen'gen	**$11 Billion**	**Construction Manufacturing**
Zong Qinghou	$10.7 Billion	Beverages
Li Yanhong	$8.8 Billion	Internet
Yan Bin	$7.8 Billion	Diversified
Xu Jiayin	**$7.2 Billion**	**Real Estate**
Wang Jianlin	**$7.1 Billion**	**Real Estate**
Wu Yuan	**$6.6 Billion**	**Real Estate**
Liu Yongxing	$6.4 Billion	Agriculture
He Xiangjian	**$6.3 Billion**	**Home Appliance**
Yang Huiyan	**$5.6 Billion**	**Real Estate**

(Source: Zeveloff, Julie. "Meet The 10 Richest People In China." Business Insider, 8 Sept. 2011. Web. 1 Mar. 2012. <http://www.businessinsider.com/richest-people-in-china-2011-9>.)

The real estate industry is now undoubtedly a major concern for the Chinese

government as it is one of the most important elements supporting China's economic

growth. To elaborate, apart from the sectors inherent in the real estate industry (e.g. real

estate investment and development, consulting, appraisal and property management), over

60 other industries are either directly linked to or heavily reliant on the continued growth

of the domestic real estate market. These sectors, among others, include the following

industries: the construction, raw materials, energy, banking and financial, home appliance

and advertising. [20]

The banking and financial industries' exposure to the real estate market is debatably

large. In 2009, home mortgages and loans to real estate developers accounted for 20% of

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[19] "The World's Billionaires 2011." *Forbes*. Forbes Magazine, Oct. 2011. Web. 10 Mar. 2012. <http://www.forbes.com/lists/2011/10/billionaires_2011.html>.
[20] Bo, 13

all outstanding loans in China. This at first seems insignificant when compared with more developed real estate markets, such as in the U.S. or Hong Kong, where the same types of loans account for more than 50%. However, the Chinese banking and financial industries' ultimate exposure is equally as large when taking into account all the other industries heavily reliant on the domestic real estate market. In 2009, the amount of loans made to these industries accounted for 24% of all outstanding loans. Shocks to the real estate market would greatly lower demand for these industries and ultimately hinder their ability to repay their loans. The banking and financial industries' exposure is then exacerbated by the use of real estate property as collateral to obtain loans by many of these firms. Shocks or price corrections in the real estate market would, thus, reduce the value of such collateral, and ultimately affect the banks' final balance sheets.[21]

Apart from these economic sectors, the government has also grown heavily reliant on real estate development. The government still legally owns all land in China, but the transfer of land-use rights is allowed; and, once purchased, an individual legally holds that right for seventy or more years. Local city and municipal governments can obtain large amounts of cash from selling land-use rights, and as the real estate industry has grown, this cash has become a major source of revenue for local governments. In Chongqing, where the government has heavily promoted the development of its urban real estate market, cash from these land-use right purchases has accounted for more than 30% of annual revenue over the past few years. [22]

The heavy concentration of economic development in China's real estate market has put the country in a particularly volatile situation. This reliance on the real estate industry

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[21] Bo, 16
[22] Bo, 14

and the fast paced growth the market has seen since 1998 has caused major economic and political problems for the Chinese government, particularly those stemming from the dramatic rise in housing prices. In many areas throughout China, high housing prices have made home ownership unattainable for many in the lower and middle classes. This has made evident the increasing economic inequality in China and poses a major threat to the central government, as it can potentially trigger vast social and political instability.[23]

In mid-2003, the state government attempted to mitigate this problem by promoting the construction of more affordable homes and encouraged banks to make more loans to developers that construct low-income housing.[24] This was done in an attempt to expand the supply of low-cost housing and force the market rate down to a more equitable level. However, though most Chinese experts agree that the promotion of low-income housing has helped curb China's rise in housing prices, it did not fix the problem.[25]

China continued to witness rapid growth in housing prices throughout the first half of the decade with a sharp increase between 2006 and 2007. However, after the U.S. housing "bubble" burst in the summer of 2007 and sent the world economy into a deep recession, the Chinese real estate market momentarily faltered. Foreign investment essentially dried up and exports fell considerably, decreasing market confidence and slowing domestic real estate investment. With the sudden drop in investment –both foreign and domestic– housing prices began to drop and many investors suffered major losses. [26] Shortly thereafter, the state government released its economic stimulus package and made cuts to the interest rate, and the real estate market quickly rebounded. Property sales

[23] Bo, 24
[24] Qiao, 10
[25] Qiao, 10
[26] Fung, et al., 86

soared 60% in the first seven months of 2009 and housing prices quickly rose to unprecedented levels.[27]

The boom in the real estate market after the release of the economic stimulus package can largely be attributed to the hurried investments made by SOE banks using stimulus funds. With the release of stimulus and a government order to invest, the SOE banks immediately began pouring money into the real estate market. Many began making hurried investments and purchased huge parcels of land. As a result, many SOE banks ultimately overpaid by 16% or more in many areas. This in turn caused real land prices to rise 97.4% in eight major Chinese cities during 2009, quickly causing a sharp increase in housing prices. Many fear that the funneling of stimulus funds into the property market has created an ominous housing "bubble" in China's real estate market.[28]

If there is a "bubble" in the Chinese real estate market, the government must be extremely cautious in its attempts to mitigate it. The consequences of a sudden burst in the real estate "bubble" could be fatal to the Chinese economy and ultimately could bring the entire world back into a deep economic recession. Therefore, overpriced housing is debatably one of the most troubling issues currently facing the Chinese government. Thus, it has been very keen on monitoring this issue, implementing a number of control measures over the past three years. However, if the government manages to stem the rise in housing prices but accidentally causes them to lower dramatically, people could begin to lose confidence in the real estate market. This would lower demand for housing and halt investment, causing a further drop in housing prices, consequently leading to major losses

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[27] "Bubble Fear as China Spends Big." *Northern Territory News* 21 Sept. 2009: 14.
[28] Wu, Jing, et al. "Measuring House Prices in China's Emerging Residential Housing Market." *IRES Working Paper Series.* June 2011. 7-10

for people currently in the market. This downward cycle has the potential to ultimately cause a collapse of the entire real estate market.[29] The failure of the real estate market would then hit the more than sixty industries tied to its development relatively hard, and ultimately could cause a collapse in the Chinese banking and financial industries. Such a shock to the economy would send China into deep economic recession and destroy many long years of positive growth.[30]

Besides this risky balancing act of stemming the rise in housing prices while not causing an economic crisis, the government also faces many other problems hindering its ability to enact positive change. Xiao Qiao notes in her paper "Review of the Chinese Real Estate Market" that "the actual implementation of policies" meant to correct the issues in the real estate market "may meet some resistance due to diverging goals for the central government and housing developers."[31] While the government wants to promote the construction of more affordable housing, property developers do not. Developers profit much more from constructing for high-end housing market than they do from the low-end. Therefore, developers are less willing to invest in affordable housing and have continued to focus on the more expensive and more profitable high-end market.

Apart from the problem with developers, the Chinese government has also developed a troubling relationship with the real estate market. Many government officials have heavily invested in the real estate market themselves, thus creating a conflict of interest that makes them reluctant to effectively implement price control measures. Local governments also have an incentive to hinder the new measures' effectiveness due to the

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[29] Bo, 41
[30] Bo, 42
[31] Qiao, 13

large amounts of revenue they receive from the selling of land-use rights. These issues are then exacerbated by the heavy government intervention already present in the real estate market. This long-term intervention has undermined the development of natural market mechanisms which have prevented the real estate market from undergoing any form of self-correction. [32]

1.3   *Recent Cooling Measures and the Residential Property Tax*

Faced with these problems, the state government has still managed to push nationwide implementation of policy measures aimed at cooling the real estate market. The most significant of these measures were implemented in April 2010. They include: an increase of the People's Bank of China's required reserve ratio; an increase in the required down payments for first homes from 20% to 30%; an increase in required down payments on second homes from 40% to 50%; a restriction on the use of any leverage on third homes or purchases from outside buyers (people not living in the respective market); and a ban on hoarding units by developers.[33] These measures were implemented throughout the country with some local governments adding stricter regulations while others have opted out of full implementation, such as Chongqing, whose municipal government chose to not place restriction on multiple purchases of residential properties. [34] In spite of these new measures, housing prices across the country continued to rise throughout 2010. So in

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[32] Qiao, 16
[33] Qiao, 12
[34] Durfee, Don, and Chris Buckley. "China Property Tax Could Go Nationwide - Chongqing Mayor." *Reuters*. Thomas Reuters, 28 Sept. 2011. Web. 01 Mar. 2012. <http://in.reuters.com/article/2011/09/29/idINIndia-59608720110929>.

January 2011, the government announced a new measure aimed at controlling this rise in housing prices.

This new policy scheme came packaged in the form of an experimental residential property tax implemented on a trial basis in two of China's four municipalities: Shanghai and Chongqing.[35] This tax is the first of its kind in China as it targets individual property owners instead of just developers and comes after many years of rumored property tax reform.[36] The government has yet to publicly announce any plans, but it is widely believed that a tax based on the one on trial in Shanghai and Chongqing will be implemented nationwide in the near future.[37]

The municipal governments of Shanghai and Chongqing began levying the residential property tax in tandem on January 28, 2011. Government leaders have stated that both taxes are part of the wider campaign to stem the rise in housing prices and cool the real estate market.[38] The two cities both levy the tax on an annual basis and primarily target individual property owners, particularly those likely to be making speculative investments. However, the tax does have differences in both form and policy between the two cities.

Shanghai's residential property tax only affects properties purchased after its implementation. Of these newly purchased properties, the tax only targets second or

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[35] China currently has four state controlled municipalities: Shanghai, Beijing, Tianjin and Chongqing.
[36] Pheny, Monica, and Pauline Wong. "Recent Development of Real Estate Tax on Residential   Properties in Chin." *International Tax Journal* 1 (2011): 51-59. 52
[37] KMBG
[38] Papuc, Andreea, and Bonnie Cao. "Chongqing, Shanghai Mull Property Tax This Quarter to Curb Surging Prices." *Bloomberg*. Bloomber L.P., 9 Jan. 2011. Web. 25 Mar. 2012. <http://www.bloomberg.com/news/2011-01-09/chongqing-mulls-luxury-   property-tax-in-first-quarter-update1-.html>.

subsequent homes purchased by residents with local household registration and all homes purchased by residents without a household registration in Shanghai (including those living and working within the city with resident permits). During the initial stage of the tax, liability will only be calculated based on the transaction price but will eventually move to a liability based on the homes' current market value in the near future. The tax is currently levied at a rate of 0.6% on a home's transaction price if it is more than double the average price per square meter in the same locale the previous year. The tax then drops to a lower rate of 0.4% for all other properties. Exemptions exist for properties less than 60 square meters and for first time homebuyers who are moving out of their parents' household. Residents who do not hold household registration in Shanghai, can also be exempt from the tax if the individual is considered to be a "key talent," lives and works within the city and is purchasing their sole residential property. Exemptions also exist for other non-native residents who have lived and paid taxes in Shanghai for three or more years and are also purchasing their sole residential property. Refunds for the tax exist for families with local household registration if they are found to be purchasing property that will replace their sole residential property. [39]

The tax implemented in Chongqing differs from the one in Shanghai in several ways. While Chongqing primarily targets residential properties purchased after the tax's implementation, it also targets detached residential properties (i.e. villas) purchased both before and after the implementation of the tax. Like Shanghai, the tax liability in Chongqing will be calculated on transaction price and move to one calculated on market value later on. The tax is levied at a rate of 0.5% to 1.2% based on the location and type of residential

[39] KPMG

property. The tax's exemptions are also much more limited in Chongqing than in Shanghai – only exempting detached residential properties purchased prior to implementation if they are less than 100 square meters. No exemptions exist for residents who do not hold household registration in Chongqing, and a household can only receive an exemption once.[40]

1.4 *Housing Prices After Implementation*

After the residential property tax was implemented in Shanghai and Chongqing, both cities began to see a gradual cooling of their real estate markets. Housing prices in both cities even realized a slight drop by the end of the year. The reasons behind the recent drop in housing prices are unclear, but people have not shied away from speculating on the recent phenomenon.

In an interview conducted in October, 2011, Chongqing's mayor, Huang Qifan, commented on the condition of his local real estate market, noting that Chongqing had the lowest average housing prices of China's seventy largest cities. He attributed this success to the new residential property tax, considering the implementation of the tax correlated with the cooling of the local property market. [41] But, Huang Qifan may have spoken a bit too soon on the effectiveness of the new residential property tax.

Cooling in the Chinese real estate market has not been contained to only Chongqing and Shanghai. Property markets all over China have seen drops in housing prices in the second half 2011 with nationwide average housing prices falling 0.3% in November. In addition, while Shanghai and Chongqing have managed a relatively mild drop in housing

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[40] KPMG
[41] Durfee, Don, and Chris Buckley

prices in the later half of 2011, other cities without the residential property tax have seen

much larger drops, such as Beijing where new housing prices fell by 13.45% during the

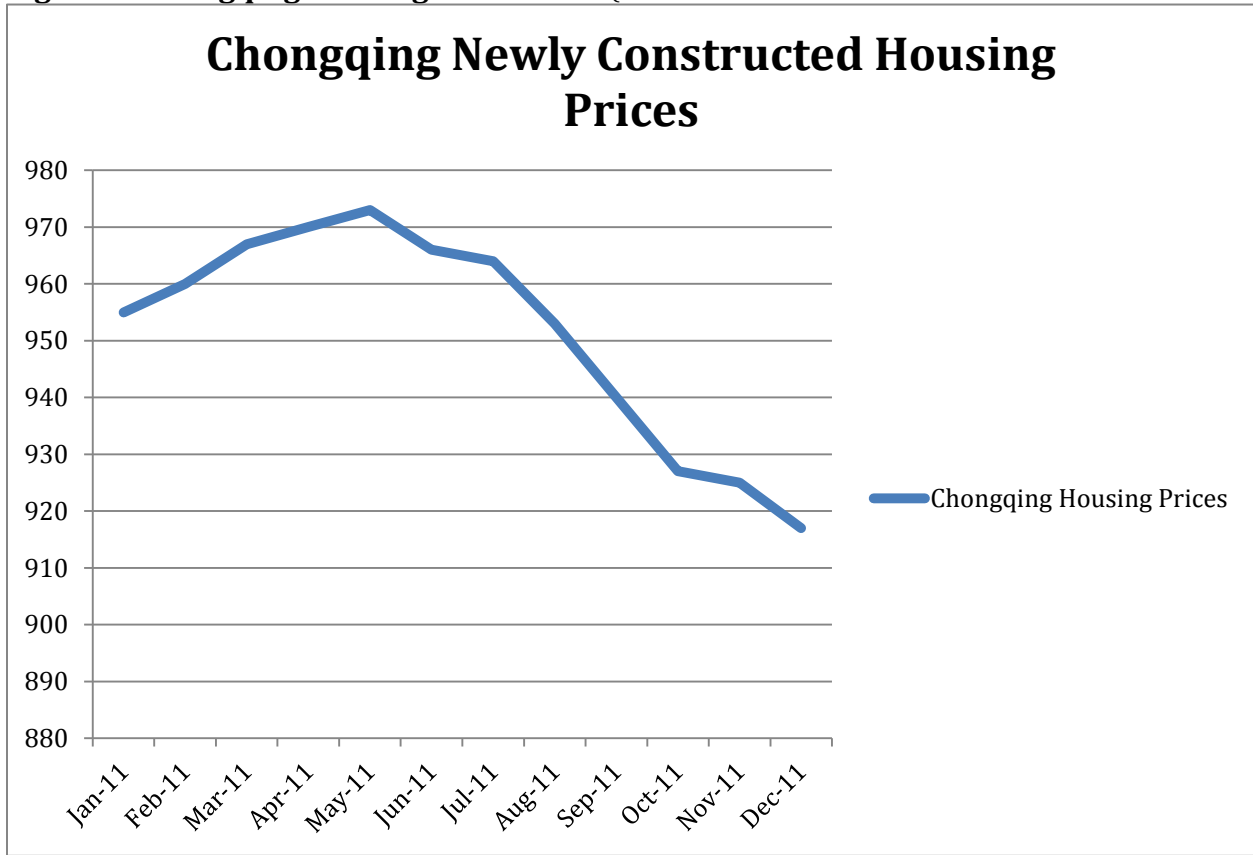same period.[42]

Figure 2: Shanghai Housing Prices 2011

(Source: *SouFun Database*. CREIS. Web. 1 Mar. 2012. <http://soufun.com/>.)

[42] "China Slows Significantly, House Prices Vulnerable." *Global Property Guide*. Matthew Montagu-Pollock, 9 Dec. 2011. Web. 20 Feb. 2012.
<http://www.globalpropertyguide.com/Asia/China/Price-History>.

Figure 2: Chongqing Housing Prices 2011 (Source: *SouFun Database.* CREIS. Web. 1 Mar. 2012. <

http://soufun.com/>.)

2   Theoretical Framework

2.1   *Causes of the Rise in Housing Prices*

In order to fully examine the effect the new residential property tax has on housing prices in Shanghai and Chongqing, one must first understand the underlying causes of the rise in Chinese housing prices. There has been much debate about what the definitive cause is of the rise in housing prices, and much research is still needed in order to determine it. Nevertheless, people have placed the blame on a number of issues for the cause of high prices.

Many, the media in particular, have largely focused their blame on the numerous issues surrounding the central government's stimulus package and the loose monetary policies enacted after the onset of the 2008 financial crisis. Others have relatedly placed the blame on the government's inability to control inflation which has resulted in a steep rise in overall price levels in the economy. They argue that many Chinese people have begun to heavily invest in order to safeguard themselves from this rising inflation, and the majority has chosen to do so in real estate as little to no other investment options exist for them. In contrast to this belief, others hold that the rise in housing prices is only the natural result of China's fast economic growth, and not the result of a real estate "bubble". These people argue that as economic prosperity has increased over the years, income, savings rate and overall demand for housing in China have increased as well which has unavoidably raised the price of housing.[43]

Although these are the most popular beliefs stated, the number of explanations people have pointed to for the rise of Chinese housing prices are endless, ranging from the realistic to the absurd. Yanbing Zhang, Xiuping Hua and Liang Zhao looked in to this very issue in their paper "Monetary Policy and Housing Prices: A Case Study of the Chinese Experience in 1999-2010". They searched through the many explanations given for the rise in housing prices to find which ones had the most credibility. They came across a number of hypotheses that held a relative amount of merit, many of which were even statistically testable.

These statistically testable hypotheses include the three popular explanations discussed earlier as well as others that attribute the rise in housing prices to the growth of

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[43] Zhang, et al., 13

international trade, foreign exchange rate, speculative investment due to expectations of

RMB appreciation, growth of foreign currency reserves, and the growth of China's domestic

stock market. Other credible explanations exist but lack available data needed to test them

statically. These explanations attribute the rise in housing prices to various economic

factors such as rural to urban migration, insufficient housing supply, level of State-owned

enterprises' participation in the market, and overall economic openness.[44]

Zhang, Hua and Zhao used various economic variables to account for these

explanations and tested the validity of their explanatory power for Chinese housing prices

from 1999 to 2010. Their analysis found a number of enlightening results. One found that

China's stock markets played a significant role in housing price dynamics. However, they

also found that a key income variable, personal disposable income, played no explanatory

role in the changes of housing prices. This, along with the weak explanatory power found of

other variables related to economic growth (GDP, industrial output, etc), point to the

weakness of the hypothesis many state that the rise in housing prices was the natural

result of China's economic growth. In contrast, they found that many variables relating to

inflation and monetary policies (CPI, PPI, M2, Lending Rate) more definitively explain the

rise in housing prices. This shows that inflation and the government's loose monetary

policies following the 2008 economic crisis could be more the more plausible explanation

behind the recent boom in housing prices. [45]

When looking outside of China, similar results are found. Kostas Tsatsaronis and

Haibin Zhu analyzed housing price dynamics across seventeen industrialized nations over a

five year period in their paper "What Drives Housing Price Dynamics: Cross-country

[44] Zhang, et al., 14-16
[45] Zhang, et al., 30

Evidence". They found that inflation played the most significant role in the change of

housing prices. Their analysis showed that inflation accounted, on average, for more than

50% of housing price variations over a five-year period. In the short run, inflation was

found to account for up to 75% of total price variations during a one-year period and

jumped even higher to 90% during a one-quarter period. [46]

Apart from inflation, Tsatsaronis and Zhu also found three other factors that played

a significant role in housing price dynamics. These were bank credit, short-term interest

rates and credit spreads. Together, these three variables were found to account for about

one-third of housing price variations in the long term, and each played about an equal size

role in their effect. They also found that personal income played a marginal role in

determining housing prices, accounting for less than 10% in the long term. [47]

The two studies done by Tsatsaronis and Zhu and Zhang, Hua and Zhao both hint at

the weakness of using China's economic growth as an explanation for the rise in housing

prices. At the same time, they also give much more legitimacy to inflation and monetary

policy factors' explanatory power on the changes in housing prices. The recent cooling of

housing prices across China in 2011 supports this further as they have coincided with a

tightening of monetary policies, namely the raise in lending interest rates.[48] Therefore,

these factors should be carefully considered when analyzing any effect the new residential

property tax has on the housing prices in Shanghai and Chongqing.

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[46] Tsatsaronis, Kostas, and Haibin Zhu. "What Drives Housing Price Dynamics: Cross-country Evidence." *Biz Quarterly*. 2004. Web. 13 Oct. 2011. <http://interbank.org>. 8
[47] Tsatsaronis, et al., 9
[48] Wassener, Bettina. "China Raises Interest Rates." *New York Times.* 6 July 2011. Web. 11 Nov. 2011. <http://www.nytimes.com/2011/07/07/business/global/07yuan.html>

2.2   Residential *Real Estate Taxation's Effect on Housing Prices*

Aside from the above two studies, some have also theorized that the complicated Chinese real estate taxation policy and structure of local government revenue streams play a contributing role in the rise of housing prices. There are currently eleven types of property taxes in China, most of which are primarily levied on property developers. In addition, there is also the Land Grant Fee and numerous other fees related to property development. Together, these taxes and fees form an overly complicated taxation policy and are largely unrelated to the market value of the targeted properties. Thus, local tax revenue has a limited correlation with changes in property values, and local governments are left heavily reliant on the continued sale of land-use rights and property development. As a result, local governments have promoted the sale of land-use rights, contributing to the boom in real estate and leaving themselves reluctant to effectively calm the overheated market.[49]

Many studies have been conducted on this current tax system in China. One study done in 2010 by Weida Kuang and Hua Zhou analyzed how increases in these property taxes have affected housing prices in select major Chinese cities. They found that these taxes have had only a marginal effect on housing prices. Prices were seen to decrease by as little as 0.02% for every 1% increase in property taxes. [50] This leaves the direct effect of the current system of property taxation on housing prices largely trivial. However, the

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[49] Pheny, Monica, and Pauline Wong, 53
[50] Kuang, Weida, and Hua Zhou. *Property Tax, Supply and Demand Elasticity and Housing Prices.* Proc. of 2010 3rd International Conference on Information Management, Innovation Management and Industrial Engineering. IEE Computer Society, 2010. 11-14. 13

implementation of the new residential property tax could signal a change in the effect

China's tax policy currently has on housing prices.

How the new tax in question will affect housing prices is still in need of much

research, but one study has already been conducted specifically examining the tax's effect

on its targeted homeowners. Luo Yang published a paper in late 2011 on the new

residential property tax's effect on rigid demand and real estate investment in Shanghai. He

created four scenarios in which he analyzed the tax's theoretical effect on income and

investment profit of those purchasing new housing liable for taxation. He found that the

tax's effect on income was relatively marginal but theoretically still had enough power to

restructure the real estate market in Shanghai. He theorized that the tax may not suppress

rigid housing demand in Shanghai but still could offer enough incentive for the lower and

middle classes to choose less expensive housing, particularly those located outside the city

center. As for real estate investment, Yang determined that the low rate of the tax in

Shanghai would have a limited effect on investments profits, therefore limiting its ability to

prevent speculators from investing in the market. He concluded that the tax would not be

an effective method at suppressing housing prices, and the government should focus on

other methods in order to achieve its goals. [51]

Studies directly related to residential real estate taxes' effect on housing prices are

numerous, but since this is a relatively new concept in China, the vast majority –if not all–

have been done in more developed markets, such the United States. In these markets,

residential property taxes have been levied for the majority of its existence. Thus, studies

largely focus on the effect of increases in residential property taxes on housing prices in the

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[51] Yang, 39

long term. In addition, the majority of this literature primarily deals with residential property taxes effect on housing prices in relation to changes in the level of goods and services provided by local tax revenue. However, China's real estate taxation policy as well as the structure of its local governments is vastly different from those found in the Western world, and this difference should be taken into consideration.

Homeowners liable for taxation in China are considered "stakeholders in the process of development" as opposed to "beneficiaries of local public services" which is the more commonly held notion in the West.[52] The Chinese government has stated that revenue from the new residential property tax will not be used for public services but will instead be used exclusively for funding new low-cost housing construction programs.[53] Therefore, when reviewing literature on residential real estate taxes' effects on housing prices, one should focus on literature that analyzes the tax's effect on housing prices without a primary focus on the change in public services.

Of these usable studies, the results largely come to the same conclusion: an increase in the rate of residential property taxes usually results in reduced property values. R. J. Cebula came to this conclusion by finding that housing prices as a whole tend to have a negative correlation with an increase in property taxes. [54] Diane P. Krantz, Robert D. Weaver and Theodore R. Alter support this finding in their own study, which found that changes in residential property tax rates can account for upwards of 60% of the changes in property values in the long term, and increases in the tax rate usually result in reduced

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[52] Qing, Zhang, and Xujian Guo. "The Modernization of Real Estate Taxation in China." *Journal of Property Tax Assessment & Administration* 3 (2006). 5-12
[53] Yang, 35
[54] Cebula, R. J. "Are property taxes capitalized into housing prices in Savannah, Georgia An investigation of Market Mechanism." *Journal of Housing Research* 18 (2009). 63-75

property values. [55] Wallace E. Oates also came to similar conclusions where his multi-market study found that increases in residential property taxes are primarily capitalized in the form of reduced property values. [56] However, these studies have all been done in well-developed markets with long histories of residential property taxation. The taxes studied also have much higher rates and broader targets for taxation than do the new residential taxes in Shanghai and Chongqing. Therefore, the perceived effects of the tax should be much more limited on housing prices in Shanghai and Chongqing than these studies suggest.

3   Data and Methodology

3.1   Data

The aim of this thesis is to examine the residential real estate tax on trial in Shanghai and Chongqing and analyze its effects, if any, on local housing prices after its implementation in late January 2011. Implementation of the tax is currently limited to Shanghai and Chongqing, which provides a particularly rare opportunity for analysis. With only two major cities levying the trial real estate tax, an extensive pool of major Chinese cities without the tax is available in order to compare changes in housing prices. In addition, Shanghai and Chongqing are two of China's four municipalities; the other two are Beijing and Tianjin. These municipalities are directly controlled by the Chinese state government and therefore tend to share a relatively similar impact from changes in the

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[55] Krantz, D. P., et al. "Residential Property tax capitalization: consistant estimates using micro-level data." *Land Economics* 58 (1982): 88-96.
[56] Oates, Wallace E. "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis." *Journal of Political Economy* 77 (1969): 957.

government's macro policies. These four cities are also the most populous and developed in China, and Beijing and Shanghai are home to the country's most mature real estate markets.[57]

In this analysis, local housing prices in the four municipalities and the major southern city of Guangzhou will be considered. The use of these five cities accounts for some of the most major real estate markets in China with the additional benefit of covering markets in the north, south, east and west. A panel data set covering monthly periods between February 2007 (before the world financial crisis) and November 2011 (nine months after tax implementation) is used. This is done in order to easily analyze the large amount of data, while still accounting for some of the differences between the five cities. Monthly-level data on housing prices and several other economic factors at the local and national level are used.[58] Data was obtained from the Wharton Research Database Service (WRDS), the Economic Intelligence Unit (EIU), the National Bureau of Statistics of China (NBSC) and the Soufun Internet Database, which compiles its data in cooperation with the China Real Estate Index System (CREIS).[59]

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[57] Du, Hongyan, et al. "The Impact of Land Policy on the Relation Between Housing and Land   Prices: Evidence from China." *The Quarterly Review of Economics and Finance* 51 (2011): 19-27. 21

[58] Real GDP and PPI are only published on an annual or quarterly basis. To resolve this issue, Cubic Spline Interpolation was used to split the quarterly-level data for real GDP and PPI into testable monthly frequencies.

[59] It should be noted that data on China is generally based on information issued by the Chinese government, which has resulted in notoriously poor quality; this should be taken into consideration when analyzing results.

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Shanghai	295	0	1	.20	.401
Chongqing	295	0	1	.20	.401
Beijing	295	0	1	.20	.401
Tianjin	295	0	1	.20	.401
Guangzhou	295	0	1	.20	.401
Hedonic Housing Price Index	295	395	1260	792.74	205.720
Newly Constructed Housing Price Index	295	614	3072	1766.04	639.035
Second Hand Housing Price Index	291	555	4775	2268.87	1181.546
Residential Real Estate Tax	295	0	1	.07	.252
Consumer Price Index	295	98	109	103.69	2.817
Producer Price Index	295	117	139	128.05	6.062
Real GDP	295	4252	10749	6211.97	1204.040
M2	295	35150	82549	56248.92	14635.018
Real Effective Exchange Rate	295	94.7	115.7	106.427	5.9041
Shanghai Stock Market Index	295	1816.3	6251.5	3246.758	9.56.2253
Central Bank Lending Rate	295	5.31	7.47	6.1690	.82822
Value-Added Industrial Output	270	5.40	19.40	14.1852	3.36599
Valid N (listwise)	268				

(Source: Soufun Internet Database; Wharton Research Service Database; Economist Intelligence Unit; and the National Bureau of Statistics of China)

3.1.1 Dependent Variables

Data on housing prices in Shanghai, Chongqing, Beijing, Tianjin and Guangzhou serve as the dependent variables in three different regression models. The Soufun Internet Database currently provides three monthly housing price indices: the Newly Constructed Housing Price Index, the Second Hand Housing Price Index and the Hedonic Housing Price Index. These housing price indices measure the average price per square meter of the different sub-markets in their respective cities.

The Newly Constructed and Second Hand Housing Price Indices are both compiled using the simple Laspeyres price indexing method. This method takes the average price per square meter in a particular market and compiles it into a weighted average using a particular base point. To elaborate, if the index has a base point of 1, an index value of 2 would indicate that housing prices have doubled in value from the base period given other factors, such as income, have not changed. It must also be noted that this method of price indexing has a tendency of to overstate inflation, and this issue should be considered when analyzing results. [60]

For the Newly Constructed Housing Price Index, Soufun uses a base point of 1000, which is based on Beijing's average housing price in December 2000. Indices for others cities are then made relative Beijing's base point and year. The Second Hand Housing Price Index uses a similar method but differs in that it uses Beijing's average second hand housing price in December 2004 as its base period. [61]

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[60] Diewert, W.E. Chapter 5: "Index Numbers" in *Essays in Index Number Theory*. eds W.E. Diewert and A.O. Nakamura. Vol 1. Elsevier Science Publishers: 1993
[61] "Index Research." *SouFun*. SouFun.com Limited, 20 Mar. 2012. Web. 20 Mar. 2012. <http://fdc.soufun.com/index/>.

The Hedonic Housing Price Index is a relatively new form of housing price indexing, particularly in China. The hedonic method attempts to control for differences in quality between housing properties with regards to price appraisal. For example, a studio apartment located in an old, poorly constructed building on the outskirts of town will value at a considerably lower price than a newly built five-star luxury apartment located in the center of the city. The hedonic method controls for these kinds of differences when estimating the average price of housing in a particular market. The hedonic method also tries to control for price differences over time due to inflation or improvements in construction quality.[62]

The hedonic price index provided by the SouFun Internet Database is compiled using data on the newly constructed sector of China's real estate market. This makes it extremely useful for this analysis, since the newly constructed sector in China is dominated by two extremes: government-promoted affordable housing and high-end residential properties. Thus, the Hedonic Housing Price Index offers a great opportunity to better analyze the trial property tax's effect on the newly constructed sector because it is able to control for the differences between these two types of housing. However, the accuracy of the hedonic indexing method is still at the center of much debate, and the SouFun Internet Database does not offer many details on what data is used in order to control for the price and quality differences in its index.[63] Therefore, these issues should be considered when reading any results obtained using this particular housing price index.

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[62] Coulson, Edward. "Chapter 2: A Brief Survey and Interpretation of Hedonic Parameters." *Hedonic Methods and Housing Markets*. Penn State University: Department of Economics, 2008.
[63] "Index Research."

The Hedonic and Newly Constructed Housing Price Indices are of particular importance to this analysis. Real estate transactions in China are heavily concentrated in the newly constructed sector, while the resale market remains relatively small in comparison. In addition, residential property investments –which are the most likely to be taxed– are more likely to be made in this sector. These two indices will offer two separate measurements of this particular housing sector and allow for a more in-depth analysis of the residential properties most likely to be affected by the new residential property tax.

3.1.2 Independent Variables

Apart from the city variables, the trial residential real estate tax (RET) and a number of economic factors are used for the independent variables. A dummy variable is employed to account for RET since it is only levied in two of the five cities, and its rate is unchanged during the time period. A value of "1" indicates a monthly period of residential property taxation, and a value of "0" indicates a monthly period of no taxation.

A number of other variables are used for control. These are the Consumer Price Index (CPI), Producer Price Index (PPI), real GDP, M2, Real Effective Exchange Rate (REER), Shanghai Stock Market Index (SSMI), China's Central Bank Lending Rate (Lending Rate) and Value-Added Industrial Output (VAI). These variables have either been found to affect housing prices in previous studies or account for some of the more practical explanations given for the rise in housing prices across China.

Variables used to control for economic growth are real GDP, VAI, and SSMI. Real GDP is a macroeconomic measure of the value of economic output adjusted for inflation and/or deflation. VAI is a measure of real production output by manufacturing, mining and

utilities industries. VAI and real GDP offer two measures of domestic economic growth and activity in China and help to control for price variations due to these factors. SSMI is a composite index measuring the overall performance of company stocks listed under the Shanghai Stock Market. This index offers a good measurement of the economic performance of domestic companies as well as the level of wealth and investment income in the economy.

CPI and PPI are used to control for inflationary effects on housing prices during the time period studied. CPI is an index that measures the price levels for consumer goods and services, while PPI measures price levels of the production costs received by domestic producers. PPI is of particular importance to the Chinese economy, where manufacturing and construction costs still make up a large share of domestic spending. PPI may also reflect changes in newly constructed housing prices sooner than CPI, as it more directly reflects changes in the costs of construction.

The Lending Rate, REER and M2 variables are used to control for effects brought on by changes in the Chinese government's fiscal and monetary policies during the time period studied. The Lending Rate is the interest rate set by the People's Bank of China, China's central bank, and is a tool commonly used to shape monetary policy. The Lending Rate is the rate at which banks can borrow from the central bank. Rate changes usually reverberate throughout the economy, influencing other interests rates, such as mortgage rates. M2 is a broad measure of currency in circulation within the domestic economy, and reflects changes in the government's fiscal and monetary policies. REER is the weighted average of the domestic currency relative to a basket of other major currencies adjusted for inflation, and reflects the purchasing power of the domestic currency. REER is usually not

under the control of government policy, but since the Chinese government has a debatable history of currency manipulation, REER is bundled with M2 and Lending Rate as part of the control variables for monetary policy.[64]

Apart from these variables, the usage of a panel data set offers other, unintended variables able to be analyzed: the cities themselves. To create the panel data set, five dummy variables (one for each city) were employed to indicate which data points corresponded with Shanghai, Chongqing, Beijing, Tianjin or Guangzhou. These variables are particularly useful, as they can reflect the variations in the housing price indices due to the location of the indices' respective markets.

3.2   Methodology

A fixed effect model of regression analysis is employed in order to determine the effect of the trial residential property tax on housing prices in Shanghai and Chongqing. This type of regression model allows for a more efficient analysis of many different variables and their effects on housing prices in different real estate markets over the period of time studied. The equation used is specified as follows:

$$\mathbf{PI_{i,t} = x_{i,t}\beta + \alpha_i + \varepsilon_{i,t}}$$

"$PI_{i,t}$" denotes the price index (Newly Constructed, Second Hand or Hedonic Housing Price Index) for the different cities (i) during the particular time period (t). "X_{it}" denotes the different independent variables (Residential Property Tax, Consumer Price Index, Producer

[64] Chan, Sewell. "China Says It Will Not Adjust Exchange Rate." *New York Times*. 24 Mar. 2010. Web. 20 Mar. 2012.
<http://www.nytimes.com/2010/03/25/business/global/25yuan.html>.

Price Index, real GDP, M2, Real Effective Exchange Rate, Stock Market Index, Lending

Interest Rate and Value-Added Industrial Output) for the different cities (i) during the

particular time period (t). β is the constant; α_i is the fixed effect term, and $\epsilon_{i,t}$ is the error

term.

4 Empirical Results

4.1 *Regression Results*

The following regression results are based on data obtained from the SouFun

Internet Database, the EIU, the WRDS and the NBSC:

Table 3: Regression Results

	Newly Constructed Price Index	Hedonic Price Index	Second Hand Price Index
R Square	.969	.963	.938
Constant (Shanghai)	-2562.122*** <1> (676.360)	-872.742*** <1> (238.278)	-7326.979*** <1> (1838.667)
Chongqing	-1411.667*** <-0.883> (22.192)	-496.500*** <-0.966> (7.818)	-2673.810*** <-0.900> (58.704)
Beijing	257.195*** <0.161> (23.122)	-20.818* <-0.040> (8.142)	-476.473*** <-0.161> (60.825)
Tianjin	-762.435*** <-0.477> (23.112)	-301.059*** <-0.585> (8.142)	-1720.764*** <-0.579> (61.151)
Guangzhou	-489.120*** <-0.306> (23.112)	-271.133*** <-0.527> (8.142)	-1808.195*** <-0.613> (60.825)
Residential Property Tax	-185.249*** <-0.076> (34.850)	39.581** <0.050> (12.278)	-303.555** <-0.067> (91.788)

Consumer Price Index	16.865** <0.075> (5.871)	2.066 <0.029> (2.068)	54.656** <0.132> (15.513)
Producer Price Index	12.740** <0.118> (4.265)	7.351*** <0.211> (1.502)	21.119 <0.105> (11.405)
Real GDP	.002 <0.003> (.010)	.001 <0.009> (.004)	-.023 <-0.023> (.027)
M2	.009*** <0.195> (.002)	.001 <0.048> (.001)	.037*** <0.455> (.006)
Real Effective Exchange Rate	10.850** <0.099> (3.599)	7.346*** <0.209> (1.268)	8.747 <0.043> (10.107)
Shanghai Stock Market Index	.057*** <0.087> (.015)	.031*** <0.145> (.005)	.087* <0.071> (.041)
Central Bank Lending Rate	-75.255** <-0.097> (27.528)	-39.716*** <-0.160> (9.698)	-107.252 <-0.075> (72.693)
Value-Added Industrial Output	5.239 <0.028> (4.098)	2.791 <0.046> (1.444)	4.614 <0.013> (11.085)
Coefficient. <Standardized Coefficient>. (Standard Error). *=p<.05, **=p<.01, ***=p<.001.			

4.1 *Newly Constructed Housing Price Index*

The Newly Constructed Housing Price Index was used as the dependent variable in the first regression model. The R Square for this model is 0.969, meaning that the independent variables account for an average of 96.9% of the variations in the Newly Constructed Housing Price Index. This at first seems extremely high, and could indicate spurious issues in the data, but given the limited amount of independent variables (the majority of which have previously been found to affect housing prices), this high of an R Square is not uncommon.

Apart from R Square, the model's p-values also showed interesting results. The p-value denotes the statistical significance of an independent variable at determining variations in the dependent variable. A p-value less than 0.05 indicates that the "null hypothesis"—the hypothesis that there is no relationship between the dependent variable and the independent variable—can be rejected. If the p-value is greater than 0.05, the "null hypothesis" cannot be rejected. Thus, independent variables with p-values lower than 0.05 hold greater statistical significance than those higher than 0.05. In this model all of the independent variables, except for real GDP and VAI whose p-values were both well above 0.05, have p-values less than 0.01. RET, M2, SSMI and the city variables were shown to have the most statistical significance, with p-values less than 0.001.

When attempting to analyze the independent variables effect on the Newly Constructed Housing Price Index, the beta coefficients are of particular importance. This model provides two different types of beta coefficients: the Standardized Coefficient and the Unstandardized Coefficient. Both of these coefficients denote the average rate of change in the dependent variable relative to a one-unit change in the independent variable. However, they differ in that the Standardized Coefficient controls for differences in the independent variables' units of measurement by standardizing the variables' different units of measurement so that their variance is 1. For example, the M2 variable has a very different unit of measurement than the Lending Rate variable, with M2 deviating between 35,150 and 82,549 during the period studied and the Lending Rate variable deviating between 5.31 and 7.37. Therefore, a one-unit change in the unstandardized M2 variable will have a much lower effect on the dependent variable than a one-unit change in the unstandardized Lending Rate variable. The Standardized Coefficient corrects this issue by

standardizing the variables' variances; thus, more attention will be placed on the Standardized Coefficient when analyzing results, as the independent variables widely differ in their units of measurement.

The beta coefficients of the statistically significant variables in the Newly Constructed Housing Price Index Model revealed surprising results. The variables shown to have the largest effect on the newly constructed housing prices in the different cities are the cities themselves. This can indicate that a large amount of the differences in the newly constructed housing prices are relative to which city the property is located. It can also indicate other factors unique to each city play a significant role in housing price deviations and are not included in this regression model.

Apart from the cities, other statistically significant variables were found to have substantial effects on housing prices. According to the Unstandardized Coefficient, RET—the main independent variable being analyzed—was found to have the largest depreciating effect on housing prices, causing an average decrease of 185.249 on newly constructed housing prices in Shanghai and Chongqing over the course of its existence. However, when looking at the Standardized Coefficients, the effect of RET is put into clearer perspective.

According to the Standardized Coefficients, RET was not found to have the largest effect on newly constructed housing prices. In fact, all of the other statistically significant variables, except for CPI, were found to have larger effects on newly constructed housing prices. M2 was found to have the largest effect on the New Constructed Housing price Indices, causing an average increase of 0.195 in the Newly Constructed Housing Price Indices for every one-unit increase in the standardized coefficient. M2 is then followed by PPI, REER, SSMI and CPI, which caused an average increase in the Newly Constructed

Housing Price Indices of 0.118, 0.099, 0.087 and 0.075, respectively, for every one-unit increase. The Lending Rate also proved to be of importance in that for every one-unit increase in its standardized coefficient, an average decrease of 0.097 was realized in the standardized coefficients for newly constructed housing price indices.

What do these results *mean* for the residential real estate tax on trial in Shanghai and Chongqing? First, this regression model concludes that the tax does have a depreciating effect on housing prices in the newly constructed sector in both Shanghai and Chongqing. However, its effect is relatively small when compared to the other independent variables, particularly in regards to the final ten months of the model's time period.

During those final ten months (February 2011 to November 2011), newly constructed housing prices in the five cities began to depreciate. Although the implementation of the tax correlates with this occurrence, and the model indicates the tax did play a role in both Shanghai and Chongqing, the regression model also reveals the greater importance of the effects caused by other independent variables on this period of depreciation. For example, at the same time the tax was implemented, the Lending Rate and the SSMI both underwent changes that, according to the regression model, would cause decreases in the Newly Constructed Housing Price Indices. The Chinese government raised the Lending Rate three different times during the period, raising it from 5.81% in January 2011 to 6.56% by November. At the same time the SSMI began to fall, lowering from 3,042 to 2,445 during the final ten months. This model indicates that these two variables may have played more significant role relative to RET in the depreciation of housing prices in the newly constructed sector during 2011.

Apart from the RET, the model also indicates a number of points regarding the various explanations for the rise in housing prices in China. This model corresponds with previous studies, such as Yanbing Zhang's, in that major factors related to economic growth (GDP and VAI) do not seem to hold significant explanatory power for the rise in housing prices.[65] The model also suggests that factors related to inflation and monetary policies (CPI, PPI, M2, REER and the Lending Rate) have played a more important role in the rise of housing prices since 2007.

4.2   *Hedonic Housing Price Index*

The Hedonic Housing Price Index was used as the dependent variable in the second regression model. The R Square for this model was similar to the Newly Constructed Housing Price Index Model at 0.961, indicating the independent variables account for 96.1% of the variations in the Hedonic Housing Price Indices. However, apart from R Square, the model reveals huge differences in the statistical results for Hedonic Housing Price Indices.

While all variables except real GDP and VAI were statistically significant in the Newly Constructed Housing Price Index model, only the cities, RET, PPI, REER, SSMI and the Lending Rate proved to be statistically significant for the Hedonic Housing Price Indices. In addition, the beta coefficients showed major differences in the statistically significant variables' effects on newly constructed housing prices. The most notable is the beta coefficient for RET. While the Newly Constructed Price Index model indicated a depreciative effect for RET on housing prices in the Newly Constructed Price Index model,

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[65] Zhang, 15

RET is seen to hold the opposite effect in the Hedonic Price Index model. The discrepancy between the two models on the effect of RET, as well as the lack of statistical significance for CPI and M2, are of major concern because this could indicate important differences in the way the Newly Constructed and Hedonic Housing Price Indices reflect variations in the average housing price for the newly constructed housing sector.

As previously discussed, the Hedonic Housing Price Index differs from the Newly Constructed Housing Price Index in that it attempts to control for differences in price between properties due to quality variations. Because of this, the Hedonic Housing Price Index may give a more accurate picture of average housing prices in the newly constructed sector, particularly in regards to possible discrepancies found in the Newly Constructed Housing Price Index due to the large presence of both newly constructed affordable housing and newly constructed high-end housing. The results for the Hedonic Housing Price Index model suggest evidence in support of this claim.

To begin with, the regression models showed major differences in the statistical significance of the two variables accounting for inflation, CPI and PPI. CPI was found to be insignificant in the Hedonic model with a p-value of 0.319, while the same variable in the Newly Constructed Housing Price Index model held a p-value of much higher significance at 0.004. On the other hand, PPI was found to be statistically significant in both models, even increasing in significance in the Hedonic Housing Price Index model. This issue could be due to the different targets of measurement for CPI and PPI. CPI measures the inflation of consumer goods and services, while PPI measures the inflation of manufacturing and construction costs. PPI should then sooner reflect changes in newly constructed housing prices than CPI because changes in construction costs will more directly effect newly

constructed housing prices than the changes in the price of factors measured by CPI, such as food or realtor services. Therefore, the Hedonic Housing Price Index may give more influence to PPI due to its more accurate measurement of housing prices in the newly constructed housing sector.

Apart from CPI and PPI, M2 was also found to have huge discrepancies between the two regression models. While M2 was one of the most statistically significant in the Newly Constructed Housing Price Index model with a p-value of 0.000, M2 holds an extremely high p-value in the Hedonic model at 0.414. This difference could indicate issues with the Hedonic Housing Price Index, but could also indicate the possibility of issues with the Newly Constructed Housing Price Index. For example, the method used to compile the Newly Constructed Housing Price Index has the tendency to overstate inflation. Although M2 is not part of the variables used to control for inflation, M2 does have a correlating relationship with inflation, as it measures the amount of currency in circulation. If the Newly Constructed Housing Price Index is overstating the inflation levels during the time period studied, the possibility exists that it provided a less than accurate portrayal of M2 and CPI's effect on housing prices in the newly constructed housing sector.

Aside from CPI and M2, the differences in the two models statistical results regarding RET could indicate that the Hedonic Housing Price Index more accurately depicts changes in the newly constructed housing prices as well. According to Luo Yang's study on the new residential real estate tax, the tax rate was not high enough to affect rigid demand or investment income, meaning that, in theory, the tax should not have a depreciative effect on housing prices.[66] The Hedonic Housing Price Index model supports this theory in two

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[66] Yang, 29

ways. First, the RET variable in the Hedonic Housing Price Index model did not have a depreciating effect on newly constructed housing prices, it in fact had the opposite. Second, the increase in the newly constructed housing prices caused by RET in the regression model could indicate the RET did not have a negative effect on rigid demand for newly construct housing. The extra costs of the tax could have simply fed into higher prices in the newly constructed housing sector. The Hedonic Housing Price Index's advantage over the Newly Constructed Housing Price Index at depicting these results could be due to the possibility that the newly constructed housing sector in China has major differences in quality between properties. Thus, the Hedonic Housing Price Index is able to more accurately depict the average price of housing in this sector because it corrects for these differences.

4.3 *Second Hand Housing Price Index*

The Second Hand Housing Price Index model also proved to have interesting results with the independent variables differing from both the Hedonic and Newly Constructed Housing Price Index models. While the model's R Square is similar to the previous two models at .938, a few key variables in the previous models were found to be of quite less importance in the Second Hand Housing Price Index model: PPI, REER, and the Lending Rate.

The most statistically significant variables for this model include: the cities, RET, CPI, M2 and SSMI. Although RET was found to cause a decrease in the Second Hand Housing Price Indices of 0.067 for a one unit change in its standardized coefficient, SSMI was, not surprisingly, found to have an even larger impact on second hand housing prices,

causing an increase of 0.071 for every one-unit increase in the SSMI's standardized

coefficient, or an inverse of -0.071 for every one-unit decrease. The continuing significance

of the SSMI's explanatory power on housing price indices in the three models may indicate

that a relationship between stock market investment and real estate investment. At the

same time, if the SSMI is looked at as a measure of nominal wealth or level of activity in the

market economy, these models may also suggest that these factors have a consistent effect

on housing prices in both the resale and newly constructed housing sectors.

However, apart from RET and SSMI, statistical results for other variables did not

coincide with results found in the Hedonic and Newly Constructed Housing Price Index

models. Both Lending Rate and PPI, while statistically significant in the previous two

models, were both found to be insignificant in the Second Hand Housing Price Index model.

This suggests a number of possibilities. One is that the Second Hand Housing Price Indices

lack of response to changes in the Lending Rate relative to that of the Hedonic and Newly

Constructed Housing Price Indices could indicate that demand for second hand housing is

less reliant on the level of availability for credit or mortgages.

Aside from this, the switch in the importance of PPI to CPI in this model relative to

the Hedonic and Newly Constructed Housing Price Index models suggest a greater

plausibility for the previously discussed importance of PPI over CPI in determining changes

in housing prices in the newly constructed sector. Changes in the cost of construction

should not have a large effect on the resale value of a residential property; therefore PPI

should be less relevant than CPI, which measures a more broad price level, at reflecting

changes in second hand housing prices due to inflation. But, this is not to say inflation does

not play a large role on the deviations in the Second Hand Housing Prices, as the model still

finds CPI as one of the more significant variables in the model. The high statistical

significance and large explanatory power of M2 may also suggest that the second hand

housing market is more sensitive than the newly constructed sector to inflationary factors,

while other variables accounting for monetary policy and economic growth are found to

have little influence in comparison. However, the Second Hand Housing Price Index is

compiled using the same method as the Newly Constructed Housing Price Index, which has

a tendency to overstate inflationary effects, so the heavy amount of influence of CPI and M2

relative to other factors is still questionable.

Apart from these the independent variables, the Second Hand Housing Price Index

model does reinforce the large amount of influence the city variables have on housing

prices. The city variables were found to have the largest explanatory power on the housing

price indices in every regression model. Although RET and SSMI were found to be

statistically significant in all three regression models, the overall consistency of the city

variables performance suggests that the particular market a property is located may be the

most important explanatory factors for housing prices.

5   Conclusion and Policy Implications

The statistical analysis of the three housing prices indices revealed a number of

enlightening results. Most importantly, the residential real estate tax on trial in Shanghai

and Chongqing was found to have different effects on each of the housing price indices. For

the newly constructed housing sector, which is likely to hold the heaviest concentration of

taxable properties, the tax was found to either increase or decrease average housing prices

depending on the type of index method used. While this may indicate problems with either

of the indices, the results for the Hedonic Housing Price Index model suggest that the Newly Constructed Housing Price Index may have issues accurately depicting the effects of the residential real estate tax on newly constructed housing prices. Thus, based on results of the Hedonic Housing Price Index model, one can conclude that not only does the residential real estate tax not achieve in its perceived goal to stem the rise in housing prices, it actually manages to them in the newly constructed sector, albeit very slightly.

This statistical analysis also suggests that, on average, factors related to inflation and monetary policy seem to affect housing prices relatively more than either the residential real estate tax or factors related to economic growth, with an exception to the Shanghai Stock Market Index. The effect of the monetary policy factors, namely the central bank's lending interest rate and M2, can more definitively explain housing price variations in China. However, none of the independent variables matched the explanatory power of the cities on their respective housing price indices, and these factors that are unique to the cities are still in need of much research.

Thus, this leaves the question: Should the Chinese government continue implement the residential real estate tax? The answer is twofold. The marginal effect the tax has on housing prices relative to other factors makes it an ineffective solution to cool the real estate market, but if bundled with other policy measure or a slight increase of tax's rate, the tax may become an important tool at cooling the overheated market. However, if housing prices continue to fall throughout China, the Chinese government would be wise to take a less direct method of control, otherwise the government risks inadvertently causing a devastating crash in the domestic real estate market. But, this is not to say that the government should stop the development of the residential real estate tax. They should,

instead, continue to push its implementation nationwide, using the tax as a way to begin overall reform in its property taxation policy.

As mentioned previously, real estate taxation in China is made up of a serious of complicated fees and taxes on developers. The current system leaves local governments reliant on the continued sales of land-use rights and collection of fees on property developers. As result, local governments have created a conflict of interest with the real estate market, leaving them reluctant to properly implement needed reforms and regulations. If the government moves to a more simple real estate taxation policy, especially one based on market value, some of these issues could begin to be resolved. Local governments could have a more reliable source of income, thus lessening their need to rely on fees and promotion of land-use right purchases. This has the potential to end the government's current conflict of interest in the real estate market, and could lead to a more rational real estate market that warrants far less government intervention.

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